

Package ‘INLA’

October 28, 2023

Type Package

Title Full Bayesian Analysis of Latent Gaussian Models using Integrated Nested Laplace Approximations

Description Full Bayesian analysis of latent Gaussian models using Integrated Nested Laplace Approximation. It is a front-end to the inla-program.

Additional_repositories <http://inlabru-org.r-universe.dev/>

Depends R (≥ 3.5),
Matrix ($\geq 1.3-0$),
sp ($\geq 1.6-0$)

Imports graphics,
grDevices,
fmesher ($\geq 0.0.9.9026$),
lifecycle,
methods,
parallel,
rlang,
splines,
stats,
utils,
withr

Suggests Deriv,
Ecdat,
HKprocess,
MatrixModels,
Rgraphviz,
deldir,
devtools,
doParallel,
dplyr,
evd,
fields,
ggplot2,
gsl,
graph,
gridExtra,
knitr,
markdown,
MASS,

```

matrixStats,
mlogit,
mvtnorm,
numDeriv,
pixmap,
rgl,
rmarkdown,
sf,
shiny,
sn,
spdep,
splancs,
terra,
tidyterra,
testthat,
tools,
INLAspacetime

```

VignetteBuilder knitr

BuildVignettes true

LazyData true

License GPL (>= 2) + file LICENSE

RoxygenNote 7.2.3

Encoding UTF-8

StagedInstall no

Collate '00000.R'

```

'INLA-package.R'
'agaussian.R'
'ar.R'
'barrier.R'
'binary.R'
'binary.install.R'
'cgeneric.R'
'changelog.R'
'collect.results.R'
'compare.results.R'
'coxph.R'
'cpo.R'
'create.data.file.R'
'cut.R'
'debug.graph.R'
'dev.new.R'
'display.matrix.R'
'doc.R'
'dryrun.R'
'expand.dataframe.R'
'export-class.R'
'external-package.R'
'f.R'
'fgn.R'
'finn.R'

```

'fmesher-io.R'
'fmesher-transition.R'
'fmesher.R'
'graph.convert.R'
'graph.matrix.R'
'group.R'
'group.cv.R'
'hyper.R'
'hyperpar.R'
'idx.R'
'iidkd.R'
'inla.R'
'inla.call.R'
'inlaEnv.R'
'interpret.formula.R'
'jmargin.R'
'jp.R'
'knmodels.R'
'knmodels.sample.R'
'lattice2node.R'
'likelihood.R'
'lincomb.R'
'link-functions.R'
'list-models.R'
'load.R'
'marginal.R'
'mdata.R'
'merge.R'
'mesh.R'
'mesh.components.R'
'meshassessment.R'
'meshbuilder.R'
'model-wrapper.R'
'models-generate.R'
'models.R'
'models_documentation.R'
'nmix.lambda.fitted.R'
'obsolete.R'
'options.R'
'os.R'
'over_sp_mesh.R'
'pardiso.R'
'pc-alphaw.R'
'pc-ar.R'
'pc-bym.R'
'pc-cor0.R'
'pc-cor1.R'
'pc-cormat.R'
'pc-gamma.R'
'pc-gammacount.R'
'pc-gev.R'
'pc-multvar.R'

```

'pc-prec.R'
'pc-sn.R'
'pc-t.R'
'plot.R'
'posterior.sample.R'
'print.R'
'priors.used.R'
'prune.R'
'q.R'
'qinv.R'
'qreordering.R'
'qsample.R'
'qsolve.R'
'quantile-regression.R'
'read.graph.R'
'remote.R'
'reorderings.R'
'rerun.R'
'residuals.R'
'rgeneric.R'
'sampler.R'
'sandbox.R'
'scale.model.R'
'sections.R'
'set.default.arguments.R'
'sm.R'
'spde.common.R'
'spde1.R'
'spde2.R'
'spde3.R'
'spmesh.R'
'startup.R'
'summary.R'
'summary.scopy.R'
'surv.R'
'upgrade.R'
'utils.R'
'version.R'

```

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R topics documented:

INLA-package	8
as.inla.mesh.segment	8
BivMetaAnalysis	9
Cancer	10
cgeneric	10
control.bgev	11
control.compute	12

control.expert	13
control.family	14
control.fixed	16
control.gcpo	17
control.group	19
control.hazard	20
control.inla	21
control.lincomb	25
control.link	26
control.lp.scale	27
control.mix	27
control.mode	28
control.pardiso	29
control.pom	30
control.predictor	31
control.scopy	32
control.update	33
control.vb	34
crs_wkt	35
cut	37
debug.graph	38
Drivers	39
dryrun	39
Epil	40
extract.groups	40
f	41
fgn	45
Germany	46
graph.convert	47
graph.matrix	47
idx	49
inla	50
inla-class	55
inla.agaussian	55
inla.ar.pacf2phi	56
inla.as.sparse	57
inla.as.wkt_tree.wkt	57
inla.barrier	58
inla.barrier.pcmatern	59
inla.binary.install	60
inla.changelog	61
inla.collect.results	62
inla.coxph	63
inla.cpo	64
inla.CRS	65
inla.CRSargs	66
inla.dev.new	68
inla.diameter	68
inla.doc	69
inla.external.lib	70
inla.extract.el	70
inla.fmesher.smorg	71

<code>inla.generate.colors</code>	72
<code>inla.get.inlaEnv</code>	73
<code>inla.group</code>	73
<code>inla.group.cv</code>	74
<code>inla.has_PROJ6</code>	75
<code>inla.hyperpar</code>	76
<code>inla.hyperpar.sample</code>	78
<code>inla.identical.CRS</code>	79
<code>inla.iidkd.sample</code>	79
<code>inla.knmodels</code>	80
<code>inla.knmodels.sample</code>	82
<code>inla.ks.plot</code>	83
<code>inla.likelihood</code>	84
<code>inla.list.models</code>	85
<code>inla.matern.cov</code>	86
<code>inla.mdata</code>	87
<code>inla.mesh.1d</code>	88
<code>inla.mesh.1d.bary</code>	89
<code>inla.mesh.2d</code>	89
<code>inla.mesh.assessment</code>	91
<code>inla.mesh.basis</code>	92
<code>inla.mesh.boundary</code>	93
<code>inla.mesh.components</code>	94
<code>inla.mesh.components</code>	95
<code>inla.mesh.create</code>	96
<code>inla.mesh.deriv</code>	98
<code>inla.mesh.fem</code>	99
<code>inla.mesh.lattice</code>	99
<code>inla.mesh.map.lim</code>	101
<code>inla.mesh.project</code>	102
<code>inla.mesh.query</code>	104
<code>inla.mesh.segment</code>	105
<code>inla.models</code>	107
<code>inla.nmix.lambda.fitted</code>	355
<code>inla.nonconvex.hull</code>	357
<code>inla.option</code>	358
<code>inla.over_sp_mesh</code>	360
<code>inla.priors.used</code>	361
<code>inla.prune</code>	362
<code>inla.qstat</code>	363
<code>inla.reorderings</code>	364
<code>inla.rerun</code>	365
<code>inla.row.kron</code>	365
<code>inla.sample</code>	366
<code>inla.simplify.curve</code>	370
<code>inla.spde.make.A</code>	371
<code>inla.spde.make.block.A</code>	373
<code>inla.spde.make.index</code>	374
<code>inla.spde.models</code>	375
<code>inla.spde.precision</code>	376
<code>inla.spde.result</code>	377
<code>inla.spde.sample</code>	379

inla.spde1.create	380
inla.spde2.generic	382
inla.spde2.matern	383
inla.spde2.matern.sd.basis	386
inla.spde2.pcmatern	387
inla.spTransform	391
inla.sp_get_crs	392
inla.ssh.copy.id	393
inla.stack.remove.unused	394
inla.surv	398
inla.update	400
inla.version	401
joint.marginal	401
jp	403
Kidney	404
lattice2node	405
Leuk	407
lines.inla.mesh.segment	407
link	408
make.lincomb	410
marginal	411
merge.inla	413
meshbuilder	415
Munich	415
nwEngland	416
Oral	417
param2.matern.orig	417
pardiso	418
pc.alphaw	418
pc.ar	420
pc.cor0	420
pc.cor1	421
pc.cormat	423
pc.ddof	424
pc.gamma	425
pc.gammacount	426
pc.gevtail	427
pc.multvar	428
pc.prec	429
pc.sn	431
plot.inla	432
plot.inla.CRS	434
plot.inla.mesh	435
plot.inla.trimesh	437
PRborder	438
print.inla	438
PRprec	439
qinv	448
qreordering	449
qsample	450
qsolve	452
read.graph	453

rgeneric.define	456
Salm	457
scale.model	458
Scotland	459
Seeds	459
SPDEtoy	460
summary.inla	461
summary.inla.mesh	462
summary.scopy	462
Surg	463
SurvSim	463
Tokyo	464
Zambia	464
Index	466

INLA-package	<i>Integrated Nested Laplace Approximation</i>
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Description

Package to perform full Bayesian analysis on generalised additive mixed models using Integrated Nested Laplace Approximations.

Details

Package INLA
Version Currently, this package uses a YY.MM.DD versioning system, and is in heavy development. See <https://github.com/hrue/r-inla/> and <https://www.r-inla.org>
License GPL2
See the web-site <https://www.r-inla.org> for further details.

Author(s)

Havard Rue, Sara Martino, Finn Lindgren, Daniel Simpson and Andrea Riebler

as.inla.mesh.segment	<i>Convert sp objects to inla.mesh.segment objects.</i>
----------------------	---------------------------------------------------------

Description

[Superseded] by [fmesher::fm_as_seg\(\)](#)

Usage

as.inla.mesh.segment(sp, ...)

inla.sp2segment(sp, ...)

Arguments

`sp` An `sp` polygon object of class `Polygon`, `Polygons`, `SpatialPolygons`, or `SpatialPolygonsDataFra`
`...` Additional arguments passed on to `fmesher::fm_as_seg()`.

Value

A `inla.mesh.segment()` object, or a list of `inla.mesh.segment()` objects.

Functions

- `inla.sp2segment()`: **[Superseded]** by `fmesher::fm_as_seg()`

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`inla.mesh.segment()`

BivMetaAnalysis

Bivariate Meta Analysis

Description

Data are taken from a meta-analysis to compare the utility of three types of diagnostic imaging - lymphangiography (LAG), computed tomography (CT) and magnetic resonance (MR) - to detect lymph node metastases in patients with cervical cancer. The dataset consists of a total of 46 studies: the first 17 for LAG, the following 19 for CT and the last 10 for MR.

Usage

`BivMetaAnalysis`

Format

A data frame with 92 observations on the following 9 variables.

N a numeric vector

Y a numeric vector

diid a numeric vector

lag.tp a numeric vector

lag.tn a numeric vector

ct.tp a numeric vector

ct.tn a numeric vector

mr.tp a numeric vector

mr.tn a numeric vector

References

J. Scheidler and H. Hricak and K. K. Yu and L. Subak and M. R. Segal, "Radiological evaluation of lymph node metastases in patients with cervical cancer: a meta-analysis", JAMA 1997

Examples

```
data(BivMetaAnalysis)
```

Cancer	<i>~~ data name/kind ... ~~</i>
--------	---------------------------------

Description

~~ A concise (1-5 lines) description of the dataset. ~~

Format

A data frame with 6690 observations on the following 4 variables.

Y Number of cases

N a numeric vector

Age a numeric vector

region a numeric vector

References

Rue, H and Held, L. (2005) *Gaussian Markov Random Fields - Theory and Applications* Chapman and Hall

cgeneric	<i>cgeneric models</i>
----------	------------------------

Description

A framework for defining latent models in C

Usage

```
inla.cgeneric.define(model = NULL, shlib = NULL, n = 0L, debug = FALSE, ...)
```

```
inla.cgeneric.q(cmodel = NULL)
```

Arguments

model	The name of the model function
shlib	Name of the compiled object-file with model
n	The size of the model
debug	Logical. Turn on/off debugging
...	Additional arguments, required by <code>inla.cgeneric.define()</code> to be named arguments
cmodel	The name of a cgeneric model-object (output from <code>inla.cgeneric.define</code>

Author(s)

Havard Rue <hrue@r-inla.org>

control.bgev

control.bgev

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.bgev(
  q.location = 0.5,
  q.spread = 0.25,
  q.mix = c(0.1, 0.2),
  beta.ab = 5L
)

inla.set.control.bgev.default(...)
```

Arguments

<code>q.location</code>	The quantile level for the location parameter
<code>q.spread</code>	The quantile level for the spread parameter (must be < 0.5)
<code>q.mix</code>	The lower and upper quantile level for the mixing function
<code>beta.ab</code>	The parameters a and b in the Beta mixing function
<code>...</code>	Named arguments passed on to the main function

Details

The `control.bgev`-list is set within the corresponding `control.family`-list as control parameters to the `family="bgev"`

See Also

Other control: [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.compute	<i>control.compute</i>
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Description

Control variables in `control.*` for use with `inla()`. The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.compute(
  openmp.strategy = "default",
  hyperpar = TRUE,
  return.marginals = TRUE,
  return.marginals.predictor = FALSE,
  dic = FALSE,
  mlik = TRUE,
  cpo = FALSE,
  po = FALSE,
  waic = FALSE,
  residuals = FALSE,
  q = FALSE,
  config = FALSE,
  likelihood.info = FALSE,
  smtp = NULL,
  graph = FALSE,
  internal.opt = TRUE,
  save.memory = NULL,
  control.gcpo = INLA::control.gcpo()
)

inla.set.control.compute.default(...)
```

Arguments

<code>openmp.strategy</code>	The computational strategy to use: 'small', 'medium', 'large', 'huge', 'default' and 'pardiso'.
<code>hyperpar</code>	A boolean variable if the marginal for the hyperparameters should be computed. Default TRUE.
<code>return.marginals</code>	A boolean variable if the marginals for the latent field should be returned (although it is computed). Default TRUE
<code>return.marginals.predictor</code>	A boolean variable if the marginals for the linear predictor should be returned (although it is computed). Default FALSE
<code>dic</code>	A boolean variable if the DIC-value should be computed. Default FALSE.
<code>mlik</code>	A boolean variable if the marginal likelihood should be computed. Default TRUE.

cpo	A boolean variable if the cross-validated predictive measures (cpo, pit) should be computed (default FALSE)
po	A boolean variable if the predictive ordinate should be computed (default FALSE)
waic	A boolean variable if the Watanabe-Akaike information criteria should be computed (default FALSE)
residuals	Provide estimates of residuals (whatever we mean by that). (default FALSE) Currently only residuals base on expected (saturated) deviance are available. The sign of the residuals are only very likely correct. These residuals are not properly justified from a Bayesian point of view, hence must be used with caution. It is provided in the hope they would be useful. This feature is EXPERIMENTAL for the moment, so changes can happen at any time.
q	A boolean variable if binary images of the precision matrix, the reordered precision matrix and the Cholesky triangle should be generated. (Default FALSE.)
config	A boolean variable if the internal GMRF approximations be stored. (Default FALSE.)
likelihood.info	A boolean variable to store likelihood-information or not. This option requires config=TRUE (Default FALSE. EXPERIMENTAL)
smtp	The sparse-matrix solver, one of 'default', 'taucs', 'band' or 'pardiso' (default inla.getOption("smtp")). smtp='pardiso' implies openmp.strategy='pardiso'.
graph	A boolean variable if the graph itself should be returned. (Default FALSE.)
internal.opt	A boolean variable, if to do internal online optimisations or not. (Default TRUE.)
save.memory	A boolean variable, make choices which saves memory over accuracy. (Default 'inla.getOption("save.memory")')
control.gcpo	(For experts only!) Set control variables for the gcpo. The intended use is to use inla.group.cv. Refer to control.gcpo , <code>?inla.group.cv</code> and the vignette for details.
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.expert

control.expert

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.expert(
  cpo.manual = FALSE,
  cpo.idx = -1,
  disable.gaussian.check = FALSE,
  jp = NULL,
  dot.product.gain = FALSE,
  globalconstr = list(A = NULL, e = NULL)
)

inla.set.control.expert.default(...)
```

Arguments

cpo.manual	A boolean variable to decide if the inla-program is to be runned in a manual-cpo-mode. (EXPERT OPTION: DO NOT USE)
cpo.idx	The index/indices of the data point(s) to remove. (EXPERT OPTION: DO NOT USE)
disable.gaussian.check	Disable the check for fast computations with a Gaussian likelihood and identity link (default FALSE)
jp	An object of class inla.jp defining a joint prior
dot.product.gain	Output the gain in optimizing dot-products? (Default FALSE)
globalconstr	Add a global constraint (see ?f and argument extraconstr). Note that a global constraint does NOT correct the normalisation constant.
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.family

*control.family***Description**

Control variables in control.* for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.family(
  dummy = 0,
  hyper = NULL,
  initial = NULL,
  prior = NULL,
  param = NULL,
  fixed = NULL,
  link = "default",
  sn.shape.max = 5,
  gev.scale.xi = 0.1,
  control.bgev = NULL,
  cenpoisson.I = c(-1L, -1L),
  beta.censor.value = 0,
  variant = 0L,
  control.mix = NULL,
  control.pom = NULL,
  control.link = NULL,
  link.simple = "default"
)

inla.set.control.family.default(...)
```

Arguments

<code>dummy</code>	A dummy argument that can be used as a workaround
<code>hyper</code>	Definition of the hyperparameters
<code>initial</code>	(OBSOLETE!) Initial value for the hyperparameter(s) of the likelihood in the internal scale.
<code>prior</code>	(OBSOLETE!) The name of the prior distribution(s) for othe hyperparameter(s).
<code>param</code>	(OBSOLETE!) The parameters for the prior distribution
<code>fixed</code>	(OBSOLETE!) Boolean variable(s) to say if the hyperparameter(s) is fixed or random.
<code>link</code>	(OBSOLETE! Use <code>control.link=list(model=)</code> instead.) The link function to use.
<code>sn.shape.max</code>	Maximum value for the shape-parameter for Skew Normal observations (default 5.0)
<code>gev.scale.xi</code>	(Expert option, do not use unless you know what you are doing.) The internal scaling of the shape-parameter for the GEV distribution. (default 0.1)
<code>control.bgev</code>	See <code>?control.bgev</code>
<code>cenpoisson.I</code>	The censoring interval for the censored Poisson
<code>beta.censor.value</code>	The censor value for the Beta-likelihood ($0 \leq \text{beta.censor.value} < 1/2$)
<code>variant</code>	This variable is used to give options for various variants of the likelihood, like chosing different parameterisations for example. See the relevant likelihood documentations for options (does only apply to some likelihoods).
<code>control.mix</code>	See <code>?control.mix</code>
<code>control.pom</code>	See <code>?control.pom</code>

control.link	See ?control.link
link.simple	See inla.doc("0inflated")
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.fixed	<i>control.fixed</i>
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Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.fixed(
  cdf = NULL,
  quantiles = NULL,
  expand.factor.strategy = "model.matrix",
  mean = 0,
  mean.intercept = 0,
  prec = 0.001,
  prec.intercept = 0,
  compute = TRUE,
  correlation.matrix = FALSE,
  remove.names = NULL
)

inla.set.control.fixed.default(...)
```

Arguments

cdf	A list of values to compute the CDF for, for all fixed effects
quantiles	A list of quantiles to compute for all fixed effects
expand.factor.strategy	The strategy used to expand factors into fixed effects based on their levels. The default strategy is us use the <code>model.matrix</code> -function for which NA's are not allowed (<code>expand.factor.strategy="model.matrix"</code>) and levels are possible removed. The alternative option (<code>expand.factor.strategy="inla"</code>) use an <code>inla</code> -specific expansion which expand a factor into one fixed effects for each level, do allow for NA's and all levels are present in the model. In this case, factors MUST BE factors in the <code>data.frame/list</code> and NOT added as <code>.+factor(x1)+.</code> in the formula only.

mean	Prior mean for all fixed effects except the intercept. Alternatively, a named list with specific means where name=default applies to unmatched names. For example <code>control.fixed=list(mean=list(a=1, b=2, default=0))</code> assign 'mean=1' to fixed effect 'a', 'mean=2' to effect 'b' and 'mean=0' to all others. (default 0.0)
mean.intercept	Prior mean for the intercept (default 0.0)
prec	Default precision for all fixed effects except the intercept. Alternatively, a named list with specific means where name=default applies to unmatched names. For example <code>control.fixed=list(prec=list(a=1, b=2, default=0.01))</code> assign 'prec=1' to fixed effect 'a', 'prec=2' to effect 'b' and 'prec=0.01' to all others. (default 0.001)
prec.intercept	Default precision the intercept (default 0.0)
compute	Compute marginals for the fixed effects ? (default TRUE)
correlation.matrix	Compute the posterior correlation matrix for all fixed effects? (default FALSE) OOPS: This option will set up appropriate linear combinations and the results are shown as the posterior correlation matrix of the linear combinations. This option will imply <code>control.inla=list(lincomb.derived.correlation.matrix=TRUE)</code> .
remove.names	A vector of names of expanded fixed effects to remove from the model-matrix. This is an expert option, and should only be used if you know what you are doing.
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.gcpo

control.gcpo

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.gcpo(
  enable = FALSE,
  num.level.sets = -1,
  size.max = 32,
  strategy = c("posterior", "prior"),
  groups = NULL,
  selection = NULL,
  friends = NULL,
```

```

    verbose = FALSE,
    epsilon = 0.005,
    prior.diagonal = 1e-04,
    correct.hyperpar = TRUE,
    keep = NULL,
    remove = NULL,
    remove.fixed = TRUE
  )

  inla.set.control.gcpo.default(...)

```

Arguments

enable	TODO
num.level.sets	TODO
size.max	TODO
strategy	TODO
groups	TODO
selection	TODO
friends	TODO
verbose	TODO
epsilon	TODO
prior.diagonal	TODO
correct.hyperpar	TODO
keep	TODO
remove	TODO
remove.fixed	TODO
...	Named arguments passed on to the main function

Details

(For experts only!) Set control variables for the gcpo in [control.compute](#). The intended use is to use `inla.group.cv`. Refer to `?inla.group.cv` and the vignette for details.

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.group	<i>control.group</i>
---------------	----------------------

Description

Control variables in `control.*` for use with `inla()`. The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.group(
  model = "exchangeable",
  order = NULL,
  cyclic = FALSE,
  graph = NULL,
  scale.model = TRUE,
  adjust.for.con.comp = TRUE,
  hyper = NULL,
  initial = NULL,
  fixed = NULL,
  prior = NULL,
  param = NULL
)

inla.set.control.group.default(...)
```

Arguments

model	Group model (one of 'exchangeable', 'exchangeablepos', 'ar1', 'ar', 'rw1', 'rw2', 'besag', or 'iid')
order	Defines the order of the model: for model ar this defines the order p, in AR(p). Not used for other models at the time being.
cyclic	Make the group model cyclic? (Only applies to models 'ar1', 'rw1' and 'rw2')
graph	The graph specification (Only applies to model 'besag')
scale.model	Scale the intrinsic model (RW1, RW2, BESAG) so the generalized variance is 1. (Default TRUE)
adjust.for.con.comp	Adjust for connected components when scale.model=TRUE? (default TRUE)
hyper	Definition of the hyperparameter(s)
initial	(OBSOLETE!) The initial value for the group correlation or precision in the internal scale.
fixed	(OBSOLETE!) A boolean variable if the group correction or precision is assumed to be fixed or random.
prior	(OBSOLETE!) The name of the prior distribution for the group correlation or precision in the internal scale
param	(OBSOLETE!) Prior parameters
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.hazard	<i>control.hazard</i>
----------------	-----------------------

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.hazard(
  model = "rw1",
  hyper = NULL,
  fixed = FALSE,
  initial = NULL,
  prior = NULL,
  param = NULL,
  constr = TRUE,
  diagonal = NULL,
  n.intervals = 15,
  cutpoints = NULL,
  strata.name = NULL,
  scale.model = NULL
)

inla.set.control.hazard.default(...)
```

Arguments

model	The model for the baseline hazard model. One of 'rw1', 'rw2' or 'iid'. (Default 'rw1'.)
hyper	The definition of the hyperparameters.
fixed	(OBSOLETE!) A boolean variable; is the precision for 'model' fixed? (Default FALSE.)
initial	(OBSOLETE!) The initial value for the precision.
prior	(OBSOLETE!) The prior distribution for the precision for 'model'
param	(OBSOLETE!) The parameters in the prior distribution
constr	A boolean variable; shall the 'model' be constrained to sum to zero?
diagonal	An extra constant added to the diagonal of the precision matrix
n.intervals	Number of intervals in the baseline hazard. (Default 15)

cutpoints	The cutpoints to use. If not specified they are computed from 'n.intervals' and the maximum length of the interval. (Default NULL)
strata.name	The name of the stratification variable for the baseline hazard in the data.frame
scale.model	Scale the baseline hazard model (RW1, RW2) so the generalized variance is 1. (Default <code>inla.getOption("scale.model.default")</code> .)
...	Named arguments passed on to the main function

See Also

Other control: `control.bgev()`, `control.compute()`, `control.expert()`, `control.family()`, `control.fixed()`, `control.gcpo()`, `control.group()`, `control.inla()`, `control.lincomb()`, `control.link()`, `control.lp.scale()`, `control.mix()`, `control.mode()`, `control.pardiso()`, `control.pom()`, `control.predictor()`, `control.scopy()`, `control.update()`, `control.vb()`

control.inla	<i>control.inla</i>
--------------	---------------------

Description

Control variables in `control.*` for use with `inla()`. The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.inla(
  strategy = "auto",
  int.strategy = "auto",
  int.design = NULL,
  interpolator = "auto",
  fast = TRUE,
  linear.correction = NULL,
  h = 0.005,
  dz = 0.75,
  diff.logdens = 6,
  print.joint.hyper = TRUE,
  force.diagonal = FALSE,
  skip.configurations = TRUE,
  mode.known = FALSE,
  adjust.weights = TRUE,
  tolerance = 0.005,
  tolerance.f = NULL,
  tolerance.g = NULL,
  tolerance.x = NULL,
  tolerance.step = 0.001,
  restart = 0L,
  optimiser = "default",
  verbose = NULL,
  reordering = "auto",
  cpo.diff = NULL,
```

```

npoints = 9,
cutoff = 1e-04,
adapt.hessian.mode = NULL,
adapt.hessian.max.trials = NULL,
adapt.hessian.scale = NULL,
adaptive.max = 25L,
huge = FALSE,
step.len = 0,
stencil = 5L,
lincomb.derived.correlation.matrix = FALSE,
diagonal = 0,
numint.maxfeval = 1e+05,
numint.relerr = 1e-05,
numint.abserr = 1e-06,
cmin = -Inf,
b.strategy = "keep",
step.factor = -0.1,
global.node.factor = 2,
global.node.degree = .Machine$integer.max,
stupid.search = TRUE,
stupid.search.max.iter = 1000L,
stupid.search.factor = 1.05,
control.vb = INLA::control.vb(),
num.gradient = "central",
num.hessian = "central",
optimise.strategy = "smart",
use.directions = TRUE,
constr.marginal.diagonal = sqrt(.Machine$double.eps),
improved.simplified.laplace = FALSE,
parallel.linesearch = FALSE,
compute.initial.values = TRUE,
hessian.correct.skewness.only = TRUE
)

inla.set.control.inla.default(...)

```

Arguments

strategy	Character The strategy to use for the approximations; one of 'auto' (default), 'gaussian', 'simplified.laplace', 'laplace' or 'adaptive'.
int.strategy	Character The integration strategy to use; one of 'auto' (default), 'ccd', 'grid', 'eb' (empirical bayes), 'user' or 'user.std'. For the experimental mode, then 'grid' equal 'ccd' for more than two hyperparameters.
int.design	Matrix Matrix of user-defined integration points and weights. Each row consists theta values and the integration weight. (EXPERIMENTAL!).
interpolator	Character The interpolator used to compute the marginals for the hyperparameters. One of 'auto', 'nearest', 'quadratic', 'weighted.distance', 'ccd', 'ccdintegrate', 'gridsum', 'gaussian'. Default is 'auto'.
fast	Logical If TRUE, then replace conditional modes in the Laplace approximation with conditional expectation (default TRUE).
linear.correction	Logical Default TRUE for the 'strategy = laplace' option.

h	Numerical The step-length for the gradient calculations for the hyperparameters. Default 0.005.
dz	Numerical The step-length in the standardised scale for the integration of the hyperparameters. Default 0.75.
diff.logdens	Numerical The difference of the log.density for the hyperparameters to stop numerical integration using <code>int.strategy='grid'</code> . Default 6.
print.joint.hyper	Logical If TRUE, the store also the joint distribution of the hyperparameters (without any costs). Default TRUE.
force.diagonal	Logical If TRUE, then force the Hessian to be diagonal. (Default FALSE)
skip.configurations	Logical Skip configurations if the values at the main axis are too small. (Default TRUE)
mode.known	Logical If TRUE then no optimisation is done. (Default FALSE.)
adjust.weights	Logical If TRUE then just more accurate integration weights. (Default TRUE.)
tolerance	Numerical The tolerance for the optimisation of the hyperparameters. If set, this is the default value for <code>'2.5tolerance.f'</code> , <code>'tolerance.g'</code> and <code>'5tolerance.x'</code> ; see below.
tolerance.f	Numerical The tolerance for the absolute change in the log posterior in the optimisation of the hyperparameters.
tolerance.g	Numerical The tolerance for the absolute change in the gradient of the log posterior in the optimisation of the hyperparameters.
tolerance.x	Numerical The tolerance for the change in the hyperparameters (root-mean-square) in the optimisation of the hyperparameters.
tolerance.step	Numerical The tolerance for the change in root-mean_square in the inner Newton-like optimisation of the latent field.
restart	Numerical To improve the optimisation, the optimiser is restarted at the found optimum 'restart' number of times.
optimiser	Character The optimiser to use; one of 'gsl' or 'default'.
verbose	Logical Run in verbose mode? (Default FALSE)
reordering	Character Type of reordering to use. (EXPERT OPTION; one of "AUTO", "DEFAULT", "IDENTITY", "REVERSEIDENTITY", "BAND", "METIS", "GENMMD", "AMD", "MD", "MMD", "AMDBAR", "AMDC", "AMDBARC", or the output from <code>inla.qreordering</code> . Default is 'auto'.)
cpo.diff	Numerical Threshold to define when the cpo-calculations are inaccurate. (EXPERT OPTION.)
npoints	Numerical Number of points to use in the 'strategy=laplace' approximation (default 9)
cutoff	Numerical The cutoff used in the 'strategy=laplace' approximation. (Smaller value is more accurate and more slow.) (default 1e-4)
adapt.hessian.mode	Logical Should optimisation be continued if the Hessian estimate is void? (Default TRUE)
adapt.hessian.max.trials	Numerical Number of steps in the adaptive Hessian optimisation
adapt.hessian.scale	Numerical The scaling of the 'h' after each trial.

<code>adaptive.max</code>	Selecting <code>strategy="adaptive"</code> will chose the default strategy for all fixed effects and model components with length less or equal to <code>adaptive.max</code> , for others, the gaussian strategy will be applied.
<code>huge</code>	Logical If TRUE then try to do some of the internal parallelisations differently. Hopefully this will be of benefit for 'HUGE' models. (Default FALSE.) THIS OPTION IS OBSOLETE AND NOT USED!
<code>step.len</code>	Numerical The step-length used to compute numerical derivaties of the log-likelihood (0 means default which depends on <code>stencil</code>)
<code>stencil</code>	Numerical Number of points in the stencil used to compute the numerical derivaties of the log-likelihood (5, 7 or 9). (default 5)
<code>lincomb.derived.correlation.matrix</code>	Logical If TRUE compute also the correlations for the derived linear combinations, if FALSE do not (Default FALSE)
<code>diagonal</code>	Numerical Expert use only! Add a this value on the diagonal of the joint precision matrix. (default 0.0)
<code>numint.maxfeval</code>	Numerical Maximum number of function evaluations in the the numerical integration for the hyperparameters. (Default 100000.)
<code>numint.reterr</code>	Numerical Relative error requirement in the the numerical integration for the hyperparameters. (Default 1e-5)
<code>numint.abserr</code>	Numerical Absolute error requirement in the the numerical integration for the hyperparameters. (Default 1e-6)
<code>cmin</code>	Numerical The minimum value for the negative Hessian from the likelihood. Increasing this value will stabalise the optimisation but can introduce bias. (Default -Inf)
<code>b.strategy</code>	Character If <code>cmin</code> is used, either keep the linear term (with <code>b.strategy="keep"</code>) or skip the contribution by setting the linear term to zero (<code>b.strategy="skip"</code>). The default value is "keep"
<code>step.factor</code>	Numerical The step factor in the Newton-Raphson algorithm saying how large step to take (Default 1.0) YES! setting this to a negative values means = 1, EXCEPT the first time (for each thread) where <code>lstep.factor</code> is used.
<code>global.node.factor</code>	Numerical The factor which defines the degree required (how many neighbors), as a fraction of $n-1$, that is required to be classified as a global node and numbered last (whatever the reordering routine says). Here, n , is the size of the graph. (Disabled if larger than 1, default 2)
<code>global.node.degree</code>	Numerical The degree required (number of neighbors) to be classified as a global node and numbered last (whatever the reordering routine says). (default <code>.Machine\$integer.max</code>)
<code>stupid.search</code>	Logical Enable or disable the stupid-search-algorithm, if the Hessian calculations reveals that the mode is not found. (Default TRUE.)
<code>stupid.search.max.iter</code>	Numerical Maximum number of iterations allowed for the stupid-search-algorithm. (default 1000)
<code>stupid.search.factor</code>	Numerical Factor (≥ 1) to increase the step-length with after each new iteration. (default 1.05)

control.vb	list of arguments for various VB corrections. See control.vb() for details.
num.gradient	Character Set the numerical scheme to compute the gradient, one of "forward" or "central" (default).
num.hessian	Character Set the numerical scheme to compute the Hessian, one of "forward" or "central" (default).
optimise.strategy	Character THIS OPTION IS EXPERIMENTAL. Chose the optimiser strategy, one of "plain" or "smart" (default)
use.directions	THIS OPTION IS EXPERIMENTAL. Unless FALSE or NULL, use directions for computing gradient and Hessian, initialised with use.directions if a matrix.
constr.marginal.diagonal	Add stability to $AQ^{-1}A^T$ by adding a small diagonal term. (default $\epsilon^{0.5}$)
improved.simplified.laplace	If TRUE use an experimental improved variant, otherwise, use the standard one.
parallel.linesearch	Use serial (default) or parallel line-search (highly experimental for the moment)
compute.initial.values	Compute initial values for the latent field or not. (experimental-mode only)
hessian.correct.skewness.only	If TRUE (default) correct only skewness in the Hessian, for the hyperparameters. If FALSE, correct also variance. (This option is for experimental-mode only)
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.lincomb	<i>control.lincomb</i>
-----------------	------------------------

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.lincomb(verbose = FALSE)

inla.set.control.lincomb.default(...)
```

Arguments

verbose	Use verbose mode for linear combinations if verbose model is set globally. (Default FALSE). This option is only available for the default <code>inla.mode</code> (<code>inla.mode="compact"</code>).
...	Named arguments passed on to the main function

See Also

Other control: `control.bgev()`, `control.compute()`, `control.expert()`, `control.family()`, `control.fixed()`, `control.gcpo()`, `control.group()`, `control.hazard()`, `control.inla()`, `control.link()`, `control.lp.scale()`, `control.mix()`, `control.mode()`, `control.pardiso()`, `control.pom()`, `control.predictor()`, `control.scopy()`, `control.update()`, `control.vb()`

control.link

*control.link***Description**

Control variables in `control.*` for use with `inla()`. The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.link(
  model = "default",
  order = NULL,
  variant = NULL,
  hyper = NULL,
  quantile = NULL,
  a = 1,
  initial = NULL,
  fixed = NULL,
  prior = NULL,
  param = NULL
)

inla.set.control.link.default(...)
```

Arguments

model	The name of the link function/model
order	The order of the link function, where the interpretation of order is model-dependent.
variant	The variant of the link function, where the interpretation of variant is model-dependent.
hyper	Definition of the hyperparameter(s) for the link model chosen
quantile	The quantile for quantile link function
a	The parameter a in the LOGa link
initial	(OBSOLETE!) The initial value(s) for the hyperparameter(s)
fixed	(OBSOLETE!) A boolean variable if hyperparameter(s) is/are fixed or random
prior	(OBSOLETE!) The name of the prior distribution(s) for the hyperparameter(s)
param	(OBSOLETE!) The parameters for the prior distribution(s) for the hyperparameter(s)
...	Named arguments passed on to the main function

Details

The control.link-list is set within the corresponding control.family-list as the link is likelihood-family specific.

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.lp.scale	<i>control.lp.scale</i>
------------------	-------------------------

Description

Control variables in control.* for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.lp.scale(hyper = NULL)

inla.set.control.lp.scale.default(...)
```

Arguments

hyper	Definition of the hyperparameter(s)
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.mix	<i>control.mix</i>
-------------	--------------------

Description

Control variables in control.* for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.mix(
  model = NULL,
  hyper = NULL,
  initial = NULL,
  fixed = NULL,
  prior = NULL,
  param = NULL,
  npoints = 101,
  integrator = "default"
)

inla.set.control.mix.default(...)
```

Arguments

model	The model for the random effect. Currently, only model='gaussian' is implemented
hyper	Definition of the hyperparameter(s) for the random effect model chosen
initial	(OBSOLETE!) The initial value(s) for the hyperparameter(s)
fixed	(OBSOLETE!) A boolean variable if hyperparameter(s) is/are fixed or random
prior	(OBSOLETE!) The name of the prior distribution(s) for the hyperparameter(s)
param	(OBSOLETE!) The parameters for the prior distribution(s) for the hyperparameter(s)
npoints	Number of points used to do the numerical integration (default 101)
integrator	The integration scheme to use (default, quadrature, simpson)
...	Named arguments passed on to the main function

Details

The control.mix list is set within the corresponding control.family-list a the mixture of the likelihood is likelihood specific. (This option is EXPERIMENTAL.)

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.mode

control.mode

Description

Control variables in control.* for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.mode(
  result = NULL,
  theta = NULL,
  x = NULL,
  restart = FALSE,
  fixed = FALSE
)

inla.set.control.mode.default(...)
```

Arguments

result	Previous result-object from <code>inla()</code> , a <code>inla</code> -state object or the name of a state-file. Use the <code>theta</code> - and <code>x</code> -mode from this object
theta	The <code>theta</code> -mode/initial values for <code>theta</code> . This option has preference over <code>result\$mode\$theta</code> .
x	The <code>x</code> -mode/initial values for <code>x</code> . This option has preference over <code>result\$mode\$x</code> .
restart	A boolean variable; should we restart the optimisation from this configuration or fix the mode at this configuration? (Default FALSE.)
fixed	A boolean variable. If TRUE then treat all thetas as known and fixed, and if FALSE then treat all thetas as unknown and random (default).
...	Named arguments passed on to the main function

Details

For internal use and for algorithms built on to of INLA.

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.pardiso

control.pardiso

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.pardiso(
  verbose = FALSE,
  debug = FALSE,
  parallel.reordering = TRUE,
  nrhs = -1
)

inla.set.control.pardiso.default(...)
```

Arguments

verbose	Show detailed output (default FALSE)
debug	Show internal debug output (default FALSE)
parallel.reordering	Do reordering in parallel (default TRUE)
nrhs	Number of right-hand sides to solve for in parallel (-1 will determine this adaptive)
...	Named arguments passed on to the main function

Details

Extra options controlling the PARDISO library

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.pom

*control.pom***Description**

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.pom(cdf = "logit", fast = FALSE)

inla.set.control.pom.default(...)
```

Arguments

cdf	character The cdf to use, "logit" (default) or "probit"
fast	Logical Use a faster but approximate form for the probit cdf (default FALSE)?
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.predictor	<i>control.predictor</i>
-------------------	--------------------------

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.predictor(
  hyper = NULL,
  fixed = NULL,
  prior = NULL,
  param = NULL,
  initial = NULL,
  compute = FALSE,
  cdf = NULL,
  quantiles = NULL,
  cross = NULL,
  A = NULL,
  precision = exp(15),
  link = NULL
)

inla.set.control.predictor.default(...)
```

Arguments

hyper	Definition of the hyperparameters.
fixed	(OBSOLETE!) If the precision for the artificial noise is fixed or not (default TRUE)
prior	(OBSOLETE!) The prior for the artificial noise
param	(OBSOLETE!) Prior parameters for the artificial noise
initial	(OBSOLETE!) The value of the log precision of the artificial noise
compute	A boolean variable; should the marginals for the linear predictor be computed? (Default FALSE.)
cdf	A list of values to compute the CDF for the linear predictor
quantiles	A list of quantiles to compute for the linear predictor

cross	Cross-sum-to-zero constraints with the linear predictor. All linear predictors with the same level of 'cross' are constrained to have sum zero. Use 'NA' for no contribution. 'Cross' has the same length as the linear predictor (including the 'A' matrix extension). (THIS IS AN EXPERIMENTAL OPTION, CHANGES MAY APPEAR.)
A	The observation matrix (matrix or Matrix::sparseMatrix).
precision	The precision for $\eta^* - A\eta$, (default $\exp(15)$)
link	Define the family-connection for unobserved observations (NA). link is integer values which defines the family connection; family[link[idx]] unless is.na(link[idx]) for which the identity-link is used. The link-argument only influence the fitted.values in the result-object. If is.null(link) (default) then the identity-link is used for all missing observations. If the length of link is 1, then this value is replicated with the length of the response vector. If an element of the response vector is !NA then the corresponding entry in link is not used (but must still be a legal value). Setting this variable implies compute=TRUE.
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.scopy

control.scopy

Description

Control variables in control.* for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.scopy(
  covariate = NULL,
  n = 5,
  model = "rw2",
  mean = 1,
  prec.mean = 1,
  prec.betas = 10
)

inla.set.control.scopy.default(...)
```


Arguments

covariate	The covariate for the scopy function
n	Number of betas
model	scopy model (one of 'rw1' and 'rw2')
mean	The prior mean for mean(betas)
prec.mean	The prior precision for mean(betas)
prec.betas	The prior precision prec(betas-mean(betas))
...	Named arguments passed on to the main function

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.update\(\)](#), [control.vb\(\)](#)

control.update	<i>control.update</i>
----------------	-----------------------

Description

Control variables in `control.*` for use with [inla\(\)](#). The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.update(result = NULL)

inla.set.control.update.default(...)
```

Arguments

result	Update the joint posterior for the hyperparameters from result
...	Named arguments passed on to the main function

See Also

[inla\(\)](#)

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.vb\(\)](#)

control.vb

control.fixed

Description

Control variables in `control.*` for use with `inla()`. The functions can be used to TAB-complete arguments, and returns a list of the default control arguments, unless overridden by specific input arguments.

Usage

```
control.vb(
  enable = "auto",
  strategy = c("mean", "variance"),
  verbose = TRUE,
  iter.max = 25,
  emergency = 25,
  f.enable.limit = c(30, 25),
  hessian.update = 2,
  hessian.strategy = c("default", "full", "partial", "diagonal")
)

inla.set.control.vb.default(...)
```

Arguments

<code>enable</code>	Logical/Character Use this feature? If "auto" this will be selected automatically.
<code>strategy</code>	Character What to correct, either "mean" or "variance".
<code>verbose</code>	Logical Be verbose or not.
<code>iter.max</code>	Integer Maximum number of iterations.
<code>emergency</code>	Numeric If the standardized correction for the mean is larger than this value, then call the vb.correction off and issue a warning
<code>f.enable.limit</code>	Vector of length 2. The size limit to correct for a <code>f()</code> . First element is for <code>strategy="mean"</code> . Second element is for <code>strategy="variance"</code> .
<code>hessian.update</code>	How many times the Hessian is updated for each correction (<code>strategy="variance"</code> only).
<code>hessian.strategy</code>	Select strategy for computing the Hessian matrix for <code>strategy="variance"</code> , one of "full", "diagonal", "partial" and "default".
<code>...</code>	Named arguments passed on to the main function

Details

`control.vb` List of arguments for various VB corrections. Used for `control.inla` `control.vb` specifications.

See Also

Other control: [control.bgev\(\)](#), [control.compute\(\)](#), [control.expert\(\)](#), [control.family\(\)](#), [control.fixed\(\)](#), [control.gcpo\(\)](#), [control.group\(\)](#), [control.hazard\(\)](#), [control.inla\(\)](#), [control.lincomb\(\)](#), [control.link\(\)](#), [control.lp.scale\(\)](#), [control.mix\(\)](#), [control.mode\(\)](#), [control.pardiso\(\)](#), [control.pom\(\)](#), [control.predictor\(\)](#), [control.scopy\(\)](#), [control.update\(\)](#)

crs_wkt

*Handling CRS/WKT***Description**

[Deprecated] in favour of [fmesher::fm_wkt\(\)](#) and related methods.

Get and set CRS object or WKT string properties.

Usage

```
inla.wkt_is_geocent(wkt)

inla.crs_is_geocent(crs)

inla.wkt_get_ellipsoid_radius(wkt)

inla.crs_get_ellipsoid_radius(crs)

inla.wkt_set_ellipsoid_radius(wkt, radius)

inla.crs_set_ellipsoid_radius(crs, radius)

inla.wkt_unit_params()

inla.wkt_get_lengthunit(wkt)

inla.wkt_set_lengthunit(wkt, unit, params = NULL)

inla.crs_get_wkt(crs)

inla.crs_get_lengthunit(crs)

inla.crs_set_lengthunit(crs, unit, params = NULL)
```

Arguments

wkt	A WKT2 character string
crs	A <code>sp::CRS</code> or <code>inla.CRS</code> object
radius	numeric
unit	character, name of a unit. Supported names are "metre", "kilometre", and the aliases "meter", "m", "International metre", "kilometer", and "km", as defined by <code>inla.wkt_unit_params</code> or the <code>params</code> argument. (For legacy PROJ4 use, only "m" and "km" are supported)
params	Length unit definitions, in the list format produced by <code>inla.wkt_unit_params()</code> , Default: <code>NULL</code> , which invokes <code>inla.wkt_unit_params()</code>

Value

For `inla.wkt_unit_params`, a list of named unit definitions

For `inla.wkt_get_lengthunit`, a list of length units used in the wkt string, excluding the ellipsoid radius unit.

For `inla.wkt_set_lengthunit`, a WKT2 string with altered length units. Note that the length unit for the ellipsoid radius is unchanged.

For `inla.crs_get_wkt`, WKT2 string.

For `inla.crs_get_lengthunit`, a list of length units used in the wkt string, excluding the ellipsoid radius unit. (For legacy PROJ4 code, the raw units from the proj4string are returned, if present.)

For `inla.crs_set_lengthunit`, a `sp::CRS` object with altered length units. Note that the length unit for the ellipsoid radius is unchanged.

For `inla.wkt_unit_params`, a list of named unit definitions

For `inla.wkt_get_lengthunit`, a list of length units used in the wkt string, excluding the ellipsoid radius unit.

For `inla.wkt_set_lengthunit`, a WKT2 string with altered length units. Note that the length unit for the ellipsoid radius is unchanged.

For `inla.crs_get_wkt`, WKT2 string.

For `inla.crs_get_lengthunit`, a list of length units used in the wkt string, excluding the ellipsoid radius unit. (For legacy PROJ4 code, the raw units from the proj4string are returned, if present.)

For `inla.crs_set_lengthunit`, a `sp::CRS` object with altered length units. Note that the length unit for the ellipsoid radius is unchanged.

Functions

- `inla.wkt_is_geocent()`: **[Deprecated]** in favour of `fmesher::fm_wkt_is_geocent()`
- `inla.crs_is_geocent()`: **[Deprecated]** in favour of `fmesher::fm_crs_is_geocent()`
- `inla.wkt_get_ellipsoid_radius()`: **[Deprecated]** in favour of `fmesher::fm_ellipsoid_radius()`
- `inla.crs_get_ellipsoid_radius()`: **[Deprecated]** in favour of `fmesher::fm_ellipsoid_radius()`
- `inla.wkt_set_ellipsoid_radius()`: **[Deprecated]** in favour of `fmesher::fm_wkt_set_ellipsoid_radius()`
- `inla.crs_set_ellipsoid_radius()`: **[Deprecated]** in favour of `fmesher::fm_ellipsoid_radius<-()`

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`inla.sp_get_crs()`

`inla.sp_get_crs()`

Examples

```
## Not run:
c1 <- fmesher::fm_CRS("globe")
inla.crs_get_lengthunit(c1)
c2 <- inla.crs_set_lengthunit(c1, "km")
inla.crs_get_lengthunit(c2)
```

```
## End(Not run)

## Not run:
c1 <- inla.CRS("globe")
inla.crs_get_lengthunit(c1)
c2 <- inla.crs_set_lengthunit(c1, "km")
inla.crs_get_lengthunit(c2)

## End(Not run)
```

cut

Group-wise model criticism using node-splitting

Description

This function performs group-wise, cross-validatory model assessment for an INLA model using so-called node-splitting (Marshall and Spiegelhalter, 2007; Presanis et al, 2013). The user inputs an object of class `inla` (i.e. a result of a call to `inla()`) as well as a variable name (`split.by`) specifying a grouping: Data points that share the same value of `split.by` are in the same group. The function then checks whether each group is an "outlier", or in conflict with the remaining groups, using the methodology described in Ferkingstad et al (2017). The result is a vector containing a p-value for each group, corresponding to a test for each group i , where the null hypothesis is that group i is consistent with the other groups except i (so a small p-value is evidence that the group is an "outlier"). See Ferkingstad et al (2017) for further details.

Usage

```
inla.cut(result, split.by, mc.cores = NULL, debug = FALSE)
```

Arguments

<code>result</code>	An object of class <code>inla</code> , i.e. a result of a call to <code>inla()</code>
<code>split.by</code>	The name of the variable to group by. Data points that have the same value of <code>split.by</code> are in the same group.
<code>mc.cores</code>	The number of cores to use in <code>parallel::mclapply</code> . If <code>is.null(mc.cores)</code> , then check <code>getOption("mc.cores")</code> and <code>inla.getOption("num.threads")</code> in that order.
<code>debug</code>	Print debugging information if TRUE, default is FALSE

Value

A numeric vector of p-values, corresponding to a test for each group i where the null hypothesis is that group i is consistent with the other groups except i . A small p-value for a group indicates that the group is an "outlier" (in conflict with remaining groups).

This function is EXPERIMENTAL!!!

Author(s)

Egil Ferkingstad <egil.ferkingstad@gmail.com> and Havard Rue <hrue@r-inla.org>

References

- Ferkingstad, E., Held, L. and Rue, H. (2017). Fast and accurate Bayesian model criticism and conflict diagnostics using R-INLA. arXiv preprint arXiv:1708.03272, available at <http://arxiv.org/abs/1708.03272>. Published in Stat, 6:331-344 (2017).
- Marshall, E. C. and Spiegelhalter, D. J. (2007). Identifying outliers in Bayesian hierarchical models: a simulation-based approach. Bayesian Analysis, 2(2):409-444.
- Presanis, A. M., Ohlssen, D., Spiegelhalter, D. J., De Angelis, D., et al. (2013). Conflict diagnostics in directed acyclic graphs, with applications in Bayesian evidence synthesis. Statistical Science, 28(3):376-397.

Examples

```
## See http://www.r-inla.org/examples/case-studies/ferkingstad-2017 and Ferkingstad et al (2017).
```

debug.graph	<i>Debug a graph-file</i>
-------------	---------------------------

Description

Debug a graph specification on file (ascii-mode only), by checking the specification along the way.

Usage

```
inla.debug.graph(graph.file)
```

Arguments

graph.file The filename of the graph (ascii-mode)

Value

If an error is found, then an error message is shows, otherwise the graph-object returned by `inla.read.graph()` is returned.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

`inla.read.graph`

Examples

```
## Not run:
cat("3\n 1 1 2\n 2 1 1\n 3 4\n", file="g.dat")
g = inla.debug.graph("g.dat")

## End(Not run)
```

Drivers	<i>Time series with seasonal effect</i>
---------	-----------------------------------------

Description

Monthly total of car drivers killed or several injured in England from January 1969 to December 1984

Format

A data frame with 204 observations on the following 4 variables.

y Number of deaths

belt Indicator of weather the belt was compulsory to use (1) or not (0)

trend time (in months)

seasonal time (in months)

Details

NB: The last 12 lines of the data set have the first column set to NULL since these data were not observed but we want to predict them.

References

Rue, H and Held, L. (2005) *Gaussian Markov Random Fields - Theory and Applications* Chapman and Hall

Examples

```
data(Drivers)
```

dryrun	<i>Do a dryrun to extract some internal information upfront</i>
--------	-----------------------------------------------------------------

Description

Do a dryrun to get information about the internal storage and the list (and ordering) of the hyperparameters

Usage

```
inla.dryrun(...)
```

Arguments

... Same arguments as `inla()`

Value

A list of start-index and length for each latent component and a list of the hyperparameters in the model

Author(s)

Havard Rue <hrue@r-inla.org>

Epil

Repeated measures on Poisson counts

Description

Seizure counts in a randomised trial of anti-convulsant therapy in epilepsy for 59 patients.

Format

A data frame with 236 observations on the following 7 variables.

y Number of seizures

Trt indicator for the presence of treatment

Base 8-week baseline seizure counts

Age Age of the patient

V4 indicator variable for the 4th visit.

rand a numeric vector

Ind indicator for the specific patient

Source

WinBUGS/OpenBUGS Manual Examples Vol I

Examples

```
data(Epil)
```

extract.groups

Extract tagged boundary/internal segments.

Description

Extract boundary or internal segments tagged by group id:s.

Usage

```
extract.groups(segm, groups, groups.new = groups, ...)
```

```
## S3 method for class 'inla.mesh.segment'
```

```
extract.groups(segm, groups, groups.new = groups, ...)
```


Arguments

<code>segm</code>	An <code>inla.mesh.segment()</code> object.
<code>groups</code>	The segment groups id:s to extract.
<code>groups.new</code>	Optional vector of group id remapping; <code>groups[k]</code> in the input will be replaced by <code>groups.new[k]</code> in the output.
<code>...</code>	Additional arguments, passed on to other methods.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.segment\(\)](#)

f

Define general Gaussian models in the INLA formula

Description

Function used for defining of smooth and spatial terms within `inla` model formulae. The function does not evaluate anything - it exists purely to help set up a model. The function specifies one smooth function in the linear predictor (see [inla.list.models\(\)](#)) as

$$w f(x)$$

Usage

```
f(
  ...,
  model = "iid",
  copy = NULL,
  scopy = NULL,
  same.as = NULL,
  n = NULL,
  nrep = NULL,
  replicate = NULL,
  ngroup = NULL,
  group = NULL,
  control.group = inla.set.control.group.default(),
  control.scopy = inla.set.control.scopy.default(),
  hyper = NULL,
  initial = NULL,
  prior = NULL,
  param = NULL,
  fixed = NULL,
  season.length = NULL,
  constr = NULL,
  extraconstr = list(A = NULL, e = NULL),
  values = NULL,
```

```

cyclic = NULL,
diagonal = NULL,
graph = NULL,
graph.file = NULL,
cdf = NULL,
quantiles = NULL,
Cmatrix = NULL,
rankdef = NULL,
Z = NULL,
nrow = NULL,
ncol = NULL,
nu = NULL,
bvalue = NULL,
spde.prefix = NULL,
spde2.prefix = NULL,
spde2.transform = c("logit", "log", "identity"),
spde3.prefix = NULL,
spde3.transform = c("logit", "log", "identity"),
mean.linear = inla.set.control.fixed.default()$mean,
prec.linear = inla.set.control.fixed.default()$prec,
compute = TRUE,
of = NULL,
precision = 10^8,
range = NULL,
adjust.for.con.comp = TRUE,
order = NULL,
scale = NULL,
rgeneric = NULL,
cgeneric = NULL,
scale.model = NULL,
args.slm = list(rho.min = NULL, rho.max = NULL, X = NULL, W = NULL, Q.beta = NULL),
args.ar1c = list(Z = NULL, Q.beta = NULL),
args.intslope = list(subject = NULL, strata = NULL, covariates = NULL),
vb.correct = TRUE,
locations = NULL,
debug = FALSE
)

```

Arguments

...	Name of the covariate and, possibly of the weights vector. NB: order counts!!!! The first specified term is the covariate and the second one is the vector of weights (which can be negative).
model	A string indicating the chosen model. The default is iid. See <code>names(inla.models())\$latent</code> for a list of possible alternatives and inla.doc() for detailed docs.
copy	The name of the model-component to copy
scopy	The name of the model-component to smooth-copy (where the copy-function is a spline)
same.as	Can be used with <code>copy=". . "</code> . <code>same.as="A"</code> says that this copy should use the same scaling parameter as another copy "A"
n	An optional argument which defines the dimension of the model if this is different from <code>length(sort(unique(covariate)))</code>

nrep	Number of replications, if not given, then nrep=max(replications)
replicate	A vector of which replications to use.
ngroup	Number of groups, if not given, then ngroup=max(group)
group	A vector of which groups to use.
control.group	Controls the use of group
control.scopy	Controls the use of scopy
hyper	Specification of the hyperparameter, fixed or random, initial values, priors and its parameters. See ?inla.models for the list of hyperparameters for each model and its default options or use inla.doc() for detailed info on the family and supported prior distributions.
initial	THIS OPTION IS OBSOLETE, DO NOT USE
prior	THIS OPTION IS OBSOLETE, DO NOT USE
param	THIS OPTION IS OBSOLETE, DO NOT USE
fixed	THIS OPTION IS OBSOLETE; DO NOT USE
season.length	Length of the seasonal component for model="seasonal"
constr	A boolean variable indicating whater to set a sum to 0 constraint on the term. By default the sum to 0 constraint is imposed on all intrinsic models ("iid","rw1","rw1","besag", etc..).
extraconstr	This argument defines extra linear constraints. The argument is a list with two elements, a matrix A and a vector e, which defines the extra constraint $Ax = e$; for example <code>extraconstr = list(A = A, e=e)</code> . The number of columns of A must correspond to the length of this f-model. Note that this constraint comes additional to the sum-to-zero constraint defined if <code>constr = TRUE</code> .
values	An optional vector giving all values assumed by the covariate for which we want estimated the effect. It must be a numeric vector, a vector of factors or NULL.
cyclic	A boolean specifying wheather the model is cyclical. Only valid for "rw1" and "rw2" models, is <code>cyclic=T</code> then the sum to 0 constraint is removed. For the correct form of the graph file see <i>Martino and Rue (2008)</i> .
diagonal	An extra constant added to the diagonal of the precision matrix to prevent numerical issues.
graph	Defines the graph-object either as a file with a graph-description, an <code>inla.graph</code> -object, or as a (sparse) symmetric matrix .
graph.file	THIS OPTION IS OBSOLETE, DO NOT USE
cdf	THIS OPTION IS OBSOLETE, DO NOT USE
quantiles	A vector of maximum 10 quantiles, $p(0), p(1), \dots$ to compute for each posterior marginal. The function returns, for each posterior marginal, the values $x(0), x(1), \dots$ such that $\text{Prob}(X < x(p)) = p$
Cmatrix	The specification of the precision matrix for the generic, generic3 or z models (up to a scaling constant). Cmatrix is either a (dense) matrix, a matrix created using <code>Matrix::sparseMatrix()</code> , or a filename which stores the non-zero elements of Cmatrix, in three columns: i, j and Qij. In case of the generic3 model, it is a list of such specifications.
rankdef	A number defining the rank deficiency of the model, with sum-to-zero constraint and possible extra-constraints taken into account. See details.

<code>Z</code>	The matrix for the z-model
<code>nrow</code>	Number of rows for 2d-models
<code>ncol</code>	Number of columns for 2d-models
<code>nu</code>	Smoothing parameter for the Matern2d-model, possible values are $c(0, 1, 2, 3)$
<code>bvalue</code>	The boundary conditions for model <code>rw2d</code> , 0 means use the correct subspace (default), while 1 means condition on 0's outside
<code>spde.prefix</code>	Internal use only
<code>spde2.prefix</code>	Internal use only
<code>spde2.transform</code>	Internal use only
<code>spde3.prefix</code>	Internal use only
<code>spde3.transform</code>	Internal use only
<code>mean.linear</code>	Prior mean for <code>model="linear"</code>
<code>prec.linear</code>	Prior precision for <code>model="linear"</code>
<code>compute</code>	A boolean variable indicating whether the marginal posterior distribution for the nodes in the <code>f()</code> model should be computed or not. This is usefull for large models where we are only interested in some posterior marginals.
<code>of</code>	Internal use only
<code>precision</code>	The precision for the artificial noise added when creating a copy of a model and others.
<code>range</code>	A vector of size two giving the lower and upper range for the scaling parameter <code>beta</code> in the model <code>COPY</code> , <code>CLINEAR</code> , <code>MEC</code> and <code>MEB</code> . If <code>low = high</code> then the identity mapping is used.
<code>adjust.for.con.comp</code>	If <code>TRUE</code> (default), adjust some of the models (currently: <code>besag</code> , <code>bym</code> , <code>bym2</code> and <code>besag2</code>) if the number of connected components in graph is larger than 1. If <code>FALSE</code> , do nothing.
<code>order</code>	Defines the order of the model: for model <code>ar</code> this defines the order <code>p</code> , in <code>AR(p)</code> . Not used for other models at the time being.
<code>scale</code>	A scaling vector. Its meaning depends on the model.
<code>rgeneric</code>	A object of class <code>inla.rgeneric</code> which defines the model. (EXPERIMENTAL!)
<code>cgeneric</code>	A object of class <code>inla.cgeneric</code> which defines the model. (EXPERIMENTAL!)
<code>scale.model</code>	Logical. If <code>TRUE</code> then scale the <code>RW1</code> and <code>RW2</code> and <code>BESAG</code> and <code>BYM</code> and <code>BESAG2</code> and <code>RW2D</code> models so the their (generlized) variance is 1. Default value is <code>inla.getOption("scale.model.default")</code>
<code>args.slm</code>	Required arguments to the <code>model="slm"</code> ; see the documentation for further details.
<code>args.ar1c</code>	Required arguments to the <code>model="ar1c"</code> ; see the documentation for further details.
<code>args.intslope</code>	A list with the subject (factor), strata (factor) and covariates (numeric) for the <code>intslope</code> model; see the documentation for further details,

vb.correct	Add this model component to the list of nodes to be used for the (potential) vb correction? If TRUE do, and do not if FALSE. Can also be a vector of nodes to add in the correction-set.
locations	A matrix with locations for the model dmatern. This also defines n.
debug	Enable local debug output

Details

There is no default value for rankdef, if it is not defined by the user then it is computed by the rank deficiency of the prior model (for the generic model, the default is zero), plus 1 for the sum-to-zero constraint if the prior model is proper, plus the number of extra constraints. **Oops:** This can be wrong, and then the user must define the rankdef explicitly.

Value

TODO

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla\(\)](#), [hyperpar.inla\(\)](#)

fgn	<i>Return the coefficients in the 3-component AR(1) mixture representing FGN(H)</i>
-----	-------------------------------------------------------------------------------------

Description

This function will return the coefficients in the 3-component AR(1) mixture representing FGN(H)

Usage

```
inla.fgn(H, K = 4L, lag.max = NULL, approx = TRUE)
```

Arguments

H	The Hurst coefficient ($0 < H < 1$), or a vector of those
K	The number of components in representation, must be 3L or 4L
lag.max	Integer. If positive integer, return the coefficients implicitly as the ACF from 0 to lag.max
approx	Logical. If lag.max is an positive integer and approx is FALSE, then return the true ACF instead of the approximated one.

Value

`inla.fgn` returns a named matrix. If `is.null(lag.max)`, then first column is H , columns $1+1:K$ are lag one correlations (or ϕ 's), and columns $1+K+1:K$ are the weights. If `lag.max > 0`, then return the ACFs in columns $2+(0:lag.max)$, for the H in column 1, either the approximated ones or the true ones.

This function is EXPERIMENTAL!!!

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
r = c(inla.fgn(0.7))
r_m = inla.fgn(seq(0.6, 0.8, by=0.01))
```

Germany

Disease Mapping

Description

Cases of Oral cavity cancer in Germany from 1986-1990

Format

A data frame with 544 observations on the following 4 variables.

region Region of Germany

E Fixed quantity which accounts for number of people in the district (offset)

Y Number of cases

x covariate measuring smoking consumption

References

Rue, H and Held, L. (2005) *Gaussian Markov Random Fields - Theory and Applications* Chapman and Hall

Examples

```
data(Germany)
```

graph.convert	<i>INLA utility functions</i>
---------------	-------------------------------

Description

Various utility functions for INLA

Usage

```
inla.geobugs2inla(adj, num, graph.file = "graph.dat")
```

Arguments

adj	A vector listing the ID numbers of the adjacent areas for each area. This is a sparse representation of the full adjacency matrix for the study region, and can be generated using the Adjacency Tool from the Map menu in GeoBUGS.
num	A vector of length N (the total number of areas) giving the number of neighbours n.i for each area.
graph.file	Name of the file of the new graph in the INLA format.

Value

The return value is the name of the graph-file created.

Note

These are all the same function, and the two different names are due to backward-compatibility

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla\(\)](#), [inla.surv\(\)](#), [hyperpar.inla\(\)](#)

graph.matrix	<i>Construct a neighbour-matrix from a graph</i>
--------------	--------------------------------------------------

Description

Construct a neighbour-matrix from a graph and display it

Usage

```
inla.matrix2graph(graph, ...)
```

```
inla.graph2matrix(graph, ...)
```

```
inla.spy(graph, ..., reordering = NULL, factor = 1, max.dim = NULL)
```

Arguments

graph	An inla.graph-object, a (sparse) symmetric matrix, a filename containing the graph, or a list or collection of characters and/or numbers defining the graph.
...	Additional arguments to inla.read.graph()
reordering	A possible reordering. Typical the one obtained from a inla-call, result\$misc\$reordering, or the result of inla.qreordering.
factor	A scaling of the inla.graph-object to reduce the size.
max.dim	Maximum dimension of the inla.graph-object plotted; if missing(factor) and max.dim is set, then factor is computed automatically to give the given max.dim.

Value

inla.graph2matrix returns a sparse symmetric matrix where the non-zero pattern is defined by the graph. The inla.spy function, plots a binary image of a graph. The reordering argument is typically the reordering used by inla, found in result\$misc\$reordering.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla.read.graph\(\)](#), [inla.qreordering\(\)](#)

Examples

```
n = 50
Q = matrix(0, n, n)
idx = sample(1:n, 2*n, replace=TRUE)
Q[idx, idx] = 1
diag(Q) = 1
g = inla.read.graph(Q)
QQ = inla.graph2matrix(g)
inla.spy(QQ)
print(all.equal(as.matrix(Q), as.matrix(QQ)))

g.file = inla.write.graph(g, filename = tempfile())
inla.dev.new()
inla.spy(g.file)
inla.spy(g.file, reordering = inla.qreordering(g))

g = inla.read.graph(g.file)
inla.dev.new()
inla.spy(g)

inla.dev.new()
inla.spy(3, 1, "1 2 2 1 1 3 0")
inla.dev.new()
inla.spy(3, 1, "1 2 2 1 1 3 0", reordering = 3:1)
```

idx	<i>Convert indexes</i>
-----	------------------------

Description

Convert indexes given by triplet '(idx, group, replicate)' to the (one-dimensional) index used in the grouped and replicated model

Usage

```
inla.idx(
  idx,
  n = max(idx),
  group = rep(1, length(idx)),
  ngroup = max(group),
  replicate = rep(1, length(idx)),
  nrep = max(replicate)
)
```

Arguments

idx	The index within the basic model. (Legal values from 1' to n'.)
n	The length 'n' of the basic model.
group	The index within group. (Legal values from 1' to ngroup'.)
ngroup	Number of groups.
replicate	The index within replication. (Legal values from 1' to nrep'.)
nrep	Number of replications.

Value

`inla.idx` returns indexes in the range 1' to *nngroupnrep*' representing where the triplet '(idx,group,replicate)' is stored internally in the full grouped and replicated model.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
##TODO
```

inla

Bayesian analysis of structured additive models

Description

inla performs a full Bayesian analysis of additive models using Integrated Nested Laplace approximation

Usage

```
inla(
  formula = NULL,
  family = "gaussian",
  contrasts = NULL,
  data = NULL,
  quantiles = c(0.025, 0.5, 0.975),
  E = NULL,
  offset = NULL,
  scale = NULL,
  weights = NULL,
  Ntrials = NULL,
  strata = NULL,
  lp.scale = NULL,
  link.covariates = NULL,
  verbose = inla.getOption("verbose"),
  lincomb = NULL,
  selection = NULL,
  control.compute = list(),
  control.predictor = list(),
  control.family = list(),
  control.inla = list(),
  control.fixed = list(),
  control.mode = list(),
  control.expert = list(),
  control.hazard = list(),
  control.lincomb = list(),
  control.update = list(),
  control.lp.scale = list(),
  control.pardiso = list(),
  only.hyperparam = FALSE,
  inla.call = inla.getOption("inla.call"),
  inla.arg = inla.getOption("inla.arg"),
  num.threads = inla.getOption("num.threads"),
  keep = inla.getOption("keep"),
  working.directory = inla.getOption("working.directory"),
  silent = inla.getOption("silent"),
  inla.mode = inla.getOption("inla.mode"),
  safe = inla.getOption("safe"),
  debug = inla.getOption("debug"),
  .parent.frame = environment(formula)
)
```

Arguments

formula	A inla formula like $y \sim 1 + z + f(\text{ind}, \text{model} = "iid") + f(\text{ind2}, \text{weights}, \text{model} = "ar1")$. This is much like the formula for a <code>glm</code> except that smooth or spatial terms can be added to the right hand side of the formula. See <code>f()</code> for full details and the web site www.r-inla.org for several worked out examples. Each smooth or spatial term specified through <code>f</code> should correspond to separate column of the data frame <code>data</code> . The response variable, <code>y</code> can be a univariate response variable, a list or the output of the function <code>inla.surf</code> for survival analysis models.
family	A string indicating the likelihood family. The default is <code>gaussian</code> with identity link. See <code>names(inla.models())\$likelihood</code> for a list of possible alternatives and use <code>inla.doc()</code> for detailed docs for individual families.
contrasts	Optional contrasts for the fixed effects; see <code>?lm</code> or <code>?glm</code> for details.
data	A data frame or list containing the variables in the model. The data frame MUST be provided
quantiles	A vector of quantiles, $p(0), p(1), \dots$ to compute for each posterior marginal. The function returns, for each posterior marginal, the values $x(0), x(1), \dots$ such that $\text{Prob}(X < x(p)) = p$
E	Known component in the mean for the Poisson likelihoods defined as $E_i \exp(\eta_i)$ <p>where</p> η_i <p>is the linear predictor. If not provided it is set to <code>rep(1, n.data)</code>.</p>
offset	This argument is used to specify an a-priori known and fixed component to be included in the linear predictor during fitting. This should be <code>NULL</code> or a numeric vector of length either one or equal to the number of cases. One or more <code>offset()</code> terms can be included in the formula instead or as well, and if both are used, they are combined into a common offset. If the A-matrix is used in the linear predictor statement <code>control.predictor</code> , then the offset given in this argument is added to <code>eta*</code> , the linear predictor related to the observations, as <code>eta* = A eta + offset</code> , whereas an offset in the formula is added to <code>eta</code> , the linear predictor related to the formula, as <code>eta = ... + offset.formula</code> . So in this case, the offset defined here and in the formula has a different meaning and usage.
scale	Fixed (optional) scale parameters of the precision for Gaussian and Student-T response models. Default value is <code>rep(1, n.data)</code> .
weights	Fixed (optional) weights parameters of the likelihood, so the <code>log-likelihood[i]</code> is changed into <code>weights[i]*log-likelihood[i]</code> . Default value is <code>rep(1, n.data)</code> . WARNING: The normalizing constant for the likelihood is NOT re-computed, so ALL marginals (and the marginal likelihood) must be interpreted with great care.
Ntrials	A vector containing the number of trials for the binomial likelihood and variants, or the number of required successes for the <code>nbinomial2</code> likelihood. Default value is <code>rep(1, n.data)</code> .
strata	Fixed (optional) strata indicators for <code>tstrata</code> likelihood model and similar. The documentation for each likelihood will inform if this argument is required.

<code>lp.scale</code>	A vector with same length as the predictor going into the likelihood with either NA's or indices indexing the scaling coefficients. NA or a index less or equal to 0 means no scaling. The priors and properties of the scaling coefficients are set in <code>control.lp.scale</code>
<code>link.covariates</code>	A vector or matrix with covariates for link functions
<code>verbose</code>	Boolean indicating if the <code>inla</code> -program should run in a verbose mode (default <code>inla.getOption("verbose")</code>)
<code>lincomb</code>	Used to define linear combination of nodes in the latent field. The posterior distribution of such linear combination is computed by the <code>inla</code> function. See vignette <i>Short tutorials from old www-page</i> for information on how to define such linear combinations.
<code>selection</code>	This is a similar argument to the one in <code>inla.posterior.sample</code> and follow the same format. This argument allows to define a subset of the latent field for which to compute an approximated joint distribution. It will appear in <code>result\$selection</code> . See also <code>?inla.rjmargin</code> and the appropriate vignette.
<code>control.compute</code>	See <code>?control.compute</code>
<code>control.predictor</code>	See <code>?control.predictor</code>
<code>control.family</code>	See <code>?control.family</code>
<code>control.inla</code>	See <code>?control.inla</code>
<code>control.fixed</code>	See <code>?control.fixed</code>
<code>control.mode</code>	See <code>?control.mode</code>
<code>control.expert</code>	See <code>?control.expert</code>
<code>control.hazard</code>	See <code>?control.hazard</code>
<code>control.lincomb</code>	See <code>?control.lincomb</code>
<code>control.update</code>	See <code>?control.update</code>
<code>control.lp.scale</code>	See <code>?control.lp.scale</code>
<code>control.pardiso</code>	See <code>?control.pardiso</code>
<code>only.hyperparam</code>	If TRUE, then only the hyperparameters are computed.
<code>inla.call</code>	The path to, or the name of, the <code>inla</code> -program. This is program is installed together with the R-package, but, for example, a native compiled version can be used instead to improve the performance.
<code>inla.arg</code>	A string indicating ALL arguments to the ' <code>inla</code> ' program and do not include default arguments. (This is an expert option and not intended for normal usage.)
<code>num.threads</code>	Maximum number of threads the <code>inla</code> -program will use, or as ' <code>A:B</code> ' defining the number threads in the outer (A) and inner (B) layer for nested parallelism. If B is set to -1, then one can force some single function evaluations to be perfered in parallel, so <code>num.threads=4:-1</code> will locally behave like <code>num.threads=4:1</code> (if considered to be more efficient). If <code>B > 1</code> then <code>num.threads=A:B</code> and <code>num.threads=A:-B</code> are equivalent.

<code>keep</code>	A boolean variable indicating that the working files (ini file, data files and results files) should be kept. If TRUE and no <code>working.directory</code> is specified, the model-files are stored in the current directory called "inla.model" or "inla.model-NUMBER".
<code>working.directory</code>	A string giving the name of a non-existing directory where to store the model-files. Sometimes this argument is required if the temporary directory returned with <code>tempdir()</code> not writeable or has an encoding that is not supported.
<code>silent</code>	If equal to 1L or TRUE, then the inla-program would be "silent". If equal to 2L, then suppress also error messages from the inla-program.
<code>inla.mode</code>	Run inla in compact-mode, or the classic-mode. Default is to use the mode set by <code>inla.getOption("inla.mode")</code> which is default compact-mode.
<code>safe</code>	If TRUE, then enable possible restarts to improve initial values and Hessian if needed.
<code>debug</code>	If TRUE, print some debug output.
<code>.parent.frame</code>	Internal use only

Value

`inla` returns an object of class "inla". This is a list containing at least the following arguments:

<code>summary.fixed</code>	Matrix containing the mean and standard deviation (plus, possibly quantiles and cdf) of the fixed effects of the model.
<code>marginals.fixed</code>	A list containing the posterior marginal densities of the fixed effects of the model.
<code>summary.random</code>	List of matrices containing the mean and standard deviation (plus, possibly quantiles and cdf) of the smooth or spatial effects defined through <code>f()</code> .
<code>marginals.random</code>	A list containing the posterior marginal densities of the random effects defined through <code>f</code> .
<code>summary.hyperpar</code>	A matrix containing the mean and sd (plus, possibly quantiles and cdf) of the hyperparameters of the model
<code>marginals.hyperpar</code>	A list containing the posterior marginal densities of the hyperparameters of the model.
<code>summary.linear.predictor</code>	A matrix containing the mean and sd (plus, possibly quantiles and cdf) of the linear predictors η in the model
<code>marginals.linear.predictor</code>	If <code>compute=TRUE</code> in <code>control.predictor</code> , a list containing the posterior marginals of the linear predictors η in the model.
<code>summary.fitted.values</code>	A matrix containing the mean and sd (plus, possibly quantiles and cdf) of the fitted values $g^{-1}(\eta)$ obtained by transforming the linear predictors by the inverse of the link function. This quantity is only computed if <code>marginals.fitted.values</code> is computed. Note that if an observation is NA then the identity link is used. You can manually transform a marginal using <code>inla.marginal.transform()</code> or set the argument <code>link</code> in the <code>control.predictor</code> -list; see <code>?control.predictor</code>

<code>marginals.fitted.values</code>	If <code>compute=TRUE</code> in <code>control.predictor</code> , a list containing the posterior marginals of the fitted values $g^{-1}(\eta)$ obtained by transforming the linear predictors by the inverse of the link function. Note that if an observation is NA then the identity link is used. You can manually transform a marginal using <code>inla.marginal.transform()</code> or set the argument <code>link</code> in the <code>control.predictor</code> -list; see <code>?control.predictor</code>
<code>summary.lincomb</code>	If <code>lincomb != NULL</code> a list of matrices containing the mean and sd (plus, possibly quantiles and cdf) of all linear combinations defined.
<code>marginals.lincomb</code>	If <code>lincomb != NULL</code> a list of posterior marginals of all linear combinations defined.
<code>selection</code>	Provide the approximated joint distribution for the selection
<code>dic</code>	If <code>dic=TRUE</code> in <code>control.compute</code> , the deviance information criteria and effective number of parameters, otherwise NULL
<code>cpo</code>	If <code>cpo=TRUE</code> in <code>control.compute</code> , a list of three elements: <code>cpo\$cpo</code> are the values of the conditional predictive ordinate (CPO), <code>cpo\$pit</code> are the values of the probability integral transform (PIT) and <code>cpo\$failure</code> indicates whether some assumptions are violated. In short, if <code>cpo\$failure[i] > 0</code> then some assumption is violated, the higher the value (maximum 1) the more seriously.
<code>po</code>	If <code>po=TRUE</code> in <code>control.compute</code> , a list of one elements: <code>po\$po</code> are the values of the predictive ordinate (CPO) ($\pi(y_i y)$)
<code>residuals</code>	If <code>residuals=TRUE</code> in <code>control.compute</code> , a list of standardized residuals are provided, see <code>?control.compute</code> for details
<code>waic</code>	If <code>waic=TRUE</code> in <code>control.compute</code> , a list of two elements: <code>waic\$waic</code> is the Watanabe-Akaike information criteria, and <code>waic\$p.eff</code> is the estimated effective number of parameters
<code>mlik</code>	If <code>mlik=TRUE</code> in <code>control.compute</code> , the log marginal likelihood of the model (using two different estimates), otherwise NULL
<code>neffp</code>	Expected effective number of parameters in the model. The standard deviation of the expected number of parameters and the number of replicas for parameter are also returned
<code>mode</code>	A list of two elements: <code>mode\$theta</code> is the computed mode of the hyperparameters and <code>mode\$x</code> is the mode of the latent field given the modal value of the hyperparameters.
<code>call</code>	The matched call.
<code>formula</code>	The formula supplied
<code>nhyper</code>	The number of hyperparameters in the model
<code>cpu.used</code>	The cpu time used by the <code>inla</code> function

Author(s)

Havard Rue <hrue@r-inla.org> and Sara Martino

See Also

[f\(\)](#)

inla-class	<i>inla estimation object class</i>
------------	-------------------------------------

Description

The inla class is defined in the INLA package

See Also

[inla](#)

inla.agaussian	<i>Aggregate Gaussian into an equivalent observation</i>
----------------	----------------------------------------------------------

Description

Aggregate Gaussians observed with the same mean and precision, into an equivalent triplet, for use with family="agaussian"

Usage

```
inla.agaussian(y, s = NULL)
```

Arguments

y	Repeated observations. If y is a matrix, then each row represents repeated observations. If y is a list, then each element of the list is a vector of repeated observations. If y is a vector, then the whole vector represents repeated observations. The optional scaling s, must have the same format as y, ie matrix or vector. NA's in y (and s) are removed and not used or counted. If s is given, then the NA-pattern in y and s must be the same.
s	Optional fixed scaling of the precisions. Must be in the same format as y, and have the same NA-pattern. See the documentation for details.

Value

The output is a inla.mdata-object ready for use with family="agaussian". See the example in the documentation.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
A = matrix(1:25,5,5)
inla.agaussian(A)

A[1,-1] = NA
A[2,-(2:3)] = NA
inla.agaussian(A)
```

inla.ar.pacf2phi	<i>Convert between parameterizations for the AR(p) model</i>
------------------	--------------------------------------------------------------

Description

These functions convert between the AR(p) coefficients `phi`, the partial autocorrelation coefficients `pacf` and the autocorrelation function `acf`. The `phi`-parameterization is the same as used for `arima`-models in R; see `?arima` and the parameter-vector `a` in `Details`.

Usage

```
inla.ar.pacf2phi(pac)

inla.ar.phi2pacf(phi)

inla.ar.phi2acf(phi, lag.max = length(phi))

inla.ar.pacf2acf(pac, lag.max = length(pac))
```

Arguments

<code>pac</code>	The partial autocorrelation coefficients
<code>phi</code>	The AR(p) parameters <code>phi</code>
<code>lag.max</code>	The maximum lag to compute the ACF for

Value

- `inla.ar.pacf2phi` returns `phi` for given `pacf`.
- `inla.ar.phi2pacf` returns `pac` for given `phi`.
- `inla.ar.phi2acf` returns `acf` for given `phi`.
- `inla.ar.pacf2acf` returns `acf` for given `pacf`.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
pac <- runif(5)
phi <- inla.ar.pacf2phi(pac)
pac2 <- inla.ar.phi2pacf(phi)
print(paste("Error:", max(abs(pac2 - pac))))
print("Correlation matrix (from pac)")
print(toeplitz(inla.ar.pacf2acf(pac)))
print("Correlation matrix (from phi)")
print(toeplitz(inla.ar.phi2acf(phi)))
```

inla.as.sparse	<i>Convert a matrix or sparse matrix into the sparse format used by INLA</i>
----------------	------------------------------------------------------------------------------

Description

Convert a matrix or sparse matrix into the sparse format used by INLA (dgTMatrix)

Usage

```
inla.as.sparse(...)
```

```
inla.as.dgTMatrix(A, unique = TRUE, na.rm = FALSE, zeros.rm = FALSE)
```

Arguments

...	The arguments. The matrix or sparse matrix, and the additional arguments
A	The matrix
unique	Logical. If TRUE, then ensure that the internal representation is unique and there are no duplicated entries. (Do not change this unless you know what you are doing.)
na.rm	Replace NA's in the matrix with zeros.
zeros.rm	Remove zeros in the matrix.

Value

inla.as.sparse and inla.as.dgTMatrix is the same function. The returned value is a sparse matrix in the dgTMatrix-format.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
A = matrix(1:9, 3, 3)
inla.as.sparse(A)
```

inla.as.wkt_tree.wkt	<i>Internal WKT handling</i>
----------------------	------------------------------

Description

[Deprecated] in favour of `fmesher::fm_wkt_as_wkt_tree()`. Conversion between WKT and a tree representation

Usage

```

inla.as.wkt_tree.wkt(x, ...)

inla.as.wkt.wkt_tree(x, pretty = FALSE, ...)

inla.wkt_tree_get_item(x, item, duplicate = 1)

inla.wkt_tree_set_item(x, item_tree, duplicate = 1)

```

Arguments

x	A WKT2 string, or a wkt_tree list structure
...	Unused
pretty	logical
item	character vector with item labels identifying a parameter item entry.
duplicate	For items that have more than one match, duplicate indicates the index number of the desired version. Default: 1
item_tree	An item tree identifying a parameter item entry

inla.barrier

Functions for defining the Barrier models

Description

Functions for defining Barrier models as an inla rgeneric model

Usage

```

inla.barrier.pcmatern(mesh, barrier.triangles, prior.range,
                      prior.sigma, range.fraction=0.2)
inla.barrier.polygon(mesh, barrier.triangles, Omega=NULL)
inla.barrier.q(fem, ranges, sigma=1)
inla.barrier.fem(mesh, barrier.triangles, Omega=NULL)

```

Arguments

mesh	The mesh to build the model on, from inla.mesh.2d
barrier.triangles	The numerical ids of the triangles that make up the barrier area
prior.range	2 parameters (range0, Prange) for the prior spatial range. If Prange is NA, then range0 is used as a fixed range value (not tested).
prior.sigma	2 parameters (sig0, Psig) for the prior marginal standard deviation sigma. If Psig is NA, then sig0 is used as a fixed sigma value (not tested).
range.fraction	The length of the spatial range inside the barrier area, as a fraction of the range parameter.
Omega	Advanced option for creating a set of permeable barriers (not documented)

Details

This model is described in the ArXiv preprint arXiv:1608.03787. For examples, see <https://haakonbakka.bitbucket.io/btopic107.html>.

Value

`inla.barrier.pcmatern` gives the (r)generic model object for fitting the model in INLA, `inla.barrier.polygon` gives the polygon around the barrier (mainly for plotting), `inla.barrier.q` is an internal method producing the Q matrix from a result of `inla.barrier.fem`, `inla.barrier.fem` is an internal method producing the Finite Element matrices.

Author(s)

Haakon Bakka <bakka@r-inla.org>

See Also

`inla.spde2.pcmatern`

`inla.barrier.pcmatern` *Functions for defining the Barrier models*

Description

Functions for defining Barrier models as an `inla_rgeneric` model

Usage

```
inla.barrier.pcmatern(
  mesh,
  barrier.triangles,
  prior.range,
  prior.sigma,
  range.fraction = 0.2
)

inla.barrier.polygon(mesh, barrier.triangles, Omega = NULL)

inla.barrier.q(fem, ranges, sigma = 1, envir = NULL)

inla.barrier.fem(mesh, barrier.triangles, Omega = NULL)
```

Arguments

<code>mesh</code>	The mesh to build the model on, from <code>inla.mesh.2d</code>
<code>barrier.triangles</code>	The numerical ids of the triangles that make up the barrier area
<code>prior.range</code>	2 parameters (<code>range0</code> , <code>Prange</code>) for the prior spatial range. If <code>Prange</code> is NA, then <code>range0</code> is used as a fixed range value (not tested).
<code>prior.sigma</code>	2 parameters (<code>sig0</code> , <code>Psig</code>) for the prior marginal standard deviation sigma. If <code>Psig</code> is NA, then <code>sig0</code> is used as a fixed sigma value (not tested).

<code>range.fraction</code>	The length of the spatial range inside the barrier area, as a fraction of the range parameter.
<code>Omega</code>	Advanced option for creating a set of permeable barriers (not documented)
<code>fem</code>	represents the Barrier model or the Different Terrains (DT) model, by containing all the needed matrices to solve the SPDE
<code>ranges, sigma</code>	the hyperparameters that determine Q
<code>envir</code>	the environment used for caching (with <code>optimize=TRUE</code>), if any

Details

This model is described in the ArXiv preprint arXiv:1608.03787. For examples, see <https://haakonbakkagit.github.io/btopic128.html>

- `inla.barrier.pcmatern` This function creates the model component used in `inla(...)`
- `inla.barrier.polygon` This function constructs `SpatialPolygons` for the different subdomains (areas)
- `inla.barrier.q`: This function computes a specific precision matrix
- `inla.barrier.fem` This function computes the Finite Element matrices that are needed to compute the precision matrix Q later

Value

- `inla.barrier.pcmatern` gives the (rgeneric) model object for fitting the model in INLA
- `inla.barrier.polygon` gives the polygon around the barrier (mainly for plotting)
- `inla.barrier.q` is an internal method producing the Q matrix from a result of `inla.barrier.fem`,
- `inla.barrier.fem` is an internal method producing the Finite Element matrices.

Author(s)

Haakon Bakka <bakka@r-inla.org>

See Also

`inla.spde2.pcmatern`

`inla.binary.install` *Install alternative binary builds.*

Description

Install a new binary for `os` unless `missing(os)`, for which the `os` is chosen interactively among the available builds.

Usage

```
inla.binary.install(
  os = c("CentOS Linux-6", "CentOS Linux-7", "CentOS Linux-8", "CentOS Stream-8",
    "Rocky Linux-9", "Fedora-33", "Fedora-34", "Fedora Linux-35", "Fedora Linux-36",
    "Fedora Linux-37", "Fedora Linux-38", "Manjaro Linux", "Ubuntu-16.04",
    "Ubuntu-18.04", "Ubuntu-20.04", "Ubuntu-22.04"),
  path = NULL,
  verbose = TRUE,
  md5.check = TRUE,
  secure.http = TRUE
)
```

Arguments

<code>os</code>	If <code>os</code> is given, install binary build for this <code>os</code> . If <code>os</code> is not given, chose <code>os</code> interactively among available builds.
<code>path</code>	character. The install path. If <code>NULL</code> the path is derived from INLA package
<code>verbose</code>	Logical. Verbose output if <code>TRUE</code>
<code>md5.check</code>	Logical. If <code>TRUE</code> , stop if md5-checksum-file is not present or md5-checksum fail. If <code>FALSE</code> , ignore md5-checksum check.
<code>secure.http</code>	Logical. Use secure http (ie <code>https://</code>) or <code>http://</code>

Value

Return `TRUE` if installation was sucessful and `FALSE` if not.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
## Not run:
inla.binary.install()
inla.binary.install(os = "CentOS Linux-7")
inla.binary.install(os = "CentOS Linux-7", path = "~/local/bin/inla.binary")

## End(Not run)
```

inla.changelog

inla.changelog

Description

List the recent changes in the inla-program and its R-interface

Usage

```
inla.changelog()
```

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla\(\)](#)

inla.collect.results *Collect results from a inla-call*

Description

inla.collect.results collect results from a inla-call

Usage

```
inla.collect.results(
  results.dir,
  debug = FALSE,
  only.hyperparam = FALSE,
  file.log = NULL,
  file.log2 = NULL,
  silent = inla.getOption("silent")
)
```

Arguments

results.dir	The directory where the results of the inla run are stored
debug	Logical. If TRUE some debugging information are printed
only.hyperparam	Binary variable indicating wheather only the results for the hyperparameters should be collected
file.log	Character. The filename, if any, of the logfile for the internal calculations
file.log2	Character. The filename, if any, of the logfile2 for the internal calculations
silent	Internal use only

Details

This function is mainly used inside inla to collect results after running the inla function. It can also be used to collect results into R after having run an inla section outside R.

Value

The function returns an object of class "inla", see the help file for inla for details.

inla.coxph	<i>Convert a Cox proportional hazard model into Poisson regression</i>
------------	------------------------------------------------------------------------

Description

Tools to convert a Cox proportional hazard model into Poisson regression

Usage

```
inla.coxph(formula, data, control.hazard = list(), debug = FALSE, tag = "")

inla.rbind.data.frames(...)
```

Arguments

formula	The formula for the coxph model where the response must be a <code>inla.surv</code> -object.
data	All the data used in the formula, as a list.
control.hazard	Control the model for the baseline-hazard; see <code>?control.hazard</code> .
debug	Print debug-information
tag	An optional tag added to the names of the new variables created (to make them unique when combined with several calls of <code>inla.coxph</code> . Note that <code>E..coxph</code> is not included, as its usually merged into one vector over different expansions.
...	Data.frames to be <code>rbind</code> -ed, padding with NA.

Value

`inla.coxph` returns a list of new expanded variables to be used in the `inla`-call. Note that element `data` and `data.list` needs to be merged into a list to be passed as the `data` argument. See the example for details.

`inla.rbind.data.frames` returns the `rbinded` data.frames padded with NAs. There is a better implementation in `dplyr::bind_rows`, which is used if package `dplyr` is installed.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
## How the cbind.data.frames works:
df1 = data.frame(x=1:2, y=2:3, z=3:4)
df2 = data.frame(x=3:4, yy=4:5, zz=5:6)
inla.rbind.data.frames(df1, df2)

## Standard example of how to convert a coxph into a Poisson regression
n = 1000
x = runif(n)
lambda = exp(1+x)
y = rexp(n, rate=lambda)
event = rep(1,n)
data = list(y=y, event=event, x=x)
```

```

y.surv = inla.surv(y, event)
intercept1 = rep(1, n)
p = inla.coxph(y.surv ~ -1 + intercept1 + x,
               list(y.surv = y.surv, x=x, intercept1 = intercept1))

r = inla(p$formula,
         family = p$family,
         data=c(as.list(p$data), p$data.list),
         E = p$E)
summary(r)

## How to use this in a joint model
intercept2 = rep(1, n)
y = 1 + x + rnorm(n, sd=0.1)
df = data.frame(intercept2, x, y)

## new need to cbind the data.frames, and then add the list-part of
## the data
df.joint = c(as.list(inla.rbind.data.frames(p$data, df)), p$data.list)
df.joint$Y = cbind(df.joint$y..coxph, df.joint$y)

## merge the formulas, recall to add '-1' and to use the new joint
## reponse 'Y'
formula = update(p$formula, Y ~ intercept2 -1 + .)

rr = inla(formula,
          family = c(p$family, "gaussian"),
          data = df.joint,
          E = df.joint$E..coxph)

```

inla.cpo

Improved estimates for the CPO/PIT-values

Description

Improve the estimates of the CPO/PIT-values by recomputing the model-fit by removing data-points.

Usage

```

inla.cpo(
  result,
  force = FALSE,
  mc.cores = NULL,
  verbose = TRUE,
  recompute.mode = TRUE
)

```

Arguments

result	An object of class inla, ie a result of a call to inla()
force	If TRUE, then recompute all CPO/PIT values and not just those with result\$cpo\$failure > 0.

<code>mc.cores</code>	The number of cores to use in <code>parallel::mclapply</code> . If <code>is.null(mc.cores)</code> , then check <code>getOption("mc.cores")</code> and <code>inla.getOption("num.threads")</code> in that order.
<code>verbose</code>	Run in verbose mode?
<code>recompute.mode</code>	Should be mode (and the integration points) be recomputed when a data-point is removed or not?

Value

The object returned is the same as `result` but the new improved estimates of the CPO/PIT values replaced.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla\(\)](#)

Examples

```
n = 10
y = rnorm(n)
r = inla(y ~ 1, data = data.frame(y), control.compute = list(cpo=TRUE))

rr = inla.cpo(r, force=TRUE)
```

inla.CRS

Create a coordinate reference system object

Description

[Deprecated] in favour of [fmesher::fm_CRS\(\)](#) Creates either a CRS object or an `inla.CRS` object, describing a coordinate reference system.

Usage

```
inla.CRS(..., args = NULL)
```

```
inla.wkt_predef()
```

Arguments

`...` Arguments passed on to `fmesher::fm_CRS(...)`.
`args` list of named proj4 arguments.

Value

Either an `sp::CRS` object or an `inla.CRS` object, depending on if the coordinate reference system described by the parameters can be expressed with a pure `sp::CRS` object or not.

An S3 `inla.CRS` object is a list, usually (but not necessarily) containing at least one element:

```
crs          The basic sp::CRS object

inla.wkt_predef returns a WKT2 string defining a projection
inla.wkt_predef returns a WKT2 string defining a projection
```

Functions

- `inla.wkt_predef()`: **[Deprecated]** in favour of `fmesher::fm_wkt_predef()`

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`sp::CRS()`, `crs_wkt()`, `inla.sp_get_crs()` `plot.CRS()`, `inla.identical.CRS()`

Examples

```
if (require("sf") && require("sp")) {
  crs1 <- fmesher::fm_CRS("longlat_globe")
  crs2 <- fmesher::fm_CRS("lambert_globe")
  crs3 <- fmesher::fm_CRS("mollweide_norm")
  crs4 <- fmesher::fm_CRS("hammer_globe")
  crs5 <- fmesher::fm_CRS("sphere")
  crs6 <- fmesher::fm_CRS("globe")
}
## Not run:
names(inla.wkt_predef())

## End(Not run)

## Not run:
names(inla.wkt_predef())

## End(Not run)
```

`inla.CRSargs`

Show expanded CRS arguments

Description

Wrapper for `sp::CRS` and `inla.CRS` objects to extract the coordinate reference system argument string. 'r lifecycle::badge("deprecated")' in favour of `fmesher::fm_proj4string()`, or `fmesher::fm_wkt()` for WKT2 representations.

Usage

```

inla.CRSargs(x, ...)

inla.as.CRSargs.list(x, ...)

inla.as.list.CRSargs(x, ...)

inla.as.list.CRS(x, ...)

inla.as.CRS.list(x, ...)

```

Arguments

<code>x</code>	An <code>sp::CRS</code> or <code>inla.CRS</code> object (for <code>inla.CRSargs</code> and <code>inla.as.list.CRS</code>), a character string (for <code>inla.as.list.CRSargs</code>), or a list (for <code>inla.as.CRS.list</code> and <code>inla.as.CRSargs.list</code>).
<code>...</code>	Additional arguments passed on to other methods.

Details

- `inla.as.CRSargs.list`: CRS proj4 string for name=value pair list
- `inla.as.list.CRSargs`: List of name=value pairs from CRS proj4 string

Value

For `inla.CRSargs` and `inla.as.CRSargs.list`, a character string with PROJ.4 arguments.

For `inla.as.list.CRS` and `inla.as.list.CRSargs`, a list of name/value pairs.

For `inla.as.CRS.list`, a CRS or `inla.CRS` object.

Author(s)

Finn Lindgren finn.lindgren@gmail.com

See Also

[inla.CRS\(\)](#)

Examples

```

if (require("sf") && require("sp") && require("fmesher")) {
  crs0 <- fm_CRS("longlat_norm")
  p4s <- fm_proj4string(crs0)
  lst <- inla.as.list.CRSargs(p4s)
  crs1 <- inla.as.CRS.list(lst)
  lst$a <- 2
  crs2 <- fm_CRS(p4s, args = lst)
  print(fm_proj4string(crs0))
  print(fm_proj4string(crs1))
  print(fm_proj4string(crs2))
}

```

inla.dev.new	<i>Opens a new device</i>
--------------	---------------------------

Description

Open a new device using `dev.new()` unless using RStudio

Usage

```
inla.dev.new(...)
```

Arguments

... Optional arguments to `dev.new()`

Value

The value of `dev.new()` if not running RStudio, otherwise NULL

Author(s)

Havard Rue <hrue@r-inla.org>

inla.diameter	<i>Diameter of a point set</i>
---------------	--------------------------------

Description

Find an upper bound to the convex hull of a point set

Usage

```
inla.diameter(x, ...)

## Default S3 method:
inla.diameter(x, manifold = "", ...)

## S3 method for class 'inla.mesh.1d'
inla.diameter(x, ...)

## S3 method for class 'inla.mesh'
inla.diameter(x, ...)

## S3 method for class 'inla.mesh.segment'
inla.diameter(x, ...)

## S3 method for class 'inla.mesh.lattice'
inla.diameter(x, ...)
```

Arguments

<code>x</code>	A point set as an $n \times d$ matrix, or an <code>inla.mesh</code> related object.
<code>...</code>	Additional parameters passed on to other methods.
<code>manifold</code>	Character string specifying the manifold type. Default is to treat the point set with Euclidean R^d metrics. Use <code>manifold="S2"</code> for great circle distances on the unit sphere (this is set automatically for <code>inla.mesh</code> objects).

Details

- `inla.diameter.default` Calculate upper bound for the diameter of a point set, by encapsulating in a circular domain.

Value

A scalar, upper bound for the diameter of the convex hull of the point set.

Author(s)

Finn Lindgren finn.lindgren@gmail.com

Examples

```
inla.diameter(matrix(c(0, 1, 1, 0, 0, 0, 1, 1), 4, 2))
```

inla.doc

[View documentation](#)

Description

View documentation of latent, prior and likelihood models.

Usage

```
inla.doc(what, section, verbose = FALSE)
```

Arguments

<code>what</code>	What to view documentation about; name of latent model, name of prior, etc. (A regular expression.)
<code>section</code>	An optional section, like <code>names(inla.models())</code> , to look for the documentation. If missing, all sections are used.
<code>verbose</code>	Logical If TRUE then run in verbose mode

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

www.r-inla.org

Examples

```
## Not run: inla.doc("rw2")
## Not run: inla.doc("gaussian", section = "prior")
```

inla.external.lib	<i>Return the path to the cgeneric-library for a pre-compiled external package</i>
-------------------	------------------------------------------------------------------------------------

Description

Return the path to the cgeneric-library for a pre-compiled external package

Usage

```
inla.external.lib(package)
```

Arguments

package the name of a package, given as a name or literal character string

Value

This function returns the complete path or NULL if file does not exists

Author(s)

Havard Rue <hrue@r-inla.org>

inla.extract.el	<i>Extract elements by matching name from container objects.</i>
-----------------	------------------------------------------------------------------

Description

Extract elements by wildcard name matching from a data.frame, list, or matrix.

Usage

```
inla.extract.el(M, ...)

## S3 method for class 'matrix'
inla.extract.el(M, match, by.row = TRUE, ...)

## S3 method for class 'data.frame'
inla.extract.el(M, match, by.row = TRUE, ...)

## S3 method for class 'list'
inla.extract.el(M, match, ...)
```

Arguments

M	A container object.
...	Additional arguments, not used.
match	A regex defining the matching criterion.
by.row	If TRUE, extract data by row, otherwise by column.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

inla.fmesher.smorg	<i>Compute various mesh related quantities.</i>
--------------------	-------------------------------------------------

Description

[Deprecated] Use the methods in the fmesher package instead; see details below.

Low level function for computing finite element matrices, spherical harmonics, B-splines, and point mappings with barycentric triangle coordinates.

Usage

```
inla.fmesher.smorg(
  loc,
  tv,
  fem = NULL,
  aniso = NULL,
  gradients = FALSE,
  sph0 = deprecated(),
  sph = deprecated(),
  bspline = NULL,
  points2mesh = NULL,
  splitlines = NULL,
  output = NULL,
  keep = FALSE
)
```

Arguments

loc	3-column triangle vertex coordinate matrix.
tv	3-column triangle vertex index matrix.
fem	[Deprecated] Use <code>fmesher::fm_fem()</code> instead. Maximum finite element matrix order to be computed.
aniso	[Deprecated] Use <code>fmesher::fm_fem()</code> instead. A two-element list with γ and v for an anisotropic operator $\nabla \cdot H \nabla$, where $H = \gamma I + vv^\top$.
gradients	[Deprecated] Use <code>fmesher::fm_fem()</code> instead. When TRUE, calculate derivative operator matrices dx, dy, and dz.
sph0	[Deprecated] Use <code>fmesher::fm_raw_basis()</code> instead.
sph	[Deprecated] Use <code>fmesher::fm_raw_basis()</code> instead.

bspline	[Deprecated] Use <code>fmesher::fm_raw_basis()</code> instead. Rotationally invariant B-splines on a sphere. 3-vector with number of basis functions <code>n</code> , basis degree <code>degree</code> , and a logical; TRUE uniform knot angles, FALSE for uniform spacing in $\sin(\text{latitude})$.
points2mesh	[Deprecated] Use <code>fmesher::fm_bary()</code> instead. 3-column matrix with points to be located in the mesh.
splitlines	[Deprecated] Use <code>fmesher::fm_split_lines()</code> or <code>fmesher::fmesher_split_lines()</code> instead. A list with elements <code>loc</code> (3-column coordinate matrix) and <code>idx</code> (2-column index matrix) describing line segments that are to be split into sub-segments at triangle boundaries.
output	Names of objects to be included in the output, if different from defaults.
keep	When TRUE, for debugging purposes keep the fmesher I/O files on disk.

Value

A list of generated named quantities.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

`inla.generate.colors` *Generate text RGB color specifications.*

Description

Generates a tex RGB color specification matrix based on a color palette.

Usage

```
inla.generate.colors(
  color,
  color.axis = NULL,
  color.n = 512,
  color.palette = cm.colors,
  color.truncate = FALSE,
  alpha = NULL
)
```

Arguments

<code>color</code>	character, matrix or vector
<code>color.axis</code>	The min/max limit values for the color mapping.
<code>color.n</code>	The number of colors to use in the color palette.
<code>color.palette</code>	A color palette function.
<code>color.truncate</code>	If TRUE, truncate the colors at the color axis limits.
<code>alpha</code>	Transparency/opaqueness values.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

inla.get.inlaEnv	<i>Return the internal environment used by INLA</i>
------------------	-----------------------------------------------------

Description

A function which return the internal environment used by INLA

Usage

```
inla.get.inlaEnv()
```

Value

This function returns the internal environment used by INLA to keep internal variables.

Author(s)

Havard Rue <hrue@r-inla.org>

inla.group	<i>Group or cluster covariates</i>
------------	------------------------------------

Description

inla.group group or cluster covariates so to reduce the number of unique values

Usage

```
inla.group(x, n = 25, method = c("cut", "quantile"), idx.only = FALSE)
```

Arguments

x	The vector of covariates to group.
n	Number of classes or bins to group into.
method	Group either using bins with equal length intervals (method = "cut"), or equal distance in the probability' scale using the quantiles (method = "quantile").
idx.only	Option to return the index only and not the method.

Value

inla.group return the new grouped covariates where the classes are set to the median of all the covariates belonging to that group.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also[f\(\)](#)**Examples**

```
## this gives groups 3 and 8
x = 1:10
x.group = inla.group(x, n = 2)

## this is the intended use, to reduce the number of unique values in
## the of first argument of f()
n = 100
x = rnorm(n)
y = x + rnorm(n)
result = inla(y ~ f(inla.group(x, n = 20), model = "iid"), data=data.frame(y=y,x=x))
```

inla.group.cv

*Compute group.cv-values***Description**

From a fitted model, compute and add the `group.cv`-values

Usage

```
inla.group.cv(
  result,
  group.cv = NULL,
  num.level.sets = -1,
  strategy = c("posterior", "prior"),
  size.max = 32,
  groups = NULL,
  selection = NULL,
  friends = NULL,
  verbose = FALSE,
  epsilon = 0.005,
  prior.diagonal = 1e-04,
  keep = NULL,
  remove = NULL,
  remove.fixed = TRUE
)
```

Arguments

<code>result</code>	An object of class <code>inla</code> , ie a result of a call to <code>inla()</code> .
<code>group.cv</code>	If given, the groups are taken from this argument. <code>group.cv</code> must be the output of previous call to <code>inla.group.cv()</code> .
<code>num.level.sets</code>	Number of level.sets to use. The default value <code>-1</code> corresponds to leave-one-out cross-validation.
<code>strategy</code>	One of "posterior" or "prior". See the vignette for details.

size.max	The maximum size of a group. If the computed group-size is larger, it will be truncated to size.max.
groups	An (optional) predefined list of groups. See the vignette for details.
selection	An optional list of data-indices to use. If not given, then all data are used.
friends	An optional list of lists of indices to use a friends
verbose	Run with verbose output of some of the internals in the calculations. This option will also enable <code>inla(..., verbose=TRUE)</code> if its not enabled already.
epsilon	Two correlations with a difference less than epsilon, will be classified as identical.
prior.diagonal	When <code>strategy="prior"</code> , <code>prior.diagonal</code> is added to the diagonal of the prior precision matrix to avoid singularities
keep	For <code>strategy="prior"</code> , then this gives a vector of the name of model-components TO USE when computing the groups. See the vignette for details. Not both of keep and remove can be defined.
remove	For <code>strategy="prior"</code> , then this gives a vector of the name of model-components NOT TO USE when computing the groups. See the vignette for details. Not both of keep and remove can be defined.
remove.fixed	For <code>strategy="prior"</code> , this is the default option which is in effect if both keep and remove are NULL. If TRUE, it will remove (or condition on) all fixed effects when computing the groups. See the vignette for details.

Value

The object returned is list related to leave-group-out cross-validation. See the vignette for details.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[control.compute\(\)](#)

inla.has_PROJ6	<i>PROJ6 detection</i>
----------------	------------------------

Description

Detect whether PROJ6 is available for INLA. Deprecated and always returns TRUE..

Usage

```
inla.has_PROJ6()
```

```
inla.not_for_PROJ6(fun)
```

```
inla.not_for_PROJ4(fun)
```

```
inla.fallback_PROJ6(fun)
```

```
inla.requires_PROJ6(fun)
```

Arguments

fun The name of the calling function

Details

inla.has_PROJ6 is called to check if PROJ6&GDAL3 are available.

Value

For inla.has_PROJ6, always returns TRUE. Previously: logical; TRUE if PROJ6 is available, FALSE otherwise

Functions

- inla.has_PROJ6(): **[Deprecated]**
- inla.not_for_PROJ6(): **[Deprecated]** Called to warn about using old PROJ4 features even though PROJ6 is available
- inla.not_for_PROJ4(): **[Deprecated]** Called to give an error when calling methods that are only available for PROJ6
- inla.fallback_PROJ6(): **[Deprecated]** Called to warn about falling back to using old PROJ4 methods when a PROJ6 method hasn't been implemented
- inla.requires_PROJ6(): **[Deprecated]** Called to give an error when PROJ6 is required but not available

Examples

```
## Not run:
inla.has_PROJ6()

## End(Not run)
```

inla.hyperpar

Improved estimates for the hyperparameters (classic-mode only)

Description

Improve the estimates of the posterior marginals for the hyperparameters of the model using the grid integration strategy. (classic-mode only)

Usage

```
inla.hyperpar(
  result,
  skip.configurations = TRUE,
  verbose = FALSE,
  dz = 0.75,
  diff.logdens = 15,
  h = NULL,
  restart = FALSE,
  quantiles = NULL,
  keep = FALSE
)
```

Arguments

<code>result</code>	An object of class <code>inla</code> , ie a result of a call to <code>inla()</code> in classic mode
<code>skip.configurations</code>	A boolean variable; skip configurations if the values at the main axis are too small. (Default TRUE)
<code>verbose</code>	Boolean indicating whether the inla program should run in a verbose mode.
<code>dz</code>	Step length in the standardized scale used in the construction of the grid, default 0.75.
<code>diff.logdens</code>	The difference of the log.density for the hyperparameters to stop numerical integration using <code>int.strategy='grid'</code> . Default 15
<code>h</code>	The step-length for the gradient calculations for the hyperparameters. Default 0.01.
<code>restart</code>	A boolean defining whether the optimizer should start again to find the mode or if it should use the mode contained in the object
<code>quantiles</code>	A vector of quantiles, to compute for each posterior marginal.
<code>keep</code>	A boolean variable indicating the working files (ini file, data files and results files) should be kept

Value

The object returned is the same as object but the estimates of the hyperparameters are replaced by improved estimates.

Note

This function might take a long time or if the number of hyperparameters in the model is large. If it complains and says I cannot get enough memory, try to increase the value of the argument `dz` or decrease `diff.logdens`.

Author(s)

Havard Rue <hrue@r-inla.org>

References

See the references in `inla`

See Also

[inla\(\)](#)

inla.hyperpar.sample	<i>Produce samples from the approximated joint posterior for the hyperparameters</i>
----------------------	--------------------------------------------------------------------------------------

Description

Produce samples from the approximated joint posterior for the hyperparameters

Usage

```
inla.hyperpar.sample(n, result, intern = FALSE, improve.marginals = FALSE)
```

Arguments

<code>n</code>	Integer. Number of samples required.
<code>result</code>	An inla-object, f.ex the output from an inla-call.
<code>intern</code>	Logical. If TRUE then produce samples in the internal scale for the hyperparameter, if FALSE then produce samples in the user-scale. (For example log-precision (intern) and precision (user-scale))
<code>improve.marginals</code>	Logical. If TRUE, then improve the samples taking into account possible better marginal estimates for the hyperparameters in <code>result</code> .

Value

A matrix where each sample is a row. The contents of the column is described in the rownames.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
n = 100
r = inla(y ~ 1 + f(idx), data = data.frame(y=rnorm(n), idx = 1:n))
ns = 500
x = inla.hyperpar.sample(ns, r)

rr = inla.hyperpar(r)
xx = inla.hyperpar.sample(ns, rr, improve.marginals=TRUE)
```

inla.identical.CRS	<i>Test CRS and inla.CRS for equality</i>
--------------------	-------------------------------------------

Description

Wrapper for identical, optionally testing only the CRS part of two objects Deprecated in favour of `fmesher::fm_crs_is_identical()`

Usage

```
inla.identical.CRS(...)
```

Arguments

... Arguments passed on to `fmesher::fm_crs_is_identical()`

inla.iidkd.sample	<i>Provide samples from the iidkd component (experimental)</i>
-------------------	----------------------------------------------------------------

Description

This function provide samples of the iidkd component using more interpretable parameters

Usage

```
inla.iidkd.sample(n = 10^4, result, name, return.cov = FALSE)
```

Arguments

n	Integer Number of samples to use
result	inla-object An object of class inla, ie a result of a call to inla()
name	Character The name of the iidkd component
return.cov	Logical Return samples of the covariance matrix instead of stdev/correlation matrix described below?

Value

A list of sampled matrices, with (default) correlations on the off-diagonal and standard-deviations on the diagonal

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

```
inla.doc("iidkd")
```

inla.knmodels *Spacetime interaction models*

Description

It implements the models in Knorr-Held, L. (2000) with three different constraint approaches: sum-to-zero, contrast or diagonal add.

Usage

```
inla.knmodels(
  formula,
  progress = FALSE,
  control.st = list(time, space, spacetime, graph, type = c(paste(1:4), paste0(2:4, "c")),
    paste0(2:4, "d")), diagonal = 1e-05, timeref = 1, spaceref = 1),
  ...,
  envir = parent.frame()
)
```

Arguments

- | | |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| formula | The formula specifying the other model components, without the spacetime interaction term. The spacetime interaction term will be added accordingly to the specification in the <code>control.st</code> argument. See <code>inla</code> |
| progress | If it is to be shown the model fitting progress. Useful if more than one interaction type is being fitted. |
| control.st | <p>Named list of arguments to control the spacetime interaction. It should contain:</p> <ul style="list-style-type: none"> time to be used as the index set for the main temporal effect which will be considered for the constraints when it is the case. space to be used as the index set for the main spatial effect which will be considered for the constraints when it is the case. spacetime to be the index set for the spacetime interaction effect. graph to be the graph for the spatial neighbor structure to be used in a <code>f()</code> term for the main spatial random effect term or for building the spacetime interaction model. type to specify the spacetime interaction type. 1 to 4 corresponds to the four interaction types in Knorr-Held, L. (2000) with all the needed sum-to-zero constraints. 2c, 3c and 4c are the contrast version considering the first time or space constrained to be equal to zero. 2d, 3d and 4d are the corresponding versions when considering the diagonal add approach. diagonal to be the value to be added to the diagonal when using the diagonal add approach. timeref to specify the time point to be the reference time in the contrast parametrization. spaceref to specify the area to be the reference for the contrast parametrization. <p>... where additional arguments can be passed to <code>f()</code> function. Specification of the hyperparameter, fixed or random, initial value, prior and its parameters for the spacetime interaction. See <code>?inla.models</code> and look for</p> |

generic0. By default we scale it and use the PC-prior to set the prior using the pc.prec prior with param = c(0.5, 0.5). See documentation with ?inla.doc("pc.prec").

... Arguments to be passed to the [inla\(\)](#) function.
 envir Environment in which to evaluate the ... arguments.

Value

inla.knmodels returns an object of class "inla". or a list of objects of this class if it is asked to compute more than one interaction type at once. Note: when the model type is 2c, 3c, 4c, 2d, 3d or 4d, it also includes linear combinations summary.

Author(s)

Elias T. Krainski

See Also

[inla.knmodels.sample\(\)](#) to sample from

Examples

```
### define space domain as a grid
grid <- SpatialGrid(GridTopology(c(0,0), c(1, 1), c(4, 5)))
(n <- nrow(xy <- coordinates(grid)))

### build a spatial neighborhood list
jj <- lapply(1:n, function(i)
  which(sqrt((xy[i,1]-xy[,1])^2 + (xy[i,2]-xy[,2])^2)==1))

### build the spatial adjacency matrix
graph <- sparseMatrix(rep(1:n, sapply(jj, length)),
  unlist(jj), x=1, dims=c(n, n))

### some random data at 10 time point
dat <- inla.knmodels.sample(graph, m=10, tau.t=2, tau.s=2, tau.st=3)
str(dat)
sapply(dat$x, summary)

nd <- length(dat$x$eta)
dat$e <- runif(nd, 0.9, 1.1)*rgamma(n, 40, 2)
dat$y <- rpois(nd, dat$e*exp(dat$x$eta-3))
summary(dat$y)

### fit the type 4 considering three different approaches
tgraph <- sparseMatrix(i=c(2:10, 1:9), j=c(1:9, 2:10), x=1)
res <- inla.knmodels(y ~ f(time, model='bym2', graph=tgraph) +
  f(space, model='bym2', graph=graph),
  data=dat, family='poisson', E=dat$E, progress=TRUE,
  control.st=list(time=time, space=space,
    spacetime=spacetime, graph=graph, type=c(4, '4c')),
  control.compute=list(dic=TRUE, waic=TRUE, cpo=TRUE))
sapply(res, function(x)
  c(dic=x$dic$dic, waic=x$waic$waic, cpo=-sum(log(x$cpo$cpo))))
```

inla.knmodels.sample *Spacetime interaction models sampler function*

Description

It implements the sampling method for the models in Knorr-Held, L. (2000) considering the algorithm 3.1 in Rue & Held (2005) book.

Usage

```
inla.knmodels.sample(
  graph,
  m,
  type = 4,
  intercept = 0,
  tau.t = 1,
  phi.t = 0.7,
  tau.s = 1,
  phi.s = 0.7,
  tau.st = 1,
  ev.t = NULL,
  ev.s = NULL
)
```

Arguments

graph	Model graph definition
m	Time dimension.
type	Integer from 1 to 4 to identify one of the four interaction type.
intercept	A constant to be added to the linear predictor
tau.t	Precision parameter for the main temporal effect.
phi.t	Mixing parameter in the bym2 model assumed for the main temporal effect.
tau.s	Precision parameter for the main spatial effect.
phi.s	Mixing parameter in the bym2 model assumed for the main spatial effect.
tau.st	Precision parameter for the spacetime effect.
ev.t	Eigenvalues and eigenvectors of the temporal precision matrix structure.
ev.s	Eigenvalues and eigenvectors of the spatial precision matrix structure.

Value

A list with the following elements

time	The time index for each observation, with length equals $m \times n$.
space	The spatial index for each observation, with length equals $m \times n$.
spacetime	The spacetime index for each observation, with length equals $m \times n$.
x	A list with the following elements
t.iid	The unstructured main temporal effect part.

t.str	The structured main temporal effect part.
t	The main temporal effect with length equals 2m.
s.iid	The unstructured main spatial effect part.
s.str	The structured main spatial effect part.
s	The main spatial effect with length equals 2n.
st	The spacetime interaction effect with length m*n.
eta	The linear predictor with length n*m.

Author(s)

Elias T. Krainski

See Also

[inla.knmodels\(\)](#) for model fitting

inla.ks.plot	<i>Kolmogorov-Smirnov Test Plots</i>
--------------	--------------------------------------

Description

Illustrate a one-sample Kolmogorov-Smirnov test by plotting the empirical distribution deviation.

Usage

```
inla.ks.plot(x, y, diff = TRUE, ...)
```

Arguments

x	a numeric vector of data values.
y	a cumulative distribution function such as 'pnorm'.
diff	logical, indicating if the normalised difference should be plotted. If FALSE, the absolute distribution functions are plotted.
...	additional arguments for ks.test() , ignored in the plotting. In particular, only two-sided tests are illustrated.

Details

In addition to the (normalised) empirical distribution deviation, lines for the K-S test statistic are drawn, as well as \pm two standard deviations around the expectation under the null hypothesis.

Value

A list with class "htest", as generated by [ks.test\(\)](#)

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[ks.test\(\)](#)

Examples

```
## Check for N(0,1) data
data = rowSums(matrix(runif(100*12)*2-1,100,12))/2
inla.ks.plot(data, pnorm)

## Not run:
## Check the goodness-of-fit of cross-validated predictions
result = inla(..., control.predictor=list(cpo=TRUE))
inla.ks.plot(result$pit, punif)

## End(Not run)
```

inla.likelihood	<i>Providing functions for sampling new data, evaluating pdf, cdf, and quantiles for new data.</i>
-----------------	----------------------------------------------------------------------------------------------------

Description

This function return function to compute the pdf,cdf,quantiles, or samples for new data using the likelihood from a inla-object.

Usage

```
inla.likelihood(type = c("d", "p", "r", "q", "s"), args)
```

Arguments

type	The returned function type. The definition is similar to "rnorm","dnorm","pnorm",and "dnorm".
args	It is usually a return value from "inla.likelihood.parser", which specifies parameters, link function and transformation function of hyperparameters.

Value

value goes here

Author(s)

Havard Rue <hrue@r-inla.org>

inla.list.models	<i>List available model components, likelihoods, priors, etc</i>
------------------	------------------------------------------------------------------

Description

List available model components, likelihoods, priors, etc. To read specific documentation for the individual elements, use [inla.doc\(\)](#).

The list is cat'ed with ... arguments.

This function is EXPERIMENTAL.

Usage

```
inla.list.models(section = names(inla.models()), ...)
```

Arguments

section	The section(s) to list, missing section will list all sections. <code>names(inla.models())</code> lists available sections.
...	Additional argument to cat

Value

Nothing is returned

Author(s)

Havard Rue

Examples

```
## Not run:
inla.list.models("likelihood")
inla.list.models(c("prior", "group"))
inla.list.models(file=file("everything.txt"))

#Show detailed doc for a specific prior/likelihood/latent model
inla.doc("binomial")

## End(Not run)
```

inla.matern.cov

Numerical evaluation of Matern and related covariance functions.

Description

Calculates covariance and correlation functions for Matern models and related oscillating SPDE models, on R^d and on the sphere, S^2 .

Usage

```
inla.matern.cov(
  nu,
  kappa,
  x,
  d = 1,
  corr = FALSE,
  norm.corr = FALSE,
  theta,
  epsilon = 1e-08
)
```

```
inla.matern.cov.s2(nu, kappa, x, norm.corr = FALSE, theta = 0, freq.max = NULL)
```

Arguments

nu	The Matern smoothness parameter.
kappa	The spatial scale parameter.
x	Distance values.
d	Space dimension; the domain is R^d .
corr	If TRUE, calculate correlations, otherwise calculate covariances. Only used for pure Matern models (i.e. with $\theta = 0$).
norm.corr	If TRUE, normalise by the estimated variance, giving approximate correlations.
theta	Oscillation strength parameter.
epsilon	Tolerance for detecting points close to distance zero.
freq.max	The maximum allowed harmonic order. Current default 40, to be changed to a dynamic choice based on error bounds.

Details

On R^d , the models are *defined* by the spectral density given by

$$S(w) = \frac{1}{(2\pi)^d (\kappa^4 + 2\kappa^2 \cos(\pi\theta) |w|^2 + |w|^4)^{(\nu+d/2)/2}}$$

On S^2 , the models are *defined* by the spectral coefficients

$$S(k) = \frac{2k+1}{4\pi (\kappa^4 + 2\kappa^2 \cos(\pi\theta) k(k+1) + k^2(k+1)^2)^{(\nu+1)/2}}$$

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

inla.mdata*Create an mdata-object for INLA*

Description

This defines an mdata-object for matrix valued response-families

Usage

```
inla.mdata(y, ...)  
  
## S3 method for class 'inla.mdata'  
print(x, ...)  
  
as.inla.mdata(object)  
  
is.inla.mdata(object)
```

Arguments

y	The response vector/matrix
...	Additional vectors/matrices of same length as y
x	An mdata object
object	Any R-object

Value

An object of class `inla.mdata`. There is method for `print`.
`is.inla.mdata` returns TRUE if object inherits from class `inla.mdata`, otherwise FALSE.
`as.inla.mdata` returns an object of class `inla.mdata`

Note

It is often required to set `Y=inla.mdata(...)` and then define the formula as `Y~...`, especially when used with `inla.stack`.

Author(s)

Havard Rue

See Also

[inla\(\)](#)

inla.mesh.1d

*Function space definition objects for 1D SPDE models.***Description**

[Deprecated] in favour of `fmesher::fm_mesh_1d()`

Create a 1D mesh specification `inla.mesh.1d` object, that defines a function space for 1D SPDE models.

Usage

```
inla.mesh.1d(
  loc,
  interval = range(loc),
  boundary = NULL,
  degree = 1,
  free.clamped = FALSE,
  ...
)

inla.mesh.1d.fem(mesh)
```

Arguments

<code>loc</code>	B-spline knot locations.
<code>interval</code>	Interval domain endpoints.
<code>boundary</code>	Boundary condition specification. Valid conditions are <code>c('neumann', 'dirichlet', 'free', 'cyclic')</code> . Two separate values can be specified, one applied to each endpoint.
<code>degree</code>	The B-spline basis degree. Supported values are 0, 1, and 2.
<code>free.clamped</code>	If TRUE, for 'free' boundaries, clamp the basis functions to the interval endpoints.
<code>...</code>	Additional option, currently unused.
<code>mesh</code>	An <code>inla.mesh.1d</code> object

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

inla.mesh.1d.bary	<i>Mapping matrix for 1D meshes</i>
-------------------	-------------------------------------

Description

Calculates barycentric coordinates and weight matrices for `inla.mesh.1d()` objects.

Usage

```
inla.mesh.1d.bary(mesh, loc, method = c("linear", "nearest"))

inla.mesh.1d.A(mesh, loc, weights = NULL, derivatives = NULL, method = NULL)
```

Arguments

mesh	An <code>inla.mesh.1d()</code> object.
loc	Coordinate values.
method	Interpolation method. If not specified for <code>inla.mesh.1d.A</code> (recommended), it is determined by the mesh basis function properties.
weights	Weights to be applied to the A matrix rows.
derivatives	If TRUE, also compute derivative weight matrices dA and d2A.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

inla.mesh.2d	<i>High-quality triangulations</i>
--------------	------------------------------------

Description

[Deprecated] in favour of `fmesher::fm_mesh_2d_inla()`.

Create a triangle mesh based on initial point locations, specified or automatic boundaries, and mesh quality parameters.

Usage

```
inla.mesh.2d(
  loc = NULL,
  loc.domain = NULL,
  offset = NULL,
  n = NULL,
  boundary = NULL,
  interior = NULL,
  max.edge = NULL,
  min.angle = NULL,
  cutoff = 1e-12,
  max.n.strict = NULL,
```

```

    max.n = NULL,
    plot.delay = NULL,
    crs = NULL
  )

```

Arguments

<code>loc</code>	Matrix of point locations to be used as initial triangulation nodes. Can alternatively be a <code>SpatialPoints</code> or <code>SpatialPointsDataFrame</code> object.
<code>loc.domain</code>	Matrix of point locations used to determine the domain extent. Can alternatively be a <code>SpatialPoints</code> or <code>SpatialPointsDataFrame</code> object.
<code>offset</code>	The automatic extension distance. One or two values, for an inner and an optional outer extension. If negative, interpreted as a factor relative to the approximate data diameter (default=-0.10???)
<code>n</code>	The number of initial nodes in the automatic extensions (default=16)
<code>boundary</code>	A list of one or two <code>inla.mesh.segment()</code> objects describing domain boundaries.
<code>interior</code>	An <code>inla.mesh.segment()</code> object describing desired interior edges.
<code>max.edge</code>	The largest allowed triangle edge length. One or two values.
<code>min.angle</code>	The smallest allowed triangle angle. One or two values. (Default=21)
<code>cutoff</code>	The minimum allowed distance between points. Point at most as far apart as this are replaced by a single vertex prior to the mesh refinement step.
<code>max.n.strict</code>	The maximum number of vertices allowed, overriding <code>min.angle</code> and <code>max.edge</code> (default=-1, meaning no limit). One or two values, where the second value gives the number of additional vertices allowed for the extension.
<code>max.n</code>	The maximum number of vertices allowed, overriding <code>max.edge</code> only (default=-1, meaning no limit). One or two values, where the second value gives the number of additional vertices allowed for the extension.
<code>plot.delay</code>	On Linux (and Mac if appropriate X11 libraries are installed), specifying a non-negative numeric value activates a rudimentary plotting system in the underlying <code>fmesher</code> program, showing the triangulation algorithm at work, with waiting time factor <code>plot.delay</code> between each step. On all systems, specifying any negative value activates displaying the result after each step of the multi-step domain extension algorithm.
<code>crs</code>	An optional CRS or <code>inla.CRS</code> object

Value

An `inla.mesh` object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`inla.mesh.create()`, `inla.delaunay()`, `inla.nonconvex.hull()`

Examples

```
loc <- matrix(runif(10 * 2), 10, 2)

if (require("splancs")) {
  boundary <- list(
    inla.nonconvex.hull(loc, 0.1, 0.15),
    inla.nonconvex.hull(loc, 0.2, 0.2)
  )
  offset <- NULL
} else {
  boundary <- NULL
  offset <- c(0.1, 0.2)
}
mesh <- inla.mesh.2d(loc, boundary = boundary, offset = offset, max.edge = c(0.05, 0.1))

plot(mesh)
```

inla.mesh.assessment *Interactive mesh building and diagnostics*

Description

Assess the finite element approximation errors in a mesh for interactive R sessions. More detailed assessment tools are in [meshbuilder\(\)](#).

Usage

```
inla.mesh.assessment(mesh, spatial.range, alpha = 2, dims = c(500, 500))
```

Arguments

mesh	An inla.mesh
spatial.range	numeric; the spatial range parameter to use for the assessment
alpha	numeric; A valid inla.spde2.pcmatern alpha parameter
dims	2-numeric; the grid size

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

inla.mesh.2d, inla.mesh.create, meshbuilder

Examples

```
bnd <- inla.mesh.segment(cbind(
  c(0, 10, 10, 0, 0),
  c(0, 0, 10, 10, 0)
), bnd = TRUE)
mesh <- inla.mesh.2d(boundary = bnd, max.edge = 1)
out <- inla.mesh.assessment(mesh, spatial.range = 3, alpha = 2)
```

inla.mesh.basis *Basis functions for inla.mesh*

Description

[Deprecated] Use the `fmesher::fm_raw_basis()` instead.

Calculate basis functions on a 1d or 2d `inla.mesh()`

Usage

```
inla.mesh.basis(
  mesh,
  type = "b.spline",
  n = 3,
  degree = 2,
  knot.placement = "uniform.area",
  rot.inv = TRUE,
  boundary = "free",
  free.clamped = TRUE,
  ...
)
```

Arguments

mesh	An <code>inla.mesh.1d</code> or <code>inla.mesh</code> object.
type	b.spline (default) for B-spline basis functions, sph.harm for spherical harmonics (available only for meshes on the sphere)
n	For B-splines, the number of basis functions in each direction (for 1d meshes n must be a scalar, and for planar 2d meshes a 2-vector). For spherical harmonics, n is the maximal harmonic order.
degree	Degree of B-spline polynomials. See <code>inla.mesh.1d()</code> .
knot.placement	For B-splines on the sphere, controls the latitudinal placements of knots. "uniform.area" (default) gives uniform spacing in $\sin(\text{latitude})$, "uniform.latitude" gives uniform spacing in latitudes.
rot.inv	For spherical harmonics on a sphere, rot.inv=TRUE gives the rotationally invariant subset of basis functions.
boundary	Boundary specification, default is free boundaries. See <code>inla.mesh.1d()</code> for more information.
free.clamped	If TRUE and boundary is "free", the boundary basis functions are clamped to 0/1 at the interval boundary by repeating the boundary knots.
...	Unused

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`inla.mesh.1d()` `inla.mesh.2d()`

Examples

```

n <- 100
loc <- matrix(runif(n * 2), n, 2)
mesh <- inla.mesh.2d(loc, max.edge = 0.05)
basis <- inla.mesh.basis(mesh, n = c(4, 5))

proj <- inla.mesh.projector(mesh)
image(proj$x, proj$y, inla.mesh.project(proj, basis[, 7]))

if (require(rgl)) {
  plot(mesh, rgl = TRUE, col = basis[, 7], draw.edges = FALSE, draw.vertices = FALSE)
}

```

inla.mesh.boundary	<i>Constraint segment extraction for inla.mesh</i>
--------------------	----------------------------------------------------

Description

Constructs an list of `inla.mesh.segment` object from boundary or interior constraint information in an `inla.mesh()` object.

Usage

```

inla.mesh.boundary(mesh, grp = NULL)

inla.mesh.interior(mesh, grp = NULL)

```

Arguments

mesh	An <code>inla.mesh</code> object.
grp	Group indices to extract. If <code>NULL</code> , all boundary/interior constrain groups are extracted.

Value

A list of `inla.mesh.segment` objects.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.segment\(\)](#), [inla.mesh.create\(\)](#), [inla.mesh.create.helper\(\)](#)

Examples

```

loc <- matrix(runif(100 * 2) * 1000, 100, 2)
mesh <- inla.mesh.create.helper(points.domain = loc, max.edge = c(50, 500))
boundary <- inla.mesh.boundary(mesh)
interior <- inla.mesh.interior(mesh)

```

inla.mesh.components *Compute connected mesh subsets*

Description

Compute subsets of vertices and triangles in an inla.mesh object that are connected by edges.

Usage

```
inla.mesh.components(mesh)
```

Arguments

mesh An inla.mesh object

Value

A list with elements vertex and triangle, vectors of integer labels for which connected component they belong, and info, a data.frame with columns

component	Connected component integer label.
nV	The number of vertices in the component.
nT	The number of triangles in the component.
area	The surface area associated with the component. Component labels are not comparable across different meshes, but some ordering stability is guaranteed by initiating each component from the lowest numbered triangle whenever a new component is initiated.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.2d\(\)](#), [inla.mesh.create\(\)](#)

Examples

```
# Construct two simple meshes:
loc <- matrix(c(0, 1, 0, 1), 2, 2)
mesh1 <- inla.mesh.2d(loc = loc, max.edge = 0.1)
bnd <- inla.nonconvex.hull(loc, 0.3)
mesh2 <- inla.mesh.2d(boundary = bnd, max.edge = 0.1)

# Compute connectivity information:
conn1 <- inla.mesh.components(mesh1)
conn2 <- inla.mesh.components(mesh2)
# One component, simply connected mesh
conn1$info
# Two disconnected components
conn2$info
```

```
# Extract the subset mesh for the largest component:
# (Note: some information is lost, such as fixed segments,
# and boundary edge labels.)
maxi <- conn2$info$component[which.max(conn2$info$area)]
mesh3 <- inla.mesh.create(
  loc = mesh2$loc,
  tv = mesh2$graph$tv[conn2$triangle == maxi, , drop = FALSE]
)
```

inla.mesh.components *Compute connected mesh subsets*

Description

Compute subsets of vertices and triangles in an inla.mesh object that are connected by edges.

Usage

```
inla.mesh.components(mesh)
```

Value

A list with elements `vertex` and `triangle`, vectors of integer labels for which connected component they belong, and `info`, a data.frame with columns

<code>component</code>	Connected component integer label.
<code>nV</code>	The number of vertices in the component.
<code>nT</code>	The number of triangles in the component.
<code>area</code>	The surface area associated with the component. Component labels are not comparable across different meshes, but some ordering stability is guaranteed by initiating each component from the lowest numbered triangle whenever a new component is initiated.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

inla.mesh.2d, inla.mesh.create

Examples

```
# Construct two simple meshes:
loc <- matrix(c(0,1,0,1), 2, 2)
mesh1 <- inla.mesh.2d(loc = loc, max.edge=0.1)
bnd <- inla.nonconvex.hull(loc, 0.3)
mesh2 <- inla.mesh.2d(boundary = bnd, max.edge=0.1)

# Compute connectivity information:
conn1 <- inla.mesh.components(mesh1)
conn2 <- inla.mesh.components(mesh2)
# One component, simply connected mesh
```

```

conn1$info
# Two disconnected components
conn2$info

# Extract the subset mesh for the largest component:
# (Note: some information is lost, such as fixed segments,
# and boundary edge labels.)
maxi <- conn2$info$component[which.max(conn2$info$area)]
mesh3 <- inla.mesh.create(loc = mesh2$loc,
                          tv = mesh2$graph$tv[conn2$triangle == maxi,,drop=FALSE])

```

inla.mesh.create	<i>Low level function for high-quality triangulations</i>
------------------	-----------------------------------------------------------

Description

[Deprecated] in favour of `fmesher::fm_rcdt_2d_inla()`.

Create a constrained refined Delaunay triangulation (CRDT) for a set of spatial locations.

`inla.mesh.create` generates triangular meshes on subsets of R^2 and S^2 . Use the higher level wrapper function `inla.mesh.2d()` for greater control over mesh resolution and coarser domain extensions.

`inla.delaunay` is a wrapper function for obtaining the convex hull of a point set and calling `inla.mesh.create` to generate the classical Delaunay triangulation.

Usage

```

inla.mesh.create(
  loc = NULL,
  tv = NULL,
  boundary = NULL,
  interior = NULL,
  extend = (missing(tv) || is.null(tv)),
  refine = FALSE,
  lattice = NULL,
  globe = NULL,
  cutoff = 1e-12,
  plot.delay = NULL,
  data.dir = NULL,
  keep = (!missing(data.dir) && !is.null(data.dir)),
  timings = FALSE,
  quality.spec = NULL,
  crs = NULL
)

inla.delaunay(loc, ...)

```

Arguments

<code>loc</code>	Matrix of point locations. Can alternatively be a <code>SpatialPoints</code> or <code>SpatialPointsDataFrame</code> object.
<code>tv</code>	A triangle-vertex index matrix, specifying an existing triangulation.

boundary	A list of <code>inla.mesh.segment</code> objects, generated by <code>inla.mesh.segment()</code> , specifying boundary constraint segments.
interior	A list of <code>inla.mesh.segment</code> objects, generated by <code>inla.mesh.segment()</code> , specifying interior constraint segments.
extend	logical or list specifying whether to extend the data region, with parameters list("n") the number of edges in the extended boundary (default=8) list("offset") the extension distance. If negative, interpreted as a factor relative to the approximate data diameter (default=-0.10) Setting to FALSE is only useful in combination lattice or boundary.
refine	logical or list specifying whether to refine the triangulation, with parameters list("min.angle") the minimum allowed interior angle in any triangle. The algorithm is guaranteed to converge for min.angle at most 21 (default=21) list("max.edge") the maximum allowed edge length in any triangle. If negative, interpreted as a relative factor in an ad hoc formula depending on the data density (default=Inf) list("max.n.strict") the maximum number of vertices allowed, overriding min.angle and max.edge (default=-1, meaning no limit) list("max.n") the maximum number of vertices allowed, overriding max.edge only (default=-1, meaning no limit)
lattice	An <code>inla.mesh.lattice</code> object, generated by <code>inla.mesh.lattice()</code> , specifying points on a regular lattice.
globe	Subdivision resolution for a semi-regular spherical triangulation with equidistant points along equidistant latitude bands.
cutoff	The minimum allowed distance between points. Point at most as far apart as this are replaced by a single vertex prior to the mesh refinement step.
plot.delay	On Linux (and Mac if appropriate X11 libraries are installed), specifying a numeric value activates a rudimentary plotting system in the underlying <code>fmesh</code> program, showing the triangulation algorithm at work.
data.dir	Where to store the <code>fmesh</code> data files. Defaults to <code>tempdir()</code> if <code>keep</code> is FALSE, otherwise <code>"inla.mesh.data"</code> .
keep	TRUE if the data files should be kept in <code>data.dir</code> or deleted afterwards. Defaults to true if <code>data.dir</code> is specified, otherwise false. Warning: If <code>keep</code> is false, <code>data.dir</code> and its contents will be deleted (unless set to <code>tempdir()</code>).
timings	If TRUE, obtain timings for the mesh construction.
quality.spec	List of vectors of per vertex max.edge target specification for each location in loc, boundary/interior (segm), and lattice. Only used if refining the mesh.
crs	An optional CRS or <code>inla.CRS</code> object
...	Optional parameters passed on to <code>inla.mesh.create</code> .

Value

An `inla.mesh` object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.2d\(\)](#), [inla.mesh.1d\(\)](#), [inla.mesh.segment\(\)](#), [inla.mesh.lattice\(\)](#), [inla.mesh.query\(\)](#)

Examples

```
loc <- matrix(runif(10 * 2), 10, 2)

mesh <- inla.delaunay(loc)
plot(mesh)

mesh <- inla.mesh.create(loc,
  interior = inla.mesh.segment(idx = 1:2),
  extend = TRUE,
  refine = list(max.edge = 0.1)
)
plot(mesh)

loc2 <- matrix(c(0, 1, 1, 0, 0, 0, 1, 1), 4, 2)
mesh2 <- inla.mesh.create(
  loc = loc,
  boundary = inla.mesh.segment(loc2),
  interior = inla.mesh.segment(idx = 1:2),
  quality.spec = list(segm = 0.2, loc = 0.05),
  refine = list(min.angle = 26)
)
plot(mesh2)
```

inla.mesh.deriv

Directional derivative matrices for functions on meshes.

Description

Calculates directional derivative matrices for functions on [inla.mesh\(\)](#) objects.

Usage

```
inla.mesh.deriv(mesh, loc)
```

Arguments

mesh	An inla.mesh() object.
loc	Coordinates where the derivatives should be evaluated.

Value

A	The projection matrix, $u(\text{loc}_i) = \sum_j A_{ij} w_i$
dx, dy, dz	Derivative weight matrices, $du/dx(\text{loc}_i) = \sum_j dx_{ij} w_i$, etc.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

inla.mesh.fem	<i>Finite element matrices</i>
---------------	--------------------------------

Description

Constructs finite element matrices for `inla.mesh()` and `inla.mesh.1d()` objects.

Usage

```
inla.mesh.fem(mesh, order = 2)
```

Arguments

mesh	An <code>inla.mesh()</code> or <code>inla.mesh.1d()</code> object.
order	The model order.

Value

A list of sparse matrices based on basis functions `psi_i`:

<code>c0</code>	$c0[i,j] = \langle \text{psi}_i, 1 \rangle$
<code>c1</code>	$c1[i,j] = \langle \text{psi}_i, \text{psi}_j \rangle$
<code>g1</code>	$g1[i,j] = \langle \text{grad psi}_i, \text{grad psi}_j \rangle$
<code>g2</code>	$g2 = g1 * c0^{-1} * g1$
<code>gk</code>	$gk = g1 * (c0^{-1} * g1)^{(k-1)}$, up to and including $k=\text{order}$

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`inla.mesh.1d.fem()`

inla.mesh.lattice	<i>Lattice grids for inla.mesh</i>
-------------------	------------------------------------

Description

Construct a lattice grid for `inla.mesh()`

Usage

```
inla.mesh.lattice(
  x = seq(0, 1, length.out = 2),
  y = seq(0, 1, length.out = 2),
  z = NULL,
  dims = if (is.matrix(x)) {
    dim(x)
  } else {
    c(length(x), length(y))
  },
  units = NULL,
  crs = NULL
)
```

Arguments

x	vector or grid matrix of x-values
y	vector of grid matrix of y-values
z	if x is a matrix, a grid matrix of z-values
dims	the size of the grid, length 2 vector
units	One of c("default", "longlat", "longsinlat").
crs	An optional CRS or inla.CRS object

Value

An inla.mesh.lattice object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh\(\)](#)

Examples

```
lattice <- inla.mesh.lattice(seq(0, 1, length.out = 17), seq(0, 1, length.out = 10))

## Use the lattice "as-is", without refinement:
mesh <- inla.mesh.create(lattice = lattice, boundary = lattice$segm)
mesh <- inla.mesh.create(lattice = lattice, extend = FALSE)
plot(mesh)

## Refine the triangulation, with limits on triangle angles and edges:
mesh <- inla.mesh.create(
  lattice = lattice,
  refine = list(max.edge = 0.08),
  extend = FALSE
)
plot(mesh)

## Add an extension around the lattice, but maintain the lattice edges:
```

```

mesh <- inla.mesh.create(
  lattice = lattice,
  refine = list(max.edge = 0.08),
  interior = lattice$segm
)
plot(mesh)

## Only add extension:
mesh <- inla.mesh.create(lattice = lattice, refine = list(max.edge = 0.08))
plot(mesh)

```

inla.mesh.map.lim	<i>Coordinate mappings for inla.mesh projections.</i>
-------------------	-------------------------------------------------------

Description

Calculates coordinate mappings for inla.mesh projections.

Usage

```

inla.mesh.map.lim(
  loc = NULL,
  projection = c("default", "longlat", "longsinlat", "mollweide")
)

inla.mesh.map(
  loc,
  projection = c("default", "longlat", "longsinlat", "mollweide"),
  inverse = TRUE
)

```

Arguments

loc	Coordinates to be mapped.
projection	The projection type.
inverse	If TRUE, loc are map coordinates and coordinates in the mesh domain are calculated. If FALSE, loc are coordinates in the mesh domain and the forward map projection is calculated.

Value

For inla.mesh.map.lim, a list:

xlim	X axis limits in the map domain
ylim	Y axis limits in the map domain

No attempt is made to find minimal limits for partial spherical domains.

Functions

- inla.mesh.map.lim(): Projection extent limit calculations

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.project\(\)](#)

inla.mesh.project	<i>Methods for projecting to/from an inla.mesh</i>
-------------------	----------------------------------------------------

Description

Calculate a lattice projection to/from an [inla.mesh\(\)](#). Deprecated in favour of `fmesher::fm_evaluate()` and `fmesher::fm_evaluator()`.

The call `inla.mesh.project(mesh, loc, field=..., ...)`, is a shortcut to `inla.mesh.project(inla.mesh.projector(mesh, loc), field)`.

Usage

```
inla.mesh.project(...)

## S3 method for class 'inla.mesh'
inla.mesh.project(mesh, loc = NULL, field = NULL, crs = NULL, ...)

## S3 method for class 'inla.mesh.1d'
inla.mesh.project(mesh, loc, field = NULL, ...)

## S3 method for class 'inla.mesh.projector'
inla.mesh.project(projector, field, ...)

inla.mesh.projector(...)

## S3 method for class 'inla.mesh'
inla.mesh.projector(
  mesh,
  loc = NULL,
  lattice = NULL,
  xlim = NULL,
  ylim = NULL,
  dims = c(100, 100),
  projection = NULL,
  crs = NULL,
  ...
)

## S3 method for class 'inla.mesh.1d'
inla.mesh.projector(mesh, loc = NULL, xlim = mesh$interval, dims = 100, ...)
```

Arguments

<code>...</code>	Additional arguments passed on to methods.
<code>mesh</code>	An <code>inla.mesh()</code> or <code>inla.mesh.1d()</code> object.
<code>loc</code>	Projection locations. Can be a matrix or a <code>SpatialPoints</code> or a <code>SpatialPointsDataFrame</code> object.
<code>field</code>	Basis function weights, one per mesh basis function, describing the function to be evaluated at the projection locations. Function values for on the mesh
<code>crs</code>	An optional CRS or <code>inla.CRS</code> object associated with <code>loc</code> and/or <code>lattice</code> .
<code>projector</code>	An <code>inla.mesh.projector</code> object.
<code>lattice</code>	An <code>inla.mesh.lattice()</code> object.
<code>xlim</code>	X-axis limits for a lattice. For R2 meshes, defaults to covering the domain.
<code>ylim</code>	Y-axis limits for a lattice. For R2 meshes, defaults to covering the domain.
<code>dims</code>	Lattice dimensions.
<code>projection</code>	One of <code>c("default", "longlat", "longsinlat", "mollweide")</code> .

Value

For `inla.mesh.project(mesh, ...)`, a list with projection information. For `inla.mesh.projector(mesh, ...)`, an `inla.mesh.projector` object. For `inla.mesh.project(projector, field, ...)`, a field projected from the mesh onto the locations given by the projector object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh\(\)](#), [inla.mesh.1d\(\)](#), [inla.mesh.lattice\(\)](#)

Examples

```
n <- 20
loc <- matrix(runif(n * 2), n, 2)
mesh <- inla.mesh.create(loc, refine = list(max.edge = 0.05))
proj <- inla.mesh.projector(mesh)
field <- cos(mesh$loc[, 1] * 2 * pi * 3) * sin(mesh$loc[, 2] * 2 * pi * 7)
image(proj$x, proj$y, inla.mesh.project(proj, field))

if (require(rgl)) {
  plot(mesh, rgl = TRUE, col = field, draw.edges = FALSE, draw.vertices = FALSE)
}
```

inla.mesh.query *High-quality triangulations*

Description

Query information about an inla.mesh object.

Usage

```
inla.mesh.query(mesh, ...)
```

Arguments

mesh	An inla.mesh object.
...	Query arguments. <ul style="list-style-type: none"> • tt.neighbours Compute neighbour triangles for triangles; list of vectors: list(triangles, orders) • vt.neighbours Compute neighbour triangles for vertices; list of vectors: list(vertices, orders)

Value

A list of query results.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.create\(\)](#), [inla.mesh.segment\(\)](#), [inla.mesh.lattice\(\)](#)

Examples

```
loc <- matrix(c(0.1, 0.15), 1, 2)
lattice <- inla.mesh.lattice(dims = c(10, 10))
mesh <- inla.mesh.create(loc = loc, lattice = lattice, extend = FALSE)

vt <- which(inla.mesh.query(mesh,
  vt.neighbours = list(
    mesh$idx$loc,
    4:6
  )
)$vt.neighbours)

mesh2 <- inla.mesh.create(mesh$loc,
  tv = mesh$graph$tv[vt, , drop = FALSE],
  refine = FALSE, extend = FALSE
)
```

inla.mesh.segment	<i>Constraint segments for inla.mesh</i>
-------------------	------------------------------------------

Description

[Deprecated] in favour of `fmesher::fm_seg()`

Constructs `inla.mesh.segment` objects that can be used to specify boundary and interior constraint edges in calls to `inla.mesh()`.

Usage

```
inla.mesh.segment(...)

## Default S3 method:
inla.mesh.segment(
  loc = NULL,
  idx = NULL,
  grp = NULL,
  is.bnd = TRUE,
  crs = NULL,
  ...
)

## S3 method for class 'inla.mesh.segment'
inla.mesh.segment(..., grp.default = 0)

inla.contour.segment(
  x = seq(0, 1, length.out = nrow(z)),
  y = seq(0, 1, length.out = ncol(z)),
  z,
  nlevels = 10,
  levels = pretty(range(z, na.rm = TRUE), nlevels),
  groups = seq_len(length(levels)),
  positive = TRUE,
  eps = NULL,
  crs = NULL
)
```

Arguments

<code>...</code>	Additional parameters. When joining segments, a list of <code>inla.mesh.segment</code> objects.
<code>loc</code>	Matrix of point locations, or <code>SpatialPoints</code> , or <code>sf/sfc</code> point object.
<code>idx</code>	Segment index sequence vector or index pair matrix. The indices refer to the rows of <code>loc</code> . If <code>loc==NULL</code> , the indices will be interpreted as indices into the point specification supplied to <code>inla.mesh.create()</code> . If <code>is.bnd==TRUE</code> , defaults to linking all the points in <code>loc</code> , as <code>c(1:nrow(loc), 1L)</code> , otherwise <code>1:nrow(loc)</code> .
<code>grp</code>	Vector of group labels for each segment. Set to <code>NULL</code> to let the labels be chosen automatically in a call to <code>inla.mesh.create()</code> .

<code>is.bnd</code>	TRUE if the segments are boundary segments, otherwise FALSE.
<code>crs</code>	An optional CRS or <code>inla.CRS</code> object
<code>grp.default</code>	When joining segments, use this group label for segments that have <code>grp=NULL</code> .
<code>x, y, z, nlevels, levels</code>	Parameters specifying a set of surface contours, with syntax described in contour() .
<code>groups</code>	Vector of group ID:s, one for each contour level.
<code>positive</code>	TRUE if the contours should encircle positive level excursions in a counter clock-wise direction.
<code>eps</code>	Tolerance for inla.simplify.curve() .

Value

An `inla.mesh.segment` object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.create\(\)](#), [inla.mesh.2d\(\)](#)

Examples

```
## Create a square boundary and a diagonal interior segment
loc.bnd <- matrix(c(0, 0, 1, 0, 1, 1, 0, 1), 4, 2, byrow = TRUE)
loc.int <- matrix(c(0.9, 0.1, 0.1, 0.6), 2, 2, byrow = TRUE)
segm.bnd <- inla.mesh.segment(loc.bnd)
segm.int <- inla.mesh.segment(loc.int, is.bnd = FALSE)

## Points to be meshed
loc <- matrix(runif(10 * 2), 10, 2) * 0.9 + 0.05
mesh <- inla.mesh.create(loc,
  boundary = segm.bnd,
  interior = segm.int,
  refine = list()
)
plot(mesh)
## Not run:
mesh <- inla.mesh.create(loc, interior = list(segm.bnd, segm.int))
plot(mesh)

## End(Not run)
```

inla.models

*Valid models in INLA***Description**

This page describe the models implemented in inla, divided into sections: latent, group, scopy, mix, link, predictor, hazard, likelihood, prior, wrapper, lp.scale.

Usage

```
inla.models()
```

Value

Valid sections are: latent, group, scopy, mix, link, predictor, hazard, likelihood, prior, wrapper, lp.scale.

'latent'

Valid models in this section are:

Model 'linear'. Properties: **doc** = Alternative interface to an fixed effect

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
pdf = linear
```

Number of hyperparameters is 0.

Model 'iid'. Properties: **doc** = Gaussian random effects in dim=1

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
pdf = indep
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 1001

```
name = log precision
short.name = prec
prior = loggamma
```

```

param = 1 5e-05
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'mec'. Properties: **doc** = Classical measurement error model

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
pdf = mec

```

Number of hyperparameters is 4.

Hyperparameter 'theta1' hyperid = 2001

```

name = beta
short.name = b
prior = gaussian
param = 1 0.001
initial = 1
fixed = FALSE
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 2002

```

name = prec.u
short.name = prec
prior = loggamma
param = 1 1e-04
initial = 9.21034037197618
fixed = TRUE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta3' hyperid = 2003

```

name = mean.x
short.name = mu.x
prior = gaussian
param = 0 1e-04
initial = 0
fixed = TRUE
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta4' hyperid = 2004

```

name = prec.x

```

```

short.name = prec.x
prior = loggamma
param = 1 10000
initial = -9.21034037197618
fixed = TRUE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'meb'. Properties: doc = Berkson measurement error model

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
pdf = meb

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 3001

```

name = beta
short.name = b
prior = gaussian
param = 1 0.001
initial = 1
fixed = FALSE
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 3002

```

name = prec.u
short.name = prec
prior = loggamma
param = 1 1e-04
initial = 6.90775527898214
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'rgeneric'. Properties: doc = Generic latent model specified using R

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE

```

```
status = experimental
```

```
pdf = rgeneric
```

Number of hyperparameters is 0.

Model 'cgeneric'. Properties: doc = Generic latent model specified using C

```
constr = FALSE
```

```
nrow.ncol = FALSE
```

```
augmented = FALSE
```

```
aug.factor = 1
```

```
aug.constr = NULL
```

```
n.div.by = NULL
```

```
n.required = TRUE
```

```
set.default.values = TRUE
```

```
status = experimental
```

```
pdf = rgeneric
```

Number of hyperparameters is 0.

Model 'rw1'. Properties: doc = Random walk of order 1

```
constr = TRUE
```

```
nrow.ncol = FALSE
```

```
augmented = FALSE
```

```
aug.factor = 1
```

```
aug.constr = NULL
```

```
n.div.by = NULL
```

```
n.required = FALSE
```

```
set.default.values = FALSE
```

```
min.diff = 1e-05
```

```
pdf = rw1
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 4001

```
name = log precision
```

```
short.name = prec
```

```
prior = loggamma
```

```
param = 1 5e-05
```

```
initial = 4
```

```
fixed = FALSE
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Model 'rw2'. Properties: doc = Random walk of order 2

```
constr = TRUE
```

```
nrow.ncol = FALSE
```

```
augmented = FALSE
```

```
aug.factor = 1
```

```
aug.constr = NULL
```

```
n.div.by = NULL
```

```
n.required = FALSE
```

```
set.default.values = FALSE
```

```
min.diff = 0.001
```

```
pdf = rw2
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 5001

```
name = log precision
```

```
short.name = prec
```

```
prior = loggamma
```

```
param = 1 5e-05
```

```
initial = 4
```

```
fixed = FALSE
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Model 'crw2'. Properties: doc = Exact solution to the random walk of order 2

```
constr = TRUE
```

```
nrow.ncol = FALSE
```

```
augmented = FALSE
```

```
aug.factor = 2
```

```
aug.constr = 1
```

```
n.div.by = NULL
```

```
n.required = FALSE
```

```
set.default.values = FALSE
```

```
min.diff = 0.001
```

```
pdf = crw2
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 6001

```
name = log precision
```

```
short.name = prec
```

```
prior = loggamma
```

```
param = 1 5e-05
```

```
initial = 4
```

```
fixed = FALSE
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Model 'seasonal'. Properties: doc = Seasonal model for time series

```
constr = FALSE
```

```
nrow.ncol = FALSE
```

```
augmented = FALSE
```

```
aug.factor = 1
```

```
aug.constr = NULL
```

```
n.div.by = NULL
```

```
n.required = FALSE
```

```
set.default.values = FALSE
```

```
pdf = seasonal
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 7001

```

name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'besag'. Properties: doc = The Besag area model (CAR-model)

```

constr = TRUE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
pdf = besag

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 8001

```

name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'besag2'. Properties: doc = The shared Besag model

```

constr = TRUE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = 1 2
n.div.by = 2
n.required = TRUE
set.default.values = TRUE
pdf = besag2

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 9001

```

name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 4

```



```

    fixed = FALSE
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 9002
    name = scaling parameter
    short.name = a
    prior = loggamma
    param = 10 10
    initial = 0
    fixed = FALSE
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Model 'bym'. Properties: doc = The BYM-model (Besag-York-Mollier model)
    constr = TRUE
    nrow.ncol = FALSE
    augmented = TRUE
    aug.factor = 2
    aug.constr = 2
    n.div.by = NULL
    n.required = TRUE
    set.default.values = TRUE
    pdf = bym
    Number of hyperparameters is 2.
Hyperparameter 'theta1' hyperid = 10001
    name = log unstructured precision
    short.name = prec.unstruct
    prior = loggamma
    param = 1 5e-04
    initial = 4
    fixed = FALSE
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 10002
    name = log spatial precision
    short.name = prec.spatial
    prior = loggamma
    param = 1 5e-04
    initial = 4
    fixed = FALSE
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Model 'bym2'. Properties: doc = The BYM-model with the PC priors
    constr = TRUE
    nrow.ncol = FALSE
    augmented = TRUE

```

```

aug.factor = 2
aug.constr = 2
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
status = experimental
pdf = bym2

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 11001

```

name = log precision
short.name = prec
prior = pc.prec
param = 1 0.01
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 11002

```

name = logit phi
short.name = phi
prior = pc
param = 0.5 0.5
initial = -3
fixed = FALSE
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'besagproper'. Properties: **doc** = A proper version of the Besag model

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
status = experimental
pdf = besagproper

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 12001

```

name = log precision
short.name = prec
prior = loggamma
param = 1 5e-04
initial = 2
fixed = FALSE

```

```

to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 12002
  name = log diagonal
  short.name = diag
  prior = loggamma
  param = 1 1
  initial = 1
  fixed = FALSE
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)

```

Model 'besagproper2'. Properties: doc = An alternative proper version of the Besag model

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
status = experimental
pdf = besagproper2

```

Number of hyperparameters is 2.

```

Hyperparameter 'theta1' hyperid = 13001
  name = log precision
  short.name = prec
  prior = loggamma
  param = 1 5e-04
  initial = 2
  fixed = FALSE
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)

```

```

Hyperparameter 'theta2' hyperid = 13002
  name = logit lambda
  short.name = lambda
  prior = gaussian
  param = 0 0.45
  initial = 3
  fixed = FALSE
  to.theta = function(x) log(x / (1 - x))
  from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'fgn'. Properties: doc = Fractional Gaussian noise model

```

constr = FALSE
nrow.ncol = FALSE
augmented = TRUE

```

```

aug.factor = 5
aug.constr = 1
n.div.by = NULL
n.required = FALSE
set.default.values = TRUE
order.default = 4
order.defined = 3 4
pdf = fgn

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 13101

```

name = log precision
short.name = prec
prior = pc.prec
param = 3 0.01
initial = 1
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 13102

```

name = logit H
short.name = H
prior = pcfgnh
param = 0.9 0.1
initial = 2
fixed = FALSE
to.theta = function(x) log((2 * x - 1) / (2 * (1 - x)))
from.theta = function(x) 0.5 + 0.5 * exp(x) / (1 + exp(x))

```

Model 'fgn2'. Properties: doc = Fractional Gaussian noise model (alt 2)

```

constr = FALSE
nrow.ncol = FALSE
augmented = TRUE
aug.factor = 4
aug.constr = 1
n.div.by = NULL
n.required = FALSE
set.default.values = TRUE
order.default = 4
order.defined = 3 4
pdf = fgn

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 13111

```

name = log precision
short.name = prec
prior = pc.prec
param = 3 0.01

```

```

initial = 1
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 13112
  name = logit H
  short.name = H
  prior = pcfgnh
  param = 0.9 0.1
  initial = 2
  fixed = FALSE
  to.theta = function(x) log((2 * x - 1) / (2 * (1 - x)))
  from.theta = function(x) 0.5 + 0.5 * exp(x) / (1 + exp(x))
Model 'ar1'. Properties: doc = Auto-regressive model of order 1 (AR(1))
  constr = FALSE
  nrow.ncol = FALSE
  augmented = FALSE
  aug.factor = 1
  aug.constr = NULL
  n.div.by = NULL
  n.required = FALSE
  set.default.values = FALSE
  pdf = ar1
Number of hyperparameters is 3.
Hyperparameter 'theta1' hyperid = 14001
  name = log precision
  short.name = prec
  prior = loggamma
  param = 1 5e-05
  initial = 4
  fixed = FALSE
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 14002
  name = logit lag one correlation
  short.name = rho
  prior = normal
  param = 0 0.15
  initial = 2
  fixed = FALSE
  to.theta = function(x) log((1 + x) / (1 - x))
  from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta3' hyperid = 14003
  name = mean
  short.name = mean

```

```

prior = normal
param = 0 1
initial = 0
fixed = TRUE
to.theta = function(x) x
from.theta = function(x) x

```

Model 'ar1c'. Properties: doc = Auto-regressive model of order 1 w/covariates

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = TRUE
status = experimental
pdf = ar1c

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 14101

```

name = log precision
short.name = prec
prior = pc.prec
param = 1 0.01
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 14102

```

name = logit lag one correlation
short.name = rho
prior = pc.cor0
param = 0.5 0.5
initial = 2
fixed = FALSE
to.theta = function(x) log((1 + x) / (1 - x))
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1

```

Model 'ar'. Properties: doc = Auto-regressive model of order p (AR(p))

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE

```

```
pdf = ar
```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 15001

```
name = log precision
```

```
short.name = prec
```

```
initial = 4
```

```
fixed = FALSE
```

```
prior = pc.prec
```

```
param = 3 0.01
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Hyperparameter 'theta2' hyperid = 15002

```
name = pacf1
```

```
short.name = pacf1
```

```
initial = 1
```

```
fixed = FALSE
```

```
prior = pc.cor0
```

```
param = 0.5 0.5
```

```
to.theta = function(x) log((1 + x) / (1 - x))
```

```
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
```

Hyperparameter 'theta3' hyperid = 15003

```
name = pacf2
```

```
short.name = pacf2
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = pc.cor0
```

```
param = 0.5 0.4
```

```
to.theta = function(x) log((1 + x) / (1 - x))
```

```
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
```

Hyperparameter 'theta4' hyperid = 15004

```
name = pacf3
```

```
short.name = pacf3
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = pc.cor0
```

```
param = 0.5 0.3
```

```
to.theta = function(x) log((1 + x) / (1 - x))
```

```
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
```

Hyperparameter 'theta5' hyperid = 15005

```
name = pacf4
```

```
short.name = pacf4
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = pc.cor0
```

```
param = 0.5 0.2
```

```

    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta6' hyperid = 15006
    name = pacf5
    short.name = pacf5
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta7' hyperid = 15007
    name = pacf6
    short.name = pacf6
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta8' hyperid = 15008
    name = pacf7
    short.name = pacf7
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta9' hyperid = 15009
    name = pacf8
    short.name = pacf8
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta10' hyperid = 15010
    name = pacf9
    short.name = pacf9
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1

```



```

to.theta = function(x) log((1 + x) / (1 - x))
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta11' hyperid = 15011
  name = pacf10
  short.name = pacf10
  initial = 0
  fixed = FALSE
  prior = pc.cor0
  param = 0.5 0.1
  to.theta = function(x) log((1 + x) / (1 - x))
  from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1

```

Model 'ou'. Properties: **doc** = The Ornstein-Uhlenbeck process

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
pdf = ou

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' **hyperid** = 16001

```

name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' **hyperid** = 16002

```

name = log phi
short.name = phi
prior = normal
param = 0 0.2
initial = -1
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'intslope'. Properties: **doc** = Intecept-slope model with Wishart-prior

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1

```

```

aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = TRUE
status = experimental
pdf = intslope

```

Number of hyperparameters is 13.

Hyperparameter 'theta1' hyperid = 16101

```

name = log precision1
short.name = prec1
initial = 4
fixed = FALSE
prior = wishart2d
param = 4 1 1 0
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 16102

```

name = log precision2
short.name = prec2
initial = 4
fixed = FALSE
prior = none
param =
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta3' hyperid = 16103

```

name = logit correlation
short.name = cor
initial = 4
fixed = FALSE
prior = none
param =
to.theta = function(x) log((1 + x) / (1 - x))
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1

```

Hyperparameter 'theta4' hyperid = 16104

```

name = gamma1
short.name = g1
initial = 1
fixed = TRUE
prior = normal
param = 1 36
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta5' hyperid = 16105

```

name = gamma2

```

```

    short.name = g2
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 16106
    name = gamma3
    short.name = g3
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 16107
    name = gamma4
    short.name = g4
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 16108
    name = gamma5
    short.name = g5
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 16109
    name = gamma6
    short.name = g6
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 16110
    name = gamma7

```

```

    short.name = g7
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 16111
    name = gamma8
    short.name = g8
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 16112
    name = gamma9
    short.name = g9
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 16113
    name = gamma10
    short.name = g10
    initial = 1
    fixed = TRUE
    prior = normal
    param = 1 36
    to.theta = function(x) x
    from.theta = function(x) x
Model 'generic'. Properties: doc = A generic model
    constr = FALSE
    nrow.ncol = FALSE
    augmented = FALSE
    aug.factor = 1
    aug.constr = NULL
    n.div.by = NULL
    n.required = TRUE
    set.default.values = TRUE
    pdf = generic0
    Number of hyperparameters is 1.

```

Hyperparameter 'theta' hyperid = 17001

```
name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Model 'generic0'. Properties: doc = A generic model (type 0)

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
pdf = generic0
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 18001

```
name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Model 'generic1'. Properties: doc = A generic model (type 1)

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
pdf = generic1
```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 19001

```
name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
```

```

    initial = 4
    fixed = FALSE
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 19002
    name = beta
    short.name = beta
    initial = 2
    fixed = FALSE
    prior = gaussian
    param = 0 0.1
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Model 'generic2'. Properties: doc = A generic model (type 2)
    constr = FALSE
    nrow.ncol = FALSE
    augmented = FALSE
    aug.factor = 2
    aug.constr = 2
    n.div.by = NULL
    n.required = TRUE
    set.default.values = TRUE
    pdf = generic2
    Number of hyperparameters is 2.
Hyperparameter 'theta1' hyperid = 20001
    name = log precision cmatrix
    short.name = prec
    initial = 4
    fixed = FALSE
    prior = loggamma
    param = 1 5e-05
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 20002
    name = log precision random
    short.name = prec.random
    initial = 4
    fixed = FALSE
    prior = loggamma
    param = 1 0.001
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Model 'generic3'. Properties: doc = A generic model (type 3)
    constr = FALSE
    nrow.ncol = FALSE

```

```

augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
status = experimental
pdf = generic3

```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 21001

```

name = log precision1
short.name = prec1
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 21002

```

name = log precision2
short.name = prec2
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta3' hyperid = 21003

```

name = log precision3
short.name = prec3
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta4' hyperid = 21004

```

name = log precision4
short.name = prec4
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

```

Hyperparameter 'theta5' hyperid = 21005
  name = log precision5
  short.name = prec5
  initial = 4
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta6' hyperid = 21006
  name = log precision6
  short.name = prec6
  initial = 4
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta7' hyperid = 21007
  name = log precision7
  short.name = prec7
  initial = 4
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta8' hyperid = 21008
  name = log precision8
  short.name = prec8
  initial = 4
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta9' hyperid = 21009
  name = log precision9
  short.name = prec9
  initial = 4
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)

```


Hyperparameter 'theta10' hyperid = 21010

```
name = log precision10
short.name = prec10
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Hyperparameter 'theta11' hyperid = 21011

```
name = log precision common
short.name = prec.common
initial = 0
fixed = TRUE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Model 'spde'. Properties: doc = A SPDE model

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
pdf = spde
```

Number of hyperparameters is 4.

Hyperparameter 'theta1' hyperid = 22001

```
name = theta.T
short.name = T
initial = 2
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta2' hyperid = 22002

```
name = theta.K
short.name = K
initial = -2
fixed = FALSE
prior = normal
param = 0 1
```

```

    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 22003
    name = theta.KT
    short.name = KT
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 22004
    name = theta.OC
    short.name = OC
    initial = -20
    fixed = TRUE
    prior = normal
    param = 0 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Model 'spde2'. Properties: doc = A SPDE2 model
    constr = FALSE
    nrow.ncol = FALSE
    augmented = FALSE
    aug.factor = 1
    aug.constr = NULL
    n.div.by = NULL
    n.required = TRUE
    set.default.values = TRUE
    pdf = spde2
Number of hyperparameters is 100.
Hyperparameter 'theta1' hyperid = 23001
    name = theta1
    short.name = t1
    initial = 0
    fixed = FALSE
    prior = mvnorm
    param = 1 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta2' hyperid = 23002
    name = theta2
    short.name = t2
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 23003
    name = theta3
    short.name = t3
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 23004
    name = theta4
    short.name = t4
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 23005
    name = theta5
    short.name = t5
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 23006
    name = theta6
    short.name = t6
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 23007
    name = theta7
    short.name = t7
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 23008
    name = theta8
    short.name = t8
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 23009
    name = theta9
    short.name = t9
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 23010
    name = theta10
    short.name = t10
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 23011
    name = theta11
    short.name = t11
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 23012
    name = theta12
    short.name = t12
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 23013
    name = theta13
    short.name = t13
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta14' hyperid = 23014
    name = theta14
    short.name = t14
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta15' hyperid = 23015
    name = theta15
    short.name = t15
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta16' hyperid = 23016
    name = theta16
    short.name = t16
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta17' hyperid = 23017
    name = theta17
    short.name = t17
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta18' hyperid = 23018
    name = theta18
    short.name = t18
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta19' hyperid = 23019
    name = theta19
    short.name = t19
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta20' hyperid = 23020
    name = theta20
    short.name = t20
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta21' hyperid = 23021
    name = theta21
    short.name = t21
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta22' hyperid = 23022
    name = theta22
    short.name = t22
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta23' hyperid = 23023
    name = theta23
    short.name = t23
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta24' hyperid = 23024
    name = theta24
    short.name = t24
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta25' hyperid = 23025
    name = theta25
    short.name = t25
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta26' hyperid = 23026
    name = theta26
    short.name = t26
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta27' hyperid = 23027
    name = theta27
    short.name = t27
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta28' hyperid = 23028
    name = theta28
    short.name = t28
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta29' hyperid = 23029
    name = theta29
    short.name = t29
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta30' hyperid = 23030
    name = theta30
    short.name = t30
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta31' hyperid = 23031
    name = theta31
    short.name = t31
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta32' hyperid = 23032
    name = theta32
    short.name = t32
    initial = 0
    fixed = FALSE

```



```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta33' hyperid = 23033
    name = theta33
    short.name = t33
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta34' hyperid = 23034
    name = theta34
    short.name = t34
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta35' hyperid = 23035
    name = theta35
    short.name = t35
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta36' hyperid = 23036
    name = theta36
    short.name = t36
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta37' hyperid = 23037
    name = theta37
    short.name = t37
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta38' hyperid = 23038
    name = theta38
    short.name = t38
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta39' hyperid = 23039
    name = theta39
    short.name = t39
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta40' hyperid = 23040
    name = theta40
    short.name = t40
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta41' hyperid = 23041
    name = theta41
    short.name = t41
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta42' hyperid = 23042
    name = theta42
    short.name = t42
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta43' hyperid = 23043
    name = theta43
    short.name = t43
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta44' hyperid = 23044
    name = theta44
    short.name = t44
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta45' hyperid = 23045
    name = theta45
    short.name = t45
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta46' hyperid = 23046
    name = theta46
    short.name = t46
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta47' hyperid = 23047
    name = theta47
    short.name = t47
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta48' hyperid = 23048
    name = theta48
    short.name = t48
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta49' hyperid = 23049
    name = theta49
    short.name = t49
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta50' hyperid = 23050
    name = theta50
    short.name = t50
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta51' hyperid = 23051
    name = theta51
    short.name = t51
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta52' hyperid = 23052
    name = theta52
    short.name = t52
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta53' hyperid = 23053
    name = theta53
    short.name = t53
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta54' hyperid = 23054
    name = theta54
    short.name = t54
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta55' hyperid = 23055
    name = theta55
    short.name = t55
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta56' hyperid = 23056
    name = theta56
    short.name = t56
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta57' hyperid = 23057
    name = theta57
    short.name = t57
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta58' hyperid = 23058
    name = theta58
    short.name = t58
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta59' hyperid = 23059
    name = theta59
    short.name = t59
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta60' hyperid = 23060
    name = theta60
    short.name = t60
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta61' hyperid = 23061
    name = theta61
    short.name = t61
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta62' hyperid = 23062
    name = theta62
    short.name = t62
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta63' hyperid = 23063
    name = theta63
    short.name = t63
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta64' hyperid = 23064
    name = theta64
    short.name = t64
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta65' hyperid = 23065
    name = theta65
    short.name = t65
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta66' hyperid = 23066
    name = theta66
    short.name = t66
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta67' hyperid = 23067
    name = theta67
    short.name = t67
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta68' hyperid = 23068
    name = theta68
    short.name = t68
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta69' hyperid = 23069
    name = theta69
    short.name = t69
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta70' hyperid = 23070
    name = theta70
    short.name = t70
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta71' hyperid = 23071
    name = theta71
    short.name = t71
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta72' hyperid = 23072
    name = theta72
    short.name = t72
    initial = 0
    fixed = FALSE

```



```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta73' hyperid = 23073
    name = theta73
    short.name = t73
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta74' hyperid = 23074
    name = theta74
    short.name = t74
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta75' hyperid = 23075
    name = theta75
    short.name = t75
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta76' hyperid = 23076
    name = theta76
    short.name = t76
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta77' hyperid = 23077
    name = theta77
    short.name = t77
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta78' hyperid = 23078
    name = theta78
    short.name = t78
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta79' hyperid = 23079
    name = theta79
    short.name = t79
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta80' hyperid = 23080
    name = theta80
    short.name = t80
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta81' hyperid = 23081
    name = theta81
    short.name = t81
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta82' hyperid = 23082
    name = theta82
    short.name = t82
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta83' hyperid = 23083
    name = theta83
    short.name = t83
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta84' hyperid = 23084
    name = theta84
    short.name = t84
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta85' hyperid = 23085
    name = theta85
    short.name = t85
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta86' hyperid = 23086
    name = theta86
    short.name = t86
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta87' hyperid = 23087
    name = theta87
    short.name = t87
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta88' hyperid = 23088
    name = theta88
    short.name = t88
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta89' hyperid = 23089
    name = theta89
    short.name = t89
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta90' hyperid = 23090
    name = theta90
    short.name = t90
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta91' hyperid = 23091
    name = theta91
    short.name = t91
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta92' hyperid = 23092
    name = theta92
    short.name = t92
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta93' hyperid = 23093
    name = theta93
    short.name = t93
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta94' hyperid = 23094
    name = theta94
    short.name = t94
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta95' hyperid = 23095
    name = theta95
    short.name = t95
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta96' hyperid = 23096
    name = theta96
    short.name = t96
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta97' hyperid = 23097
    name = theta97
    short.name = t97
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta98' hyperid = 23098
    name = theta98
    short.name = t98
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta99' hyperid = 23099
    name = theta99
    short.name = t99
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta100' hyperid = 23100
    name = theta100
    short.name = t100
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Model 'spde3'. Properties: doc = A SPDE3 model
    constr = FALSE
    nrow.ncol = FALSE
    augmented = FALSE
    aug.factor = 1
    aug.constr = NULL
    n.div.by = NULL
    n.required = TRUE
    set.default.values = TRUE
    pdf = spde3
Number of hyperparameters is 100.
Hyperparameter 'theta1' hyperid = 24001
    name = theta1
    short.name = t1

```

```

    initial = 0
    fixed = FALSE
    prior = mvnorm
    param = 1 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta2' hyperid = 24002
    name = theta2
    short.name = t2
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 24003
    name = theta3
    short.name = t3
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 24004
    name = theta4
    short.name = t4
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 24005
    name = theta5
    short.name = t5
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 24006
    name = theta6
    short.name = t6

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 24007
    name = theta7
    short.name = t7
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 24008
    name = theta8
    short.name = t8
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 24009
    name = theta9
    short.name = t9
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 24010
    name = theta10
    short.name = t10
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 24011
    name = theta11
    short.name = t11

```



```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 24012
    name = theta12
    short.name = t12
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 24013
    name = theta13
    short.name = t13
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta14' hyperid = 24014
    name = theta14
    short.name = t14
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta15' hyperid = 24015
    name = theta15
    short.name = t15
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta16' hyperid = 24016
    name = theta16
    short.name = t16

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta17' hyperid = 24017
    name = theta17
    short.name = t17
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta18' hyperid = 24018
    name = theta18
    short.name = t18
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta19' hyperid = 24019
    name = theta19
    short.name = t19
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta20' hyperid = 24020
    name = theta20
    short.name = t20
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta21' hyperid = 24021
    name = theta21
    short.name = t21

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta22' hyperid = 24022
    name = theta22
    short.name = t22
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta23' hyperid = 24023
    name = theta23
    short.name = t23
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta24' hyperid = 24024
    name = theta24
    short.name = t24
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta25' hyperid = 24025
    name = theta25
    short.name = t25
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta26' hyperid = 24026
    name = theta26
    short.name = t26

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta27' hyperid = 24027
    name = theta27
    short.name = t27
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta28' hyperid = 24028
    name = theta28
    short.name = t28
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta29' hyperid = 24029
    name = theta29
    short.name = t29
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta30' hyperid = 24030
    name = theta30
    short.name = t30
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta31' hyperid = 24031
    name = theta31
    short.name = t31

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta32' hyperid = 24032
    name = theta32
    short.name = t32
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta33' hyperid = 24033
    name = theta33
    short.name = t33
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta34' hyperid = 24034
    name = theta34
    short.name = t34
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta35' hyperid = 24035
    name = theta35
    short.name = t35
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta36' hyperid = 24036
    name = theta36
    short.name = t36

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta37' hyperid = 24037
    name = theta37
    short.name = t37
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta38' hyperid = 24038
    name = theta38
    short.name = t38
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta39' hyperid = 24039
    name = theta39
    short.name = t39
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta40' hyperid = 24040
    name = theta40
    short.name = t40
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta41' hyperid = 24041
    name = theta41
    short.name = t41

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta42' hyperid = 24042
    name = theta42
    short.name = t42
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta43' hyperid = 24043
    name = theta43
    short.name = t43
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta44' hyperid = 24044
    name = theta44
    short.name = t44
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta45' hyperid = 24045
    name = theta45
    short.name = t45
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta46' hyperid = 24046
    name = theta46
    short.name = t46

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta47' hyperid = 24047
    name = theta47
    short.name = t47
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta48' hyperid = 24048
    name = theta48
    short.name = t48
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta49' hyperid = 24049
    name = theta49
    short.name = t49
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta50' hyperid = 24050
    name = theta50
    short.name = t50
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta51' hyperid = 24051
    name = theta51
    short.name = t51

```



```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta52' hyperid = 24052
    name = theta52
    short.name = t52
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta53' hyperid = 24053
    name = theta53
    short.name = t53
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta54' hyperid = 24054
    name = theta54
    short.name = t54
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta55' hyperid = 24055
    name = theta55
    short.name = t55
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta56' hyperid = 24056
    name = theta56
    short.name = t56

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta57' hyperid = 24057
    name = theta57
    short.name = t57
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta58' hyperid = 24058
    name = theta58
    short.name = t58
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta59' hyperid = 24059
    name = theta59
    short.name = t59
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta60' hyperid = 24060
    name = theta60
    short.name = t60
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta61' hyperid = 24061
    name = theta61
    short.name = t61

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta62' hyperid = 24062
    name = theta62
    short.name = t62
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta63' hyperid = 24063
    name = theta63
    short.name = t63
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta64' hyperid = 24064
    name = theta64
    short.name = t64
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta65' hyperid = 24065
    name = theta65
    short.name = t65
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta66' hyperid = 24066
    name = theta66
    short.name = t66

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta67' hyperid = 24067
    name = theta67
    short.name = t67
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta68' hyperid = 24068
    name = theta68
    short.name = t68
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta69' hyperid = 24069
    name = theta69
    short.name = t69
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta70' hyperid = 24070
    name = theta70
    short.name = t70
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta71' hyperid = 24071
    name = theta71
    short.name = t71

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta72' hyperid = 24072
    name = theta72
    short.name = t72
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta73' hyperid = 24073
    name = theta73
    short.name = t73
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta74' hyperid = 24074
    name = theta74
    short.name = t74
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta75' hyperid = 24075
    name = theta75
    short.name = t75
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta76' hyperid = 24076
    name = theta76
    short.name = t76

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta77' hyperid = 24077
    name = theta77
    short.name = t77
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta78' hyperid = 24078
    name = theta78
    short.name = t78
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta79' hyperid = 24079
    name = theta79
    short.name = t79
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta80' hyperid = 24080
    name = theta80
    short.name = t80
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta81' hyperid = 24081
    name = theta81
    short.name = t81

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta82' hyperid = 24082
    name = theta82
    short.name = t82
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta83' hyperid = 24083
    name = theta83
    short.name = t83
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta84' hyperid = 24084
    name = theta84
    short.name = t84
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta85' hyperid = 24085
    name = theta85
    short.name = t85
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta86' hyperid = 24086
    name = theta86
    short.name = t86

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta87' hyperid = 24087
    name = theta87
    short.name = t87
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta88' hyperid = 24088
    name = theta88
    short.name = t88
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta89' hyperid = 24089
    name = theta89
    short.name = t89
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta90' hyperid = 24090
    name = theta90
    short.name = t90
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta91' hyperid = 24091
    name = theta91
    short.name = t91

```



```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta92' hyperid = 24092
    name = theta92
    short.name = t92
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta93' hyperid = 24093
    name = theta93
    short.name = t93
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta94' hyperid = 24094
    name = theta94
    short.name = t94
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta95' hyperid = 24095
    name = theta95
    short.name = t95
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta96' hyperid = 24096
    name = theta96
    short.name = t96

```

```

    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta97' hyperid = 24097
    name = theta97
    short.name = t97
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta98' hyperid = 24098
    name = theta98
    short.name = t98
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta99' hyperid = 24099
    name = theta99
    short.name = t99
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta100' hyperid = 24100
    name = theta100
    short.name = t100
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Model 'iid1d'. Properties: doc = Gaussian random effect in dim=1 with Wishart prior
    constr = FALSE
    nrow.ncol = FALSE

```

```

augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = TRUE
pdf = iid123d

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 25001

```

name = precision
short.name = prec
initial = 4
fixed = FALSE
prior = wishart1d
param = 2 1e-04
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'iid2d'. Properties: doc = Gaussian random effect in dim=2 with Wishart prior

```

constr = FALSE
nrow.ncol = FALSE
augmented = TRUE
aug.factor = 1
aug.constr = 1 2
n.div.by = 2
n.required = TRUE
set.default.values = TRUE
pdf = iid123d

```

Number of hyperparameters is 3.

Hyperparameter 'theta1' hyperid = 26001

```

name = log precision1
short.name = prec1
initial = 4
fixed = FALSE
prior = wishart2d
param = 4 1 1 0
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 26002

```

name = log precision2
short.name = prec2
initial = 4
fixed = FALSE
prior = none
param =
to.theta = function(x) log(x)

```

```

    from.theta = function(x) exp(x)
Hyperparameter 'theta3' hyperid = 26003
    name = logit correlation
    short.name = cor
    initial = 4
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1

```

Model 'iid3d'. Properties: doc= Gaussian random effect in dim=3 with Wishart prior

```

    constr = FALSE
    nrow.ncol = FALSE
    augmented = TRUE
    aug.factor = 1
    aug.constr = 1 2 3
    n.div.by = 3
    n.required = TRUE
    set.default.values = TRUE
    pdf = iid123d

```

Number of hyperparameters is 6.

```

Hyperparameter 'theta1' hyperid = 27001
    name = log precision1
    short.name = prec1
    initial = 4
    fixed = FALSE
    prior = wishart3d
    param = 7 1 1 1 0 0 0
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)

```

```

Hyperparameter 'theta2' hyperid = 27002
    name = log precision2
    short.name = prec2
    initial = 4
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)

```

```

Hyperparameter 'theta3' hyperid = 27003
    name = log precision3
    short.name = prec3
    initial = 4
    fixed = FALSE
    prior = none

```

```

    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta4' hyperid = 27004
    name = logit correlation12
    short.name = cor12
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta5' hyperid = 27005
    name = logit correlation13
    short.name = cor13
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta6' hyperid = 27006
    name = logit correlation23
    short.name = cor23
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Model 'iid4d'. Properties: doc= Gaussian random effect in dim=4 with Wishart prior
    constr = FALSE
    nrow.ncol = FALSE
    augmented = TRUE
    aug.factor = 1
    aug.constr = 1 2 3 4
    n.div.by = 4
    n.required = TRUE
    set.default.values = TRUE
    pdf = iid123d
Number of hyperparameters is 10.
Hyperparameter 'theta1' hyperid = 28001
    name = log precision1
    short.name = prec1
    initial = 4

```

```

    fixed = FALSE
    prior = wishart4d
    param = 11 1 1 1 1 0 0 0 0 0 0
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 28002
    name = log precision2
    short.name = prec2
    initial = 4
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta3' hyperid = 28003
    name = log precision3
    short.name = prec3
    initial = 4
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta4' hyperid = 28004
    name = log precision4
    short.name = prec4
    initial = 4
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta5' hyperid = 28005
    name = logit correlation12
    short.name = cor12
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta6' hyperid = 28006
    name = logit correlation13
    short.name = cor13
    initial = 0

```

```

    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta7' hyperid = 28007
    name = logit correlation14
    short.name = cor14
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta8' hyperid = 28008
    name = logit correlation23
    short.name = cor23
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta9' hyperid = 28009
    name = logit correlation24
    short.name = cor24
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta10' hyperid = 28010
    name = logit correlation34
    short.name = cor34
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Model 'iid5d'. Properties: doc = Gaussian random effect in dim=5 with Wishart prior
    constr = FALSE
    nrow.ncol = FALSE
    augmented = TRUE

```

```

aug.factor = 1
aug.constr = 1 2 3 4 5
n.div.by = 5
n.required = TRUE
set.default.values = TRUE
pdf = iid123d

```

Number of hyperparameters is 15.

Hyperparameter 'theta1' hyperid = 29001

```

name = log precision1
short.name = prec1
initial = 4
fixed = FALSE
prior = wishart5d
param = 16 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 29002

```

name = log precision2
short.name = prec2
initial = 4
fixed = FALSE
prior = none
param =
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta3' hyperid = 29003

```

name = log precision3
short.name = prec3
initial = 4
fixed = FALSE
prior = none
param =
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta4' hyperid = 29004

```

name = log precision4
short.name = prec4
initial = 4
fixed = FALSE
prior = none
param =
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta5' hyperid = 29005

```

name = log precision5

```



```

    short.name = prec5
    initial = 4
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta6' hyperid = 29006
    name = logit correlation12
    short.name = cor12
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta7' hyperid = 29007
    name = logit correlation13
    short.name = cor13
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta8' hyperid = 29008
    name = logit correlation14
    short.name = cor14
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta9' hyperid = 29009
    name = logit correlation15
    short.name = cor15
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta10' hyperid = 29010
    name = logit correlation23

```

```

    short.name = cor23
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta11' hyperid = 29011
    name = logit correlation24
    short.name = cor24
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta12' hyperid = 29012
    name = logit correlation25
    short.name = cor25
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta13' hyperid = 29013
    name = logit correlation34
    short.name = cor34
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta14' hyperid = 29014
    name = logit correlation35
    short.name = cor35
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta15' hyperid = 29015
    name = logit correlation45

```


Hyperparameter 'theta4' hyperid = 29104

```
name = theta4
short.name = theta4
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta5' hyperid = 29105

```
name = theta5
short.name = theta5
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta6' hyperid = 29106

```
name = theta6
short.name = theta6
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta7' hyperid = 29107

```
name = theta7
short.name = theta7
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta8' hyperid = 29108

```
name = theta8
short.name = theta8
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta9' hyperid = 29109
  name = theta9
  short.name = theta9
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 29110
  name = theta10
  short.name = theta10
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 29111
  name = theta11
  short.name = theta11
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 29112
  name = theta12
  short.name = theta12
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 29113
  name = theta13
  short.name = theta13
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
```

Hyperparameter 'theta14' hyperid = 29114

```
name = theta14
short.name = theta14
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta15' hyperid = 29115

```
name = theta15
short.name = theta15
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta16' hyperid = 29116

```
name = theta16
short.name = theta16
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta17' hyperid = 29117

```
name = theta17
short.name = theta17
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta18' hyperid = 29118

```
name = theta18
short.name = theta18
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta19' hyperid = 29119

```
name = theta19
short.name = theta19
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta20' hyperid = 29120

```
name = theta20
short.name = theta20
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta21' hyperid = 29121

```
name = theta21
short.name = theta21
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta22' hyperid = 29122

```
name = theta22
short.name = theta22
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta23' hyperid = 29123

```
name = theta23
short.name = theta23
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta24' hyperid = 29124

```
name = theta24
short.name = theta24
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta25' hyperid = 29125

```
name = theta25
short.name = theta25
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta26' hyperid = 29126

```
name = theta26
short.name = theta26
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta27' hyperid = 29127

```
name = theta27
short.name = theta27
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta28' hyperid = 29128

```
name = theta28
short.name = theta28
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```


Hyperparameter 'theta29' hyperid = 29129

```
name = theta29
short.name = theta29
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta30' hyperid = 29130

```
name = theta30
short.name = theta30
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta31' hyperid = 29131

```
name = theta31
short.name = theta31
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta32' hyperid = 29132

```
name = theta32
short.name = theta32
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta33' hyperid = 29133

```
name = theta33
short.name = theta33
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta34' hyperid = 29134

```
name = theta34
short.name = theta34
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta35' hyperid = 29135

```
name = theta35
short.name = theta35
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta36' hyperid = 29136

```
name = theta36
short.name = theta36
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta37' hyperid = 29137

```
name = theta37
short.name = theta37
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta38' hyperid = 29138

```
name = theta38
short.name = theta38
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta39' hyperid = 29139

```
name = theta39
short.name = theta39
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta40' hyperid = 29140

```
name = theta40
short.name = theta40
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta41' hyperid = 29141

```
name = theta41
short.name = theta41
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta42' hyperid = 29142

```
name = theta42
short.name = theta42
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta43' hyperid = 29143

```
name = theta43
short.name = theta43
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta44' hyperid = 29144

```
name = theta44
short.name = theta44
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta45' hyperid = 29145

```
name = theta45
short.name = theta45
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta46' hyperid = 29146

```
name = theta46
short.name = theta46
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta47' hyperid = 29147

```
name = theta47
short.name = theta47
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta48' hyperid = 29148

```
name = theta48
short.name = theta48
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta49' hyperid = 29149

```
name = theta49
short.name = theta49
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta50' hyperid = 29150

```
name = theta50
short.name = theta50
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta51' hyperid = 29151

```
name = theta51
short.name = theta51
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta52' hyperid = 29152

```
name = theta52
short.name = theta52
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta53' hyperid = 29153

```
name = theta53
short.name = theta53
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta54' hyperid = 29154

```
name = theta54
short.name = theta54
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta55' hyperid = 29155

```
name = theta55
short.name = theta55
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta56' hyperid = 29156

```
name = theta56
short.name = theta56
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta57' hyperid = 29157

```
name = theta57
short.name = theta57
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta58' hyperid = 29158

```
name = theta58
short.name = theta58
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta59' hyperid = 29159

```
name = theta59
short.name = theta59
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta60' hyperid = 29160

```
name = theta60
short.name = theta60
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta61' hyperid = 29161

```
name = theta61
short.name = theta61
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta62' hyperid = 29162

```
name = theta62
short.name = theta62
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta63' hyperid = 29163

```
name = theta63
short.name = theta63
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta64' hyperid = 29164

```
name = theta64
short.name = theta64
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta65' hyperid = 29165

```
name = theta65
short.name = theta65
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta66' hyperid = 29166

```
name = theta66
short.name = theta66
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta67' hyperid = 29167

```
name = theta67
short.name = theta67
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta68' hyperid = 29168

```
name = theta68
short.name = theta68
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```


Hyperparameter 'theta69' hyperid = 29169

```
name = theta69
short.name = theta69
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta70' hyperid = 29170

```
name = theta70
short.name = theta70
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta71' hyperid = 29171

```
name = theta71
short.name = theta71
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta72' hyperid = 29172

```
name = theta72
short.name = theta72
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta73' hyperid = 29173

```
name = theta73
short.name = theta73
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta74' hyperid = 29174

```
name = theta74
short.name = theta74
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta75' hyperid = 29175

```
name = theta75
short.name = theta75
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta76' hyperid = 29176

```
name = theta76
short.name = theta76
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta77' hyperid = 29177

```
name = theta77
short.name = theta77
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta78' hyperid = 29178

```
name = theta78
short.name = theta78
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta79' hyperid = 29179

```
name = theta79
short.name = theta79
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta80' hyperid = 29180

```
name = theta80
short.name = theta80
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta81' hyperid = 29181

```
name = theta81
short.name = theta81
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta82' hyperid = 29182

```
name = theta82
short.name = theta82
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta83' hyperid = 29183

```
name = theta83
short.name = theta83
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta84' hyperid = 29184

```
name = theta84
short.name = theta84
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta85' hyperid = 29185

```
name = theta85
short.name = theta85
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta86' hyperid = 29186

```
name = theta86
short.name = theta86
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta87' hyperid = 29187

```
name = theta87
short.name = theta87
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta88' hyperid = 29188

```
name = theta88
short.name = theta88
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta89' hyperid = 29189

```
name = theta89
short.name = theta89
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta90' hyperid = 29190

```
name = theta90
short.name = theta90
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta91' hyperid = 29191

```
name = theta91
short.name = theta91
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta92' hyperid = 29192

```
name = theta92
short.name = theta92
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta93' hyperid = 29193

```
name = theta93
short.name = theta93
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta94' hyperid = 29194

```
name = theta94
short.name = theta94
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta95' hyperid = 29195

```
name = theta95
short.name = theta95
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta96' hyperid = 29196

```
name = theta96
short.name = theta96
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta97' hyperid = 29197

```
name = theta97
short.name = theta97
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta98' hyperid = 29198

```
name = theta98
short.name = theta98
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta99' hyperid = 29199  
  name = theta99  
  short.name = theta99  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta100' hyperid = 29200  
  name = theta100  
  short.name = theta100  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta101' hyperid = 29201  
  name = theta101  
  short.name = theta101  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta102' hyperid = 29202  
  name = theta102  
  short.name = theta102  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta103' hyperid = 29203  
  name = theta103  
  short.name = theta103  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x
```

Hyperparameter 'theta104' hyperid = 29204

```
name = theta104
short.name = theta104
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta105' hyperid = 29205

```
name = theta105
short.name = theta105
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta106' hyperid = 29206

```
name = theta106
short.name = theta106
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta107' hyperid = 29207

```
name = theta107
short.name = theta107
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta108' hyperid = 29208

```
name = theta108
short.name = theta108
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```


Hyperparameter 'theta109' hyperid = 29209

```
name = theta109
short.name = theta109
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta110' hyperid = 29210

```
name = theta110
short.name = theta110
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta111' hyperid = 29211

```
name = theta111
short.name = theta111
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta112' hyperid = 29212

```
name = theta112
short.name = theta112
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta113' hyperid = 29213

```
name = theta113
short.name = theta113
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta114' hyperid = 29214

```
name = theta114
short.name = theta114
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta115' hyperid = 29215

```
name = theta115
short.name = theta115
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta116' hyperid = 29216

```
name = theta116
short.name = theta116
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta117' hyperid = 29217

```
name = theta117
short.name = theta117
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta118' hyperid = 29218

```
name = theta118
short.name = theta118
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta119' hyperid = 29219  
  name = theta119  
  short.name = theta119  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta120' hyperid = 29220  
  name = theta120  
  short.name = theta120  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta121' hyperid = 29221  
  name = theta121  
  short.name = theta121  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta122' hyperid = 29222  
  name = theta122  
  short.name = theta122  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta123' hyperid = 29223  
  name = theta123  
  short.name = theta123  
  initial = 1048576  
  fixed = FALSE  
  prior = none  
  param =  
  to.theta = function(x) x  
  from.theta = function(x) x
```

Hyperparameter 'theta124' hyperid = 29224

```
name = theta124
short.name = theta124
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta125' hyperid = 29225

```
name = theta125
short.name = theta125
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta126' hyperid = 29226

```
name = theta126
short.name = theta126
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta127' hyperid = 29227

```
name = theta127
short.name = theta127
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta128' hyperid = 29228

```
name = theta128
short.name = theta128
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta129' hyperid = 29229
  name = theta129
  short.name = theta129
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta130' hyperid = 29230
  name = theta130
  short.name = theta130
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta131' hyperid = 29231
  name = theta131
  short.name = theta131
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta132' hyperid = 29232
  name = theta132
  short.name = theta132
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta133' hyperid = 29233
  name = theta133
  short.name = theta133
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
```

Hyperparameter 'theta134' hyperid = 29234

```
name = theta134
short.name = theta134
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta135' hyperid = 29235

```
name = theta135
short.name = theta135
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta136' hyperid = 29236

```
name = theta136
short.name = theta136
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta137' hyperid = 29237

```
name = theta137
short.name = theta137
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta138' hyperid = 29238

```
name = theta138
short.name = theta138
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta139' hyperid = 29239
  name = theta139
  short.name = theta139
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta140' hyperid = 29240
  name = theta140
  short.name = theta140
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta141' hyperid = 29241
  name = theta141
  short.name = theta141
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta142' hyperid = 29242
  name = theta142
  short.name = theta142
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta143' hyperid = 29243
  name = theta143
  short.name = theta143
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
```

Hyperparameter 'theta144' hyperid = 29244

```
name = theta144
short.name = theta144
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta145' hyperid = 29245

```
name = theta145
short.name = theta145
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta146' hyperid = 29246

```
name = theta146
short.name = theta146
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta147' hyperid = 29247

```
name = theta147
short.name = theta147
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta148' hyperid = 29248

```
name = theta148
short.name = theta148
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```


Hyperparameter 'theta149' hyperid = 29249

```
name = theta149
short.name = theta149
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta150' hyperid = 29250

```
name = theta150
short.name = theta150
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta151' hyperid = 29251

```
name = theta151
short.name = theta151
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta152' hyperid = 29252

```
name = theta152
short.name = theta152
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta153' hyperid = 29253

```
name = theta153
short.name = theta153
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta154' hyperid = 29254

```
name = theta154
short.name = theta154
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta155' hyperid = 29255

```
name = theta155
short.name = theta155
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta156' hyperid = 29256

```
name = theta156
short.name = theta156
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta157' hyperid = 29257

```
name = theta157
short.name = theta157
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta158' hyperid = 29258

```
name = theta158
short.name = theta158
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta159' hyperid = 29259
  name = theta159
  short.name = theta159
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta160' hyperid = 29260
  name = theta160
  short.name = theta160
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta161' hyperid = 29261
  name = theta161
  short.name = theta161
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta162' hyperid = 29262
  name = theta162
  short.name = theta162
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta163' hyperid = 29263
  name = theta163
  short.name = theta163
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
```

Hyperparameter 'theta164' hyperid = 29264

```
name = theta164
short.name = theta164
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta165' hyperid = 29265

```
name = theta165
short.name = theta165
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta166' hyperid = 29266

```
name = theta166
short.name = theta166
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta167' hyperid = 29267

```
name = theta167
short.name = theta167
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta168' hyperid = 29268

```
name = theta168
short.name = theta168
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta169' hyperid = 29269

```
name = theta169
short.name = theta169
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta170' hyperid = 29270

```
name = theta170
short.name = theta170
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta171' hyperid = 29271

```
name = theta171
short.name = theta171
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta172' hyperid = 29272

```
name = theta172
short.name = theta172
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta173' hyperid = 29273

```
name = theta173
short.name = theta173
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta174' hyperid = 29274

```
name = theta174
short.name = theta174
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta175' hyperid = 29275

```
name = theta175
short.name = theta175
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta176' hyperid = 29276

```
name = theta176
short.name = theta176
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta177' hyperid = 29277

```
name = theta177
short.name = theta177
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta178' hyperid = 29278

```
name = theta178
short.name = theta178
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta179' hyperid = 29279
  name = theta179
  short.name = theta179
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta180' hyperid = 29280
  name = theta180
  short.name = theta180
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta181' hyperid = 29281
  name = theta181
  short.name = theta181
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta182' hyperid = 29282
  name = theta182
  short.name = theta182
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta183' hyperid = 29283
  name = theta183
  short.name = theta183
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
```

Hyperparameter 'theta184' hyperid = 29284

```
name = theta184
short.name = theta184
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta185' hyperid = 29285

```
name = theta185
short.name = theta185
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta186' hyperid = 29286

```
name = theta186
short.name = theta186
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta187' hyperid = 29287

```
name = theta187
short.name = theta187
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta188' hyperid = 29288

```
name = theta188
short.name = theta188
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```



```
Hyperparameter 'theta189' hyperid = 29289
  name = theta189
  short.name = theta189
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta190' hyperid = 29290
  name = theta190
  short.name = theta190
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta191' hyperid = 29291
  name = theta191
  short.name = theta191
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta192' hyperid = 29292
  name = theta192
  short.name = theta192
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta193' hyperid = 29293
  name = theta193
  short.name = theta193
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
```

Hyperparameter 'theta194' hyperid = 29294

```
name = theta194
short.name = theta194
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta195' hyperid = 29295

```
name = theta195
short.name = theta195
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta196' hyperid = 29296

```
name = theta196
short.name = theta196
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta197' hyperid = 29297

```
name = theta197
short.name = theta197
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta198' hyperid = 29298

```
name = theta198
short.name = theta198
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

```
Hyperparameter 'theta199' hyperid = 29299
  name = theta199
  short.name = theta199
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta200' hyperid = 29300
  name = theta200
  short.name = theta200
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta201' hyperid = 29301
  name = theta201
  short.name = theta201
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta202' hyperid = 29302
  name = theta202
  short.name = theta202
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta203' hyperid = 29303
  name = theta203
  short.name = theta203
  initial = 1048576
  fixed = FALSE
  prior = none
  param =
  to.theta = function(x) x
  from.theta = function(x) x
```

Hyperparameter 'theta204' hyperid = 29304

```
name = theta204
short.name = theta204
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta205' hyperid = 29305

```
name = theta205
short.name = theta205
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta206' hyperid = 29306

```
name = theta206
short.name = theta206
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta207' hyperid = 29307

```
name = theta207
short.name = theta207
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta208' hyperid = 29308

```
name = theta208
short.name = theta208
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta209' hyperid = 29309

```
name = theta209
short.name = theta209
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta210' hyperid = 29310

```
name = theta210
short.name = theta210
initial = 1048576
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x
```

Model '2diid'. Properties: doc = (This model is obsolete)

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = 1 2
n.div.by = 2
n.required = TRUE
set.default.values = TRUE
pdf = iid123d
```

Number of hyperparameters is 3.

Hyperparameter 'theta1' hyperid = 30001

```
name = log precision1
short.name = prec1
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Hyperparameter 'theta2' hyperid = 30002

```
name = log precision2
short.name = prec2
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
```

```

    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta3' hyperid = 30003
    name = correlation
    short.name = cor
    initial = 4
    fixed = FALSE
    prior = normal
    param = 0 0.15
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1

```

Model 'z'. Properties: doc = The z-model in a classical mixed model formulation

```

    constr = FALSE
    nrow.ncol = FALSE
    augmented = FALSE
    aug.factor = 1
    aug.constr = NULL
    n.div.by = NULL
    n.required = TRUE
    set.default.values = TRUE
    pdf = z
    status = experimental

```

Number of hyperparameters is 1.

```

Hyperparameter 'theta' hyperid = 31001
    name = log precision
    short.name = prec
    initial = 4
    fixed = FALSE
    prior = loggamma
    param = 1 5e-05
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)

```

Model 'rw2d'. Properties: doc = Thin-plate spline model

```

    constr = TRUE
    nrow.ncol = TRUE
    augmented = FALSE
    aug.factor = 1
    aug.constr = NULL
    n.div.by = NULL
    n.required = FALSE
    set.default.values = TRUE
    pdf = rw2d

```

Number of hyperparameters is 1.

```

Hyperparameter 'theta' hyperid = 32001
    name = log precision

```

```

short.name = prec
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'rw2diid'. Properties: doc = Thin-plate spline with iid noise

```

constr = TRUE
nrow.ncol = TRUE
augmented = TRUE
aug.factor = 2
aug.constr = 2
n.div.by = NULL
n.required = FALSE
set.default.values = TRUE
status = experimental
pdf = rw2diid

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 33001

```

name = log precision
short.name = prec
prior = pc.prec
param = 1 0.01
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 33002

```

name = logit phi
short.name = phi
prior = pc
param = 0.5 0.5
initial = 3
fixed = FALSE
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'slm'. Properties: doc = Spatial lag model

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE

```

```
set.default.values = TRUE
```

```
pdf = slm
```

```
status = experimental
```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 34001

```
name = log precision
```

```
short.name = prec
```

```
initial = 4
```

```
fixed = FALSE
```

```
prior = loggamma
```

```
param = 1 5e-05
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Hyperparameter 'theta2' hyperid = 34002

```
name = rho
```

```
short.name = rho
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = normal
```

```
param = 0 10
```

```
to.theta = function(x) log(x / (1 - x))
```

```
from.theta = function(x) 1 / (1 + exp(-x))
```

Model 'matern2d'. Properties: doc = Matern covariance function on a regular grid

```
constr = FALSE
```

```
nrow.ncol = TRUE
```

```
augmented = FALSE
```

```
aug.factor = 1
```

```
aug.constr = NULL
```

```
n.div.by = NULL
```

```
n.required = FALSE
```

```
set.default.values = TRUE
```

```
pdf = matern2d
```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 35001

```
name = log precision
```

```
short.name = prec
```

```
initial = 4
```

```
fixed = FALSE
```

```
prior = loggamma
```

```
param = 1 5e-05
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Hyperparameter 'theta2' hyperid = 35002

```
name = log range
```

```
short.name = range
```



```

initial = 2
fixed = FALSE
prior = loggamma
param = 1 0.01
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'dmatern'. Properties: **doc** = Dense Matern field

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = TRUE
set.default.values = TRUE
status = experimental
pdf = dmatern

```

Number of hyperparameters is 3.

Hyperparameter 'theta1' hyperid = 35101

```

name = log precision
short.name = prec
initial = 3
fixed = FALSE
prior = pc.prec
param = 1 0.01
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 35102

```

name = log range
short.name = range
initial = 0
fixed = FALSE
prior = pc.range
param = 1 0.5
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta3' hyperid = 35103

```

name = log nu
short.name = nu
initial = -0.693147180559945
fixed = TRUE
prior = loggamma
param = 0.5 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'copy'. Properties: **doc** = Create a copy of a model component

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
pdf = copy

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 36001

```

name = beta
short.name = b
initial = 0
fixed = TRUE
prior = normal
param = 1 10
to.theta = function(x, REPLACE.ME.low, REPLACE.ME.high) {
from.theta = function(x, REPLACE.ME.low, REPLACE.ME.high) {

```

```

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if (all(i

```

Model 'scopy'. Properties: **doc** = Create a scopy of a model component

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
status = experimental
pdf = scopy

```

Number of hyperparameters is 15.

Hyperparameter 'theta1' hyperid = 36101

```

name = beta1
short.name = b1
initial = 0.1
fixed = FALSE
prior = none
param =
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 36102

```

name = beta2
short.name = b2
initial = 0.1

```

```

    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 36103
    name = beta3
    short.name = b3
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 36104
    name = beta4
    short.name = b4
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 36105
    name = beta5
    short.name = b5
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 36106
    name = beta6
    short.name = b6
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 36107
    name = beta7
    short.name = b7
    initial = 0.1

```

```

    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 36108
    name = beta8
    short.name = b8
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 36109
    name = beta9
    short.name = b9
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 36110
    name = beta10
    short.name = b10
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 36111
    name = beta11
    short.name = b11
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 36112
    name = beta12
    short.name = b12
    initial = 0.1

```

```

    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 36113
    name = beta13
    short.name = b13
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta14' hyperid = 36114
    name = beta14
    short.name = b14
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta15' hyperid = 36115
    name = beta15
    short.name = b15
    initial = 0.1
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Model 'clinear'. Properties: doc = Constrained linear effect
    constr = FALSE
    nrow.ncol = FALSE
    augmented = FALSE
    aug.factor = 1
    aug.constr = NULL
    n.div.by = NULL
    n.required = FALSE
    set.default.values = FALSE
    pdf = clinear
    Number of hyperparameters is 1.
Hyperparameter 'theta' hyperid = 37001
    name = beta

```

```

    short.name = b
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x, REPLACE.ME.low, REPLACE.ME.high) {
    from.theta = function(x, REPLACE.ME.low, REPLACE.ME.high) {
Model 'sigm'. Properties: doc = Sigmoidal effect of a covariate
    constr = FALSE
    nrow.ncol = FALSE
    augmented = FALSE
    aug.factor = 1
    aug.constr = NULL
    n.div.by = NULL
    n.required = FALSE
    set.default.values = FALSE
    status = experimental
    pdf = sigm
Number of hyperparameters is 3.
Hyperparameter 'theta1' hyperid = 38001
    name = beta
    short.name = b
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta2' hyperid = 38002
    name = loghalflife
    short.name = halflife
    initial = 3
    fixed = FALSE
    prior = loggamma
    param = 3 1
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta3' hyperid = 38003
    name = logshape
    short.name = shape
    initial = 0
    fixed = FALSE
    prior = loggamma
    param = 10 10
    to.theta = function(x) log(x)

```

```
from.theta = function(x) exp(x)
```

Model 'revsigm'. Properties: **doc** = Reverse sigmoidal effect of a covariate

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
status = experimental
pdf = sigm
```

Number of hyperparameters is 3.

Hyperparameter 'theta1' hyperid = 39001

```
name = beta
short.name = b
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta2' hyperid = 39002

```
name = loghalflife
short.name = halflife
initial = 3
fixed = FALSE
prior = loggamma
param = 3 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Hyperparameter 'theta3' hyperid = 39003

```
name = logshape
short.name = shape
initial = 0
fixed = FALSE
prior = loggamma
param = 10 10
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Model 'log1exp'. Properties: **doc** = A nonlinear model of a covariate

```
constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
```

```

aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
status = experimental
pdf = log1exp

```

Number of hyperparameters is 3.

Hyperparameter 'theta1' hyperid = 39011

```

name = beta
short.name = b
initial = 1
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 39012

```

name = alpha
short.name = a
initial = 0
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 39013

```

name = gamma
short.name = g
initial = 0
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x

```

Model 'logdist'. Properties: doc = A nonlinear model of a covariate

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
status = experimental
pdf = logdist

```

Number of hyperparameters is 3.

Hyperparameter 'theta1' hyperid = 39021

```
name = beta
short.name = b
initial = 1
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x
```

Hyperparameter 'theta2' hyperid = 39022

```
name = alpha1
short.name = a1
initial = 0
fixed = FALSE
prior = loggamma
param = 0.1 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Hyperparameter 'theta3' hyperid = 39023

```
name = alpha2
short.name = a2
initial = 0
fixed = FALSE
prior = loggamma
param = 0.1 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

'group'

Valid models in this section are:

Model 'exchangeable'. Properties: doc = Exchangeable correlations

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 40001

```
name = logit correlation
short.name = rho
initial = 1
fixed = FALSE
prior = normal
param = 0 0.2
to.theta = function(x, REPLACE.ME.ngroup) log((1 + x * (ngroup - 1)) / (1 - x))
from.theta = function(x, REPLACE.ME.ngroup) (exp(x) - 1) / (exp(x) + ngroup - 1)
```

Model 'exchangeablepos'. Properties: doc = Exchangeable positive correlations

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 40101

```

name = logit correlation
short.name = rho
initial = 1
fixed = FALSE
prior = pc.cor0
param = 0.5 0.5
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'ar1'. Properties: doc = AR(1) correlations

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 41001

```

name = logit correlation
short.name = rho
initial = 2
fixed = FALSE
prior = normal
param = 0 0.15
to.theta = function(x) log((1 + x) / (1 - x))
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1

```

Model 'ar'. Properties: doc = AR(p) correlations

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 42001

```

name = log precision
short.name = prec
initial = 0
fixed = TRUE
prior = pc.prec
param = 3 0.01
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 42002

```

name = pacf1
short.name = pacf1
initial = 2
fixed = FALSE
prior = pc.cor0
param = 0.5 0.5
to.theta = function(x) log((1 + x) / (1 - x))
from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1

```

Hyperparameter 'theta3' hyperid = 42003

```

name = pacf2
short.name = pacf2
initial = 0
fixed = FALSE
prior = pc.cor0

```

```

    param = 0.5 0.4
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta4' hyperid = 42004
    name = pacf3
    short.name = pacf3
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.3
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta5' hyperid = 42005
    name = pacf4
    short.name = pacf4
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.2
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta6' hyperid = 42006
    name = pacf5
    short.name = pacf5
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta7' hyperid = 42007
    name = pacf6
    short.name = pacf6
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta8' hyperid = 42008
    name = pacf7
    short.name = pacf7
    initial = 0
    fixed = FALSE
    prior = pc.cor0

```

```

    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta9' hyperid = 42009
    name = pacf8
    short.name = pacf8
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta10' hyperid = 42010
    name = pacf9
    short.name = pacf9
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Hyperparameter 'theta11' hyperid = 42011
    name = pacf10
    short.name = pacf10
    initial = 0
    fixed = FALSE
    prior = pc.cor0
    param = 0.5 0.1
    to.theta = function(x) log((1 + x) / (1 - x))
    from.theta = function(x) 2 * exp(x) / (1 + exp(x)) - 1
Model 'rw1'. Properties: doc = Random walk of order 1
Number of hyperparameters is 1.
Hyperparameter 'theta' hyperid = 43001
    name = log precision
    short.name = prec
    prior = loggamma
    param = 1 5e-05
    initial = 0
    fixed = TRUE
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Model 'rw2'. Properties: doc = Random walk of order 2
Number of hyperparameters is 1.
Hyperparameter 'theta' hyperid = 44001
    name = log precision

```

```

short.name = prec
prior = loggamma
param = 1 5e-05
initial = 0
fixed = TRUE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'besag'. Properties: **doc** = Besag model

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 45001

```

name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 0
fixed = TRUE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'iid'. Properties: **doc** = Independent model

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 46001

```

name = log precision
short.name = prec
prior = loggamma
param = 1 5e-05
initial = 0
fixed = TRUE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

'scopy'

Valid models in this section are:

Model 'rw1'. Properties: **doc** = Random walk of order 1

Number of hyperparameters is 0.

Model 'rw2'. Properties: **doc** = Random walk of order 2

Number of hyperparameters is 0.

'mix'

Valid models in this section are:

Model 'gaussian'. Properties: **doc** = Gaussian mixture

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 47001

```

name = log precision

```

```

short.name = prec
output.name = Precision for the Gaussian observations
output.name.intern = Log precision for the Gaussian observations
prior = pc.prec
param = 1 0.01
initial = 0
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'loggamma'. Properties: **doc** = LogGamma mixture

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 47101

```

name = log precision
short.name = prec
prior = pc.mgamma
param = 4.8
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'mloggamma'. Properties: **doc** = Minus-LogGamma mixture

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 47201

```

name = log precision
short.name = prec
prior = pc.mgamma
param = 4.8
initial = 4
fixed = FALSE
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

'link'

Valid models in this section are:

Model 'default'. Properties: **doc** = The default link

Number of hyperparameters is 0.

Model 'cloglog'. Properties: **doc** = The complementary log-log link

Number of hyperparameters is 0.

Model 'ccloglog'. Properties: **doc** = The complement complementary log-log link

Number of hyperparameters is 0.

Model 'loglog'. Properties: **doc** = The log-log link

Number of hyperparameters is 0.

Model 'identity'. Properties: **doc** = The identity link

Number of hyperparameters is 0.

Model 'inverse'. Properties: **doc** = The inverse link
 Number of hyperparameters is 0.

Model 'log'. Properties: **doc** = The log-link
 Number of hyperparameters is 0.

Model 'loga'. Properties: **doc** = The loga-link
 Number of hyperparameters is 0.

Model 'neglog'. Properties: **doc** = The negative log-link
 Number of hyperparameters is 0.

Model 'logit'. Properties: **doc** = The logit-link
 Number of hyperparameters is 0.

Model 'probit'. Properties: **doc** = The probit-link
 Number of hyperparameters is 0.

Model 'cauchit'. Properties: **doc** = The cauchit-link
 Number of hyperparameters is 0.

Model 'tan'. Properties: **doc** = The tan-link
 Number of hyperparameters is 0.

Model 'quantile'. Properties: **doc** = The quantile-link
 Number of hyperparameters is 0.

Model 'pquantile'. Properties: **doc** = The population quantile-link
 Number of hyperparameters is 0.

Model 'sslogit'. Properties: **doc** = Logit link with sensitivity and specificity
status = disabled
pdf = NA
 Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 48001
name = sensitivity
short.name = sens
prior = logitbeta
param = 10 5
initial = 1
fixed = FALSE
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

Hyperparameter 'theta2' hyperid = 48002
name = specificity
short.name = spec
prior = logitbeta
param = 10 5
initial = 1
fixed = FALSE
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

Model 'logoffset'. Properties: **doc** = Log-link with an offset

pdf = logoffset

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 49001

name = beta

short.name = b

prior = normal

param = 0 100

initial = 0

fixed = TRUE

to.theta = function(x) log(x)

from.theta = function(x) exp(x)

Model 'logitoffset'. Properties: doc = Logit-link with an offset

status = experimental

pdf = logitoffset

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 49011

name = prob

short.name = p

prior = normal

param = -1 100

initial = -1

fixed = FALSE

to.theta = function(x) log(x / (1 - x))

from.theta = function(x) exp(x) / (1 + exp(x))

Model 'robit'. Properties: doc = Robit link

status = experimental

pdf = robit

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 49021

name = log degrees of freedom

short.name = dof

initial = 1.6094379124341

fixed = TRUE

prior = pc.dof

param = 50 0.5

to.theta = function(x) log(x - 2)

from.theta = function(x) 2 + exp(x)

Model 'sn'. Properties: doc = Skew-normal link

pdf = linksn

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 49031

name = skewness

short.name = skew

initial = 0.00123456789

fixed = FALSE


```

    prior = pc.sn
    param = 10
    to.theta = function(x, skew.max = 0.988) log((1 + x / skew.max) / (1 - x / skew.max))
    from.theta = function(x, skew.max = 0.988) skew.max * (2 * exp(x) / (1 + exp(x)) - 1)
Hyperparameter 'theta2' hyperid = 49032
    name = intercept
    short.name = intercept
    initial = 0
    fixed = FALSE
    prior = linksnintercept
    param = 0 0
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Model 'powerlogit'. Properties: doc = Power logit link
    pdf = powerlogit
    Number of hyperparameters is 2.
Hyperparameter 'theta1' hyperid = 49131
    name = power
    short.name = power
    initial = 0.00123456789
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 49132
    name = intercept
    short.name = intercept
    initial = 0
    fixed = FALSE
    prior = logitbeta
    param = 1 1
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Model 'test1'. Properties: doc = A test1-link function (experimental)
    pdf = NA
    Number of hyperparameters is 1.
Hyperparameter 'theta' hyperid = 50001
    name = beta
    short.name = b
    prior = normal
    param = 0 100
    initial = 0
    fixed = FALSE
    to.theta = function(x) x

```

```
from.theta = function(x) x
```

Model 'special1'. Properties: doc = A special1-link function (experimental)

```
pdf = NA
```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 51001

```
name = log precision
```

```
short.name = prec
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = loggamma
```

```
param = 1 1
```

```
to.theta = function(x) x
```

```
from.theta = function(x) x
```

Hyperparameter 'theta2' hyperid = 51002

```
name = beta1
```

```
short.name = beta1
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = mvnorm
```

```
param = 0 100
```

```
to.theta = function(x) x
```

```
from.theta = function(x) x
```

Hyperparameter 'theta3' hyperid = 51003

```
name = beta2
```

```
short.name = beta2
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = none
```

```
param =
```

```
to.theta = function(x) x
```

```
from.theta = function(x) x
```

Hyperparameter 'theta4' hyperid = 51004

```
name = beta3
```

```
short.name = beta3
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = none
```

```
param =
```

```
to.theta = function(x) x
```

```
from.theta = function(x) x
```

Hyperparameter 'theta5' hyperid = 51005

```
name = beta4
```

```
short.name = beta4
```

```
initial = 0
```

```
fixed = FALSE
```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 51006
    name = beta5
    short.name = beta5
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 51007
    name = beta6
    short.name = beta6
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 51008
    name = beta7
    short.name = beta7
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 51009
    name = beta8
    short.name = beta8
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 51010
    name = beta9
    short.name = beta9
    initial = 0
    fixed = FALSE

```

```

    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 51011
    name = beta10
    short.name = beta10
    initial = 0
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) x
    from.theta = function(x) x
Model 'special2'. Properties: doc = A special2-link function (experimental)
    pdf = NA
    Number of hyperparameters is 1.
Hyperparameter 'theta' hyperid = 52001
    name = beta
    short.name = b
    prior = normal
    param = 0 10
    initial = 0
    fixed = FALSE
    to.theta = function(x) x
    from.theta = function(x) x

```

'predictor'

Valid models in this section are:

Model 'predictor'. Properties: doc = (do not use)

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 53001

```

    name = log precision
    short.name = prec
    initial = 13.8155105579643
    fixed = TRUE
    prior = loggamma
    param = 1 1e-05
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)

```

'hazard'

Valid models in this section are:

Model 'rw1'. Properties: doc = A random walk of order 1 for the log-hazard

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 54001

```
name = log precision
short.name = prec
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Model 'rw2'. Properties: **doc =** A random walk of order 2 for the log-hazard
Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 55001

```
name = log precision
short.name = prec
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Model 'iid'. Properties: **doc =** An iid model for the log-hazard
Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 55501

```
name = log precision
short.name = prec
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

'likelihood'

Valid models in this section are:

Model 'poisson'. Properties: **doc =** The Poisson likelihood

```
survival = FALSE
discrete = TRUE
link = default log logoffset quantile test1 special1 special2
pdf = poisson
```

Number of hyperparameters is 0.

Model 'nzpoisson'. Properties: **doc =** The nzPoisson likelihood

```
survival = FALSE
discrete = TRUE
link = default log logoffset
```

pdf = nzpoisson

Number of hyperparameters is 0.

Model 'xpoisson'. Properties: **doc** = The Poisson likelihood (expert version)

survival = FALSE

discrete = TRUE

link = default log logoffset quantile test1 special1 special2

pdf = poisson

Number of hyperparameters is 0.

Model 'cenpoisson'. Properties: **doc** = Then censored Poisson likelihood

survival = FALSE

discrete = TRUE

link = default log logoffset test1 special1 special2

pdf = cenpoisson

Number of hyperparameters is 0.

Model 'cenpoisson2'. Properties: **doc** = Then censored Poisson likelihood (version 2)

survival = FALSE

discrete = TRUE

link = default log logoffset test1 special1 special2

pdf = cenpoisson2

Number of hyperparameters is 0.

Model 'gpoisson'. Properties: **doc** = The generalized Poisson likelihood

survival = FALSE

discrete = TRUE

link = default log logoffset

pdf = gpoisson

status = experimental

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 56001

name = overdispersion

short.name = phi

output.name = Overdispersion for gpoisson

output.name.intern = Log overdispersion for gpoisson

initial = 0

fixed = FALSE

prior = loggamma

param = 1 1

to.theta = function(x) log(x)

from.theta = function(x) exp(x)

Hyperparameter 'theta2' hyperid = 56002

name = p

short.name = p

output.name = Parameter p for gpoisson

output.name.intern = Parameter p_intern for gpoisson

initial = 1

fixed = TRUE

```

prior = normal
param = 1 100
to.theta = function(x) x
from.theta = function(x) x

```

Model 'poisson.special1'. Properties: **doc** = The Poisson.special1 likelihood

```

survival = FALSE
discrete = TRUE
link = default log
pdf = poisson-special

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 56100

```

name = logit probability
short.name = prob
output.name = one-probability parameter for poisson.special1
output.name.intern = intern one-probability parameter for poisson.special1
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model '0poisson'. Properties: **doc** = New 0-inflated Poisson

```

status = experimental
survival = FALSE
discrete = TRUE
link = default log quantile
link.simple = default logit cauchit probit cloglog ccloglog
pdf = 0inflated

```

Number of hyperparameters is 10.

Hyperparameter 'theta1' hyperid = 56201

```

name = beta1
short.name = beta1
output.name = beta1 for 0poisson observations
output.name.intern = beta1 for 0poisson observations
initial = -4
fixed = FALSE
prior = normal
param = -4 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 56202

```

name = beta2
short.name = beta2
output.name = beta2 for 0poisson observations
output.name.intern = beta2 for 0poisson observations

```

```

initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 56203
  name = beta3
  short.name = beta3
  output.name = beta3 for 0poisson observations
  output.name.intern = beta3 for 0poisson observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 56204
  name = beta4
  short.name = beta4
  output.name = beta4 for 0poisson observations
  output.name.intern = beta4 for 0poisson observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 56205
  name = beta5
  short.name = beta5
  output.name = beta5 for 0poisson observations
  output.name.intern = beta5 for 0poisson observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 56206
  name = beta6
  short.name = beta6
  output.name = beta6 for 0poisson observations
  output.name.intern = beta6 for 0poisson observations
  initial = 0

```



```

fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 56207
  name = beta7
  short.name = beta7
  output.name = beta7 for 0poisson observations
  output.name.intern = beta7 for 0poisson observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 56208
  name = beta8
  short.name = beta8
  output.name = beta8 for 0poisson observations
  output.name.intern = beta8 for 0poisson observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 56209
  name = beta9
  short.name = beta9
  output.name = beta9 for 0poisson observations
  output.name.intern = beta9 for 0poisson observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 56210
  name = beta10
  short.name = beta10
  output.name = beta10 for 0poisson observations
  output.name.intern = beta10 for 0poisson observations
  initial = 0
  fixed = FALSE

```

```

prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Model '0poissonS'. Properties: doc = New 0-inflated Poisson Swap

```

status = experimental
survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog log sslogit logitoffset qua
link.simple = default log
pdf = 0inflated

```

Number of hyperparameters is 10.

Hyperparameter 'theta1' hyperid = 56301

```

name = beta1
short.name = beta1
output.name = beta1 for 0poissonS observations
output.name.intern = beta1 for 0poissonS observations
initial = -4
fixed = FALSE
prior = normal
param = -4 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 56302

```

name = beta2
short.name = beta2
output.name = beta2 for 0poissonS observations
output.name.intern = beta2 for 0poissonS observations
initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 56303

```

name = beta3
short.name = beta3
output.name = beta3 for 0poissonS observations
output.name.intern = beta3 for 0poissonS observations
initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

```

Hyperparameter 'theta4' hyperid = 56304
  name = beta4
  short.name = beta4
  output.name = beta4 for 0poissonS observations
  output.name.intern = beta4 for 0poissonS observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 56305
  name = beta5
  short.name = beta5
  output.name = beta5 for 0poissonS observations
  output.name.intern = beta5 for 0poissonS observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 56306
  name = beta6
  short.name = beta6
  output.name = beta6 for 0poissonS observations
  output.name.intern = beta6 for 0poissonS observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 56307
  name = beta7
  short.name = beta7
  output.name = beta7 for 0poissonS observations
  output.name.intern = beta7 for 0poissonS observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 56308

```

```

name = beta8
short.name = beta8
output.name = beta8 for 0poissonS observations
output.name.intern = beta8 for 0poissonS observations
initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta9' hyperid = 56309

```

name = beta9
short.name = beta9
output.name = beta9 for 0poissonS observations
output.name.intern = beta9 for 0poissonS observations
initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta10' hyperid = 56310

```

name = beta10
short.name = beta10
output.name = beta10 for 0poissonS observations
output.name.intern = beta10 for 0poissonS observations
initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Model 'bell'. Properties: doc = The Bell likelihood

```

status = experimental
survival = FALSE
discrete = TRUE
link = default log
pdf = bell

```

Number of hyperparameters is 0.

Model '0binomial'. Properties: doc = New 0-inflated Binomial

```

status = experimental
survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog log
link.simple = default logit cauchit probit cloglog ccloglog

```

```

pdf = 0inflated
Number of hyperparameters is 10.
Hyperparameter 'theta1' hyperid = 56401
  name = beta1
  short.name = beta1
  output.name = beta1 for 0binomial observations
  output.name.intern = beta1 for 0binomial observations
  initial = -4
  fixed = FALSE
  prior = normal
  param = -4 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta2' hyperid = 56402
  name = beta2
  short.name = beta2
  output.name = beta2 for 0binomial observations
  output.name.intern = beta2 for 0binomial observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 56403
  name = beta3
  short.name = beta3
  output.name = beta3 for 0binomial observations
  output.name.intern = beta3 for 0binomial observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 56404
  name = beta4
  short.name = beta4
  output.name = beta4 for 0binomial observations
  output.name.intern = beta4 for 0binomial observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x

```

```

    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 56405
    name = beta5
    short.name = beta5
    output.name = beta5 for 0binomial observations
    output.name.intern = beta5 for 0binomial observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 56406
    name = beta6
    short.name = beta6
    output.name = beta6 for 0binomial observations
    output.name.intern = beta6 for 0binomial observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 56407
    name = beta7
    short.name = beta7
    output.name = beta7 for 0binomial observations
    output.name.intern = beta7 for 0binomial observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 56408
    name = beta8
    short.name = beta8
    output.name = beta8 for 0binomial observations
    output.name.intern = beta8 for 0binomial observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x

```

Hyperparameter 'theta9' hyperid = 56409

```

name = beta9
short.name = beta9
output.name = beta9 for 0binomial observations
output.name.intern = beta9 for 0binomial observations
initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta10' hyperid = 56410

```

name = beta10
short.name = beta10
output.name = beta10 for 0binomial observations
output.name.intern = beta10 for 0binomial observations
initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Model '0binomialS'. Properties: doc = New 0-inflated Binomial Swap

```

status = experimental
survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog log
link.simple = default logit cauchit probit cloglog ccloglog
pdf = 0inflated

```

Number of hyperparameters is 10.

Hyperparameter 'theta1' hyperid = 56501

```

name = beta1
short.name = beta1
output.name = beta1 for 0binomialS observations
output.name.intern = beta1 for 0binomialS observations
initial = -4
fixed = FALSE
prior = normal
param = -4 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 56502

```

name = beta2
short.name = beta2
output.name = beta2 for 0binomialS observations

```

```

    output.name.intern = beta2 for 0binomialS observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 56503
    name = beta3
    short.name = beta3
    output.name = beta3 for 0binomialS observations
    output.name.intern = beta3 for 0binomialS observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 56504
    name = beta4
    short.name = beta4
    output.name = beta4 for 0binomialS observations
    output.name.intern = beta4 for 0binomialS observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 56505
    name = beta5
    short.name = beta5
    output.name = beta5 for 0binomialS observations
    output.name.intern = beta5 for 0binomialS observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 56506
    name = beta6
    short.name = beta6
    output.name = beta6 for 0binomialS observations
    output.name.intern = beta6 for 0binomialS observations

```



```

initial = 0
fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 56507
  name = beta7
  short.name = beta7
  output.name = beta7 for 0binomialS observations
  output.name.intern = beta7 for 0binomialS observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 56508
  name = beta8
  short.name = beta8
  output.name = beta8 for 0binomialS observations
  output.name.intern = beta8 for 0binomialS observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 56509
  name = beta9
  short.name = beta9
  output.name = beta9 for 0binomialS observations
  output.name.intern = beta9 for 0binomialS observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 56510
  name = beta10
  short.name = beta10
  output.name = beta10 for 0binomialS observations
  output.name.intern = beta10 for 0binomialS observations
  initial = 0

```

```

fixed = FALSE
prior = normal
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```

Model 'binomial'. Properties: **doc** = The Binomial likelihood

```

survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog log sslogit logitoffset qua
pdf = binomial

```

Number of hyperparameters is 0.

Model 'xbinomial'. Properties: **doc** = The Binomial likelihood (expert version)

```

survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog log sslogit logitoffset qua
pdf = binomial
status = experimental

```

Number of hyperparameters is 0.

Model 'pom'. Properties: **doc** = Likelihood for the proportional odds model

```

status = experimental
survival = FALSE
discrete = TRUE
link = default identity
pdf = pom

```

Number of hyperparameters is 10.

Hyperparameter 'theta1' hyperid = 57101

```

name = theta1
short.name = theta1
output.name = theta1 for POM
output.name.intern = theta1 for POM
initial = NA
fixed = FALSE
prior = dirichlet
param = 3
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 57102

```

name = theta2
short.name = theta2
output.name = theta2 for POM
output.name.intern = theta2 for POM
initial = NA
fixed = FALSE
prior = none
param =

```

```

    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta3' hyperid = 57103
    name = theta3
    short.name = theta3
    output.name = theta3 for POM
    output.name.intern = theta3 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta4' hyperid = 57104
    name = theta4
    short.name = theta4
    output.name = theta4 for POM
    output.name.intern = theta4 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta5' hyperid = 57105
    name = theta5
    short.name = theta5
    output.name = theta5 for POM
    output.name.intern = theta5 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta6' hyperid = 57106
    name = theta6
    short.name = theta6
    output.name = theta6 for POM
    output.name.intern = theta6 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)

```

```

    from.theta = function(x) exp(x)
Hyperparameter 'theta7' hyperid = 57107
    name = theta7
    short.name = theta7
    output.name = theta7 for POM
    output.name.intern = theta7 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta8' hyperid = 57108
    name = theta8
    short.name = theta8
    output.name = theta8 for POM
    output.name.intern = theta8 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta9' hyperid = 57109
    name = theta9
    short.name = theta9
    output.name = theta9 for POM
    output.name.intern = theta9 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta10' hyperid = 57110
    name = theta10
    short.name = theta10
    output.name = theta10 for POM
    output.name.intern = theta10 for POM
    initial = NA
    fixed = FALSE
    prior = none
    param =
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)

```

Model 'bgev'. Properties: `doc =` The blended Generalized Extreme Value likelihood

`status =` experimental

`survival =` FALSE

`discrete =` FALSE

`link =` default identity log

`pdf =` bgev

Number of hyperparameters is 12.

Hyperparameter 'theta1' hyperid = 57201

`name =` spread

`short.name =` sd

`output.name =` spread for BGEV observations

`output.name.intern =` log spread for BGEV observations

`initial =` 0

`fixed =` FALSE

`prior =` loggamma

`param =` 1 3

`to.theta =` function(x) log(x)

`from.theta =` function(x) exp(x)

Hyperparameter 'theta2' hyperid = 57202

`name =` tail

`short.name =` xi

`output.name =` tail for BGEV observations

`output.name.intern =` intern tail for BGEV observations

`initial =` -4

`fixed =` FALSE

`prior =` pc.gevtail

`param =` 7 0 0.5

`to.theta =` function(x, interval = c(REPLACE.ME.low, REPLACE.ME.high)) log(-(interval[1] - x)

`from.theta =` function(x, interval = c(REPLACE.ME.low, REPLACE.ME.high)) interval[1] + (inte

Hyperparameter 'theta3' hyperid = 57203

`name =` beta1

`short.name =` beta1

`output.name =` MUST BE FIXED

`output.name.intern =` MUST BE FIXED

`initial =` NA

`fixed =` FALSE

`prior =` normal

`param =` 0 300

`to.theta =` function(x) x

`from.theta =` function(x) x

Hyperparameter 'theta4' hyperid = 57204

`name =` beta2

`short.name =` beta2

`output.name =` MUST BE FIXED

`output.name.intern =` MUST BE FIXED

```

initial = NA
fixed = FALSE
prior = normal
param = 0 300
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 57205
  name = beta3
  short.name = beta3
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA
  fixed = FALSE
  prior = normal
  param = 0 300
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 57206
  name = beta4
  short.name = beta4
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA
  fixed = FALSE
  prior = normal
  param = 0 300
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 57207
  name = beta5
  short.name = beta5
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA
  fixed = FALSE
  prior = normal
  param = 0 300
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 57208
  name = beta6
  short.name = beta6
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA

```

```

fixed = FALSE
prior = normal
param = 0 300
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 57209
  name = beta7
  short.name = beta7
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA
  fixed = FALSE
  prior = normal
  param = 0 300
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 57210
  name = beta8
  short.name = beta8
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA
  fixed = FALSE
  prior = normal
  param = 0 300
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 57211
  name = beta9
  short.name = beta9
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA
  fixed = FALSE
  prior = normal
  param = 0 300
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 57212
  name = beta10
  short.name = beta
  output.name = MUST BE FIXED
  output.name.intern = MUST BE FIXED
  initial = NA
  fixed = FALSE

```

```

prior = normal
param = 0 300
to.theta = function(x) x
from.theta = function(x) x

```

Model 'gamma'. Properties: **doc** = The Gamma likelihood

```

survival = FALSE
discrete = FALSE
link = default log quantile
pdf = gamma

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 58001

```

name = precision parameter
short.name = prec
output.name = Precision-parameter for the Gamma observations
output.name.intern = Intern precision-parameter for the Gamma observations
initial = 4.60517018598809
fixed = FALSE
prior = loggamma
param = 1 0.01
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'gammasurv'. Properties: **doc** = The Gamma likelihood (survival)

```

survival = TRUE
discrete = FALSE
status = experimental
link = default log neglog quantile
pdf = gammasurv

```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 58101

```

name = precision parameter
short.name = prec
output.name = Precision-parameter for the Gamma surv observations
output.name.intern = Intern precision-parameter for the Gamma surv observations
initial = 0
fixed = FALSE
prior = loggamma
param = 1 0.01
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 58102

```

name = beta1
short.name = beta1
output.name = beta1 for Gamma-Cure
output.name.intern = beta1 for Gamma-Cure
initial = -7

```



```

fixed = FALSE
prior = normal
param = -4 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 58103
  name = beta2
  short.name = beta2
  output.name = beta2 for Gamma-Cure
  output.name.intern = beta2 for Gamma-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 58104
  name = beta3
  short.name = beta3
  output.name = beta3 for Gamma-Cure
  output.name.intern = beta3 for Gamma-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 58105
  name = beta4
  short.name = beta4
  output.name = beta4 for Gamma-Cure
  output.name.intern = beta4 for Gamma-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 58106
  name = beta5
  short.name = beta5
  output.name = beta5 for Gamma-Cure
  output.name.intern = beta5 for Gamma-Cure
  initial = 0
  fixed = FALSE

```

```

    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 58107
    name = beta6
    short.name = beta6
    output.name = beta6 for Gamma-Cure
    output.name.intern = beta6 for Gamma-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 58108
    name = beta7
    short.name = beta7
    output.name = beta7 for Gamma-Cure
    output.name.intern = beta7 for Gamma-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 58109
    name = beta8
    short.name = beta8
    output.name = beta8 for Gamma-Cure
    output.name.intern = beta8 for Gamma-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 58110
    name = beta9
    short.name = beta9
    output.name = beta9 for Gamma-Cure
    output.name.intern = beta9 for Gamma-Cure
    initial = 0
    fixed = FALSE
    prior = normal

```

```

param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 58111
name = beta10
short.name = beta10
output.name = beta10 for Gamma-Cure
output.name.intern = beta10 for Gamma-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Model 'gammajw'. Properties: doc = A special case of the Gamma likelihood

```

survival = FALSE
discrete = FALSE
link = default log neglog
pdf = gammajw

```

Number of hyperparameters is 0.

Model 'gammajwsurv'. Properties: doc = A special case of the Gamma likelihood (survival)

```

survival = TRUE
discrete = FALSE
link = default log
pdf = gammajw

```

Number of hyperparameters is 10.

```

Hyperparameter 'theta1' hyperid = 58200
name = beta1
short.name = beta1
output.name = beta1 for GammaJW-Cure
output.name.intern = beta1 for GammaJW-Cure
initial = -7
fixed = FALSE
prior = normal
param = -4 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 58201

```

name = beta2
short.name = beta2
output.name = beta1 for GammaJW-Cure
output.name.intern = beta1 for GammaJW-Cure
initial = 0
fixed = FALSE
prior = normal

```

```

    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 58202
    name = beta3
    short.name = beta3
    output.name = beta3 for GammaJW-Cure
    output.name.intern = beta3 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 58203
    name = beta4
    short.name = beta4
    output.name = beta4 for GammaJW-Cure
    output.name.intern = beta4 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 58204
    name = beta5
    short.name = beta5
    output.name = beta5 for GammaJW-Cure
    output.name.intern = beta5 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 58205
    name = beta6
    short.name = beta6
    output.name = beta6 for GammaJW-Cure
    output.name.intern = beta6 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100

```

```

    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 58206
    name = beta7
    short.name = beta7
    output.name = beta7 for GammaJW-Cure
    output.name.intern = beta7 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 58207
    name = beta8
    short.name = beta8
    output.name = beta8 for GammaJW-Cure
    output.name.intern = beta8 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 58208
    name = beta9
    short.name = beta9
    output.name = beta9 for GammaJW-Cure
    output.name.intern = beta9 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 58209
    name = beta10
    short.name = beta10
    output.name = beta10 for GammaJW-Cure
    output.name.intern = beta10 for GammaJW-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x

```

```
from.theta = function(x) x
```

Model 'gammacount'. Properties: **doc** = A Gamma generalisation of the Poisson likelihood

```
survival = FALSE
```

```
discrete = FALSE
```

```
link = default log
```

```
status = experimental
```

```
pdf = gammacount
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 59001

```
name = log alpha
```

```
short.name = alpha
```

```
output.name = Log-alpha parameter for Gammacount observations
```

```
output.name.intern = Alpha parameter for Gammacount observations
```

```
initial = 0
```

```
fixed = FALSE
```

```
prior = pc.gammacount
```

```
param = 3
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Model 'qkumar'. Properties: **doc** = A quantile version of the Kumar likelihood

```
survival = FALSE
```

```
discrete = FALSE
```

```
link = default logit loga cauchit
```

```
pdf = qkumar
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 60001

```
name = precision parameter
```

```
short.name = prec
```

```
output.name = precision for qkumar observations
```

```
output.name.intern = log precision for qkumar observations
```

```
initial = 1
```

```
fixed = FALSE
```

```
prior = loggamma
```

```
param = 1 0.1
```

```
to.theta = function(x, sc = 0.1) log(x) / sc
```

```
from.theta = function(x, sc = 0.1) exp(sc * x)
```

Model 'qloglogistic'. Properties: **doc** = A quantile loglogistic likelihood

```
survival = FALSE
```

```
discrete = FALSE
```

```
link = default log neglog
```

```
pdf = qloglogistic
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 60011

```
name = log alpha
```

```
short.name = alpha
```

```

output.name = alpha for qloglogistic observations
output.name.intern = log alpha for qloglogistic observations
initial = 1
fixed = FALSE
prior = loggamma
param = 25 25
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'qloglogisticsurv'. Properties: **doc** = A quantile loglogistic likelihood (survival)

```

survival = TRUE
discrete = FALSE
link = default log neglog
pdf = qloglogistic

```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 60021

```

name = log alpha
short.name = alpha
output.name = alpha for qloglogisticsurv observations
output.name.intern = log alpha for qloglogisticsurv observations
initial = 1
fixed = FALSE
prior = loggamma
param = 25 25
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 60022

```

name = beta1
short.name = beta1
output.name = beta1 for qlogLogistic-Cure
output.name.intern = beta1 for logLogistic-Cure
initial = -5
fixed = FALSE
prior = normal
param = -4 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 60023

```

name = beta2
short.name = beta2
output.name = beta2 for qlogLogistic-Cure
output.name.intern = beta2 for logLogistic-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100

```

```

    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 60024
    name = beta3
    short.name = beta3
    output.name = beta3 for qlogLogistic-Cure
    output.name.intern = beta3 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 60025
    name = beta4
    short.name = beta4
    output.name = beta4 for qlogLogistic-Cure
    output.name.intern = beta4 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 60026
    name = beta5
    short.name = beta5
    output.name = beta5 for qlogLogistic-Cure
    output.name.intern = beta5 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 60027
    name = beta6
    short.name = beta6
    output.name = beta6 for qlogLogistic-Cure
    output.name.intern = beta6 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x

```



```

    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 60028
    name = beta7
    short.name = beta7
    output.name = beta7 for qlogLogistic-Cure
    output.name.intern = beta7 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 60029
    name = beta8
    short.name = beta8
    output.name = beta8 for qlogLogistic-Cure
    output.name.intern = beta8 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 60030
    name = beta9
    short.name = beta9
    output.name = beta9 for qlogLogistic-Cure
    output.name.intern = beta9 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 60031
    name = beta10
    short.name = beta10
    output.name = beta10 for qlogLogistic-Cure
    output.name.intern = beta10 for qlogLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x

```

Model 'beta'. Properties: **doc** = The Beta likelihood

```
survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog
pdf = beta
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 61001

```
name = precision parameter
short.name = phi
output.name = precision parameter for the beta observations
output.name.intern = intern precision-parameter for the beta observations
initial = 2.30258509299405
fixed = FALSE
prior = loggamma
param = 1 0.1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Model 'betabinomial'. Properties: **doc** = The Beta-Binomial likelihood

```
survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = betabinomial
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 62001

```
name = overdispersion
short.name = rho
output.name = overdispersion for the betabinomial observations
output.name.intern = intern overdispersion for the betabinomial observations
initial = 0
fixed = FALSE
prior = gaussian
param = 0 0.4
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))
```

Model 'betabinomialna'. Properties: **doc** = The Beta-Binomial Normal approximation likelihood

```
survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = betabinomialna
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 62101

```
name = overdispersion
short.name = rho
output.name = overdispersion for the betabinomialna observations
output.name.intern = intern overdispersion for the betabinomialna observations
```

```

initial = 0
fixed = FALSE
prior = gaussian
param = 0 0.4
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'cbinomial'. Properties: **doc** = The clustered Binomial likelihood

```

survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
status = experimental
pdf = cbinomial

```

Number of hyperparameters is 0.

Model 'nbinomial'. Properties: **doc** = The negBinomial likelihood

```

survival = FALSE
discrete = TRUE
link = default log logoffset quantile
pdf = nbinomial

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 63001

```

name = size
short.name = size
output.name = size for the nbinomial observations (1/overdispersion)
output.name.intern = log size for the nbinomial observations (1/overdispersion)
initial = 2.30258509299405
fixed = FALSE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'nbinomial2'. Properties: **doc** = The negBinomial2 likelihood

```

survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog
pdf = nbinomial

```

Number of hyperparameters is 0.

Model 'cennbinomial2'. Properties: **doc** = The CenNegBinomial2 likelihood (similar to cenpoisson2)

```

status = experimental
survival = FALSE
discrete = TRUE
link = default log logoffset quantile
pdf = cennbinomial2

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 63101

```

name = size

```

```

short.name = size
output.name = size for the cennbinomial2 observations (1/overdispersion)
output.name.intern = log size for the cennbinomial2 observations (1/overdispersion)
initial = 2.30258509299405
fixed = FALSE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'simplex'. Properties: **doc** = The simplex likelihood

```

survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog
pdf = simplex

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 64001

```

name = log precision
short.name = prec
output.name = Precision for the Simplex observations
output.name.intern = Log precision for the Simplex observations
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'gaussian'. Properties: **doc** = The Gaussian likelihood

```

survival = FALSE
discrete = FALSE
link = default identity logit loga cauchit log logoffset
pdf = gaussian

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 65001

```

name = log precision
short.name = prec
output.name = Precision for the Gaussian observations
output.name.intern = Log precision for the Gaussian observations
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 65002

```

name = log precision offset

```

```

short.name = preoffset
output.name = NOT IN USE
output.name.intern = NOT IN USE
initial = 72.0873067782343
fixed = TRUE
prior = none
param =
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'stdgaussian'. Properties: **doc** = The stdGaussian likelihood

```

survival = FALSE
discrete = FALSE
link = default identity logit loga cauchit log logoffset
pdf = gaussian

```

Number of hyperparameters is 0.

Model 'gaussianjw'. Properties: **doc** = The GaussianJW likelihood

```

status = experimental
survival = FALSE
discrete = FALSE
link = default logit probit
pdf = gaussianjw

```

Number of hyperparameters is 3.

Hyperparameter 'theta1' hyperid = 65101

```

name = beta1
short.name = beta1
output.name = beta1 for GaussianJW observations
output.name.intern = beta1 for GaussianJW observations
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 65102

```

name = beta2
short.name = beta2
output.name = beta2 for GaussianJW observations
output.name.intern = beta2 for GaussianJW observations
initial = 1
fixed = FALSE
prior = normal
param = 1 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 65103

```

name = beta3
short.name = beta3
output.name = beta3 for GaussianJW observations
output.name.intern = beta3 for GaussianJW observations
initial = -1
fixed = FALSE
prior = normal
param = -1 100
to.theta = function(x) x
from.theta = function(x) x

```

Model 'agaussian'. Properties: doc = The aggregated Gaussian likelihood

```

status = experimental
survival = FALSE
discrete = FALSE
link = default identity logit loga cauchit log logoffset
pdf = agaussian

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 66001

```

name = log precision
short.name = prec
output.name = Precision for the AggGaussian observations
output.name.intern = Log precision for the AggGaussian observations
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'circularnormal'. Properties: doc = The circular Gaussian likelihood

```

survival = FALSE
discrete = FALSE
link = default tan
pdf = circular-normal
status = experimental

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 67001

```

name = log precision parameter
short.name = prec
output.name = Precision parameter for the Circular Normal observations
output.name.intern = Log precision parameter for the Circular Normal observations
initial = 2
fixed = FALSE
prior = loggamma
param = 1 0.01
to.theta = function(x) log(x)

```

```
from.theta = function(x) exp(x)
```

Model 'wrappedcauchy'. Properties: doc = The wrapped Cauchy likelihood

```
survival = FALSE
discrete = FALSE
link = default tan
pdf = wrapped-cauchy
status = disabled
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 68001

```
name = log precision parameter
short.name = prec
output.name = Precision parameter for the Wrapped Cauchy observations
output.name.intern = Log precision parameter for the Wrapped Cauchy observations
initial = 2
fixed = FALSE
prior = loggamma
param = 1 0.005
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))
```

Model 'iidgamma'. Properties: doc = (experimental)

```
survival = FALSE
discrete = FALSE
link = default identity
pdf = iidgamma
status = experimental
```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 69001

```
name = logshape
short.name = shape
output.name = Shape parameter for iid-gamma
output.name.intern = Log shape parameter for iid-gamma
initial = 0
fixed = FALSE
prior = loggamma
param = 100 100
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Hyperparameter 'theta2' hyperid = 69002

```
name = lograte
short.name = rate
output.name = Rate parameter for iid-gamma
output.name.intern = Log rate parameter for iid-gamma
initial = 0
fixed = FALSE
prior = loggamma
```

```

param = 100 100
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'iidlogitbeta'. Properties: doc = (experimental)

```

survival = FALSE
discrete = FALSE
link = default logit loga
pdf = iidlogitbeta
status = experimental

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 70001

```

name = log.a
short.name = a
output.name = a parameter for iid-beta
output.name.intern = Log a parameter for iid-beta
initial = 1
fixed = FALSE
prior = loggamma
param = 1 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 70002

```

name = log.b
short.name = b
output.name = Rate parameter for iid-gamma
output.name.intern = Log rate parameter for iid-gamma
initial = 1
fixed = FALSE
prior = loggamma
param = 1 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'loggammafrailty'. Properties: doc = (experimental)

```

survival = FALSE
discrete = FALSE
link = default identity
pdf = loggammafrailty
status = experimental

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 71001

```

name = log precision
short.name = prec
output.name = precision for the gamma frailty
output.name.intern = log precision for the gamma frailty
initial = 4

```



```

fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'logistic'. Properties: **doc** = The Logistic likelihood

```

survival = FALSE
discrete = FALSE
link = default identity
pdf = logistic

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 72001

```

name = log precision
short.name = prec
output.name = precision for the logistic observations
output.name.intern = log precision for the logistic observations
initial = 1
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'sn'. Properties: **doc** = The Skew-Normal likelihood

```

status = experimental
survival = FALSE
discrete = FALSE
link = default identity
pdf = sn

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 74001

```

name = log precision
short.name = prec
output.name = precision for skew-normal observations
output.name.intern = log precision for skew-normal observations
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 74002

```

name = logit skew
short.name = skew
output.name = Skewness for skew-normal observations
output.name.intern = Intern skewness for skew-normal observations

```

```

initial = 0.00123456789
fixed = FALSE
prior = pc.sn
param = 10
to.theta = function(x, skew.max = 0.988) log((1 + x / skew.max) / (1 - x / skew.max))
from.theta = function(x, skew.max = 0.988) skew.max * (2 * exp(x) / (1 + exp(x)) - 1)

```

Model 'gev'. Properties: **doc** = The Generalized Extreme Value likelihood

```

survival = FALSE
discrete = FALSE
link = default identity
status = disabled: Use likelihood model 'bgev' instead; see inla.doc('bgev')
pdf = gev

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 76001

```

name = log precision
short.name = prec
output.name = precision for GEV observations
output.name.intern = log precision for GEV observations
initial = 4
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 76002

```

name = tail parameter
short.name = tail
output.name = tail parameter for GEV observations
output.name.intern = tail parameter for GEV observations
initial = 0
fixed = FALSE
prior = gaussian
param = 0 25
to.theta = function(x) x
from.theta = function(x) x

```

Model 'lognormal'. Properties: **doc** = The log-Normal likelihood

```

survival = FALSE
discrete = FALSE
link = default identity
pdf = lognormal

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 77101

```

name = log precision
short.name = prec
output.name = Precision for the lognormal observations

```

```

output.name.intern = Log precision for the lognormal observations
initial = 0
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'lognormalsurv'. Properties: **doc** = The log-Normal likelihood (survival)

```

survival = TRUE
discrete = FALSE
link = default identity
pdf = lognormal

```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 78001

```

name = log precision
short.name = prec
output.name = Precision for the lognormalsurv observations
output.name.intern = Log precision for the lognormalsurv observations
initial = 0
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 78002

```

name = beta1
short.name = beta1
output.name = beta1 for logNormal-Cure
output.name.intern = beta1 for logNormal-Cure
initial = -7
fixed = FALSE
prior = normal
param = -4 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 78003

```

name = beta2
short.name = beta2
output.name = beta2 for logNormal-Cure
output.name.intern = beta2 for logNormal-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x

```

```

    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 78004
    name = beta3
    short.name = beta3
    output.name = beta3 for logNormal-Cure
    output.name.intern = beta3 for logNormal-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 78005
    name = beta4
    short.name = beta4
    output.name = beta4 for logNormal-Cure
    output.name.intern = beta4 for logNormal-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 78006
    name = beta5
    short.name = beta5
    output.name = beta5 for logNormal-Cure
    output.name.intern = beta5 for logNormal-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 78007
    name = beta6
    short.name = beta6
    output.name = beta6 for logNormal-Cure
    output.name.intern = beta6 for logNormal-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x

```

```

Hyperparameter 'theta8' hyperid = 78008
  name = beta7
  short.name = beta7
  output.name = beta7 for logNormal-Cure
  output.name.intern = beta7 for logNormal-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x

```

```

Hyperparameter 'theta9' hyperid = 78009
  name = beta8
  short.name = beta8
  output.name = beta8 for logNormal-Cure
  output.name.intern = beta8 for logNormal-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x

```

```

Hyperparameter 'theta10' hyperid = 78010
  name = beta9
  short.name = beta9
  output.name = beta9 for logNormal-Cure
  output.name.intern = beta9 for logNormal-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x

```

```

Hyperparameter 'theta11' hyperid = 78011
  name = beta10
  short.name = beta10
  output.name = beta10 for logNormal-Cure
  output.name.intern = beta10 for logNormal-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x

```

Model 'exponential'. Properties: doc = The Exponential likelihood

```

survival = FALSE
discrete = FALSE
link = default log
pdf = exponential

```

Number of hyperparameters is 0.

Model 'exponentialsurv'. Properties: **doc** = The Exponential likelihood (survival)

```

survival = TRUE
discrete = FALSE
link = default log neglog
pdf = exponential

```

Number of hyperparameters is 10.

Hyperparameter 'theta1' hyperid = 78020

```

name = beta1
short.name = beta1
output.name = beta1 for Exp-Cure
output.name.intern = beta1 for Exp-Cure
initial = -4
fixed = FALSE
prior = normal
param = -1 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 78021

```

name = beta2
short.name = beta2
output.name = beta2 for Exp-Cure
output.name.intern = beta2 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 78022

```

name = beta3
short.name = beta3
output.name = beta3 for Exp-Cure
output.name.intern = beta3 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta4' hyperid = 78023

```

name = beta4
short.name = beta4
output.name = beta4 for Exp-Cure
output.name.intern = beta4 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 78024
name = beta5
short.name = beta5
output.name = beta5 for Exp-Cure
output.name.intern = beta5 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 78025
name = beta6
short.name = beta6
output.name = beta6 for Exp-Cure
output.name.intern = beta6 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 78026
name = beta7
short.name = beta7
output.name = beta7 for Exp-Cure
output.name.intern = beta7 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 78027
name = beta8

```

```

short.name = beta8
output.name = beta8 for Exp-Cure
output.name.intern = beta8 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta9' hyperid = 78028

```

name = beta9
short.name = beta9
output.name = beta9 for Exp-Cure
output.name.intern = beta9 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta10' hyperid = 78029

```

name = beta10
short.name = beta10
output.name = beta10 for Exp-Cure
output.name.intern = beta10 for Exp-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Model 'coxph'. Properties: **doc** = Cox-proportional hazard likelihood

```

survival = TRUE
discrete = TRUE
link = default log neglog
pdf = coxph

```

Number of hyperparameters is 0.

Model 'weibull'. Properties: **doc** = The Weibull likelihood

```

survival = FALSE
discrete = FALSE
link = default log neglog quantile
pdf = weibull

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 79001

```

name = log alpha

```



```

short.name = alpha
output.name = alpha parameter for weibull
output.name.intern = alpha_intern for weibull
initial = -2
fixed = FALSE
prior = pc.alphaw
param = 5
to.theta = function(x, sc = 0.1) log(x) / sc
from.theta = function(x, sc = 0.1) exp(sc * x)

```

Model 'weibullsurv'. Properties: **doc** = The Weibull likelihood (survival)

```

survival = TRUE
discrete = FALSE
link = default log neglog quantile
pdf = weibull

```

Number of hyperparameters is 11.

Hyperparameter 'theta' hyperid = 79101

```

name = log alpha
short.name = alpha
output.name = alpha parameter for weibullsurv
output.name.intern = alpha_intern for weibullsurv
initial = -2
fixed = FALSE
prior = pc.alphaw
param = 5
to.theta = function(x, sc = 0.1) log(x) / sc
from.theta = function(x, sc = 0.1) exp(sc * x)

```

Hyperparameter 'theta2' hyperid = 79102

```

name = beta1
short.name = beta1
output.name = beta1 for Weibull-Cure
output.name.intern = beta1 for Weibull-Cure
initial = -7
fixed = FALSE
prior = normal
param = -4 100
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 79103

```

name = beta2
short.name = beta2
output.name = beta2 for Weibull-Cure
output.name.intern = beta2 for Weibull-Cure
initial = 0
fixed = FALSE
prior = normal

```

```

    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 79104
    name = beta3
    short.name = beta3
    output.name = beta3 for Weibull-Cure
    output.name.intern = beta3 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 79105
    name = beta4
    short.name = beta4
    output.name = beta4 for Weibull-Cure
    output.name.intern = beta4 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 79106
    name = beta5
    short.name = beta5
    output.name = beta5 for Weibull-Cure
    output.name.intern = beta5 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 79107
    name = beta6
    short.name = beta6
    output.name = beta6 for Weibull-Cure
    output.name.intern = beta6 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100

```

```

    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 79108
    name = beta7
    short.name = beta7
    output.name = beta7 for Weibull-Cure
    output.name.intern = beta7 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 79109
    name = beta8
    short.name = beta8
    output.name = beta8 for Weibull-Cure
    output.name.intern = beta8 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 79110
    name = beta9
    short.name = beta9
    output.name = beta9 for Weibull-Cure
    output.name.intern = beta9 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 79111
    name = beta10
    short.name = beta10
    output.name = beta10 for Weibull-Cure
    output.name.intern = beta10 for Weibull-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x

```

```
from.theta = function(x) x
```

Model 'loglogistic'. Properties: **doc** = The loglogistic likelihood

```
survival = FALSE
```

```
discrete = FALSE
```

```
link = default log neglog
```

```
pdf = loglogistic
```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 80001

```
name = log alpha
```

```
short.name = alpha
```

```
output.name = alpha for loglogistic observations
```

```
output.name.intern = log alpha for loglogistic observations
```

```
initial = 1
```

```
fixed = FALSE
```

```
prior = loggamma
```

```
param = 25 25
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Model 'loglogisticsurv'. Properties: **doc** = The loglogistic likelihood (survival)

```
survival = TRUE
```

```
discrete = FALSE
```

```
link = default log neglog
```

```
pdf = loglogistic
```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 80011

```
name = log alpha
```

```
short.name = alpha
```

```
output.name = alpha for loglogisticsurv observations
```

```
output.name.intern = log alpha for loglogisticsurv observations
```

```
initial = 1
```

```
fixed = FALSE
```

```
prior = loggamma
```

```
param = 25 25
```

```
to.theta = function(x) log(x)
```

```
from.theta = function(x) exp(x)
```

Hyperparameter 'theta2' hyperid = 80012

```
name = beta1
```

```
short.name = beta1
```

```
output.name = beta1 for logLogistic-Cure
```

```
output.name.intern = beta1 for logLogistic-Cure
```

```
initial = -5
```

```
fixed = FALSE
```

```
prior = normal
```

```
param = -4 100
```

```
to.theta = function(x) x
```

```

    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 80013
    name = beta2
    short.name = beta2
    output.name = beta2 for logLogistic-Cure
    output.name.intern = beta2 for logLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 80014
    name = beta3
    short.name = beta3
    output.name = beta3 for logLogistic-Cure
    output.name.intern = beta3 for logLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 80015
    name = beta4
    short.name = beta4
    output.name = beta4 for logLogistic-Cure
    output.name.intern = beta4 for logLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 80016
    name = beta5
    short.name = beta5
    output.name = beta5 for logLogistic-Cure
    output.name.intern = beta5 for logLogistic-Cure
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 100
    to.theta = function(x) x
    from.theta = function(x) x

```

```

Hyperparameter 'theta7' hyperid = 80017
  name = beta6
  short.name = beta6
  output.name = beta6 for logLogistic-Cure
  output.name.intern = beta6 for logLogistic-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 80018
  name = beta7
  short.name = beta7
  output.name = beta7 for logLogistic-Cure
  output.name.intern = beta7 for logLogistic-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 80019
  name = beta8
  short.name = beta8
  output.name = beta8 for logLogistic-Cure
  output.name.intern = beta8 for logLogistic-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 80020
  name = beta9
  short.name = beta9
  output.name = beta9 for logLogistic-Cure
  output.name.intern = beta9 for logLogistic-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 80021

```

```

name = beta10
short.name = beta10
output.name = beta10 for logLogistic-Cure
output.name.intern = beta10 for logLogistic-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x

```

Model 'stochvol'. Properties: doc = The Gaussian stochvol likelihood

```

survival = FALSE
discrete = FALSE
link = default log
pdf = stochvolgaussian

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 82001

```

name = log precision
short.name = prec
output.name = Offset precision for stochvol
output.name.intern = Log offset precision for stochvol
initial = 500
fixed = TRUE
prior = loggamma
param = 1 0.005
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'stochvolns'. Properties: doc = The SkewNormal stochvol likelihood

```

status = experimental
survival = FALSE
discrete = FALSE
link = default log
pdf = stochvolns

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 82101

```

name = logit skew
short.name = skew
output.name = Skewness for stochvol_sn observations
output.name.intern = Intern skewness for stochvol_sn observations
initial = 0.00123456789
fixed = FALSE
prior = pc.sn
param = 10
to.theta = function(x, skew.max = 0.988) log((1 + x / skew.max) / (1 - x / skew.max))
from.theta = function(x, skew.max = 0.988) skew.max * (2 * exp(x) / (1 + exp(x)) - 1)

```

Hyperparameter 'theta2' hyperid = 82102

```

name = log precision
short.name = prec
output.name = Offset precision for stochvol_sn
output.name.intern = Log offset precision for stochvol_sn
initial = 500
fixed = TRUE
prior = loggamma
param = 1 0.005
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'stochvolt'. Properties: doc = The Student-t stochvol likelihood

```

survival = FALSE
discrete = FALSE
link = default log
pdf = stochvolt

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 83001

```

name = log degrees of freedom
short.name = dof
output.name = degrees of freedom for stochvol student-t
output.name.intern = dof_intern for stochvol student-t
initial = 4
fixed = FALSE
prior = pc.dof
param = 15 0.5
to.theta = function(x) log(x - 2)
from.theta = function(x) 2 + exp(x)

```

Model 'stochvolnig'. Properties: doc = The Normal inverse Gaussian stochvol likelihood

```

survival = FALSE
discrete = FALSE
link = default log
pdf = stochvolnig

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 84001

```

name = skewness
short.name = skew
output.name.intern = skewness_param_intern for stochvol-nig
output.name = skewness parameter for stochvol-nig
initial = 0
fixed = FALSE
prior = gaussian
param = 0 10
to.theta = function(x) x
from.theta = function(x) x

```


Hyperparameter 'theta2' hyperid = 84002

```

name = shape
short.name = shape
output.name = shape parameter for stochvol-nig
output.name.intern = shape_param_intern for stochvol-nig
initial = 0
fixed = FALSE
prior = loggamma
param = 1 0.5
to.theta = function(x) log(x - 1)
from.theta = function(x) 1 + exp(x)

```

Model 'zeroinflatedpoisson0'. Properties: doc = Zero-inflated Poisson, type 0

```

survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 85001

```

name = logit probability
short.name = prob
output.name = zero-probability parameter for zero-inflated poisson_0
output.name.intern = intern zero-probability parameter for zero-inflated poisson_0
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatedpoisson1'. Properties: doc = Zero-inflated Poisson, type 1

```

survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 86001

```

name = logit probability
short.name = prob
output.name = zero-probability parameter for zero-inflated poisson_1
output.name.intern = intern zero-probability parameter for zero-inflated poisson_1
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatedpoisson2'. Properties: doc = Zero-inflated Poisson, type 2

survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 87001

name = log alpha
short.name = a
output.name = zero-probability parameter for zero-inflated poisson_2
output.name.intern = intern zero-probability parameter for zero-inflated poisson_2
initial = 0.693147180559945
fixed = FALSE
prior = gaussian
param = 0.693147180559945 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

Model 'zeroinflatedcenpoisson0'. Properties: doc = Zero-inflated censored Poisson, type 0

status = experimental
survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 87101

name = logit probability
short.name = prob
output.name = zero-probability parameter for zero-inflated poisson_0
output.name.intern = intern zero-probability parameter for zero-inflated poisson_0
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

Model 'zeroinflatedcenpoisson1'. Properties: doc = Zero-inflated censored Poisson, type 1

status = experimental
survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 87201

name = logit probability
short.name = prob

```

output.name = zero-probability parameter for zero-inflated poisson_1
output.name.intern = intern zero-probability parameter for zero-inflated poisson_1
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatedbetabinomial0'. Properties: **doc** = Zero-inflated Beta-Binomial, type 0

```

survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = zeroinflated

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 88001

```

name = overdispersion
short.name = rho
output.name = rho for zero-inflated betabinomial_0
output.name.intern = rho_intern for zero-inflated betabinomial_0
initial = 0
fixed = FALSE
prior = gaussian
param = 0 0.4
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Hyperparameter 'theta2' hyperid = 88002

```

name = logit probability
short.name = prob
output.name = zero-probability parameter for zero-inflated betabinomial_0
output.name.intern = intern zero-probability parameter for zero-inflated betabinomial_0
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatedbetabinomial1'. Properties: **doc** = Zero-inflated Beta-Binomial, type 1

```

survival = FALSE
discrete = TRUE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = zeroinflated

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 89001

```

name = overdispersion
short.name = rho

```

```

output.name = rho for zero-inflated betabinomial_1
output.name.intern = rho_intern for zero-inflated betabinomial_1
initial = 0
fixed = FALSE
prior = gaussian
param = 0 0.4
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Hyperparameter 'theta2' hyperid = 89002

```

name = logit probability
short.name = prob
output.name = zero-probability parameter for zero-inflated betabinomial_1
output.name.intern = intern zero-probability parameter for zero-inflated betabinomial_1
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatedbinomial0'. Properties: **doc** = Zero-inflated Binomial, type 0

```

survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = zeroinflated

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 90001

```

name = logit probability
short.name = prob
output.name = zero-probability parameter for zero-inflated binomial_0
output.name.intern = intern zero-probability parameter for zero-inflated binomial_0
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatedbinomial1'. Properties: **doc** = Zero-inflated Binomial, type 1

```

survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = zeroinflated

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 91001

```

name = logit probability
short.name = prob

```

```

output.name = zero-probability parameter for zero-inflated binomial_1
output.name.intern = intern zero-probability parameter for zero-inflated binomial_1
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatedbinomial2'. Properties: **doc** = Zero-inflated Binomial, type 2

```

survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = zeroinflated

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 92001

```

name = alpha
short.name = alpha
output.name = zero-probability parameter for zero-inflated binomial_2
output.name.intern = intern zero-probability parameter for zero-inflated binomial_2
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'zeroninflatedbinomial2'. Properties: **doc** = Zero and N inflated binomial, type 2

```

survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = NA

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 93001

```

name = alpha1
short.name = alpha1
output.name = alpha1 parameter for zero-n-inflated binomial_2
output.name.intern = intern alpha1 parameter for zero-n-inflated binomial_2
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 93002

```

name = alpha2
short.name = alpha2

```

```

output.name = alpha2 parameter for zero-n-inflated binomial_2
output.name.intern = intern alpha2 parameter for zero-n-inflated binomial_2
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'zeroninflatedbinomial3'. Properties: **doc** = Zero and N inflated binomial, type 3

```

status = experimental
survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = zeroinflated

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 93101

```

name = alpha0
short.name = alpha0
output.name = alpha0 parameter for zero-n-inflated binomial_3
output.name.intern = intern alpha0 parameter for zero-n-inflated binomial_3
initial = 1
fixed = FALSE
prior = loggamma
param = 1 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 93102

```

name = alphaN
short.name = alphaN
output.name.intern = intern alphaN parameter for zero-n-inflated binomial_3
output.name = alphaN parameter for zero-n-inflated binomial_3
initial = 1
fixed = FALSE
prior = loggamma
param = 1 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'zeroinflatedbetabinomial2'. Properties: **doc** = Zero inflated Beta-Binomial, type 2

```

survival = FALSE
discrete = FALSE
link = default logit loga cauchit probit cloglog ccloglog loglog robit sn
pdf = zeroinflated

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 94001

```

name = log alpha

```

```

short.name = a
output.name = zero-probability parameter for zero-inflated betabinomial_2
output.name.intern = intern zero-probability parameter for zero-inflated betabinomial_2
initial = 0.693147180559945
fixed = FALSE
prior = gaussian
param = 0.693147180559945 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 94002
  name = beta
  short.name = b
  output.name = overdispersion parameter for zero-inflated betabinomial_2
  output.name.intern = intern overdispersion parameter for zero-inflated betabinomial_2
  initial = 0
  fixed = FALSE
  prior = gaussian
  param = 0 1
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Model 'zeroinflatednbinomial0'. Properties: doc = Zero inflated negBinomial, type 0
  survival = FALSE
  discrete = FALSE
  link = default log
  pdf = zeroinflated
Number of hyperparameters is 2.
Hyperparameter 'theta1' hyperid = 95001
  name = log size
  short.name = size
  output.name = size for nbinomial_0 zero-inflated observations
  output.name.intern = log size for nbinomial_0 zero-inflated observations
  initial = 2.30258509299405
  fixed = FALSE
  prior = pc.mgamma
  param = 7
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 95002
  name = logit probability
  short.name = prob
  output.name = zero-probability parameter for zero-inflated nbinomial_0
  output.name.intern = intern zero-probability parameter for zero-inflated nbinomial_0
  initial = -1
  fixed = FALSE
  prior = gaussian

```

```

param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatednbinomial1'. Properties: doc = Zero inflated negBinomial, type 1

```

survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 96001

```

name = log size
short.name = size
output.name = size for nbinomial_1 zero-inflated observations
output.name.intern = log size for nbinomial_1 zero-inflated observations
initial = 2.30258509299405
fixed = FALSE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 96002

```

name = logit probability
short.name = prob
output.name = zero-probability parameter for zero-inflated nbinomial_1
output.name.intern = intern zero-probability parameter for zero-inflated nbinomial_1
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatednbinomial1strata2'. Properties: doc = Zero inflated negBinomial, type 1, strata 2

```

status = experimental
survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 97001

```

name = log size
short.name = size
output.name = size for zero-inflated nbinomial_1_strata2
output.name.intern = log size for zero-inflated nbinomial_1_strata2
initial = 2.30258509299405
fixed = FALSE

```



```

    prior = pc.mgamma
    param = 7
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)
Hyperparameter 'theta2' hyperid = 97002
    name = logit probability 1
    short.name = prob1
    output.name = zero-probability1 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability1 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = FALSE
    prior = gaussian
    param = -1 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Hyperparameter 'theta3' hyperid = 97003
    name = logit probability 2
    short.name = prob2
    output.name = zero-probability2 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability2 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = FALSE
    prior = gaussian
    param = -1 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Hyperparameter 'theta4' hyperid = 97004
    name = logit probability 3
    short.name = prob3
    output.name = zero-probability3 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability3 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = TRUE
    prior = gaussian
    param = -1 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Hyperparameter 'theta5' hyperid = 97005
    name = logit probability 4
    short.name = prob4
    output.name = zero-probability4 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability4 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = TRUE
    prior = gaussian

```

```

    param = -1 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Hyperparameter 'theta6' hyperid = 97006
    name = logit probability 5
    short.name = prob5
    output.name = zero-probability5 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability5 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = TRUE
    prior = gaussian
    param = -1 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Hyperparameter 'theta7' hyperid = 97007
    name = logit probability 6
    short.name = prob6
    output.name = zero-probability6 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability6 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = TRUE
    prior = gaussian
    param = -1 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Hyperparameter 'theta8' hyperid = 97008
    name = logit probability 7
    short.name = prob7
    output.name = zero-probability7 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability7 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = TRUE
    prior = gaussian
    param = -1 0.2
    to.theta = function(x) log(x / (1 - x))
    from.theta = function(x) exp(x) / (1 + exp(x))
Hyperparameter 'theta9' hyperid = 97009
    name = logit probability 8
    short.name = prob8
    output.name = zero-probability8 for zero-inflated nbinomial_1_strata2
    output.name.intern = intern zero-probability8 for zero-inflated nbinomial_1_strata2
    initial = -1
    fixed = TRUE
    prior = gaussian
    param = -1 0.2

```

```

to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Hyperparameter 'theta10' hyperid = 97010

```

name = logit probability 9
short.name = prob9
output.name = zero-probability9 for zero-inflated nbinomial_1_strata2
output.name.intern = intern zero-probability9 for zero-inflated nbinomial_1_strata2
initial = -1
fixed = TRUE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Hyperparameter 'theta11' hyperid = 97011

```

name = logit probability 10
short.name = prob10
output.name = zero-probability10 for zero-inflated nbinomial_1_strata2
output.name.intern = intern zero-probability10 for zero-inflated nbinomial_1_strata2
initial = -1
fixed = TRUE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Model 'zeroinflatednbinomial1strata3'. Properties: doc = Zero inflated negBinomial, type 1, strata 3

```

status = experimental
survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 98001

```

name = logit probability
short.name = prob
output.name = zero-probability for zero-inflated nbinomial_1_strata3
output.name.intern = intern zero-probability for zero-inflated nbinomial_1_strata3
initial = -1
fixed = FALSE
prior = gaussian
param = -1 0.2
to.theta = function(x) log(x / (1 - x))
from.theta = function(x) exp(x) / (1 + exp(x))

```

Hyperparameter 'theta2' hyperid = 98002

```

name = log size 1
short.name = size1

```

```

output.name = size1 for zero-inflated nbinomial_1_strata3
output.name.intern = log_size1 for zero-inflated nbinomial_1_strata3
initial = 2.30258509299405
fixed = FALSE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta3' hyperid = 98003
  name = log size 2
  short.name = size2
  output.name = size2 for zero-inflated nbinomial_1_strata3
  output.name.intern = log_size2 for zero-inflated nbinomial_1_strata3
  initial = 2.30258509299405
  fixed = FALSE
  prior = pc.mgamma
  param = 7
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta4' hyperid = 98004
  name = log size 3
  short.name = size3
  output.name = size3 for zero-inflated nbinomial_1_strata3
  output.name.intern = log_size3 for zero-inflated nbinomial_1_strata3
  initial = 2.30258509299405
  fixed = TRUE
  prior = pc.mgamma
  param = 7
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta5' hyperid = 98005
  name = log size 4
  short.name = size4
  output.name = size4 for zero-inflated nbinomial_1_strata3
  output.name.intern = log_size4 for zero-inflated nbinomial_1_strata3
  initial = 2.30258509299405
  fixed = TRUE
  prior = pc.mgamma
  param = 7
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta6' hyperid = 98006
  name = log size 5
  short.name = size5
  output.name = size5 for zero-inflated nbinomial_1_strata3

```

```

output.name.intern = log_size5 for zero-inflated nbinomial_1_strata3
initial = 2.30258509299405
fixed = TRUE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta7' hyperid = 98007
  name = log size 6
  short.name = size6
  output.name = size6 for zero-inflated nbinomial_1_strata3
  output.name.intern = log_size6 for zero-inflated nbinomial_1_strata3
  initial = 2.30258509299405
  fixed = TRUE
  prior = pc.mgamma
  param = 7
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta8' hyperid = 98008
  name = log size 7
  short.name = size7
  output.name = size7 for zero-inflated nbinomial_1_strata3
  output.name.intern = log_size7 for zero-inflated nbinomial_1_strata3
  initial = 2.30258509299405
  fixed = TRUE
  prior = pc.mgamma
  param = 7
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta9' hyperid = 98009
  name = log size 8
  short.name = size8
  output.name = size8 for zero-inflated nbinomial_1_strata3
  output.name.intern = log_size8 for zero-inflated nbinomial_1_strata3
  initial = 2.30258509299405
  fixed = TRUE
  prior = pc.mgamma
  param = 7
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta10' hyperid = 98010
  name = log size 9
  short.name = size9
  output.name = size9 for zero-inflated nbinomial_1_strata3
  output.name.intern = log_size9 for zero-inflated nbinomial_1_strata3

```

```

initial = 2.30258509299405
fixed = TRUE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta11' hyperid = 98011

```

name = log size 10
short.name = size10
output.name = size10 for zero-inflated nbinomial_1_strata3
output.name.intern = log_size10 for zero-inflated nbinomial_1_strata3
initial = 2.30258509299405
fixed = TRUE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'zeroinflatednbinomial2'. Properties: **doc** = Zero inflated negBinomial, type 2

```

survival = FALSE
discrete = FALSE
link = default log
pdf = zeroinflated

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 99001

```

name = log size
short.name = size
output.name = size for nbinomial zero-inflated observations
output.name.intern = log size for nbinomial zero-inflated observations
initial = 2.30258509299405
fixed = FALSE
prior = pc.mgamma
param = 7
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Hyperparameter 'theta2' hyperid = 99002

```

name = log alpha
short.name = a
output.name = parameter alpha for zero-inflated nbinomial2
output.name.intern = parameter alpha.intern for zero-inflated nbinomial2
initial = 0.693147180559945
fixed = FALSE
prior = gaussian
param = 2 1
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 't'. Properties: `doc = Student-t likelihood`

```
survival = FALSE
discrete = FALSE
link = default identity
pdf = student-t
```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 100001

```
name = log precision
short.name = prec
output.name = precision for the student-t observations
output.name.intern = log precision for the student-t observations
initial = 0
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
```

Hyperparameter 'theta2' hyperid = 100002

```
name = log degrees of freedom
short.name = dof
output.name = degrees of freedom for student-t
output.name.intern = dof_intern for student-t
initial = 5
fixed = FALSE
prior = pc.dof
param = 15 0.5
to.theta = function(x) log(x - 2)
from.theta = function(x) 2 + exp(x)
```

Model 'tstrata'. Properties: `doc = A stratified version of the Student-t likelihood`

```
survival = FALSE
discrete = FALSE
link = default identity
pdf = tstrata
```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 101001

```
name = log degrees of freedom
short.name = dof
output.name.intern = dof_intern for tstrata
output.name = degrees of freedom for tstrata
initial = 4
fixed = FALSE
prior = pc.dof
param = 15 0.5
to.theta = function(x) log(x - 5)
from.theta = function(x) 5 + exp(x)
```

```

Hyperparameter 'theta2' hyperid = 101002
  name = log precision1
  short.name = prec1
  output.name = Prec for tstrata strata
  output.name.intern = Log prec for tstrata strata
  initial = 2
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta3' hyperid = 101003
  name = log precision2
  short.name = prec2
  output.name = Prec for tstrata strata[2]
  output.name.intern = Log prec for tstrata strata[2]
  initial = 2
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta4' hyperid = 101004
  name = log precision3
  short.name = prec3
  output.name = Prec for tstrata strata[3]
  output.name.intern = Log prec for tstrata strata[3]
  initial = 2
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta5' hyperid = 101005
  name = log precision4
  short.name = prec4
  output.name = Prec for tstrata strata[4]
  output.name.intern = Log prec for tstrata strata[4]
  initial = 2
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Hyperparameter 'theta6' hyperid = 101006

```



```

name = log precision5
short.name = prec5
output.name = Prec for tstrata strata[5]
output.name.intern = Log prec for tstrata strata[5]
initial = 2
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta7' hyperid = 101007
name = log precision6
short.name = prec6
output.name = Prec for tstrata strata[6]
output.name.intern = Log prec for tstrata strata[6]
initial = 2
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta8' hyperid = 101008
name = log precision7
short.name = prec7
output.name = Prec for tstrata strata[7]
output.name.intern = Log prec for tstrata strata[7]
initial = 2
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta9' hyperid = 101009
name = log precision8
short.name = prec8
output.name = Prec for tstrata strata[8]
output.name.intern = Log prec for tstrata strata[8]
initial = 2
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta10' hyperid = 101010
name = log precision9

```

```

short.name = prec9
output.name = Prec for tstrata strata[9]
output.name.intern = Log prec for tstrata strata[9]
initial = 2
fixed = FALSE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)
Hyperparameter 'theta11' hyperid = 101011
  name = log precision10
  short.name = prec10
  output.name = Prec for tstrata strata[10]
  output.name.intern = Log prec for tstrata strata[10]
  initial = 2
  fixed = FALSE
  prior = loggamma
  param = 1 5e-05
  to.theta = function(x) log(x)
  from.theta = function(x) exp(x)
Model 'nmix'. Properties: doc = Binomial-Poisson mixture
  status = experimental
  survival = FALSE
  discrete = TRUE
  link = default logit loga probit
  pdf = nmix
Number of hyperparameters is 15.
Hyperparameter 'theta1' hyperid = 101101
  name = beta1
  short.name = beta1
  output.name = beta[1] for NMix observations
  output.name.intern = beta[1] for NMix observations
  initial = 2.30258509299405
  fixed = FALSE
  prior = normal
  param = 0 0.5
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta2' hyperid = 101102
  name = beta2
  short.name = beta2
  output.name = beta[2] for NMix observations
  output.name.intern = beta[2] for NMix observations
  initial = 0
  fixed = FALSE

```

```

    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 101103
    name = beta3
    short.name = beta3
    output.name = beta[3] for NMix observations
    output.name.intern = beta[3] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 101104
    name = beta4
    short.name = beta4
    output.name = beta[4] for NMix observations
    output.name.intern = beta[4] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 101105
    name = beta5
    short.name = beta5
    output.name = beta[5] for NMix observations
    output.name.intern = beta[5] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 101106
    name = beta6
    short.name = beta6
    output.name = beta[6] for NMix observations
    output.name.intern = beta[6] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal

```

```

    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 101107
    name = beta7
    short.name = beta7
    output.name = beta[7] for NMix observations
    output.name.intern = beta[7] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 101108
    name = beta8
    short.name = beta8
    output.name = beta[8] for NMix observations
    output.name.intern = beta[8] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 101109
    name = beta9
    short.name = beta9
    output.name = beta[9] for NMix observations
    output.name.intern = beta[9] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 101110
    name = beta10
    short.name = beta10
    output.name = beta[10] for NMix observations
    output.name.intern = beta[10] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1

```

```

    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 101111
    name = beta11
    short.name = beta11
    output.name = beta[11] for NMix observations
    output.name.intern = beta[11] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 101112
    name = beta12
    short.name = beta12
    output.name = beta[12] for NMix observations
    output.name.intern = beta[12] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 101113
    name = beta13
    short.name = beta13
    output.name = beta[13] for NMix observations
    output.name.intern = beta[13] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta14' hyperid = 101114
    name = beta14
    short.name = beta14
    output.name = beta[14] for NMix observations
    output.name.intern = beta[14] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x

```

```

    from.theta = function(x) x
Hyperparameter 'theta15' hyperid = 101115
    name = beta15
    short.name = beta15
    output.name = beta[15] for NMix observations
    output.name.intern = beta[15] for NMix observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Model 'nmixnb'. Properties: doc = NegBinomial-Poisson mixture
    status = experimental
    survival = FALSE
    discrete = TRUE
    link = default logit loga probit
    pdf = nmixnb
Number of hyperparameters is 16.
Hyperparameter 'theta1' hyperid = 101121
    name = beta1
    short.name = beta1
    output.name = beta[1] for NMixNB observations
    output.name.intern = beta[1] for NMixNB observations
    initial = 2.30258509299405
    fixed = FALSE
    prior = normal
    param = 0 0.5
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta2' hyperid = 101122
    name = beta2
    short.name = beta2
    output.name = beta[2] for NMixNB observations
    output.name.intern = beta[2] for NMixNB observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 101123
    name = beta3
    short.name = beta3
    output.name = beta[3] for NMixNB observations

```

```

    output.name.intern = beta[3] for NMixNB observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 101124
    name = beta4
    short.name = beta4
    output.name = beta[4] for NMixNB observations
    output.name.intern = beta[4] for NMixNB observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 101125
    name = beta5
    short.name = beta5
    output.name = beta[5] for NMixNB observations
    output.name.intern = beta[5] for NMixNB observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 101126
    name = beta6
    short.name = beta6
    output.name = beta[6] for NMixNB observations
    output.name.intern = beta[6] for NMixNB observations
    initial = 0
    fixed = FALSE
    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 101127
    name = beta7
    short.name = beta7
    output.name = beta[7] for NMixNB observations
    output.name.intern = beta[7] for NMixNB observations

```

```

initial = 0
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 101128
  name = beta8
  short.name = beta8
  output.name = beta[8] for NMixNB observations
  output.name.intern = beta[8] for NMixNB observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 1
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 101129
  name = beta9
  short.name = beta9
  output.name = beta[9] for NMixNB observations
  output.name.intern = beta[9] for NMixNB observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 1
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 101130
  name = beta10
  short.name = beta10
  output.name = beta[10] for NMixNB observations
  output.name.intern = beta[10] for NMixNB observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 1
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 101131
  name = beta11
  short.name = beta11
  output.name = beta[11] for NMixNB observations
  output.name.intern = beta[11] for NMixNB observations
  initial = 0

```



```

fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 101132
  name = beta12
  short.name = beta12
  output.name = beta[12] for NMixNB observations
  output.name.intern = beta[12] for NMixNB observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 1
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 101133
  name = beta13
  short.name = beta13
  output.name = beta[13] for NMixNB observations
  output.name.intern = beta[13] for NMixNB observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 1
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta14' hyperid = 101134
  name = beta14
  short.name = beta14
  output.name = beta[14] for NMixNB observations
  output.name.intern = beta[14] for NMixNB observations
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 1
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta15' hyperid = 101135
  name = beta15
  short.name = beta15
  output.name = beta[15] for NMixNB observations
  output.name.intern = beta[15] for NMixNB observations
  initial = 0
  fixed = FALSE

```

```

    prior = normal
    param = 0 1
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta16' hyperid = 101136
    name = overdispersion
    short.name = overdispersion
    output.name = overdispersion for NMixNB observations
    output.name.intern = log_overdispersion for NMixNB observations
    initial = 0
    fixed = FALSE
    prior = pc.gamma
    param = 7
    to.theta = function(x) log(x)
    from.theta = function(x) exp(x)

```

Model 'gp'. Properties: doc = Generalized Pareto likelihood

```

    status = experimental
    survival = FALSE
    discrete = TRUE
    link = default quantile
    pdf = genPareto

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 101201

```

    name = tail
    short.name = xi
    output.name = Tail parameter for the gp observations
    output.name.intern = Intern tail parameter for the gp observations
    initial = -4
    fixed = FALSE
    prior = pc.gevtail
    param = 7 0 0.5
    to.theta = function(x, interval = c(REPLACE.ME.low, REPLACE.ME.high)) log(-(interval[1] - x))
    from.theta = function(x, interval = c(REPLACE.ME.low, REPLACE.ME.high)) interval[1] + (interval[2] - interval[1]) * exp(-x)

```

Model 'dgp'. Properties: doc = Discrete generalized Pareto likelihood

```

    status = experimental
    survival = FALSE
    discrete = TRUE
    link = default quantile
    pdf = dgp

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 101301

```

    name = tail
    short.name = xi
    output.name = Tail parameter for the dgp observations
    output.name.intern = Intern tail parameter for the dgp observations

```

```

initial = 2
fixed = FALSE
prior = pc.gevtail
param = 7 0 0.5
to.theta = function(x, interval = c(REPLACE.ME.low, REPLACE.ME.high)) log(-(interval[1] - x)
from.theta = function(x, interval = c(REPLACE.ME.low, REPLACE.ME.high)) interval[1] + (inte

```

Model 'logperiodogram'. Properties: **doc** = Likelihood for the log-periodogram

```

survival = FALSE
discrete = FALSE
link = default identity
pdf = NA

```

Number of hyperparameters is 0.

Model 'tweedie'. Properties: **doc** = Tweedie distribution

```

survival = FALSE
discrete = FALSE
link = default log
pdf = tweedie

```

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 102101

```

name = p
short.name = p
output.name = p parameter for Tweedie
output.name.intern = p_intern parameter for Tweedie
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x, interval = c(1.0, 2.0)) log(-(interval[1] - x) / (interval[2] - x))
from.theta = function(x, interval = c(1.0, 2.0)) interval[1] + (interval[2] - interval[1]) *

```

Hyperparameter 'theta2' hyperid = 102201

```

name = dispersion
short.name = phi
output.name = Dispersion parameter for Tweedie
output.name.intern = Log dispersion parameter for Tweedie
initial = -4
fixed = FALSE
prior = loggamma
param = 100 100
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

Model 'fmri'. Properties: **doc** = fmri distribution (special nc-chi)

```

status = experimental
survival = FALSE
discrete = FALSE
link = default log

```

pdf = fmri

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 103101

name = precision

short.name = prec

output.name = Precision for fmri

output.name.intern = Log precision for fmri

initial = 0

fixed = FALSE

prior = loggamma

param = 10 10

to.theta = function(x) log(x)

from.theta = function(x) exp(x)

Hyperparameter 'theta2' hyperid = 103202

name = dof

short.name = df

output.name = NOT IN USE

output.name.intern = NOT IN USE

initial = 4

fixed = TRUE

prior = normal

param = 0 1

to.theta = function(x) x

from.theta = function(x) x

Model 'fmrisurv'. Properties: **doc** = fmri distribution (special nc-chi)

status = experimental

survival = TRUE

discrete = FALSE

link = default log

pdf = fmri

Number of hyperparameters is 2.

Hyperparameter 'theta1' hyperid = 104101

name = precision

short.name = prec

output.name = Precision for fmrisurv

output.name.intern = Log precision for fmrisurv

initial = 0

fixed = FALSE

prior = loggamma

param = 10 10

to.theta = function(x) log(x)

from.theta = function(x) exp(x)

Hyperparameter 'theta2' hyperid = 104201

name = dof

short.name = df

```

output.name = NOT IN USE
output.name.intern = NOT IN USE
initial = 4
fixed = TRUE
prior = normal
param = 0 1
to.theta = function(x) x
from.theta = function(x) x

```

Model 'gompertz'. Properties: **doc** = gompertz distribution

```

status = experimental
survival = FALSE
discrete = FALSE
link = default log neglog
pdf = gompertz

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 105101

```

name = shape
short.name = alpha
output.name.intern = alpha_intern for Gompertz
output.name = alpha parameter for Gompertz
initial = -1
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x, sc = 0.1) log(x) / sc
from.theta = function(x, sc = 0.1) exp(sc * x)

```

Model 'gompertzsurv'. Properties: **doc** = gompertz distribution

```

status = experimental
survival = TRUE
discrete = FALSE
link = default log neglog
pdf = gompertz

```

Number of hyperparameters is 11.

Hyperparameter 'theta1' hyperid = 106101

```

name = shape
short.name = alpha
output.name.intern = alpha_intern for Gompertz-surv
output.name = alpha parameter for Gompertz-surv
initial = -10
fixed = FALSE
prior = normal
param = 0 1
to.theta = function(x, sc = 0.1) log(x) / sc
from.theta = function(x, sc = 0.1) exp(sc * x)

```

Hyperparameter 'theta2' hyperid = 106102

```

name = beta1
short.name = beta1
output.name = beta1 for Gompertz-Cure
output.name.intern = beta1 for Gompertz-Cure
initial = -5
fixed = FALSE
prior = normal
param = -4 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta3' hyperid = 106103
name = beta2
short.name = beta2
output.name = beta2 for Gompertz-Cure
output.name.intern = beta2 for Gompertz-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta4' hyperid = 106104
name = beta3
short.name = beta3
output.name = beta3 for Gompertz-Cure
output.name.intern = beta3 for Gompertz-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 106105
name = beta4
short.name = beta4
output.name = beta4 for Gompertz-Cure
output.name.intern = beta4 for Gompertz-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 106106
name = beta5

```

```

short.name = beta5
output.name = beta5 for Gompertz-Cure
output.name.intern = beta5 for Gompertz-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 106107
  name = beta6
  short.name = beta6
  output.name = beta6 for Gompertz-Cure
  output.name.intern = beta6 for Gompertz-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 106108
  name = beta7
  short.name = beta7
  output.name = beta7 for Gompertz-Cure
  output.name.intern = beta7 for Gompertz-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 106109
  name = beta8
  short.name = beta8
  output.name = beta8 for Gompertz-Cure
  output.name.intern = beta8 for Gompertz-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 106110
  name = beta9
  short.name = beta9

```

```

output.name = beta9 for Gompertz-Cure
output.name.intern = beta9 for Gompertz-Cure
initial = 0
fixed = FALSE
prior = normal
param = 0 100
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 106111
  name = beta10
  short.name = beta10
  output.name = beta10 for Gompertz-Cure
  output.name.intern = beta10 for Gompertz-Cure
  initial = 0
  fixed = FALSE
  prior = normal
  param = 0 100
  to.theta = function(x) x
  from.theta = function(x) x

```

'prior'

Valid models in this section are:

Model 'normal'. Number of parameters in the prior = 2

Model 'gaussian'. Number of parameters in the prior = 2

Model 'linksnintercept'. Number of parameters in the prior = 2

Model 'wishart1d'. Number of parameters in the prior = 2

Model 'wishart2d'. Number of parameters in the prior = 4

Model 'wishart3d'. Number of parameters in the prior = 7

Model 'wishart4d'. Number of parameters in the prior = 11

Model 'wishart5d'. Number of parameters in the prior = 16

Model 'loggamma'. Number of parameters in the prior = 2

Model 'gamma'. Number of parameters in the prior = 2

Model 'minuslogsqrtruncnormal'. Number of parameters in the prior = 2

Model 'lognormal'. Number of parameters in the prior = 2

Model 'logtgaussian'. Number of parameters in the prior = 2

Model 'flat'. Number of parameters in the prior = 0

Model 'logflat'. Number of parameters in the prior = 0

Model 'logiflat'. Number of parameters in the prior = 0

Model 'mvnorm'. Number of parameters in the prior = -1

Model 'pc.alphaw'. Number of parameters in the prior = 1

Model 'pc.ar'. Number of parameters in the prior = 1

Model 'dirichlet'. Number of parameters in the prior = 1

Model 'none'. Number of parameters in the prior = 0
Model 'invalid'. Number of parameters in the prior = 0
Model 'betacorrelation'. Number of parameters in the prior = 2
Model 'logitbeta'. Number of parameters in the prior = 2
Model 'pc.prec'. Number of parameters in the prior = 2
Model 'pc.dof'. Number of parameters in the prior = 2
Model 'pc.cor0'. Number of parameters in the prior = 2
Model 'pc.cor1'. Number of parameters in the prior = 2
Model 'pc.fgnh'. Number of parameters in the prior = 2
Model 'pc.spde.GA'. Number of parameters in the prior = 4
Model 'pc.matern'. Number of parameters in the prior = 3
Model 'pc.range'. Number of parameters in the prior = 2
Model 'pc.sn'. Number of parameters in the prior = 1
Model 'pc.gamma'. Number of parameters in the prior = 1
Model 'pc.mgamma'. Number of parameters in the prior = 1
Model 'pc.gammacount'. Number of parameters in the prior = 1
Model 'pc.gevtail'. Number of parameters in the prior = 3
Model 'pc'. Number of parameters in the prior = 2
Model 'ref.ar'. Number of parameters in the prior = 0
Model 'pom'. Number of parameters in the prior = 0
Model 'jeffreystdf'. Number of parameters in the prior = 0
Model 'wishartkd'. Number of parameters in the prior = 211
Model 'expression:'. Number of parameters in the prior = -1
Model 'table:'. Number of parameters in the prior = -1

'wrapper'

Valid models in this section are:

Model 'joint'. Properties: **doc** = (experimental)

```

constr = FALSE
nrow.ncol = FALSE
augmented = FALSE
aug.factor = 1
aug.constr = NULL
n.div.by = NULL
n.required = FALSE
set.default.values = FALSE
pdf = NA

```

Number of hyperparameters is 1.

Hyperparameter 'theta' hyperid = 102001

```

name = log precision
short.name = prec
output.name = NOT IN USE

```

```

output.name.intern = NOT IN USE
initial = 0
fixed = TRUE
prior = loggamma
param = 1 5e-05
to.theta = function(x) log(x)
from.theta = function(x) exp(x)

```

'lp.scale'

Valid models in this section are:

Model 'lp.scale'. Properties: pdf = lp.scale

Number of hyperparameters is 100.

Hyperparameter 'theta1' hyperid = 103001

```

name = beta1
short.name = b1
output.name = beta[1] for lp_scale
output.name.intern = beta[1] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta2' hyperid = 103002

```

name = beta2
short.name = b2
output.name = beta[2] for lp_scale
output.name.intern = beta[2] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x

```

Hyperparameter 'theta3' hyperid = 103003

```

name = beta3
short.name = b3
output.name = beta[3] for lp_scale
output.name.intern = beta[3] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x

```

```
Hyperparameter 'theta4' hyperid = 103004
  name = beta4
  short.name = b4
  output.name = beta[4] for lp_scale
  output.name.intern = beta[4] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta5' hyperid = 103005
  name = beta5
  short.name = b5
  output.name = beta[5] for lp_scale
  output.name.intern = beta[5] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta6' hyperid = 103006
  name = beta6
  short.name = b6
  output.name = beta[6] for lp_scale
  output.name.intern = beta[6] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta7' hyperid = 103007
  name = beta7
  short.name = b7
  output.name = beta[7] for lp_scale
  output.name.intern = beta[7] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta8' hyperid = 103008
```

```

name = beta8
short.name = b8
output.name = beta[8] for lp_scale
output.name.intern = beta[8] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta9' hyperid = 103009
name = beta9
short.name = b9
output.name = beta[9] for lp_scale
output.name.intern = beta[9] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta10' hyperid = 103010
name = beta10
short.name = b10
output.name = beta[10] for lp_scale
output.name.intern = beta[10] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta11' hyperid = 103011
name = beta11
short.name = b11
output.name = beta[11] for lp_scale
output.name.intern = beta[11] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta12' hyperid = 103012
name = beta12

```

```

short.name = b12
output.name = beta[12] for lp_scale
output.name.intern = beta[12] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta13' hyperid = 103013
  name = beta13
  short.name = b13
  output.name = beta[13] for lp_scale
  output.name.intern = beta[13] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta14' hyperid = 103014
  name = beta14
  short.name = b14
  output.name = beta[14] for lp_scale
  output.name.intern = beta[14] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta15' hyperid = 103015
  name = beta15
  short.name = b15
  output.name = beta[15] for lp_scale
  output.name.intern = beta[15] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta16' hyperid = 103016
  name = beta16
  short.name = b16

```

```

output.name = beta[16] for lp_scale
output.name.intern = beta[16] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta17' hyperid = 103017
  name = beta17
  short.name = b17
  output.name = beta[17] for lp_scale
  output.name.intern = beta[17] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta18' hyperid = 103018
  name = beta18
  short.name = b18
  output.name = beta[18] for lp_scale
  output.name.intern = beta[18] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta19' hyperid = 103019
  name = beta19
  short.name = b19
  output.name = beta[19] for lp_scale
  output.name.intern = beta[19] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta20' hyperid = 103020
  name = beta20
  short.name = b20
  output.name = beta[20] for lp_scale

```

```

    output.name.intern = beta[20] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta21' hyperid = 103021
    name = beta21
    short.name = b21
    output.name = beta[21] for lp_scale
    output.name.intern = beta[21] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta22' hyperid = 103022
    name = beta22
    short.name = b22
    output.name = beta[22] for lp_scale
    output.name.intern = beta[22] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta23' hyperid = 103023
    name = beta23
    short.name = b23
    output.name = beta[23] for lp_scale
    output.name.intern = beta[23] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta24' hyperid = 103024
    name = beta24
    short.name = b24
    output.name = beta[24] for lp_scale
    output.name.intern = beta[24] for lp_scale

```

```

initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta25' hyperid = 103025
  name = beta25
  short.name = b25
  output.name = beta[25] for lp_scale
  output.name.intern = beta[25] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta26' hyperid = 103026
  name = beta26
  short.name = b26
  output.name = beta[26] for lp_scale
  output.name.intern = beta[26] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta27' hyperid = 103027
  name = beta27
  short.name = b27
  output.name = beta[27] for lp_scale
  output.name.intern = beta[27] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta28' hyperid = 103028
  name = beta28
  short.name = b28
  output.name = beta[28] for lp_scale
  output.name.intern = beta[28] for lp_scale
  initial = 1

```



```

fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta29' hyperid = 103029
  name = beta29
  short.name = b29
  output.name = beta[29] for lp_scale
  output.name.intern = beta[29] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta30' hyperid = 103030
  name = beta30
  short.name = b30
  output.name = beta[30] for lp_scale
  output.name.intern = beta[30] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta31' hyperid = 103031
  name = beta31
  short.name = b31
  output.name = beta[31] for lp_scale
  output.name.intern = beta[31] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta32' hyperid = 103032
  name = beta32
  short.name = b32
  output.name = beta[32] for lp_scale
  output.name.intern = beta[32] for lp_scale
  initial = 1
  fixed = FALSE

```

```

    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta33' hyperid = 103033
    name = beta33
    short.name = b33
    output.name = beta[33] for lp_scale
    output.name.intern = beta[33] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta34' hyperid = 103034
    name = beta34
    short.name = b34
    output.name = beta[34] for lp_scale
    output.name.intern = beta[34] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta35' hyperid = 103035
    name = beta35
    short.name = b35
    output.name = beta[35] for lp_scale
    output.name.intern = beta[35] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta36' hyperid = 103036
    name = beta36
    short.name = b36
    output.name = beta[36] for lp_scale
    output.name.intern = beta[36] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal

```

```

    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta37' hyperid = 103037
    name = beta37
    short.name = b37
    output.name = beta[37] for lp_scale
    output.name.intern = beta[37] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta38' hyperid = 103038
    name = beta38
    short.name = b38
    output.name = beta[38] for lp_scale
    output.name.intern = beta[38] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta39' hyperid = 103039
    name = beta39
    short.name = b39
    output.name = beta[39] for lp_scale
    output.name.intern = beta[39] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta40' hyperid = 103040
    name = beta40
    short.name = b40
    output.name = beta[40] for lp_scale
    output.name.intern = beta[40] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10

```

```

    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta41' hyperid = 103041
    name = beta41
    short.name = b41
    output.name = beta[41] for lp_scale
    output.name.intern = beta[41] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta42' hyperid = 103042
    name = beta42
    short.name = b42
    output.name = beta[42] for lp_scale
    output.name.intern = beta[42] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta43' hyperid = 103043
    name = beta43
    short.name = b43
    output.name = beta[43] for lp_scale
    output.name.intern = beta[43] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta44' hyperid = 103044
    name = beta44
    short.name = b44
    output.name = beta[44] for lp_scale
    output.name.intern = beta[44] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x

```

```

    from.theta = function(x) x
Hyperparameter 'theta45' hyperid = 103045
    name = beta45
    short.name = b45
    output.name = beta[45] for lp_scale
    output.name.intern = beta[45] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta46' hyperid = 103046
    name = beta46
    short.name = b46
    output.name = beta[46] for lp_scale
    output.name.intern = beta[46] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta47' hyperid = 103047
    name = beta47
    short.name = b47
    output.name = beta[47] for lp_scale
    output.name.intern = beta[47] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta48' hyperid = 103048
    name = beta48
    short.name = b48
    output.name = beta[48] for lp_scale
    output.name.intern = beta[48] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x

```

```

Hyperparameter 'theta49' hyperid = 103049
  name = beta49
  short.name = b49
  output.name = beta[49] for lp_scale
  output.name.intern = beta[49] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta50' hyperid = 103050
  name = beta50
  short.name = b50
  output.name = beta[50] for lp_scale
  output.name.intern = beta[50] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta51' hyperid = 103051
  name = beta51
  short.name = b51
  output.name = beta[51] for lp_scale
  output.name.intern = beta[51] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta52' hyperid = 103052
  name = beta52
  short.name = b52
  output.name = beta[52] for lp_scale
  output.name.intern = beta[52] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta53' hyperid = 103053

```

```

name = beta53
short.name = b53
output.name = beta[53] for lp_scale
output.name.intern = beta[53] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta54' hyperid = 103054
name = beta54
short.name = b54
output.name = beta[54] for lp_scale
output.name.intern = beta[54] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta55' hyperid = 103055
name = beta55
short.name = b55
output.name = beta[55] for lp_scale
output.name.intern = beta[55] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta56' hyperid = 103056
name = beta56
short.name = b56
output.name = beta[56] for lp_scale
output.name.intern = beta[56] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta57' hyperid = 103057
name = beta57

```

```

short.name = b57
output.name = beta[57] for lp_scale
output.name.intern = beta[57] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta58' hyperid = 103058
  name = beta58
  short.name = b58
  output.name = beta[58] for lp_scale
  output.name.intern = beta[58] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta59' hyperid = 103059
  name = beta59
  short.name = b59
  output.name = beta[59] for lp_scale
  output.name.intern = beta[59] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta60' hyperid = 103060
  name = beta60
  short.name = b60
  output.name = beta[60] for lp_scale
  output.name.intern = beta[60] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta61' hyperid = 103061
  name = beta61
  short.name = b61

```



```

output.name = beta[61] for lp_scale
output.name.intern = beta[61] for lp_scale
initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta62' hyperid = 103062
  name = beta62
  short.name = b62
  output.name = beta[62] for lp_scale
  output.name.intern = beta[62] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta63' hyperid = 103063
  name = beta63
  short.name = b63
  output.name = beta[63] for lp_scale
  output.name.intern = beta[63] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta64' hyperid = 103064
  name = beta64
  short.name = b64
  output.name = beta[64] for lp_scale
  output.name.intern = beta[64] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta65' hyperid = 103065
  name = beta65
  short.name = b65
  output.name = beta[65] for lp_scale

```

```

    output.name.intern = beta[65] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta66' hyperid = 103066
    name = beta66
    short.name = b66
    output.name = beta[66] for lp_scale
    output.name.intern = beta[66] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta67' hyperid = 103067
    name = beta67
    short.name = b67
    output.name = beta[67] for lp_scale
    output.name.intern = beta[67] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta68' hyperid = 103068
    name = beta68
    short.name = b68
    output.name = beta[68] for lp_scale
    output.name.intern = beta[68] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta69' hyperid = 103069
    name = beta69
    short.name = b69
    output.name = beta[69] for lp_scale
    output.name.intern = beta[69] for lp_scale

```

```

initial = 1
fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta70' hyperid = 103070
  name = beta70
  short.name = b70
  output.name = beta[70] for lp_scale
  output.name.intern = beta[70] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta71' hyperid = 103071
  name = beta71
  short.name = b71
  output.name = beta[71] for lp_scale
  output.name.intern = beta[71] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta72' hyperid = 103072
  name = beta72
  short.name = b72
  output.name = beta[72] for lp_scale
  output.name.intern = beta[72] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta73' hyperid = 103073
  name = beta73
  short.name = b73
  output.name = beta[73] for lp_scale
  output.name.intern = beta[73] for lp_scale
  initial = 1

```

```

fixed = FALSE
prior = normal
param = 1 10
to.theta = function(x) x
from.theta = function(x) x
Hyperparameter 'theta74' hyperid = 103074
  name = beta74
  short.name = b74
  output.name = beta[74] for lp_scale
  output.name.intern = beta[74] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta75' hyperid = 103075
  name = beta75
  short.name = b75
  output.name = beta[75] for lp_scale
  output.name.intern = beta[75] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta76' hyperid = 103076
  name = beta76
  short.name = b76
  output.name = beta[76] for lp_scale
  output.name.intern = beta[76] for lp_scale
  initial = 1
  fixed = FALSE
  prior = normal
  param = 1 10
  to.theta = function(x) x
  from.theta = function(x) x
Hyperparameter 'theta77' hyperid = 103077
  name = beta77
  short.name = b77
  output.name = beta[77] for lp_scale
  output.name.intern = beta[77] for lp_scale
  initial = 1
  fixed = FALSE

```

```

    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta78' hyperid = 103078
    name = beta78
    short.name = b78
    output.name = beta[78] for lp_scale
    output.name.intern = beta[78] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta79' hyperid = 103079
    name = beta79
    short.name = b79
    output.name = beta[79] for lp_scale
    output.name.intern = beta[79] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta80' hyperid = 103080
    name = beta80
    short.name = b80
    output.name = beta[80] for lp_scale
    output.name.intern = beta[80] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta81' hyperid = 103081
    name = beta81
    short.name = b81
    output.name = beta[81] for lp_scale
    output.name.intern = beta[81] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal

```

```

    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta82' hyperid = 103082
    name = beta82
    short.name = b82
    output.name = beta[82] for lp_scale
    output.name.intern = beta[82] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta83' hyperid = 103083
    name = beta83
    short.name = b83
    output.name = beta[83] for lp_scale
    output.name.intern = beta[83] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta84' hyperid = 103084
    name = beta84
    short.name = b84
    output.name = beta[84] for lp_scale
    output.name.intern = beta[84] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta85' hyperid = 103085
    name = beta85
    short.name = b85
    output.name = beta[85] for lp_scale
    output.name.intern = beta[85] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10

```

```

    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta86' hyperid = 103086
    name = beta86
    short.name = b86
    output.name = beta[86] for lp_scale
    output.name.intern = beta[86] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta87' hyperid = 103087
    name = beta87
    short.name = b87
    output.name = beta[87] for lp_scale
    output.name.intern = beta[87] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta88' hyperid = 103088
    name = beta88
    short.name = b88
    output.name = beta[88] for lp_scale
    output.name.intern = beta[88] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta89' hyperid = 103089
    name = beta89
    short.name = b89
    output.name = beta[89] for lp_scale
    output.name.intern = beta[89] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x

```

```

    from.theta = function(x) x
Hyperparameter 'theta90' hyperid = 103090
    name = beta90
    short.name = b90
    output.name = beta[90] for lp_scale
    output.name.intern = beta[90] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta91' hyperid = 103091
    name = beta91
    short.name = b91
    output.name = beta[91] for lp_scale
    output.name.intern = beta[91] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta92' hyperid = 103092
    name = beta92
    short.name = b92
    output.name = beta[92] for lp_scale
    output.name.intern = beta[92] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta93' hyperid = 103093
    name = beta93
    short.name = b93
    output.name = beta[93] for lp_scale
    output.name.intern = beta[93] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x

```



```
Hyperparameter 'theta94' hyperid = 103094  
  name = beta94  
  short.name = b94  
  output.name = beta[94] for lp_scale  
  output.name.intern = beta[94] for lp_scale  
  initial = 1  
  fixed = FALSE  
  prior = normal  
  param = 1 10  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta95' hyperid = 103095  
  name = beta95  
  short.name = b95  
  output.name = beta[95] for lp_scale  
  output.name.intern = beta[95] for lp_scale  
  initial = 1  
  fixed = FALSE  
  prior = normal  
  param = 1 10  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta96' hyperid = 103096  
  name = beta96  
  short.name = b96  
  output.name = beta[96] for lp_scale  
  output.name.intern = beta[96] for lp_scale  
  initial = 1  
  fixed = FALSE  
  prior = normal  
  param = 1 10  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta97' hyperid = 103097  
  name = beta97  
  short.name = b97  
  output.name = beta[97] for lp_scale  
  output.name.intern = beta[97] for lp_scale  
  initial = 1  
  fixed = FALSE  
  prior = normal  
  param = 1 10  
  to.theta = function(x) x  
  from.theta = function(x) x  
Hyperparameter 'theta98' hyperid = 103098
```

```

    name = beta98
    short.name = b98
    output.name = beta[98] for lp_scale
    output.name.intern = beta[98] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta99' hyperid = 103099
    name = beta99
    short.name = b99
    output.name = beta[99] for lp_scale
    output.name.intern = beta[99] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x
Hyperparameter 'theta100' hyperid = 103100
    name = beta100
    short.name = b100
    output.name = beta[100] for lp_scale
    output.name.intern = beta[100] for lp_scale
    initial = 1
    fixed = FALSE
    prior = normal
    param = 1 10
    to.theta = function(x) x
    from.theta = function(x) x

```

Examples

```

## How to set hyperparameters to pass as the argument 'hyper'. This
## format is compatible with the old style (using 'initial', 'fixed',
## 'prior', 'param'), but the new style using 'hyper' takes precedence
## over the old style. The two styles can also be mixed. The old style
## might be removed from the code in the future...

## Only a subset need to be given
hyper <- list(theta = list(initial = 2))
## The 'name' can be used instead of 'theta', or 'theta1', 'theta2',...
hyper <- list(precision = list(initial = 2))
hyper <- list(precision = list(prior = "flat", param = numeric(0)))
hyper <- list(theta2 = list(initial = 3), theta1 = list(prior = "gaussian"))
## The 'short.name' can be used instead of 'name'
hyper <- list(rho = list(param = c(0, 1)))

```

inla.nmix.lambda.fitted

Estimate posterior distributions of fitted lambda values

Description

For use with 'nmix' and 'nmixnb' models. This function takes the information contained in an object returned by `inla()` and uses the contents to create fitted lambda values using the linear predictor for $\log(\lambda)$, the input covariate values, and samples from the posteriors of the model hyperparameters. Fitted values from the linear predictor are exponentiated, by default, before being returned.

Usage

```
inla.nmix.lambda.fitted(
  result,
  sample.size = 1000,
  return.posteriors = FALSE,
  scale = "exp"
)
```

Arguments

- | | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| result | The output object from a call to <code>inla()</code> , where the family argument has been set to 'nmix' or 'nmixnb'. For the function to work, the call to <code>inla()</code> should also include the argument <code>control.compute=list(config = TRUE)</code> . |
| sample.size | The size of the sample from the posteriors of the model hyperparameters. This sample size ends up being the size of the estimated posterior for a fitted lambda value. Default is 1000. Larger values are recommended. |
| return.posteriors | A logical value for whether or not to return the full estimated posteriors for each fitted value (TRUE), or just a summary of the posteriors (FALSE). Default is FALSE. |
| scale | A character string, where the default string, "exp", causes values from the linear predictor to be exponentiated before being returned. The string, "log", causes values to be returned on the $\log(\lambda)$ scale. |

Value

- | | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| fitted.summary | A data frame with summaries of estimated posteriors of fitted lambda values. The number of rows equals the number of rows in the data used to create the 'nmix' or 'nmixnb' model. There are six columns of summary statistics for each estimated posterior. Columns include an index, <code>mean.lambda</code> , <code>sd.lambda</code> , <code>quant025.lambda</code> , <code>median.lambda</code> , <code>quant975.lambda</code> , and <code>mode.lambda</code> . |
| fitted.posteriors | A data frame containing samples that comprise the full estimated posteriors of fitted values. The number of rows equals the number of rows in the data used to create the 'nmix' or 'nmixnb' model. The number of columns equals one plus the number of samples specified by the <code>sample.size</code> argument. |

Note

This function is experimental.

Author(s)

Tim Meehan tmeehan@audubon.org

References

See documentation for families "nmix" and "nmixmb": `inla.doc("nmix")`

Examples

```
## an example analysis of an N-mixture model using simulated data
## set parameters
n <- 75                                # number of study sites
nrep.max <- 5                          # number of surveys per site
b0 <- 0.5                              # lambda intercept, expected abundance
b1 <- 2.0                              # effect of x1 on lambda
a0 <- 1.0                              # p intercept, detection probability
a2 <- 0.5                              # effect of x2 on p
size <- 3.0                            # size of theta
overdispersion <- 1 / size             # for negative binomial distribution

## make empty vectors and matrix
x1 <- c(); x2 <- c()
lambdas <- c(); Ns <- c()
y <- matrix(NA, n, nrep.max)

## fill vectors and matrix
for(i in 1:n) {
  x1.i <- runif(1) - 0.5
  lambda <- exp(b0 + b1 * x1.i)
  N <- rnbino(1, mu = lambda, size = size)
  x2.i <- runif(1) - 0.5
  eta <- a0 + a2 * x2.i
  p <- exp(eta) / (exp(eta) + 1)
  nr <- sample(1:nrep.max, 1)
  y[i, 1:nr] <- rbinom(nr, size = N, prob = p)
  x1 <- c(x1, x1.i); x2 <- c(x2, x2.i)
  lambdas <- c(lambdas, lambda); Ns <- c(Ns, N)
}

## bundle counts, lambda intercept, and lambda covariates
Y <- inla.mdata(y, 1, x1)

## run inla and summarize output
result <- inla(Y ~ 1 + x2,
  data = list(Y=Y, x2=x2),
  family = "nmixnb",
  control.fixed = list(mean = 0, mean.intercept = 0, prec = 0.01,
    prec.intercept = 0.01),
  control.family = list(hyper = list(theta1 = list(param = c(0, 0.01)),
    theta2 = list(param = c(0, 0.01)),
    theta3 = list(prior = "flat",
      param = numeric()))),
```

```

control.compute=list(config = TRUE)) # important argument
summary(result)

## get and evaluate fitted values
lam.fits <- inla.nmix.lambda.fitted(result, 5000)$fitted.summary
plot(lam.fits$median.lambda, lambdas)
round(sum(lam.fits$median.lambda), 0); sum(Ns)

```

inla.nonconvex.hull *Nonconvex set extensions.*

Description

[Deprecated] in favour of `fmesh::fm_nonconvex_hull_inla()` and `fmesh::fm_nonconvex_hull()`.

Constructs a nonconvex boundary for a point set using morphological operations.

Usage

```

inla.nonconvex.hull(
  points,
  convex = -0.15,
  concave = convex,
  resolution = 40,
  eps = NULL,
  crs = NULL
)

inla.nonconvex.hull.basic(
  points,
  convex = -0.15,
  resolution = 40,
  eps = NULL,
  crs = NULL
)

```

Arguments

points	2D point coordinates (2-column matrix). Can alternatively be a <code>SpatialPoints</code> or <code>SpatialPointsDataFrame</code> object.
convex	The desired extension radius. Also determines the smallest allowed convex curvature radius. Negative values are interpreted as fractions of the approximate initial set diameter.
concave	The desired minimal concave curvature radius. Default is <code>concave=convex</code> .
resolution	The internal computation resolution. A warning will be issued when this needs to be increased for higher accuracy, with the required resolution stated.
eps	The polygonal curve simplification tolerance used for simplifying the resulting boundary curve. See <code>inla.simplify.curve()</code> for details.
crs	An optional CRS or <code>inla.CRS</code> object

Details

Morphological dilation by convex, followed by closing by concave, with minimum concave curvature radius concave. If the dilated set has no gaps of width between

$$2convex(\sqrt{1 + 2concave/convex} - 1)$$

and $2concave$, then the minimum convex curvature radius is convex. Special case $concave=0$ delegates to `inla.nonconvex.hull.basic`

The implementation is based on the identity

$$dilation(a) \& closing(b) = dilation(a + b) \& erosion(b)$$

where all operations are with respect to disks with the specified radii.

Value

An `inla.mesh.segment()` object.

Note

Requires `nndistF` from the `splancs` package.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

Examples

```
if (require(splancs)) {
  loc <- matrix(runif(20), 10, 2)
  boundary <- inla.nonconvex.hull(loc, convex = 0.2)
  lines(boundary, add = FALSE)
  points(loc)
}
```

inla.option

Set and get global options for INLA

Description

Set and get global options for INLA

Usage

```
inla.getOption(
  option = c("inla.call", "inla.arg", "fmesher.call", "fmesher.arg", "num.threads",
    "smtp", "safe", "pardiso.license", "keep", "verbose", "save.memory",
    "working.directory", "silent", "debug", "show.warning.graph.file",
    "scale.model.default", "short.summary", "inla.timeout", "fmesher.timeout",
    "inla.mode", "fmesher.evolution", "fmesher.evolution.warn",
    "fmesher.evolution.verbosity")
)

inla.setOption(...)
```

Arguments

- option** The option to get. If option = NULL then `inla.getOption` then `inla.getOption` will return a named list of current values, otherwise, option must be one of
- inla.call** The path to the inla-program.
 - inla.arg** Additional arguments to `inla.call`
 - fmesher.call** The path to the fmesher-program
 - fmesher.arg** Additional arguments to `fmesher.call`
 - num.threads** Character string with the number of threads to use as A:B, see `?inla`
 - smtplib** Sparse matrix library to use, one of band, taucs (default) or pardiso
 - safe** Run in safe-mode (ie try to automatically fix convergence errors) (default TRUE)
 - pardiso.license** The full path to the PARDISO license file or a newline-separated string with license key(s)
 - keep** Keep temporary files?
 - verbose** Verbose output?
 - save.memory** Save memory at the cost of (minor) accuracy and computing time?
 - working.directory** The name of the working directory.
 - silent** Run the inla-program in a silent mode?
 - debug** Run the inla-program in a debug mode?
 - cygwin** The home of the Cygwin installation (default "C:/cygwin") (Remote computing for Windows only) (No longer in use!)
 - ssh.auth.sock** The ssh bind-address (value of \$SSH_AUTH_SOCK in the Cygwin-shell). (Remote computing for Windows only)
 - show.warning.graph.file** Give a warning for using the obsolete argument `graph.file` instead of `graph`
 - scale.model.default** The default value of argument `scale.model` which optionally scale intrinsic models to have generalized unit average variance
 - short.summary** Use a less verbose output for summary. Useful for Markdown documents.
 - inla.timeout** The timeout limit, in whole seconds, for calls to the inla binary. Default is 0, meaning no timeout limit. Set to a positive integer to terminate inla calls if they run to long. Fractional seconds are rounded up to the nearest integer. This feature is EXPERIMENTAL and might change at a later stage.
 - fmesher.timeout** The timeout limit, in whole seconds, for calls to the fmesher binary. Default is 0, meaning no timeout limit. Set to a positive integer to terminate fmesher calls that may enter infinite loops due to special geometry regularity. Fractional seconds are rounded up to the nearest integer.
 - inla.mode** Which mode to use in INLA? Default is "compact". Other options are "classic" and "twostage".
 - fmesher.evolution** Control use of fmesher methods during the transition to a separate fmesher package. Levels of `fmesher.evolution`:
 - 1L uses the intermediate `fm_*` methods in fmesher that were already available via `inlabru` from 2.8.0.
 - 2L (current default) uses the full range of fmesher package methods.
 Further levels may be added as the package development progresses.

fmesher.evolution.warn logical; whether to show warnings about deprecated use of legacy INLA methods with fmesher package replacements. When TRUE, shows deprecation messages for many CRS and mesh related methods, pointing to their fm_* replacements. Default is currently FALSE.

fmesher.evolution.verbosity logical or character; at what minimum severity to show warnings about deprecated use of legacy INLA methods with fmesher package replacements. When set to "default" (default), "soft", "warn", or "stop", indicates the minimum warning level used when fmesher.evolution.warn is TRUE.

... Option and value, like option=value or option, value; see the Examples

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
## set number of threads
inla.setOption("num.threads", "4:1")
## alternative format
inla.setOption(num.threads="4:1")
## check it
inla.getOption("num.threads")
```

inla.over_sp_mesh	<i>Check which mesh triangles are inside a polygon</i>
-------------------	--------------------------------------------------------

Description

Wrapper for the `sp::over()` method to find triangle centroids or vertices inside sp polygon objects. Deprecated since 23.06.06 in favour of `inlabru::fm_contains()` when inlabru version `>= 2.7.0.9011` is installed, and since 23.08.02 in favour of `fmesher::fm_contains()` when fmesher.

Usage

```
inla.over_sp_mesh(x, y, type = c("centroid", "vertex"), ignore.CRS = FALSE)
```

Arguments

x	geometry (typically a <code>sp::SpatialPolygons()</code> object) for the queries
y	an <code>inla.mesh()</code> object
type	the query type; either 'centroid' (default, for triangle centroids), or 'vertex' (for mesh vertices)
ignore.CRS	logical; whether to ignore the coordinate system information in x and y (default FALSE)

Value

A vector of triangle indices (when type is 'centroid') or vertex indices (when type is 'vertex')

Author(s)

Haakon Bakka, <bakka@r-inla.org>, and Finn Lindgren <finn.lindgren@gmail.com>

Examples

```
# Create a polygon and a mesh
obj <- sp::SpatialPolygons(
  list(Polygons(
    list(Polygon(rbind(
      c(0, 0),
      c(50, 0),
      c(50, 50),
      c(0, 50)
    )))
  ),
  ID = 1
),
  proj4string = fmesher::fm_CRS("longlat_globe")
)
mesh <- inla.mesh.create(globe = 2, crs = fmesher::fm_CRS("sphere"))

## 3 vertices found in the polygon
inla.over_sp_mesh(obj, mesh, type = "vertex")

## 3 triangles found in the polygon
inla.over_sp_mesh(obj, mesh)

## Multiple transformations can lead to slightly different results due to edge cases
## 4 triangles found in the polygon
inla.over_sp_mesh(
  obj,
  fmesher::fm_transform(mesh, crs = fmesher::fm_crs("mollweide_norm"))
)
```

inla.priors.used	<i>Print priors used</i>
------------------	--------------------------

Description

Print the priors used for the hyperparameters

Usage

```
inla.priors.used(result, digits = 6L)
```

Arguments

result	An inla-object, typically the output from an inla()-call
digits	The digits argument to the function format()

Details

This function provides a more human-friendly output of `result$all.hyper` of all the priors used for the hyperparameters. Since not all information about the model is encoded in this object, more hyperparameters than actually used, may be printed. In particular, `group.theta1` is printed even though the argument `group` in `f()` is not used. Similarly for `spde`-models, but the user should know that, for example, only the two first ones are actually used. Hopefully, this issue will be fixed in the future.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
r = inla(y ~ 1 + x, data = data.frame(y = 1:10, x = rep(1:5, 2)))
inla.priors.used(r)
```

inla.prune

Prune the INLA-package

Description

Prune the INLA-package by deleting binary files not supported by the running OS

Usage

```
inla.prune(ask = TRUE)
```

Arguments

ask	Logical. If TRUE, then ask for user confirmation before deleting. If FALSE, then delete without user confirmation.
-----	--------------------------------------------------------------------------------------------------------------------

Value

No value is returned.

Author(s)

Havard Rue <hrue@r-inla.org>

inla.qstat	<i>Control and view a remote inla-queue</i>
------------	---------------------------------------------

Description

Control and view a remote inla-queue of submitted jobs

inla.qstat show job(s) on the server, inla.qget fetch the results (and by default remove the files on the server), inla.qdel removes a job on the server and inla.qnuke remove all jobs on the server. inla.qlog fetches the logfile only.

The recommended procedure is to use `r=inla(..., inla.call="submit")` and then do `r=inla.qget(r)` at a later stage. If the job is not finished, then `r` will not be overwritten and this step can be repeated. The reason for this procedure, is that some information usually stored in the result object does not go through the remote server, hence have to be appended to the results that are retrieved from the server. Hence doing `r=inla(..., inla.call="submit")` and then later retrieve it using `r=inla.qget(1)`, say, then `r` does not contain all the usual information. All the main results are there, but administrative information which is required to call `inla.hyperpar` or `inla.rerun` are not there.

Usage

```
## S3 method for class 'inla.q'
summary(object, ...)

## S3 method for class 'inla.q'
print(x, ...)

inla.qget(id, remove = TRUE)

inla.qdel(id)

inla.qstat(id)

inla.qlog(id)

inla.qnuke()
```

Arguments

object	An inla.q-object which is the output from inla.qstat
...	other arguments.
x	An inla.q-object which is the output from inla.qstat
id	The job-id which is the output from inla when the job is submitted, the job-number or job-name. For inla.qstat, id is optional and if omitted all the jobs will be listed.
remove	Logical If FALSE, leave the job on the server after retrieval, otherwise remove it (default).

Value

inla.qstat returns an inla.q-object with information about current jobs.

Author(s)

Havard Rue

See Also

[inla\(\)](#)

Examples

```
## Not run:
r = inla(y~1, data = data.frame(y=rnorm(10)), inla.call="submit")
inla.qstat()
r = inla.qget(r, remove=FALSE)
inla.qdel(1)
inla.qnuke()

## End(Not run)
```

inla.reorderings

Reorderings methods for sparse matrices

Description

Provide the names of all implemented reordering schemes

Usage

```
inla.reorderings()
```

Value

The names of all available reorderings

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
inla.reorderings()
```

inla.rerun	<i>Rerun an analysis</i>
------------	--------------------------

Description

Rerun [inla\(\)](#) on an inla-object (output from `link{inla}`)

Usage

```
inla.rerun(object, plain = FALSE)
```

Arguments

<code>object</code>	An inla-object, ie the output from an inla-call
<code>plain</code>	Logical. If FALSE (default), then make changes in object to improve the performance

Value

This function will take the result in `object`, and rerun `inla` again. If `plain` is FALSE, start the optimization from the mode in `object` so that we can obtain an improvement the mode for the hyperparameters. Otherwise, start from the same configuration as for `object`. The returned value is an inla-object.

See Also

[inla\(\)](#)

Examples

```
r = inla(y ~ 1, data = data.frame(y=1:10))
r = inla.rerun(r)
```

inla.row.kron	<i>Row-wise Kronecker products</i>
---------------	------------------------------------

Description

Takes two Matrices and computes the row-wise Kronecker product. Optionally applies row-wise weights and/or applies an additional 0/1 row-wise Kronecker matrix product, as needed by [inla.spde.make.A\(\)](#).

Usage

```
inla.row.kron(M1, M2, repl = NULL, n.repl = NULL, weights = NULL)
```

Arguments

M1	A matrix that can be transformed into a sparse Matrix.
M2	A matrix that can be transformed into a sparse Matrix.
repl	An optional index vector. For each entry, specifies which replicate the row belongs to, in the sense used in inla.spde.make.A() .
n.repl	The maximum replicate index, in the sense used in inla.spde.make.A() .
weights	Optional scaling weights to be applied row-wise to the resulting matrix.

Value

A sparseMatrix object.

Author(s)

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See Also

[inla.spde.make.A\(\)](#)

inla.sample	<i>Generate samples, and functions thereof, from an approximated posterior of a fitted model</i>
-------------	--------------------------------------------------------------------------------------------------

Description

This function generate samples, and functions of those, from an approximated posterior of a fitted model (an inla-object)

The hyperparameters are sampled from the configurations used to do the numerical integration, hence if you want a higher resolution, you need to to change the `int.strategy` variable and friends. The latent field is sampled from the Gaussian approximation conditioned on the hyperparameters, but with a correction for the mean (default), and optional (and by default) corrected for the estimated skewness.

The log.density report is only correct when there is no constraints. With constraints, it correct the Gaussian part of the sample for the constraints.

After the sample is (optional) skewness corrected, the log.density is is not exact for correcting for constraints, but the error is very small in most cases.

Usage

```
inla.posterior.sample(
  n = 1L,
  result,
  selection = list(),
  intern = FALSE,
  use.improved.mean = TRUE,
  skew.corr = TRUE,
  add.names = TRUE,
  seed = 0L,
```

```

    num.threads = NULL,
    parallel.configs = TRUE,
    verbose = FALSE
  )

  inla.posterior.sample.eval(fun, samples, return.matrix = TRUE, ...)

```

Arguments

<code>n</code>	Number of samples.
<code>result</code>	The inla-object, ie the output from an inla-call. The inla-object must be created with <code>control.compute=list(config=TRUE)</code> .
<code>selection</code>	Select what part of the sample to return. By default, the whole sample is returned. <code>selection</code> is a named list with the name of the components of the sample, and what indices of them to return. Names include APredictor, Predictor, (Intercept), and otherwise names in the formula. The values of the list, is interpreted as indices. If they are negative, they are interpreted as 'not', a zero is interpreted as 'all', and positive indices are interpreted as 'only'. The names of elements of each samples refer to the indices in the full sample. DO NOT USE this feature together with <code>inla.posterior.sample.eval</code> .
<code>intern</code>	Logical. If TRUE then produce samples in the internal scale for the hyperparameter, if FALSE then produce samples in the user-scale. (For example log-precision (intern) and precision (user-scale))
<code>use.improved.mean</code>	Logical. If TRUE then use the marginal mean values when constructing samples. If FALSE then use the mean in the Gaussian approximations.
<code>skew.corr</code>	Logical. If TRUE then correct samples for skewness, if FALSE, do not correct samples for skewness (ie use the Gaussian).
<code>add.names</code>	Logical. If TRUE then add name for each elements of each sample. If FALSE, only add name for the first sample. (This save space.)
<code>seed</code>	See the same argument in <code>?inla.qsample</code> for further information. In order to produce reproducible results, you ALSO need to make sure the RNG in R is in the same state, see example below. When <code>seed</code> is non-zero, <code>num.threads</code> is forced to "1:1" and <code>parallel.configs</code> is set to FALSE, since parallel sampling would not produce a reproducible sequence of pseudo-random numbers.
<code>num.threads</code>	The number of threads to use in the format 'A:B' defining the number threads in the outer (A) and inner (B) layer for nested parallelism. A '0' will be replaced intelligently. <code>seed!=0</code> requires serial computations.
<code>parallel.configs</code>	Logical. If TRUE and not on Windows, then try to run each configuration in parallel (not Windows) using A threads (see <code>num.threads</code>), where each of them is using B:0 threads.
<code>verbose</code>	Logical. Run in verbose mode or not.
<code>fun</code>	The function to evaluate for each sample. Upon entry, the variable names defined in the model are defined as the value of the sample. The list of names are defined in <code>result\$misc\$configs\$contents</code> where <code>result</code> is an inla-object. This includes predefined names for the linear predictor (Predictor and APredictor), and the intercept ((Intercept) or Intercept). The hyperparameters are defined as <code>theta</code> , no matter if they are in the internal scale or not. The function <code>fun</code> can also return a vector. To simplify usage, <code>fun</code> can

also be a vector character's. In this case fun it is interpreted as (strict) variable names, and a function is created that return these variables: if argument fun equals `c("Intercept", "a[1:2]")`, then this is equivalent to pass `function() return(c(get('Intercept'), get('a[1:2]')))`.

`samples` `samples` is the output from `inla.posterior.sample()`
`return.matrix` Logical. If TRUE, then return the samples of fun as matrix, otherwise, as a list.
`...` Additional arguments to fun

Value

`inla.posterior.sample` returns a list of the samples, where each sample is a list with names `hyperpar` and `latent`, and with their marginal densities in `logdens$hyperpar` and `logdens$latent` and the joint density is in `logdens$joint`. `inla.posterior.sample.eval` return a list or a matrix of fun applied to each sample.

Author(s)

Havard Rue <hrue@r-inla.org> and Cristian Chiuchiole <cristian.chiuchiole@kaust.edu.sa>

Examples

```
r = inla(y ~ 1 ,data = data.frame(y=rnorm(1)), control.compute = list(config=TRUE))
samples = inla.posterior.sample(2,r)

## reproducible results:
inla.seed = as.integer(runif(1)*.Machine$integer.max)
set.seed(12345)
x = inla.posterior.sample(10, r, seed = inla.seed, num.threads="1:1")
set.seed(12345)
xx = inla.posterior.sample(10, r, seed = inla.seed, num.threads="1.1")
all.equal(x, xx)

set.seed(1234)
n = 25
xx = rnorm(n)
yy = rev(xx)
z = runif(n)
y = rnorm(n)
r = inla(y ~ 1 + z + f(xx) + f(yy, copy="xx"),
        data = data.frame(y, z, xx, yy),
        control.compute = list(config=TRUE),
        family = "gaussian")
r.samples = inla.posterior.sample(10, r)

fun = function(...) {
  mean(xx) - mean(yy)
}
f1 = inla.posterior.sample.eval(fun, r.samples)

fun = function(...) {
  c(exp(Intercept), exp(Intercept + z))
}
f2 = inla.posterior.sample.eval(fun, r.samples)

fun = function(...) {
```



```

    return (theta[1]/(theta[1] + theta[2]))
  }
f3 = inla.posterior.sample.eval(fun, r.samples)

## Predicting nz new observations, and
## comparing the estimated one with the true one
set.seed(1234)
n = 100
alpha = beta = s = 1
z = rnorm(n)
y = alpha + beta * z + rnorm(n, sd = s)
r = inla(y ~ 1 + z,
        data = data.frame(y, z),
        control.compute = list(config=TRUE),
        family = "gaussian")
r.samples = inla.posterior.sample(10^3, r)

## just return samples of the intercept
intercepts = inla.posterior.sample.eval("Intercept", r.samples)

nz = 3
znew = rnorm(nz)
fun = function(zz = NA) {
  ## theta[1] is the precision
  return (Intercept + z * zz +
          rnorm(length(zz), sd = sqrt(1/theta[1])))
}
par(mfrow=c(1, nz))
f1 = inla.posterior.sample.eval(fun, r.samples, zz = znew)
for(i in 1:nz) {
  hist(f1[i, ], n = 100, prob = TRUE)
  m = alpha + beta * znew[i]
  xx = seq(m-4*s, m+4*s, by = s/100)
  lines(xx, dnorm(xx, mean=m, sd = s), lwd=2)
}

##
## Be aware that using non-clean variable names might be a little tricky
##
n <- 100
X <- matrix(rnorm(n^2), n, 2)
x <- X[, 1]
xx <- X[, 2]
xxx <- x*xx

y <- 1 + 2*x + 3*xx + 4*xxx + rnorm(n, sd = 0.01)

r <- inla(y ~ X[, 1]*X[, 2],
        data = list(y = y, X = X),
        control.compute = list(config = TRUE))
print(round(dig = 4, r$summary.fixed[, "mean"]))

sam <- inla.posterior.sample(100, r)
sam.extract <- inla.posterior.sample.eval(
  (function(...) {
    beta.1 <- get("X[, 1]")
    beta.2 <- get("X[, 2]")
  })

```

```

        beta.12 <- get("X[, 1]:X[, 2]")
        return(c(Intercept, beta.1, beta.2, beta.12))
    }}, sam)
print(round(dig = 4, rowMeans(sam.extract)))

## a simpler form can also be used here, and in the examples below
sam.extract <- inla.posterior.sample.eval(
    c("Intercept", "X[, 1]", "X[, 2]", "X[, 1]:X[, 2]"), sam)
print(round(dig = 4, rowMeans(sam.extract)))

r <- inla(y ~ x + xx + xxx,
    data = list(y = y, x = x, xx = xx, xxx = xxx),
    control.compute = list(config = TRUE))

sam <- inla.posterior.sample(100, r)
sam.extract <- inla.posterior.sample.eval(
    (function(...) {
        return(c(Intercept, x, xx, xxx))
    })), sam)
print(round(dig = 4, rowMeans(sam.extract)))

sam.extract <- inla.posterior.sample.eval(c("Intercept", "x", "xx", "xxx"), sam)
print(round(dig = 4, rowMeans(sam.extract)))

r <- inla(y ~ x*xx,
    data = list(y = y, x = x, xx = xx),
    control.compute = list(config = TRUE))

sam <- inla.posterior.sample(100, r)
sam.extract <- inla.posterior.sample.eval(
    (function(...) {
        return(c(Intercept, x, xx, get("x:xx")))
    })), sam)
print(round(dig = 4, rowMeans(sam.extract)))

sam.extract <- inla.posterior.sample.eval(c("Intercept", "x", "xx", "x:xx"), sam)
print(round(dig = 4, rowMeans(sam.extract)))

```

inla.simplify.curve *Recursive curve simplification.*

Description

Attempts to simplify a polygonal curve by joining nearly colinear segments.

Usage

```
inla.simplify.curve(loc, idx, eps)
```

Arguments

loc	Coordinate matrix.
idx	Index vector into loc specifying a polygonal curve.
eps	Straightness tolerance.

Details

Uses a variation of the binary splitting Ramer-Douglas-Peucker algorithm, with a width `eps` ellipse instead of a rectangle, motivated by prediction ellipse for Brownian bridge.

Value

An index vector into `loc` specifying the simplified polygonal curve.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

Examples

```
theta <- seq(0, 2 * pi, length.out = 1000)
loc <- cbind(cos(theta), sin(theta))
idx <- inla.simplify.curve(loc = loc, idx = 1:nrow(loc), eps = 0.01)
print(c(nrow(loc), length(idx)))
plot(loc, type = "l")
lines(loc[idx, ], col = "red")
```

inla.spde.make.A

Observation/prediction matrices for mesh models.

Description

Constructs observation/prediction weight matrices for models based on `inla.mesh()` and `inla.mesh.1d()` objects.

Usage

```
inla.spde.make.A(
  mesh = NULL,
  loc = NULL,
  index = NULL,
  group = NULL,
  repl = 1L,
  n.spde = NULL,
  n.group = NULL,
  n.repl = NULL,
  group.mesh = NULL,
  weights = NULL,
  A.loc = NULL,
  A.group = NULL,
  group.index = NULL,
  block = NULL,
  n.block = NULL,
  block.rescale = c("none", "count", "weights", "sum"),
  ...
)
```

Arguments

mesh	An inla.mesh() or inla.mesh.1d() object specifying a function basis on a mesh domain. Alternatively, an inla.spde object that includes a mesh (e.g. from inla.spde2.matern()).
loc	Observation/prediction coordinates. mesh and loc defines a matrix A.loc of mapping weights between basis function weights and field values. If loc is NULL, A.loc is defined as <code>Diagonal(n.spde, 1)</code> .
index	For each observation/prediction value, an index into loc. Default is <code>seq_len(nrow(A.loc))</code> .
group	For each observation/prediction value, an index into the group model.
repl	For each observation/prediction value, the replicate index.
n.spde	The number of basis functions in the mesh model. (Note: may be different than the number of mesh vertices/nodes/knots.)
n.group	The size of the group model.
n.repl	The total number of replicates.
group.mesh	An optional inla.mesh.1d() object for the group model.
weights	Optional scaling weights to be applied row-wise to the resulting matrix.
A.loc	Optional precomputed observation/prediction matrix. A.loc can be specified instead of mesh+loc, optionally with index supplied.
A.group	Optional precomputed observation/prediction matrix for the group model. A.group can be specified instead of group and/or group.mesh, optionally with group.index supplied.
group.index	For each observation/prediction value, an index into the rows of A.group.
block	Optional indices specifying block groupings: Entries with the same block value are joined into a single row in the resulting matrix, and the block values are the row indices. This is intended for construction of approximate integration schemes for regional data problems. See inla.spde.make.block.A() for details.
n.block	The number of blocks.
block.rescale	Specifies what scaling method should be used when joining entries as grouped by a block specification. See inla.spde.make.block.A() for details.
...	Additional parameters. Currently unused.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde.make.index\(\)](#)

Examples

```
loc <- matrix(runif(10000 * 2) * 1000, 10000, 2)
mesh <- inla.mesh.2d(
  loc = loc,
  cutoff = 50,
  max.edge = c(50, 500)
)
A <- inla.spde.make.A(mesh, loc = loc)
```

`inla.spde.make.block.A`*Observation matrices for mesh models.*

Description

Constructs observation/prediction weight matrices for numerical integration schemes for regional data problems. Primarily intended for internal use by [inla.spde.make.A\(\)](#).

Usage

```
inla.spde.make.block.A(  
  A,  
  block,  
  n.block = max(block),  
  weights = NULL,  
  rescale = c("none", "count", "weights", "sum")  
)
```

Arguments

A	A precomputed observation/prediction matrix for locations that are to be joined.
block	Indices specifying block groupings: Entries with the same block value are joined into a single row in the resulting matrix, and the block values are the row indices.
n.block	The number of blocks.
weights	Optional scaling weights to be applied row-wise to the input A matrix.
rescale	Specifies what scaling method should be used when joining the rows of the A matrix as grouped by the block specification. <ul style="list-style-type: none">• 'none': Straight sum, no rescaling.• 'count': Divide by the number of entries in the block.• 'weights': Divide by the sum of the weight values within each block.• 'sum': Divide by the resulting row sums.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde.make.A\(\)](#)

inla.spde.make.index *SPDE model index vector generation*

Description

Generates a list of named index vectors for an SPDE model.

Usage

```
inla.spde.make.index(name, n.spde, n.group = 1, n.repl = 1, ...)
```

Arguments

name	A character string with the base name of the effect.
n.spde	The size of the model, typically from <code>spde\$n.spde</code> .
n.group	The size of the group model.
n.repl	The number of model replicates.
...	Additional parameters. Currently unused.

Value

A list of named index vectors.

name	Indices into the vector of latent variables
name.group	'group' indices
name.repl	Indices for replicates

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde.make.A\(\)](#), [inla.spde2.result\(\)](#)

Examples

```
loc <- matrix(runif(100 * 2), 100, 2)
mesh <- inla.mesh.create.helper(points.domain = loc, max.edge = c(0.1, 0.5))
spde <- inla.spde2.matern(mesh)
index <- inla.spde.make.index("spatial", spde$n.spde, n.repl = 2)
spatial.A <- inla.spde.make.A(mesh, loc,
  index = rep(1:nrow(loc), 2),
  repl = rep(1:2, each = nrow(loc))
)
y <- 10 + rnorm(100 * 2)
stack <- inla.stack(
  data = list(y = y),
  A = list(spatial.A),
  effects = list(c(index, list(intercept = 1))),
  tag = "tag"
```

```

)
data <- inla.stack.data(stack, spde = spde)
formula <- y ~ -1 + intercept + f(spatial,
  model = spde,
  replicate = spatial.repl
)
result <- inla(formula,
  family = "gaussian", data = data,
  control.predictor = list(A = inla.stack.A(stack))
)
spde.result <- inla.spde2.result(result, "spatial", spde)

```

inla.spde.models	<i>List SPDE models supported by inla.spde objects</i>
------------------	--------------------------------------------------------

Description

List SPDE models supported by inla.spde objects

Usage

```

inla.spde.models(function.names = FALSE)

inla.spde1.models()

inla.spde2.models()

```

Arguments

`function.names` If FALSE, return list model name lists. If TRUE, return list of model object constructor function names.

Details

Returns a list of available SPDE model type name lists, one for each inla.spde model class (currently [inla.spde1\(\)](#) and [inla.spde2\(\)](#)).

Value

List of available SPDE model type name lists.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

Examples

```

## Not run:
## Display help for each supported inla.spde2 model:
for (model in inla.spde2.models()) {
  print(help(paste("inla.spde2.", model, sep = "")))
}

```

```
## Display help for each supported inla.spde* model:
models <- inla.spde.models()
for (type in names(models)) {
  for (model in models[[type]]) {
    print(help(paste("inla.", type, ".", model, sep = "")))
  }
}

## Display help for each supported inla.spde* model (equivalent to above):
for (model in inla.spde.models(function.names = TRUE)) {
  print(help(model))
}

## End(Not run)
```

inla.spde.precision *Precision matrices for SPDE models*

Description

Calculates the precision matrix for given parameter values based on an inla.spde model object.

Usage

```
inla.spde.precision(...)

inla.spde1.precision(spde, ...)

## S3 method for class 'inla.spde1'
inla.spde.precision(spde, ...)

inla.spde2.precision(
  spde,
  theta = NULL,
  phi0 = inla.spde2.theta2phi0(spde, theta),
  phi1 = inla.spde2.theta2phi1(spde, theta),
  phi2 = inla.spde2.theta2phi2(spde, theta),
  ...
)

## S3 method for class 'inla.spde2'
inla.spde.precision(
  spde,
  theta = NULL,
  phi0 = inla.spde2.theta2phi0(spde, theta),
  phi1 = inla.spde2.theta2phi1(spde, theta),
  phi2 = inla.spde2.theta2phi2(spde, theta),
  ...
)
```


Arguments

...	Additional parameters passed on to other methods.
spde	An inla.spde object.
theta	The parameter vector.
phi0	Internal parameter for a generic model. Expert option only.
phi1	Internal parameter for a generic model. Expert option only.
phi2	Internal parameter for a generic model. Expert option only.

Value

A sparse precision matrix.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde.models\(\)](#), [inla.spde2.generic\(\)](#), [inla.spde2.theta2phi0\(\)](#), [inla.spde2.theta2phi1\(\)](#), [inla.spde2.theta2phi2\(\)](#)

inla.spde.result	<i>SPDE result extraction from INLA estimation results</i>
------------------	------------------------------------------------------------

Description

Extract field and parameter values and distributions for an inla.spde SPDE effect from an inla result object.

Usage

```
inla.spde.result(...)

inla.spde1.result(inla, name, spde, do.transform = TRUE, ...)

## S3 method for class 'inla.spde1'
inla.spde.result(inla, name, spde, do.transform = TRUE, ...)

inla.spde2.result(inla, name, spde, do.transform = TRUE, ...)

## S3 method for class 'inla.spde2'
inla.spde.result(inla, name, spde, do.transform = TRUE, ...)
```

Arguments

<code>...</code>	Further arguments passed to and from other methods.
<code>inla</code>	An <code>inla</code> object obtained from a call to <code>inla()</code>
<code>name</code>	A character string with the name of the SPDE effect in the <code>inla</code> formula.
<code>spde</code>	The <code>inla.spde</code> object used for the effect in the <code>inla</code> formula. (Note: this could have been stored in the <code>inla</code> output, but isn't.) Usually the result of a call to <code>inla.spde2.matern()</code> .
<code>do.transform</code>	If TRUE, also calculate marginals transformed to user-scale. Setting to FALSE is useful for large non-stationary models, as transforming many marginal densities is time-consuming.

Value

For `inla.spde2` models, a list, where the nominal range and variance are defined as the values that would have been obtained with a stationary model and no boundary effects:

<code>marginals.kappa</code>	Marginal densities for kappa
<code>marginals.log.kappa</code>	Marginal densities for log(kappa)
<code>marginals.log.range.nominal</code>	Marginal densities for log(range)
<code>marginals.log.tau</code>	Marginal densities for log(tau)
<code>marginals.log.variance.nominal</code>	Marginal densities for log(variance)
<code>marginals.range.nominal</code>	Marginal densities for range
<code>marginals.tau</code>	Marginal densities for tau
<code>marginals.theta</code>	Marginal densities for the theta parameters
<code>marginals.values</code>	Marginal densities for the field values
<code>marginals.variance.nominal</code>	Marginal densities for variance
<code>summary.hyperpar</code>	The SPDE related part of the <code>inla.hyperpar</code> output summary
<code>summary.log.kappa</code>	Summary statistics for log(kappa)
<code>summary.log.range.nominal</code>	Summary statistics for log(range)
<code>summary.log.tau</code>	Summary statistics for log(tau)
<code>summary.log.variance.nominal</code>	Summary statistics for log(kappa)
<code>summary.theta</code>	Summary statistics for the theta parameters
<code>summary.values</code>	Summary statistics for the field values

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde.models\(\)](#), [inla.spde2.matern\(\)](#)

Examples

```
loc <- matrix(runif(100 * 2), 100, 2)
mesh <- inla.mesh.create.helper(points.domain = loc, max.edge = c(0.1, 0.5))
spde <- inla.spde2.matern(mesh)
index <- inla.spde.make.index("spatial", mesh$n, n.repl = 2)
spatial.A <- inla.spde.make.A(mesh, loc,
  index = rep(1:nrow(loc), 2),
  repl = rep(1:2, each = nrow(loc))
)
## Toy example with no spatial correlation (range=zero)
y <- 10 + rnorm(100 * 2)
stack <- inla.stack(
  data = list(y = y),
  A = list(spatial.A),
  effects = list(c(index, list(intercept = 1))),
  tag = "tag"
)
data <- inla.stack.data(stack, spde = spde)
formula <- y ~ -1 + intercept + f(spatial,
  model = spde,
  replicate = spatial.repl
)
result <- inla(formula,
  family = "gaussian", data = data,
  control.predictor = list(A = inla.stack.A(stack))
)
spde.result <- inla.spde.result(result, "spatial", spde)
plot(spde.result$marginals.range.nominal[[1]], type = "l")
```

inla.spde.sample

Sample from SPDE models

Description

Old methods for sampling from a SPDE model. For new code, use [inla.spde.precision\(\)](#) and [inla.qsample\(\)](#) instead.

Usage

```
inla.spde.sample(...)

## Default S3 method:
inla.spde.sample(precision, seed = NULL, ...)

## S3 method for class 'inla.spde'
inla.spde.sample(spde, seed = NULL, ...)
```

Arguments

...	Parameters passed on to other methods.
precision	A precision matrix.
seed	The seed for the pseudo-random generator.
spde	An inla.spde object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde.precision\(\)](#), [inla.qsample\(\)](#)

inla.spde1.create	<i>Old SPDE model objects for INLA</i>
-------------------	----------------------------------------

Description

Create an inla.spde1 model object.

Usage

```
inla.spde1.create(
  mesh,
  model = c("matern", "imatern", "matern.osc"),
  param = NULL,
  ...
)

inla.spde1.matern(mesh, ...)

inla.spde1.imatern(mesh, ...)

inla.spde1.matern.osc(mesh, ...)
```

Arguments

mesh	The mesh to build the model on, as an inla.mesh() object.
model	The name of the model.
param	Model specific parameters.
...	Additional parameters passed on to other methods.

Details

Note: This is an old spde object format retained for backwards compatibility. Please use [inla.spde2\(\)](#) models for new code.

This method constructs an object for SPDE models. Currently implemented:

model="matern"

$$\begin{aligned} (\kappa^2(u) - \Delta)^{\alpha/2}(\tau(u) \\ x(u)) = W(u) \end{aligned}$$

param:

- alpha = 1 or 2
- basis.T = Matrix of basis functions for $\log \tau(u)$
- basis.K = Matrix of basis functions for $\log \kappa^2(u)$

model="imatern"

$$\begin{aligned} (-\Delta)^{\alpha/2}(\tau(u) \\ x(u)) = W(u) \end{aligned}$$

param:

- alpha = 1 or 2
- basis.T = Matrix of basis functions for $\log \tau(u)$

Value

An inla.spde1 object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde2.matern\(\)](#), [inla.mesh.2d\(\)](#), [inla.mesh.basis\(\)](#)

Examples

```
n <- 100
field.fcn <- function(loc) (10 * cos(2 * pi * 2 * (loc[, 1] + loc[, 2])))
loc <- matrix(runif(n * 2), n, 2)
## One field, 2 observations per location
idx.y <- rep(1:n, 2)
y <- field.fcn(loc[idx.y, ]) + rnorm(length(idx.y))

mesh <- inla.mesh.create(loc, refine = list(max.edge = 0.05))
spde <- inla.spde1.create(mesh, model = "matern")
data <- list(y = y, field = mesh$idx$loc[idx.y])
formula <- y ~ -1 + f(field, model = spde)
result <- inla(formula, data = data, family = "normal")
```

```

## Plot the mesh structure:
plot(mesh)

if (require(rgl)) {
  ## Plot the posterior mean:
  plot(mesh,
        rgl = TRUE,
        result$summary.random$field[, "mean"],
        color.palette = colorRampPalette(c("blue", "green", "red")))
  )
  ## Plot residual field:
  plot(mesh,
        rgl = TRUE,
        result$summary.random$field[, "mean"] - field.fcn(mesh$loc),
        color.palette = colorRampPalette(c("blue", "green", "red")))
  )
}

```

inla.spde2.generic	<i>Generic spde2 model creation.</i>
--------------------	--------------------------------------

Description

Creates and inla.spde2 object describing the internal structure of an 'spde2' model.

Usage

```

inla.spde2.generic(
  M0,
  M1,
  M2,
  B0,
  B1,
  B2,
  theta.mu,
  theta.Q,
  transform = c("logit", "log", "identity"),
  theta.initial = theta.mu,
  fixed = rep(FALSE, length(theta.mu)),
  theta.fixed = theta.initial[fixed],
  BLC = cbind(0, diag(nrow = length(theta.mu))),
  ...
)

```

Arguments

M0	The symmetric M0 matrix.
M1	The square M1 matrix.
M2	The symmetric M2 matrix.
B0	Basis definition matrix for ϕ_0 .

B1	Basis definition matrix for ϕ_2 .
B2	Basis definition matrix for ϕ_2 .
theta.mu	Prior expectation for the θ vector
theta.Q	Prior precision for the θ vector
transform	Transformation link for ϕ_2 . Valid settings are "logit", "log", and "identity"
theta.initial	Initial value for the θ vector. Default theta.mu
fixed	Logical vector. For every TRUE value, treat the corresponding theta value as known.
theta.fixed	Vector holding the values of fixed theta values. Default=theta.initial[fixed]
BLC	Basis definition matrix for linear combinations of theta.
...	Additional parameters, currently unused.
theta	parameter values to be mapped.

Value

For inla.spde2.generic, an [inla.spde2\(\)](#) object.

For inla.spde2.theta2phi0/1/2, a vector of ϕ values.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde2.models\(\)](#), [inla.spde2.matern\(\)](#)

inla.spde2.matern	<i>Matern SPDE model object for INLA</i>
-------------------	------------------------------------------

Description

Create an inla.spde2 model object for a Matern model. Use inla.spde2.pcmatern instead for a PC prior for the parameters.

Usage

```
inla.spde2.matern(
  mesh,
  alpha = 2,
  param = NULL,
  constr = FALSE,
  extraconstr.int = NULL,
  extraconstr = NULL,
  fractional.method = c("parsimonious", "null"),
  B.tau = matrix(c(0, 1, 0), 1, 3),
  B.kappa = matrix(c(0, 0, 1), 1, 3),
  prior.variance.nominal = 1,
  prior.range.nominal = NULL,
```

```

prior.tau = NULL,
prior.kappa = NULL,
theta.prior.mean = NULL,
theta.prior.prec = 0.1,
n.iid.group = 1,
...
)

inla.spde2.theta2phi0(spde, theta)

inla.spde2.theta2phi1(spde, theta)

inla.spde2.theta2phi2(spde, theta)

```

Arguments

mesh	The mesh to build the model on, as an <code>inla.mesh()</code> or <code>inla.mesh.1d()</code> object.
alpha	Fractional operator order, $0 < \alpha \leq 2$ supported. ($\nu = \alpha - d/2$)
param	Parameter, e.g. generated by <code>param2.matern.orig</code>
constr	If TRUE, apply an integrate-to-zero constraint. Default FALSE.
extraconstr.int	Field integral constraints.
extraconstr	Direct linear combination constraints on the basis weights.
fractional.method	Specifies the approximation method to use for fractional (non-integer) alpha values. 'parsimonious' gives an overall approximate minimal covariance error, 'null' uses approximates low-order properties.
B.tau	Matrix with specification of log-linear model for τ .
B.kappa	Matrix with specification of log-linear model for κ .
prior.variance.nominal	Nominal prior mean for the field variance
prior.range.nominal	Nominal prior mean for the spatial range
prior.tau	Prior mean for tau (overrides <code>prior.variance.nominal</code>)
prior.kappa	Prior mean for kappa (overrides <code>prior.range.nominal</code>)
theta.prior.mean	(overrides <code>prior.*</code>)
theta.prior.prec	Scalar, vector or matrix, specifying the joint prior precision for <i>theta</i> .
n.iid.group	If greater than 1, build an explicitly iid replicated model, to support constraints applied to the combined replicates, for example in a time-replicated spatial model. Constraints can either be specified for a single mesh, in which case it's applied to the average of the replicates (<code>ncol(A)</code> should be <code>mesh\$n</code> for 2D meshes, <code>mesh\$m</code> for 1D), or as general constraints on the collection of replicates (<code>ncol(A)</code> should be <code>mesh\$n * n.iid.group</code> for 2D meshes, <code>mesh\$m * n.iid.group</code> for 1D).
...	Additional parameters for special uses.
spde	An spde model object
theta	Parameters in the model's internal scale

Details

This method constructs a Matern SPDE model, with spatial scale parameter $\kappa(u)$ and variance rescaling parameter $\tau(u)$.

$$(\kappa^2(u) - \Delta)^{\alpha/2}(\tau(u)) \\ x(u) = W(u)$$

Stationary models are supported for $0 < \alpha \leq 2$, with spectral approximation methods used for non-integer α , with approximation method determined by `fractional.method`.

Non-stationary models are supported for $\alpha = 2$ only, with

- $\log \tau(u) = B_0^\tau(u) + \sum_{k=1}^p B_k^\tau(u) \theta_k$
- $\log \kappa(u) = B_0^\kappa(u) + \sum_{k=1}^p B_k^\kappa(u) \theta_k$

The same parameterisation is used in the stationary cases, but with B_0^τ , B_k^τ , B_0^κ , and B_k^κ constant across u .

Integration and other general linear constraints are supported via the `constr`, `extraconstr.int`, and `extraconstr` parameters, which also interact with `n.iid.group`.

Value

An `inla.spde2` object.

Functions

- `inla.spde2.theta2phi0()`: Convert from theta vector to phi0 values in the internal `spde2` model representation
- `inla.spde2.theta2phi1()`: Convert from theta vector to phi1 values in the internal `spde2` model representation
- `inla.spde2.theta2phi2()`: Convert from theta vector to phi2 values in the internal `spde2` model representation

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.2d\(\)](#), [inla.mesh.create\(\)](#), [inla.mesh.1d\(\)](#), [inla.mesh.basis\(\)](#), [inla.spde2.pcmatern\(\)](#), [inla.spde2.generic\(\)](#)

Examples

```
n <- 100
field.fcn <- function(loc) (10 * cos(2 * pi * 2 * (loc[, 1] + loc[, 2])))
loc <- matrix(runif(n * 2), n, 2)
## One field, 2 observations per location
idx.y <- rep(1:n, 2)
y <- field.fcn(loc[idx.y, ]) + rnorm(length(idx.y))

mesh <- inla.mesh.create(loc, refine = list(max.edge = 0.05))
spde <- inla.spde2.matern(mesh)
```

```

data <- list(y = y, field = mesh$idx$loc[idx.y])
formula <- y ~ -1 + f(field, model = spde)
result <- inla(formula, data = data, family = "normal")

## Plot the mesh structure:
plot(mesh)

if (require(rgl)) {
  col.pal <- colorRampPalette(c("blue", "cyan", "green", "yellow", "red"))
  ## Plot the posterior mean:
  plot(mesh,
        rgl = TRUE,
        result$summary.random$field[, "mean"],
        color.palette = col.pal
      )
  ## Plot residual field:
  plot(mesh,
        rgl = TRUE,
        result$summary.random$field[, "mean"] - field.fcn(mesh$loc),
        color.palette = col.pal
      )
}

result.field <- inla.spde.result(result, "field", spde)
plot(result.field$marginals.range.nominal[[1]])

```

inla.spde2.matern.sd.basis

Approximate variance-compensating basis functions

Description

Calculates an approximate basis for tau and kappa for an inla.spde2.matern model where tau is a rescaling parameter.

Usage

```

inla.spde2.matern.sd.basis(
  mesh,
  B.sd,
  B.range,
  method = 1,
  local.offset.compensation = FALSE,
  alpha = 2,
  ...
)

```

Arguments

mesh	An inla.mesh() object.
B.sd	Desired basis for log-standard deviations.
B.range	Desired basis for spatial range.

method	Construction method selector. Expert option only.
local.offset.compensation	If FALSE, only compensate in the average for the tau offset.
alpha	The model alpha parameter.
...	Additional parameters passed on to internal inla.spde2.matern calls.

Value

List of basis specifications

B.tau	Basis for log(tau)
B.kappa	Basis for log(kappa)

Intended for passing on to [inla.spde2.matern\(\)](#).

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde2.matern\(\)](#)

inla.spde2.pcmatern	<i>Matern SPDE model object with PC prior for INLA</i>
---------------------	--------------------------------------------------------

Description

Create an inla.spde2 model object for a Matern model, using a PC prior for the parameters.

Usage

```
inla.spde2.pcmatern(
  mesh,
  alpha = 2,
  param = NULL,
  constr = FALSE,
  extraconstr.int = NULL,
  extraconstr = NULL,
  fractional.method = c("parsimonious", "null"),
  n.iid.group = 1,
  prior.range = NULL,
  prior.sigma = NULL
)
```

Arguments

<code>mesh</code>	The mesh to build the model on, as an <code>inla.mesh()</code> or <code>inla.mesh.1d()</code> object.
<code>alpha</code>	Fractional operator order, $0 < \alpha \leq 2$ supported, for $\nu = \alpha - d/2 > 0$.
<code>param</code>	Further model parameters. Not currently used.
<code>constr</code>	If TRUE, apply an integrate-to-zero constraint. Default FALSE.
<code>extraconstr.int</code>	Field integral constraints.
<code>extraconstr</code>	Direct linear combination constraints on the basis weights.
<code>fractional.method</code>	Specifies the approximation method to use for fractional (non-integer) alpha values. 'parsimonious' gives an overall approximate minimal covariance error, 'null' uses approximates low-order properties.
<code>n.iid.group</code>	If greater than 1, build an explicitly iid replicated model, to support constraints applied to the combined replicates, for example in a time-replicated spatial model. Constraints can either be specified for a single mesh, in which case it's applied to the average of the replicates (<code>ncol(A)</code> should be <code>mesh\$n</code> for 2D meshes, <code>mesh\$m</code> for 1D), or as general constraints on the collection of replicates (<code>ncol(A)</code> should be <code>mesh\$n * n.iid.group</code> for 2D meshes, <code>mesh\$m * n.iid.group</code> for 1D).
<code>prior.range</code>	A length 2 vector, with (<code>range0</code> , <code>Prange</code>) specifying that $P(\rho < \rho_0) = p_\rho$, where ρ is the spatial range of the random field. If <code>Prange</code> is NA, then <code>range0</code> is used as a fixed range value.
<code>prior.sigma</code>	A length 2 vector, with (<code>sigma0</code> , <code>Psigma</code>) specifying that $P(\sigma > \sigma_0) = p_\sigma$, where σ is the marginal standard deviation of the field. If <code>Psigma</code> is NA, then <code>sigma0</code> is used as a fixed range value.

Details

This method constructs a Matern SPDE model, with spatial range ρ and standard deviation parameter σ . In the parameterisation

$$(\kappa^2 - \Delta)^{\alpha/2}(\tau x(u)) = W(u)$$

the spatial scale parameter $\kappa = \sqrt{8\nu}/\rho$, where $\nu = \alpha - d/2$, and τ is proportional to $1/\sigma$.

Stationary models are supported for $0 < \alpha \leq 2$, with spectral approximation methods used for non-integer α , with approximation method determined by `fractional.method`.

Integration and other general linear constraints are supported via the `constr`, `extraconstr.int`, and `extraconstr` parameters, which also interact with `n.iid.group`.

The joint PC prior density for the spatial range, ρ , and the marginal standard deviation, σ , and is

$$\begin{aligned} \pi(\rho, \sigma) = & \\ & \frac{d\lambda_\rho}{2} \rho^{-1-d/2} \exp(-\lambda_\rho \rho^{-d/2}) \\ & \lambda_\sigma \exp(-\lambda_\sigma \sigma) \end{aligned}$$

where λ_ρ and λ_σ are hyperparameters that must be determined by the analyst. The practical approach for this in INLA is to require the user to indirectly specify these hyperparameters through

$$P(\rho < \rho_0) = p_\rho$$

and

$$P(\sigma > \sigma_0) = p_\sigma$$

where the user specifies the lower tail quantile and probability for the range (ρ_0 and p_ρ) and the upper tail quantile and probability for the standard deviation (σ_0 and p_σ).

This allows the user to control the priors of the parameters by supplying knowledge of the scale of the problem. What is a reasonable upper magnitude for the spatial effect and what is a reasonable lower scale at which the spatial effect can operate? The shape of the prior was derived through a construction that shrinks the spatial effect towards a base model of no spatial effect in the sense of distance measured by Kullback-Leibler divergence.

The prior is constructed in two steps, under the idea that having a spatial field is an extension of not having a spatial field. First, a spatially constant random effect ($\rho = \infty$) with finite variance is more complex than not having a random effect ($\sigma = 0$). Second, a spatial field with spatial variation ($\rho < \infty$) is more complex than the random effect with no spatial variation. Each of these extensions are shrunk towards the simpler model and, as a result, we shrink the spatial field towards the base model of no spatial variation and zero variance ($\rho = \infty$ and $\sigma = 0$).

The details behind the construction of the prior is presented in Fuglstad, et al. (2016) and is based on the PC prior framework (Simpson, et al., 2015).

Value

An `inla.spde2` object.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

References

- Fuglstad, G.-A., Simpson, D., Lindgren, F., and Rue, H. (2016) Constructing Priors that Penalize the Complexity of Gaussian Random Fields. arXiv:1503.00256
- Simpson, D., Rue, H., Martins, T., Riebler, A., and Sørbye, S. (2015) Penalising model component complexity: A principled, practical approach to constructing priors. arXiv:1403.4630

See Also

[inla.mesh.2d\(\)](#), [inla.mesh.create\(\)](#), [inla.mesh.1d\(\)](#), [inla.mesh.basis\(\)](#), [inla.spde2.matern\(\)](#), [inla.spde2.generic\(\)](#)

Examples

```
## Spatial interpolation
n <- 100
field.fcn <- function(loc) (10 * cos(2 * pi * 2 * (loc[, 1] + loc[, 2])))
loc <- matrix(runif(n * 2), n, 2)
## One field, 2 observations per location
idx.y <- rep(1:n, 2)
y <- field.fcn(loc[idx.y, ]) + rnorm(length(idx.y))
```

```

mesh <- inla.mesh.2d(loc, max.edge = 0.05, cutoff = 0.01)
spde <- inla.spde2.pcmatern(mesh,
  prior.range = c(0.01, 0.1), prior.sigma = c(100, 0.1)
)
data <- list(y = y, field = mesh$idx$loc[idx.y])
formula <- y ~ -1 + f(field, model = spde)
result <- inla(formula, data = data, family = "normal")

## Plot the mesh structure:
plot(mesh)

if (require(rgl)) {
  col.pal <- colorRampPalette(c("blue", "cyan", "green", "yellow", "red"))
  ## Plot the posterior mean:
  plot(mesh,
    rgl = TRUE,
    result$summary.random$field[, "mean"],
    color.palette = col.pal
  )
  ## Plot residual field:
  plot(mesh,
    rgl = TRUE,
    result$summary.random$field[, "mean"] - field.fcn(mesh$loc),
    color.palette = col.pal
  )
}

result.field <- inla.spde.result(result, "field", spde)
par(mfrow = c(2, 1))
plot(result.field$marginals.range.nominal[[1]],
  type = "l", main = "Posterior density for range"
)
plot(inla.tmarginal(sqrt, result.field$marginals.variance.nominal[[1]]),
  type = "l", main = "Posterior density for std.dev."
)
par(mfrow = c(1, 1))

## Spatial model
set.seed(1234234)

## Generate spatial locations
nObs <- 200
loc <- matrix(runif(nObs * 2), nrow = nObs, ncol = 2)

## Generate observation of spatial field
nu <- 1.0
rhoT <- 0.2
kappaT <- sqrt(8 * nu) / rhoT
sigT <- 1.0
Sig <- sigT^2 * inla.matern.cov(
  nu = nu,
  kappa = kappaT,
  x = as.matrix(dist(loc)),
  d = 2,
  corr = TRUE
)

```

```

L <- t(chol(Sig))
u <- L %*% rnorm(nObs)

## Construct observation with nugget
sigN <- 0.1
y <- u + sigN * rnorm(nObs)

## Create the mesh and spde object
mesh <- inla.mesh.2d(loc,
  max.edge = 0.05,
  cutoff = 0.01
)
spde <- inla.spde2.pcmatern(mesh,
  prior.range = c(0.01, 0.05),
  prior.sigma = c(10, 0.05)
)

## Create projection matrix for observations
A <- inla.spde.make.A(
  mesh = mesh,
  loc = loc
)

## Run model without any covariates
idx <- 1:spde$n.spde
res <- inla(y ~ f(idx, model = spde) - 1,
  data = list(y = y, idx = idx, spde = spde),
  control.predictor = list(A = A)
)

## Re-run model with fixed range
spde.fixed <- inla.spde2.pcmatern(mesh,
  prior.range = c(0.2, NA),
  prior.sigma = c(10, 0.05)
)

res.fixed <- inla(y ~ f(idx, model = spde) - 1,
  data = list(y = y, idx = idx, spde = spde.fixed),
  control.predictor = list(A = A)
)

```

inla.spTransform

Wrapper method for fmesher::fm_transform

Description

[Deprecated] in favour of `fmesher::fm_transform()`. Handles transformation of various inla objects according to coordinate reference systems of `sf::crs`, `sp::CRS` or `inla.CRS` class.

Usage

```
inla.spTransform(x, CRSobj, ...)
```

Arguments

`x` The object that should be transformed from its current CRS to a new CRS
`CRSobj` passed on as the `crs` argument to `fmesher::fm_transform()`.
`...` Potential other arguments for `fmesher::fm_transform()`.

Value

The object is returned with its coordinates transformed

Author(s)

Finn Lindgren finn.lindgren@gmail.com

See Also

[inla.CRS\(\)](#)

Examples

```
if (require("sf") && require("sp") && require("fmesher")) {
  latt <- inla.mesh.lattice(-10:10, 40:60)
  mesh1 <- inla.mesh.create(
    lattice = latt, extend = FALSE, refine = FALSE,
    crs = fm_CRS("longlat_norm")
  )
  mesh2 <- fm_transform(mesh1, fm_crs("lambert_globe"))
  print(summary(mesh1))
  print(summary(mesh2))
}
```

inla.sp_get_crs

Extract CRS information

Description

[Deprecated] in favour of `fmesher::fm_CRS()`. Wrapper for `CRS(projargs)` (PROJ4) and `CRS(wkt)` for `sp::Spatial` objects.

This function is a convenience method to workaround PROJ4/PROJ6 differences, and the lack of a crs extraction method for `Spatial` objects.

Usage

```
inla.sp_get_crs(x)
```

Arguments

`x` A `sp::Spatial` object

Value

A CRS object, or NULL if no valid CRS identified

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

Examples

```
## Not run:
if (interactive()) {
  s <- sp::SpatialPoints(matrix(1:6, 3, 2), proj4string = fmesher::fm_CRS("sphere"))
  inla.sp_get_crs(s)
}

## End(Not run)
```

inla.ssh.copy.id	<i>Setup remote computing</i>
------------------	-------------------------------

Description

Initialize the definition file and print the path to the internal script to transfer ssh-keys

Usage

```
inla.ssh.copy.id()

inla.remote()
```

Value

inla.remote is used once to setup the remote host information file (definition file) in the users home directory; see the FAQ entry on this issue for more information. inla.ssh.copy.id will return the path to the internal script to transfer ssh-keys.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
##See the FAQ entry on this issue on r-inla.org.
```

inla.stack.remove.unused

Data stacking for advanced INLA models

Description

Functions for combining data, effects and observation matrices into `inla.stack` objects, and extracting information from such objects.

Usage

```
inla.stack.remove.unused(stack)

inla.stack.compress(stack, remove.unused = TRUE)

inla.stack(..., compress = TRUE, remove.unused = TRUE)

inla.stack.sum(
  data,
  A,
  effects,
  tag = "",
  compress = TRUE,
  remove.unused = TRUE
)

inla.stack.join(..., compress = TRUE, remove.unused = TRUE)

inla.stack.index(stack, tag)

inla.stack.LHS(stack)

inla.stack.RHS(stack)

inla.stack.data(stack, ...)

inla.stack.A(stack)
```

Arguments

<code>stack</code>	A <code>inla.data.stack</code> object, created by a call to <code>inla.stack</code> , <code>inla.stack.sum</code> , or <code>inla.stack.join</code> .
<code>remove.unused</code>	If <code>TRUE</code> , compress the model by removing rows of effects corresponding to all-zero columns in the A matrix (and removing those columns).
<code>...</code>	For <code>inla.stack.join</code> , two or more data stacks of class <code>inla.data.stack</code> , created by a call to <code>inla.stack</code> , <code>inla.stack.sum</code> , or <code>inla.stack.join</code> . For <code>inla.stack.data</code> , a list of variables to be joined with the data list.
<code>compress</code>	If <code>TRUE</code> , compress the model by removing duplicated rows of effects, replacing the corresponding A-matrix columns with a single column containing the sum.

data	A list or codedata.frame of named data vectors. Scalars are expanded to match the number of rows in the A matrices, or any non-scalar data vectors. An error is given if the input is inconsistent.
A	A list of observation matrices. Scalars are expanded to diagonal matrices matching the effect vector lengths. An error is given if the input is inconsistent or ambiguous.
effects	A collection of effects/predictors. Each list element corresponds to an observation matrix, and must either be a single vector, a list of vectors, or a data.frame. Single-element effect vectors are expanded to vectors matching the number of columns in the corresponding A matrix. An error is given if the input is inconsistent or ambiguous.
tag	A string specifying a tag for later identification.

Details

For models with a single effects collection, the outer list container for A and effects may be omitted.

Component size definitions:

- n_l effect blocks
- n_k effects
- n_i data values
- $n_{j,l}$ effect size for block l
- $n_j = \sum_{l=1}^{n_l} n_{j,l}$ total effect size

Input:

data (y^1, \dots, y^p) p vectors, each of length n_i

A (A^1, \dots, A^{n_l}) matrices of size $n_i \times n_{j,l}$

effects $((x^{1,1}, \dots, x^{n_k,1}), \dots, (x^{1,n_l}, \dots, x^{n_k,n_l}))$ collections of effect vectors of length $n_{j,l}$

$$\text{predictor}(y^1, \dots, y^p) \sim \sum_{l=1}^{n_l} A^l \sum_{k=1}^{n_k} g(k, x^{k,l}) = \tilde{A} \sum_{k=1}^{n_k} g(k, \tilde{x}^k)$$

where

$$\tilde{A} = \text{cbind}(A^1, \dots, A^{n_l})$$

and

$$\tilde{x}^k = \text{rbind}(x^{k,1}, \dots, x^{k,n_l})$$

and for each block l , any missing $x^{k,l}$ is replaced by an NA vector.

Value

A data stack of class `inla.data.stack`. Elements:

- data = $(y^1, \dots, y^p, \tilde{x}^1, \dots, \tilde{x}^{n_k})$
- A = \tilde{A}
- data.names List of data names, length p
- effect.names List of effect names, length n_k
- n.data Data length, n_i
- index List indexed by tags, each element indexing into $i = 1, \dots, n_i$

Functions

- `inla.stack.remove.unused()`: Remove unused entries from an existing stack
- `inla.stack.compress()`: Compress an existing stack by removing duplicates
- `inla.stack.sum()`: Create data stack as a sum of predictors
- `inla.stack.join()`: Join two or more data stacks
- `inla.stack.index()`: Extract tagged indices
- `inla.stack.LHS()`: Extract data associated with the "left hand side" of the model (e.g. the data itself, Ntrials, link, E)
- `inla.stack.RHS()`: Extract data associated with the "right hand side" of the model (all the covariates/predictors)
- `inla.stack.data()`: Extract data for an inla call, and optionally join with other variables
- `inla.stack.A()`: Extract the "A matrix" for control.predictor

Functions

- `inla.stack.remove.unused`: Remove unused entries from an existing stack
- `inla.stack.compress`: Compress an existing stack by removing duplicates
- `inla.stack`: Shorthand for `inla.stack.join` and `inla.stack.sum`
- `inla.stack.sum`: Create data stack as a sum of predictors
- `inla.stack.join`: Join two or more data stacks
- `inla.stack.index`: Extract tagged indices
- `inla.stack.LHS`: Extract data associated with the "left hand side" of the model (e.g. the data itself, Ntrials, link, E)
- `inla.stack.RHS`: Extract data associated with the "right hand side" of the model (all the covariates/predictors)
- `inla.stack.data`: Extract data for an inla call, and optionally join with other variables
- `inla.stack.A`: Extract the "A matrix" for control.predictor

See Also

[inla.spde.make.A\(\)](#), [inla.spde.make.index\(\)](#)

Examples

```
n <- 200
loc <- matrix(runif(n * 2), n, 2)
mesh <- inla.mesh.2d(
  loc.domain = loc,
  max.edge = c(0.05, 0.2)
)
proj.obs <- inla.mesh.projector(mesh, loc = loc)
proj.pred <- inla.mesh.projector(mesh, loc = mesh$loc)
spde <- inla.spde2.pcmatern(mesh,
  prior.range = c(0.01, 0.01),
  prior.sigma = c(10, 0.01)
)

covar <- rnorm(n)
field <- inla.qsample(n = 1, Q = inla.spde.precision(spde, theta = log(c(0.5, 1))))[, 1]
```

```

y <- 2 * covar + inla.mesh.project(proj.obs, field)

A.obs <- inla.spde.make.A(mesh, loc = loc)
A.pred <- inla.spde.make.A(mesh, loc = proj.pred$loc)
stack.obs <-
  inla.stack(
    data = list(y = y),
    A = list(A.obs, 1),
    effects = list(c(
      list(Intercept = 1),
      inla.spde.make.index("spatial", spde$n.spde)
    ),
    covar = covar
  ),
  tag = "obs"
)
stack.pred <-
  inla.stack(
    data = list(y = NA),
    A = list(A.pred),
    effects = list(c(
      list(Intercept = 1),
      inla.spde.make.index("spatial", mesh$n)
    )),
    tag = "pred"
  )
stack <- inla.stack(stack.obs, stack.pred)

formula <- y ~ -1 + Intercept + covar + f(spatial, model = spde)
result1 <- inla(formula,
  data = inla.stack.data(stack.obs, spde = spde),
  family = "gaussian",
  control.predictor = list(
    A = inla.stack.A(stack.obs),
    compute = TRUE
  )
)

plot(y, result1$summary.fitted.values[inla.stack.index(stack.obs, "obs")$data, "mean"],
  main = "Observations vs posterior predicted values at the data locations"
)

result2 <- inla(formula,
  data = inla.stack.data(stack, spde = spde),
  family = "gaussian",
  control.predictor = list(
    A = inla.stack.A(stack),
    compute = TRUE
  )
)

field.pred <- inla.mesh.project(
  proj.pred,
  result2$summary.fitted.values[inla.stack.index(stack, "pred")$data, "mean"]
)
field.pred.sd <- inla.mesh.project(
  proj.pred,

```

```

    result2$summary.fitted.values[inla.stack.index(stack, "pred")$data, "sd"]
  )

  plot(field, field.pred, main = "True vs predicted field")
  abline(0, 1)
  image(inla.mesh.project(mesh,
    field = field,
    dims = c(200, 200)
  ),
  main = "True field"
  )
  image(inla.mesh.project(mesh,
    field = field.pred,
    dims = c(200, 200)
  ),
  main = "Posterior field mean"
  )
  image(inla.mesh.project(mesh,
    field = field.pred.sd,
    dims = c(200, 200)
  ),
  main = "Prediction standard deviation"
  )
  plot(field, (field.pred - field) / 1,
    main = "True field vs standardised prediction residuals"
  )

```

inla.surv

Create a Survival Object for INLA

Description

Create a survival object, to be used as a response variable in a model formula for the `inla()` function for survival models.

Usage

```

inla.surv(
  time,
  event,
  time2,
  truncation,
  subject = NULL,
  cure = NULL,
  .special = NULL
)

## S3 method for class 'inla.surv'
plot(x, y, ...)

## S3 method for class 'inla.surv'
print(x, ...)

```



```
## Second example
time = c(182,182,63,68,182,152,182,130,134,145,152,182,98,152,182,88,95,105,130,137,167,182,
        152,182,81,182,71,84,126,134,152,182)
event = c(1,0,1,1,0,1,0,1,1,1,1,0,1,1,1,1,1,1,1,0,1,0,1,0,1,1,1,1,0)
subject = c(1,2,3,3,3,4,4,5,5,5,5,6,6,6,7,7,7,7,7,7,8,8,9,9,10,10,10,10,10)
y = inla.surv(time, event, subject=subject)
```

inla.update

Upgrade the INLA-package

Description

Functions to upgrade the INLA-package to the current version.

Usage

```
inla.update(lib = NULL, testing = FALSE, ask = TRUE)
```

```
inla.upgrade(lib = NULL, testing = FALSE, ask = TRUE)
```

Arguments

lib	Location to install the library.
testing	If TRUE, then look for a test-version if the INLA-package.
ask	same argument as in <code>update.packages</code>

Value

`inla.upgrade` will update the INLA package to the current version, and `inla.update` do the same for backward compatibility. This function is simple wrapper for `update.packages` using the INLA repository.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

`update.packages`

inla.version	<i>Show the version of the INLA-package</i>
--------------	---------------------------------------------

Description

Show the version of the INLA-package

Usage

```
inla.version(what = c("default", "version", "date"))
```

Arguments

what	What to show version of
------	-------------------------

Value

inla.version display the current version information using cat with default or info, or return other specific requests through the call.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
## Summary of all
inla.version()
## The building date
inla.version("date")
```

joint.marginal	<i>Sample, transform and evaluate from a joint marginal approximation</i>
----------------	---------------------------------------------------------------------------

Description

Sample, transform and evaluate from from a joint marginal approximation as returned using argument selection in inla.

Usage

```
inla.rjmarginal(n, jmarginal, constr)

inla.rjmarginal.eval(fun, samples, ...)

## S3 method for class 'inla.jmarginal'
print(x, ...)

## S3 method for class 'inla.jmarginal'
```

```
summary(object, ...)

## S3 method for class 'summary.inla.jmarginal'
print(x, ...)

inla.tjmarginal(jmarginal, A)

inla.1djmarginal(jmarginal)
```

Arguments

<code>n</code>	The number of samples
<code>jmarginal</code>	A marginal object given either by a <code>inla</code> object or <code>result\$selection</code>
<code>constr</code>	Optional linear constraints; see <code>?INLA::f</code> and argument <code>extraconstr</code>
<code>fun</code>	A function which is evaluated for each sample, similar to <code>inla.posterior.sample.eval</code> : please see the documentation for this functions for details.
<code>samples</code>	The samples, as in the form of the output from <code>inla.rjmarginal</code>
<code>...</code>	Arguments passed on to other methods (printing and summarising)
<code>x</code>	Object to be printed
<code>object</code>	Object to be summarised
<code>A</code>	A matrix used for the linear combination

Value

THESE FUNCTIONS ARE EXPERIMENTAL FOR THE MOMENT (JULY 2020)

`inla.rjmarginal` returns a list with the samples in `samples` (matrix) and the corresponding log-densities in `log.density` (vector). Each column in `samples` contains one sample.

`inla.rjmarginal.eval` returns a matrix, where each row is the (vector) function evaluated at each sample.

`inla.tjmarginal` returns a `inla.jmarginal`-object of the linear combination defined by the matrix `A`.

`inla.1djmarginal` return the marginal densities from a joint approximation.

Author(s)

Cristian Chiuchiolu and Havard Rue <hrue@r-inla.org>

See Also

[inla\(\)](#)

Examples

```
n = 10
x = 1+rnorm(n)
xx = 3 + rnorm(n)
y = 1 + x + xx + rnorm(n)
selection = list(xx=1, x=1)
r = inla(y ~ 1 + x + xx,
        data = data.frame(y, x, xx),
```

```

        selection = selection)
ns = 100
xx = inla.rjmarginal(ns, r)

print(cbind(mean = r$selection$mean, sample.mean = rowMeans(xx$samples)))
print("cov matrix")
print(round(r$selection$cov.matrix, dig=3))
print("sample cov matrix")
print(round(cov(t(xx$samples)), dig=3))

skew = function(z) mean((z-mean(z))^3)/var(z)^1.5
print(round(cbind(skew = r$selection$skewness,
                  sample.skew = apply(xx$samples, 1, skew)), digits = 3))

## illustrating the eval function
n = 10
x = rnorm(n)
eta = 1 + x
y = eta + rnorm(n, sd=0.1)
selection = list(x = 1, '(Intercept)' = 1)
r = inla(y ~ 1 + x,
        data = data.frame(y, x),
        selection = selection)
xx = inla.rjmarginal(100, r)
xx.eval = inla.rjmarginal.eval(function() c(x, Intercept), xx)
print(cbind(xx$samples[, 1]))
print(cbind(xx.eval[, 1]))

constr <- list(A = matrix(1, ncol = nrow(xx$samples), nrow = 1), e = 1)
x <- inla.rjmarginal(10, r, constr = constr)

A <- matrix(rnorm(nrow(xx$samples)^2), nrow(xx$samples), nrow(xx$samples))
b <- inla.tjmarginal(r, A)
b.marg <- inla.1djmarginal(b)

```

jp

*Joint-prior models***Description**

A framework for defining joint priors in R

Usage

```
inla.jp.define(jp = NULL, ...)
```

Arguments

jp	The jp-function which returns the joint log-prior as a function of argument theta. There is an optional second argument that is a vector of theta-names. If second argument is not present, argument . theta. desc will be added.
...	Named list of variables that defines the environment of jp

Value

This allows joint priors to be defined in R.

This function is for internal use only.

Author(s)

Havard Rue <hrue@r-inla.org>

Kidney	<i>Kidney infection data</i>
--------	------------------------------

Description

Times of infection from the time to insertion of the catheter for 38 kindey patients using portable dialysis equipment

Format

A data frame with 76 observations on the following 9 variables.

time a numeric vector. Time to infection from the insertion of catheter

event a numeric vector. 1: time of infection 0: time of censoring

age a numeric vector. Age of the patient at the time of infection

sex a numeric vector. Sex of the patient 0: male 1:female

disease a numeric vector. Type of disease

dis1 a numeric vector. Dummy variable to codify the disease type.

dis2 a numeric vector. Dummy variable to codify the disease type.

dis3 a numeric vector. Dummy variable to codify the disease type.

ID a numeric vector. Patient code.

References

McGilchrist and C.W. Aisbett (1991), Regression with frailty in survival analysis, *Biometrics*, vol.47, pages 461–466.

D.J. Spiegelhalter and A. Thomas and N.G. Best and W.R. Gilks (1995) BUGS: Bayesian Inference Using Gibbs sampling, Version 0.50., MRC Biostatistics Unit, Cambridge, England.

lattice2node

*Functions to define mapping between a lattice and nodes***Description**

These functions define mapping in between two-dimensional indices on a lattice and the one-dimensional node representation used in inla.

Usage

```
inla.lattice2node.mapping(nrow, ncol)
inla.node2lattice.mapping(nrow, ncol)
inla.lattice2node(irow, icol, nrow, ncol)
inla.node2lattice(node, nrow, ncol)
inla.matrix2vector(a.matrix)
inla.vector2matrix(a.vector, nrow, ncol)
```

Arguments

nrow	Number of rows in the lattice.
ncol	Number of columns in the lattice.
irow	Lattice row index, between 1 and nrow
icol	Lattice column index, between 1 and ncol
node	The node index, between 1 and ncol*nrow
a.matrix	is a matrix to be mapped to a vector using internal representation defined by inla.lattice2node
a.vector	is a vector to be mapped into a matrix using the internal representation defined by inla.node2lattice

Details

The mapping from node to lattice follows the default R behaviour (which is column based storage), and `as.vector(A)` and `matrix(a, nrow, ncol)` can be used instead of `inla.matrix2vector` and `inla.vector2matrix`.

Value

`inla.lattice2node.mapping` returns the hole mapping as a matrix, and `inla.node2lattice.mapping` returns the hole mapping as `list(irow=..., icol=...)`. `inla.lattice2node` and `inla.node2lattice` provide the mapping for a given set of lattice indices and nodes. `inla.matrix2vector` provide the mapped vector from a matrix, and `inla.vector2matrix` provide the inverse mapped matrix from vector.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla](#)

Examples

```
## write out the mapping using the two alternatives
nrow = 2
ncol = 3
mapping = inla.lattice2node.mapping(nrow,ncol)

for (i in 1:nrow){
  for(j in 1:ncol){
    print(paste("Alt.1: lattice index [", i,",", j,"] corresponds",
               "to node [", mapping[i,j],"]", sep=""))
  }
}

for (i in 1:nrow){
  for(j in 1:ncol){
    print(paste("Alt.2: lattice index [", i,",", j,"] corresponds to node [",
               inla.lattice2node(i,j,nrow,ncol), "]", sep=""))
  }
}

inv.mapping = inla.node2lattice.mapping(nrow,ncol)
for(node in 1:(nrow*ncol))
  print(paste("Alt.1: node [", node, "] corresponds to lattice index [",
             inv.mapping$irow[node], ",",
             inv.mapping$icol[node],"]", sep=""))

for(node in 1:(nrow*ncol))
  print(paste("Alt.2: node [", node, "] corresponds to lattice index [",
             inla.node2lattice(node,nrow,ncol)$irow[1], ",",
             inla.node2lattice(node,nrow,ncol)$icol[1],"]", sep=""))

## apply the mapping from matrix to vector and back
n = nrow*ncol
z = matrix(1:n,nrow,ncol)
z.vector = inla.matrix2vector(z) # as.vector(z) could also be used
print(mapping)
print(z)
print(z.vector)

## the vector2matrix is the inverse, and should give us the z-matrix
## back. matrix(z.vector, nrow, ncol) could also be used here.
z.matrix = inla.vector2matrix(z.vector, nrow, ncol)
print(z.matrix)
```

Leuk

The Leukemia data

Description

This the Leukemia data from Henderson et al (2003); see source.

Format

A data frame with 1043 observations on the following 9 variables.

time TODO

cens TODO

xcoord TODO

ycoord TODO

age TODO

sex TODO

wbc TODO

tpi TODO

district TODO

Source

This is the dataset from

Henderson, R. and Shimakura, S. and Gorst, D., 2002, Modeling spatial variation in leukemia survival data, JASA, 97, 460, 965–972.

Examples

```
data(Leuk)
```

```
lines.inla.mesh.segment
```

Draw inla.mesh.segment objects.

Description

Draws a `inla.mesh.segment()` object with generic or rgl graphics.

Usage

```
## S3 method for class 'inla.mesh.segment'
lines(
  x,
  loc = NULL,
  col = NULL,
  colors = c("black", "blue", "red", "green"),
  add = TRUE,
  xlim = NULL,
  ylim = NULL,
  rgl = FALSE,
  ...
)
```

Arguments

x	An <code>inla.mesh.segment()</code> object.
loc	Point locations to be used if <code>x\$loc</code> is NULL.
col	Segment color specification.
colors	Colors to cycle through if <code>col</code> is NULL.
add	If TRUE, add to the current plot, otherwise start a new plot.
xlim	X axis limits for a new plot.
ylim	Y axis limits for a new plot.
rgl	If TRUE, use <code>rgl</code> for plotting.
...	Additional parameters, passed on to graphics methods.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`inla.mesh.segment()`

link

Link functions in INLA

Description

Define link-functions and its inverse

Usage

```
inla.link.cauchit(x, inverse = FALSE)

inla.link.invcauchit(x, inverse = FALSE)

inla.link.log(x, inverse = FALSE)
```



```
inla.link.invlog(x, inverse = FALSE)
inla.link.neglog(x, inverse = FALSE)
inla.link.invneglog(x, inverse = FALSE)
inla.link.logit(x, inverse = FALSE)
inla.link.invlogit(x, inverse = FALSE)
inla.link.probit(x, inverse = FALSE)
inla.link.invprobit(x, inverse = FALSE)
inla.link.robit(x, df = 7, inverse = FALSE)
inla.link.invrobit(x, df = 7, inverse = FALSE)
inla.link.loglog(x, inverse = FALSE)
inla.link.invloglog(x, inverse = FALSE)
inla.link.cloglog(x, inverse = FALSE)
inla.link.invcloglog(x, inverse = FALSE)
inla.link.ccloglog(x, inverse = FALSE)
inla.link.invccloglog(x, inverse = FALSE)
inla.link.tan(x, inverse = FALSE)
inla.link.invtan(x, inverse = FALSE)
inla.link.identity(x, inverse = FALSE)
inla.link.invidentity(x, inverse = FALSE)
inla.link.inverse(x, inverse = FALSE)
inla.link.invinverse(x, inverse = FALSE)
inla.link.invqpoisson(x, inverse = FALSE, quantile = 0.5)
inla.link.sn(x, intercept = 0.5, skew = 0, a = NULL, inverse = FALSE)
inla.link.invsn(x, intercept = 0.5, skew = 0, a = NULL, inverse = FALSE)
inla.link.invalid(x, inverse = FALSE)
inla.link.invinvalid(x, inverse = FALSE)
```

Arguments

x	The argument. A numeric vector.
inverse	Logical. Use the link (inverse=FALSE) or its inverse (inverse=TRUE)
df	The degrees of freedom for the Student-t
quantile	The quantile level for quantile links
intercept	The quantile level for the intercept in the Skew-Normal link
skew	The skewness in the Skew-Normal. Only one of skew and a can be given.
a	The a-parameter in the Skew-Normal. Only one of skew and a can be given.

Value

Return the values of the link-function or its inverse.

Note

The inv-functions are redundant, as `inla.link.invlog(x) = inla.link.log(x, inverse=TRUE)` and so on, but they are simpler to use as arguments to other functions.

Author(s)

Havard Rue <hrue@r-inla.org>

make.lincomb	<i>Create linear combinations</i>
--------------	-----------------------------------

Description

Create a linear combination or several linear combinations, as input to `inla(..., lincomb = <lincomb>)`

Usage

```
inla.make.lincomb(...)
```

```
inla.make.lincombs(...)
```

Arguments

... Arguments; see examples

Value

A structure to be passed on to `inla()` argument `lincomb`

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

TODO

Examples

```
##See the worked out examples and description in the OLD-FAQ
##vignette {vignette("old-faq", package="INLA")}
```

marginal

Functions which operates on marginals

Description

Density, distribution function, quantile function, random generation, hpd-interval, interpolation, expectations, mode and transformations of marginals obtained by `inla` or `inla.hyperpar()`. These functions computes the density (`inla.dmarginal`), the distribution function (`inla.pmarginal`), the quantile function (`inla.qmarginal`), random generation (`inla.rmarginal`), spline smoothing (`inla.smarginal`), computes expected values (`inla.emarginal`), computes the mode (`inla.mmarginal`), transforms the marginal (`inla.tmarginal`), and provide summary statistics (`inla.zmarginal`).

Usage

```
inla.smarginal(
  marginal,
  log = FALSE,
  extrapolate = 0,
  keep.type = FALSE,
  factor = 15L
)

inla.emarginal(fun, marginal, ...)

inla.dmarginal(x, marginal, log = FALSE)

inla.pmarginal(q, marginal, normalize = TRUE, len = 2048L)

inla.qmarginal(p, marginal, len = 2048L)

inla.hpdmarginal(p, marginal, len = 2048L)

inla.rmarginal(n, marginal)

inla.tmarginal(
  fun,
  marginal,
  n = 2048L,
  h.diff = .Machine[["double.eps"]]^(1/3),
  method = c("quantile", "linear")
)

inla.mmarginal(marginal)

inla.zmarginal(marginal, silent = FALSE)

inla.is.marginal(marginal)
```

Arguments

<code>marginal</code>	A marginal object from either <code>inla</code> or <code>inla.hyperpar()</code> , which is either <code>list(x=c(), y=c())</code> with density values <code>y</code> at locations <code>x</code> , or a <code>matrix(,n,2)</code> for which the density values are the second column and the locations in the first column. The <code>inla.hpdmarginal()</code> -function assumes a unimodal density.
<code>log</code>	Return density or interpolated density in log-scale?
<code>extrapolate</code>	How much to extrapolate on each side when computing the interpolation. In fraction of the range.
<code>keep.type</code>	If FALSE then return a <code>list(x=, y=)</code> , otherwise if TRUE, then return a matrix if the input is a matrix
<code>factor</code>	The number of points after interpolation is <code>factor</code> times the original number of points; which is argument <code>n</code> in <code>spline</code>
<code>fun</code>	A (vectorised) function like <code>function(x) exp(x)</code> to compute the expectation against, or which define the transformation <code>new = fun(old)</code>
<code>...</code>	Further arguments to be passed to function which expectation is to be computed.
<code>x</code>	Evaluation points
<code>q</code>	Quantiles
<code>normalize</code>	Renormalise the density after interpolation?
<code>len</code>	Number of locations used to interpolate the distribution function.
<code>p</code>	Probabilities
<code>n</code>	The number of observations. If <code>length(n) > 1</code> , the length is taken to be the number required.
<code>h.diff</code>	The step-length for the numerical differentiation inside <code>inla.tmarginal</code>
<code>method</code>	Which method should be used to layout points for where the transformation is computed.
<code>silent</code>	Output the result visually (TRUE) or just through the call.

Value

`inla.smarginal` returns `list=c(x=c(), y=c())` of interpolated values do extrapolation using the factor given, and the remaining function returns what they say they should do.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla\(\)](#), [inla.hyperpar\(\)](#)

Examples

```
## a simple linear regression example
n = 10
x = rnorm(n)
sd = 0.1
y = 1+x + rnorm(n,sd=sd)
res = inla(y ~ 1 + x, data = data.frame(x,y),
          control.family=list(initial = log(1/sd^2L),fixed=TRUE))
```

```

## chose a marginal and compare the with the results computed by the
## inla-program
r = res$summary.fixed["x",]
m = res$marginals.fixed$x

## compute the 95% HPD interval
inla.hpdmarginal(0.95, m)

x = seq(-6, 6, length.out = 1000)
y = dnorm(x)
inla.hpdmarginal(0.95, list(x=x, y=y))

## compute the the density for exp(r), version 1
r.exp = inla.tmarginal(exp, m)
## or version 2
r.exp = inla.tmarginal(function(x) exp(x), m)

## to plot the marginal, we use the inla.smarginal, which interpolates (in
## log-scale). Compare with some samples.
plot(inla.smarginal(m), type="l")
s = inla.rmarginal(1000, m)
hist(inla.rmarginal(1000, m), add=TRUE, prob=TRUE)
lines(density(s), lty=2)

m1 = inla.emarginal(function(x) x, m)
m2 = inla.emarginal(function(x) x^2L, m)
stdev = sqrt(m2 - m1^2L)
q = inla.qmarginal(c(0.025,0.975), m)

## inla-program results
print(r)

## inla.marginal-results (they shouldn't be perfect!)
print(c(mean=m1, sd=stdev, "0.025quant" = q[1], "0.975quant" = q[2L]))
## using the buildt-in function
inla.zmarginal(m)

```

merge.inla

Merge a mixture of inla-objects

Description

The function `merge.inla` implements method `merge` for `inla`-objects. `merge.inla` is a wrapper for the function `inla.merge`. The interface is slightly different, `merge.inla` is more tailored for interactive use, whereas `inla.merge` is better in general code.

`inla.merge` is intended for merging a mixture of `inla`-objects, each run with the same formula and settings, except for a set of hyperparameters that are fixed to different values. Using this function, we can then integrate over these hyperparameters using (unnormalized) integration weights `prob`. The main objects to be merged, are the summary statistics and marginal densities (like for hyperparameters, fixed, random, etc). Not all entries in the object can be merged, and by default these are inherited from the first object in the list, while some are just set to `NULL`. Those objects that are merged, will be listed if run with option `verbose=TRUE`.

Note that merging hyperparameter in the user-scale is prone to discretization error in general, so it is more stable to convert the marginal of the hyperparameter from the merged internal scale to the user-scale. (This is not done by this function.)

Usage

```
## S3 method for class 'inla'
merge(x, y, ..., prob = rep(1, length(list(x, y, ...))), verbose = FALSE)

inla.merge(loo, prob = rep(1, length(loo)), mc.cores = NULL, verbose = FALSE)
```

Arguments

<code>x</code>	An inla-object to be merged
<code>y</code>	An inla-object to be merged
<code>...</code>	Additional inla-objects to be merged
<code>prob</code>	The mixture of (possibly unnormalized) probabilities
<code>verbose</code>	Turn on verbose-output or not
<code>loo</code>	List of inla-objects to be merged
<code>mc.cores</code>	The number of cores to use in <code>parallel::mclapply</code> . If <code>is.null(mc.cores)</code> , then check <code>getOption("mc.cores")</code> and <code>inla.getOption("num.threads")</code> in that order.

Value

A merged inla-object.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
set.seed(123)
n = 100
y = rnorm(n)
y[1:10] = NA
x = rnorm(n)
z1 = runif(n)
z2 = runif(n)*n
idx = 1:n
idx2 = 1:n
lc1 = inla.make.lincomb(idx = c(1, 2, 3))
names(lc1) = "lc1"
lc2 = inla.make.lincomb(idx = c(0, 1, 2, 3))
names(lc2) = "lc2"
lc3 = inla.make.lincomb(idx = c(0, 0, 1, 2, 3))
names(lc3) = "lc3"
lc = c(lc1, lc2, lc3)
rr = list()
for (logprec in c(0, 1, 2))
  rr[[length(rr)+1]] = inla(y ~ 1 + x + f(idx, z1) + f(idx2, z2),
    lincomb = lc,
```

```

control.family = list(hyper = list(prec = list(initial = logprec))),
control.predictor = list(compute = TRUE, link = 1),
data = data.frame(y, x, idx, idx2, z1, z2))
r = inla.merge(rr, prob = seq_along(rr), verbose=TRUE)
summary(r)

```

meshbuilder

*Interactive mesh building and diagnostics***Description**

Interactively design and build a triangle mesh for use with SPDE models, and assess the finite element approximation errors. The R code needed to recreate the mesh outside the interactive Shiny app is also generated. Spatial objects can be imported from the global workspace.

Usage

```
meshbuilder()
```

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.mesh.2d\(\)](#), [inla.mesh.create\(\)](#)

Examples

```

## Not run:
meshbuilder()

## End(Not run)

```

Munich

*The Munich rent data***Description**

The Munich rent data

Format

A data frame with 2035 observations on the following 17 variables.

rent Net rent per square meter.

floor.size Size of the flat in square meters.

year Year of construction of the building in which the flat is located.

location Location index (in terms of subquarters).

Gute.Wohnlage Dummy variable for good locations / good neighborhoods.

Beste.Wohnlage Dummy variable for very good locations / very good neighborhoods.

Keine.Wvv Dummy for absence of warm water supply.

Keine.Zh Dummy for absence of central heating system.

Kein.Badkach Dummy for absence of flagging in the bathroom.

Besond.Bad Dummy for special features of the bathroom.

Gehobene.Kueche Dummy for more refined kitchen equipment.

zim1 Dummy for a flat with 1 room.

zim2 Dummy for a flat with 2 rooms.

zim3 Dummy for a flat with 3 rooms.

zim4 Dummy for a flat with 4 rooms.

zim5 Dummy for a flat with 5 rooms.

zim6 Dummy for a flat with 6 rooms.

Source

See Rue and Held (2005), Chapter 4.

References

Rue, H and Held, L. (2005) *Gaussian Markov Random Fields - Theory and Applications* Chapman and Hall

nwEngland

The New England map

Description

This map is used in association to the Leukemia data from Henderson et al (2003); see source.

Format

A SpatialPolygons object.

Source

This map are used to analyse the Leukaemia dataset from

Henderson, R. and Shimakura, S. and Gorst, D., 2002, Modeling spatial variation in leukemia survival data, JASA, 97, 460, 965–972.

Examples

```
data(Leuk)
plot(nwEngland)
```

Oral	~~ data name/kind ... ~~
------	--------------------------

Description

~~ A concise (1-5 lines) description of the dataset. ~~

Format

A data frame with 544 observations on the following 3 variables.

region a numeric vector

E a numeric vector

Y a numeric vector

References

Rue, H and Held, L. (2005) *Gaussian Markov Random Fields - Theory and Applications* Chapman and Hall

param2.matern.orig	<i>Parameter settings for inla.spde2.matern models.</i>
--------------------	---------------------------------------------------------

Description

Construct parameter settings for inla.spde2.matern models.

Usage

```
param2.matern.orig(
  mesh,
  alpha = 2,
  B.tau = matrix(c(0, 1, 0), 1, 3),
  B.kappa = matrix(c(0, 0, 1), 1, 3),
  prior.variance.nominal = 1,
  prior.range.nominal = NULL,
  prior.tau = NULL,
  prior.kappa = NULL,
  theta.prior.mean = NULL,
  theta.prior.prec = 0.1
)
```

Arguments

mesh	The mesh to build the model on, as an inla.mesh() object.
alpha	Fractional operator order, $0 < \alpha \leq 2$ supported. ($\nu = \alpha - d/2$)
B.tau	Matrix with specification of log-linear model for τ .
B.kappa	Matrix with specification of log-linear model for κ .

`prior.variance.nominal`
 Nominal prior mean for the field variance
`prior.range.nominal`
 Nominal prior mean for the spatial range
`prior.tau` Prior mean for tau (overrides `prior.variance.nominal`)
`prior.kappa` Prior mean for kappa (overrides `prior.range.nominal`)
`theta.prior.mean`
 (overrides `prior.*`)
`theta.prior.prec`
 Scalar, vector or matrix, specifying the joint prior precision for *theta*.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[inla.spde2.matern\(\)](#)

pardiso

Describe and check the PARDISO support in R-INLA

Description

`inla.pardiso()` describes the PARDISO support in R-INLA, how to get the license key and enable it in the R-INLA package. `inla.pardiso.check()` check if the PARDISO support is working.

Usage

`inla.pardiso()`

`inla.pardiso.check()`

Author(s)

Havard Rue <hrue@r-inla.org>

pc.alphaw

Utility functions for the PC prior for the alpha parameter in the Weibull likelihood

Description

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for the alpha parameter in the Weibull likelihood

Usage

```
inla.pc.ralphaw(n, lambda = 5)

inla.pc.dalphaw(alpha, lambda = 5, log = FALSE)

inla.pc.qalphaw(p, lambda = 5)

inla.pc.palphaw(q, lambda = 5)
```

Arguments

n	Number of observations
lambda	The rate parameter in the PC-prior
alpha	Vector of evaluation points, where $\alpha > 0$.
log	Logical. Return the density in natural or log-scale.
p	Vector of probabilities
q	Vector of quantiles

Details

This gives the PC prior for the alpha parameter for the Weibull likelihood, where $\alpha=1$ is the base model.

Value

inla.pc.dalphaw gives the density, inla.pc.palphaw gives the distribution function, inla.pc.qalphaw gives the quantile function, and inla.pc.ralphaw generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

```
inla.doc("pc.alphaw")
```

Examples

```
x = inla.pc.ralphaw(100, lambda = 5)
d = inla.pc.dalphaw(x, lambda = 5)
x = inla.pc.qalphaw(0.5, lambda = 5)
inla.pc.palphaw(x, lambda = 5)
```

pc.ar

*Utility functions for the PC prior for a an AR(p) model***Description**

Functions to evaluate and sample from the PC prior for an AR(p) model

Usage

```
inla.pc.ar.rpacf(n = 1, p, lambda = 1)
```

```
inla.pc.ar.dpacf(pac, lambda = 1, log = TRUE)
```

Arguments

n	Number of observations
p	The order of the AR-model
lambda	The rate parameter in the prior
pac	A vector of partial autocorrelation coefficients
log	Logical. Return the density in natural or log-scale.

Value

inla.pc.ar.rpac generate samples from the prior, returning a matrix where each row is a sample of theta. inla.pc.ar.dpac evaluates the density of pac. Use inla.ar.pacf2phi, inla.ar.phi2pacf, inla.ar.pacf2acf and inla.ar.acf2pacf to convert between various parameterisations.

Author(s)

Havard Rue <hrue@r-inla.org>

pc.cor0

*Utility functions for the PC prior for correlation in AR(1)***Description**

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for the correlation in the Gaussian AR(1) model where the base-model is zero correlation.

Usage

```
inla.pc.rcor0(n, u, alpha, lambda)
```

```
inla.pc.dcor0(cor, u, alpha, lambda, log = FALSE)
```

```
inla.pc.qcor0(p, u, alpha, lambda)
```

```
inla.pc.pcor0(q, u, alpha, lambda)
```

Arguments

n	Number of observations
u	The upper limit (see Details)
alpha	The probability going above the upper limit (see Details)
lambda	The rate parameter (see Details)
cor	Vector of correlations
log	Logical. Return the density in natural or log-scale.
p	Vector of probabilities
q	Vector of quantiles

Details

The statement $\text{Prob}(|\text{cor}| > u) = \alpha$ is used to determine λ unless λ is given. Either λ must be given, or u AND α . The density is symmetric around zero.

Value

`inla.pc.dcor0` gives the density, `inla.pc.pcor0` gives the distribution function, `inla.pc.qcor0` gives the quantile function, and `inla.pc.rcor0` generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

`inla.doc("pc.rho0")`

Examples

```
cor = inla.pc.rcor0(100, lambda = 1)
d = inla.pc.dcor0(cor, lambda = 1)
cor = inla.pc.qcor0(c(0.3, 0.7), u = 0.5, alpha=0.01)
inla.pc.pcor0(cor, u = 0.5, alpha=0.01)
```

pc.cor1

Utility functions for the PC prior for correlation in AR(1)

Description

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for the correlation in the Gaussian AR(1) model where the base-model is correlation one.

Usage

```
inla.pc.rcor1(n, u, alpha, lambda)

inla.pc.dcor1(cor, u, alpha, lambda, log = FALSE)

inla.pc.qcor1(p, u, alpha, lambda)

inla.pc.pcor1(q, u, alpha, lambda)
```

Arguments

n	Number of observations
u	The upper limit (see Details)
alpha	The probability going above the upper limit (see Details)
lambda	The rate parameter (see Details)
cor	Vector of correlations
log	Logical. Return the density in natural or log-scale.
p	Vector of probabilities
q	Vector of quantiles

Details

The statement $\text{Prob}(\text{cor} > u) = \alpha$ is used to determine λ unless λ is given. Either λ must be given, or u AND α .

Value

`inla.pc.dcor1` gives the density, `inla.pc.pcor1` gives the distribution function, `inla.pc.qcor1` gives the quantile function, and `inla.pc.rcor1` generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

`inla.doc("pc.rho1")`

Examples

```
cor = inla.pc.rcor1(100, lambda = 1)
d = inla.pc.dcor1(cor, lambda = 1)
cor = inla.pc.qcor1(c(0.3, 0.7), u = 0.5, alpha=0.75)
inla.pc.pcor1(cor, u = 0.5, alpha=0.75)
```

Description

Functions to evaluate and sample from the PC prior for a correlation matrix.

The parameterisation of a correlation matrix of dimension p has dim parameters: `theta` which are in the interval $-\pi$ to π . The alternative parameterisation is through the off-diagonal elements r of the correlation matrix R . The functions `inla.pc.cormat.<A>2` convert between parameterisations `<A>` to parameterisations ``, where both `<A>` and `` are one of `theta`, r and R , and p and dim .

Usage

```
inla.pc.cormat.dim2p(dim)
inla.pc.cormat.p2dim(p)
inla.pc.cormat.theta2R(theta)
inla.pc.cormat.R2theta(R)
inla.pc.cormat.r2R(r)
inla.pc.cormat.R2r(R)
inla.pc.cormat.r2theta(r)
inla.pc.cormat.theta2r(theta)
inla.pc.cormat.permute(R)
inla.pc.cormat.rtheta(n = 1, p, lambda = 1)
inla.pc.cormat.dtheta(theta, lambda = 1, log = FALSE)
```

Arguments

<code>dim</code>	The dimension of <code>theta</code> , the parameterisation of the correlation matrix
<code>p</code>	The dimension the correlation matrix
<code>theta</code>	A vector of parameters for the correlation matrix
<code>R</code>	A correlation matrix
<code>r</code>	The off diagonal elements of a correlation matrix
<code>n</code>	Number of observations
<code>lambda</code>	The rate parameter in the prior
<code>log</code>	Logical. Return the density in natural or log-scale.

Value

`inla.pc.cormat.rtheta` generate samples from the prior, returning a matrix where each row is a sample of `theta`. `inla.pc.cormat.dtheta` evaluates the density of `theta`. `inla.pc.cormat.permute` randomly permutes a correlation matrix, which is useful if an exchangeable sample of a correlation matrix is required.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
p = 4
print(paste("theta has length", inla.pc.cormat.p2dim(p)))
theta = inla.pc.cormat.rtheta(n=1, p=4, lambda = 1)
print("sample theta:")
print(theta)
print(paste("log.dens", inla.pc.cormat.dtheta(theta, log=TRUE)))
print("r:")
r = inla.pc.cormat.theta2r(theta)
print(r)
print("A sample from the non-exchangable prior, R:")
R = inla.pc.cormat.r2R(r)
print(R)
print("A sample from the exchangeable prior, R:")
R = inla.pc.cormat.permute(R)
print(R)
```

pc.ddof

PC-prior for dof in a standardized Student-t

Description

A function to evaluate the PC-prior for the degrees of freedom in a standardized Student-t distribution

Usage

```
inla.pc.ddof(dof, lambda, u, alpha, log = FALSE)
```

Arguments

dof	Degrees of freedom
lambda	The optional value of <code>lambda</code> , instead of defining it implicitly through <code>u</code> and <code>alpha</code>
u	The upper value of <code>dof</code> used to elicitate <code>lambda</code> , $\text{Prob}(\text{dof} < u) = \alpha$
alpha	The probability <code>alpha</code> used to elicitate <code>lambda</code>
log	Logical. Return the density or the log-density

Details

These functions implements the PC-prior for the dof in a standardized Student-t distribution (ie. with unit variance and $\text{dof} > 2$). Either `lambda`, or `u` AND `alpha` must be given. Due the internal tabulation, `dof` must be larger than 2.0025.

Value

`inla.pc.ddof` returns the prior density for given `dof`.

Author(s)

Havard Rue <hrue@r-inla.org>

<code>pc.gamma</code>	<i>Utility functions for the PC prior for $\text{Gamma}(1/a, 1/a)$</i>
-----------------------	-----------------------------------------------------------------------------------

Description

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for $\text{Gamma}(1/a, 1/a)$

Usage

```
inla.pc.rgamma(n, lambda = 1)

inla.pc.dgamma(x, lambda = 1, log = FALSE)

inla.pc.qgamma(p, lambda = 1)

inla.pc.pgamma(q, lambda = 1)
```

Arguments

<code>n</code>	Number of observations
<code>lambda</code>	The rate parameter (see Details)
<code>x</code>	Evaluation points
<code>log</code>	Logical. Return the density in natural or log-scale.
<code>p</code>	Vector of probabilities
<code>q</code>	Vector of quantiles

Details

This gives the PC prior for the $\text{Gamma}(1/a, 1/a)$ case, where $a=0$ is the base model.

Value

`inla.pc.dgamma` gives the density, `inla.pc.pgamma` gives the distribution function, `inla.pc.qgamma` gives the quantile function, and `inla.pc.rgamma` generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

inla.doc("pc.gamma")

Examples

```
x = inla.pc.rgamma(100, lambda = 1)
d = inla.pc.dgamma(x, lambda = 1)
x = inla.pc.qgamma(0.5, lambda = 1)
inla.pc.pgamma(x, lambda = 1)
```

pc.gammacount

Utility functions for the PC prior for the gammacount likelihood

Description

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for the gammacount likelihood

Usage

```
inla.pc.rgammacount(n, lambda = 1)

inla.pc.dgammacount(x, lambda = 1, log = FALSE)

inla.pc.qgammacount(p, lambda = 1)

inla.pc.pgammacount(q, lambda = 1)
```

Arguments

n	Number of observations
lambda	The rate parameter (see Details)
x	Evaluation points
log	Logical. Return the density in natural or log-scale.
p	Vector of probabilities
q	Vector of quantiles

Details

This gives the PC prior for the gammacount likelihood, which is the PC prior for a in $\text{Gamma}(a, 1)$ where $\text{Gamma}(1, 1)$ is the base model.

Value

inla.pc.dgammacount gives the density, inla.pc.pgammacount gives the distribution function, inla.pc.qgammacount gives the quantile function, and inla.pc.rgammacount generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

inla.doc("pc.gammacount")

Examples

```
x = inla.pc.rgammacount(100, lambda = 1)
d = inla.pc.dgammacount(x, lambda = 1)
x = inla.pc.qgammacount(0.5, lambda = 1)
inla.pc.pgammacount(x, lambda = 1)
```

pc.gevtail

Utility functions for the PC prior for the tail parameter in the GEV likelihood

Description

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for the tail parameter in the GEV likelihood

Usage

```
inla.pc.rgevtail(n, lambda = 7)

inla.pc.dgevtail(xi, lambda = 7, log = FALSE)

inla.pc.qgevtail(p, lambda = 7)

inla.pc.pgevtail(q, lambda = 7)
```

Arguments

n	Number of observations
lambda	The rate parameter in the PC-prior
xi	Vector of evaluation points, where $1 > xi > 0$.
log	Logical. Return the density in natural or log-scale.
p	Vector of probabilities
q	Vector of quantiles

Details

This gives the PC prior for the tail parameter for the GEV likelihood, where $xi=0$ is the base model.

Value

inla.pc.dgevtail gives the density, inla.pc.pgevtail gives the distribution function, inla.pc.qgevtail gives the quantile function, and inla.pc.rgevtail generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

inla.doc("pc.gevtail")

Examples

```
xi = inla.pc.rgevtail(100, lambda = 7)
d = inla.pc.dgevtail(xi, lambda = 7)
xi = inla.pc.qgevtail(0.5, lambda = 7)
inla.pc.pgevtail(xi, lambda = 7)
```

pc.multvar

Multivariate PC priors

Description

Functions to evaluate and simulate from multivariate PC priors: The simplex and sphere case

Usage

```
inla.pc.multvar.h.default(x, inverse = FALSE, derivative = FALSE)
```

```
inla.pc.multvar.simplex.r(
  n = NULL,
  lambda = 1,
  h = inla.pc.multvar.h.default,
  b = NULL
)
```

```
inla.pc.multvar.simplex.d(
  x = NULL,
  lambda = 1,
  log = FALSE,
  h = inla.pc.multvar.h.default,
  b = NULL
)
```

```
inla.pc.multvar.sphere.r(
  n = NULL,
  lambda = 1,
  h = inla.pc.multvar.h.default,
  H = NULL
)
```

```
inla.pc.multvar.sphere.d(
  x = NULL,
  lambda = 1,
```

```

    log = FALSE,
    h = inla.pc.multvar.h.default,
    H = NULL
  )

```

Arguments

x	Samples to evaluate. If input is a matrix then each row is a sample. If input is a vector then this is the sample.
inverse	Compute the inverse of the h()-function.
derivative	Compute the derivative of the h()-function. (derivative of the inverse function is not used).
n	Number of samples to generate.
lambda	The lambda-parameter in the PC-prior.
h	The h()-function, defaults to <code>inla.pc.multvar.h.default</code> . See that code for an example of how to write a user-specific function.
b	The b-vector (gradient) in the expression for the simplex option, $d(\mathbf{x}) = \mathbf{h}(\mathbf{b}^T \mathbf{x})$
log	Evaluate the density in log-scale or ordinary scale.
H	The H(essian)-matrix in the expression for the sphere option, $d(\mathbf{x}) = \mathbf{h}(1/2 * \mathbf{x}^T \mathbf{H} \mathbf{x})$. If H is a vector, then it is interpreted as the diagonal of a (sparse) diagonal matrix.

Details

These functions implements multivariate PC-priors of the simplex and sphere type.

Value

`inla.pc.multvar.simplex.r` generate samples from the simplex case, and `inla.pc.multvar.simplex.d` evaluate the density. `inla.pc.multvar.sphere.r` generate samples from the sphere case, and `inla.pc.multvar.sphere.d` evaluate the density. `inla.pc.multvar.h.default` implements the default h()-function and illustrate how to code your own specific one, if needed.

Author(s)

Havard Rue <hrue@r-inla.org>

pc.prec

Utility functions for the PC prior for the precision

Description

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for the precision in the Gaussian distribution.

Usage

```
inla.pc.rprec(n, u, alpha, lambda)

inla.pc.dprec(prec, u, alpha, lambda, log = FALSE)

inla.pc.qprec(p, u, alpha, lambda)

inla.pc.pprec(q, u, alpha, lambda)
```

Arguments

n	Number of observations
u	The upper limit (see Details)
alpha	The probability going above the upper limit (see Details)
lambda	The rate parameter (see Details)
prec	Vector of precisions
log	Logical. Return the density in natural or log-scale.
p	Vector of probabilities
q	Vector of quantiles

Details

The statement $\text{Prob}(1/\sqrt{\text{prec}} > u) = \alpha$ is used to determine λ unless λ is given. Either λ must be given, or u AND α .

Value

`inla.pc.dprec` gives the density, `inla.pc.pprec` gives the distribution function, `inla.pc.qprec` gives the quantile function, and `inla.pc.rprec` generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

```
inla.doc("pc.prec")
```

Examples

```
prec = inla.pc.rprec(100, lambda = 1)
d = inla.pc.dprec(prec, lambda = 1)
prec = inla.pc.qprec(0.5, u = 1, alpha=0.01)
inla.pc.pprec(prec, u = 1, alpha=0.01)
```

pc.sn

Utility functions for the PC prior for skewness in the skew-normal linkfunction and likelihood

Description

Functions to evaluate, sample, compute quantiles and percentiles of the PC prior for the skewness in the skew-normal link-function and likelihood

Usage

```
inla.pc.rsn(n, lambda = 40)

inla.pc.dsn(skew, lambda = 40, log = FALSE)

inla.pc.qsn(p, lambda = 40)

inla.pc.psn(q, lambda = 40)
```

Arguments

n	number of observations
lambda	the rate parameter in the PC prior
skew	vector of evaluation points
log	logical. return the density in natural or log-scale.
p	vector of probabilities
q	vector of quantiles

Details

Defines the PC prior for the skewness for the skew-normal linkfunction and likelihood, where skew=0 is the base model. The skewness range from -0.99527... to 0.99527.... ca.

Value

inla.pc.dsn gives the density, inla.pc.psn gives the distribution function, inla.pc.qsn gives the quantile function, and inla.pc.rsn generates random deviates.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

inla.doc("pc.sn")

Examples

```
x = inla.pc.rsn(100, lambda = 40)
d = inla.pc.dsn(x, lambda = 40)
x = inla.pc.qsn(0.5, lambda = 40)
inla.pc.psn(x, lambda = 40)
```

plot.inla

*Default INLA plotting***Description**

Takes an inla object produced by inla and plot the results

Usage

```
## S3 method for class 'inla'
plot(
  x,
  plot.fixed.effects = TRUE,
  plot.lincomb = TRUE,
  plot.random.effects = TRUE,
  plot.hyperparameters = TRUE,
  plot.predictor = TRUE,
  plot.q = TRUE,
  plot.cpo = TRUE,
  plot.prior = FALSE,
  plot.opt.trace = FALSE,
  single = FALSE,
  postscript = FALSE,
  pdf = FALSE,
  prefix = "inla.plots/figure-",
  intern = FALSE,
  debug = FALSE,
  cex = 1.75,
  ...
)
```

Arguments

x	A fitted inla object produced by inla
plot.fixed.effects	Boolean indicating if posterior marginals for the fixed effects in the model should be plotted
plot.lincomb	Boolean indicating if posterior marginals for the linear combinations should be plotted
plot.random.effects	Boolean indicating if posterior mean and quantiles for the random effects in the model should be plotted

plot.hyperparameters	Boolean indicating if posterior marginals for the hyperparameters in the model should be plotted
plot.predictor	Boolean indicating if posterior mean and quantiles for the linear predictor in the model should be plotted
plot.q	Boolean indicating if precision matrix should be displayed
plot.cpo	Boolean indicating if CPO/PIT values should be plotted
plot.prior	Plot also the prior density for the hyperparameters
plot.opt.trace	Plot optimization trace
single	Boolean indicating if there should be more than one plot per page (FALSE) or just one (TRUE)
postscript	Boolean indicating if postscript files should be produced instead
pdf	Boolean indicating if PDF files should be produced instead
prefix	The prefix for the created files. Additional numbering and suffix is added.
intern	Plot also the hyperparameters in its internal scale.
debug	Write some debug information
cex	The cex parameter in <code>par()</code> . If set to NULL or \emptyset , then default values will be used for graphics parameters
...	Additional arguments to <code>postscript()</code> , <code>pdf()</code> or <code>dev.new()</code> .

Value

The return value is a list of the files created (if any).

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla\(\)](#)

Examples

```
## Not run:
result = inla(...)
plot(result)
plot(result, single = TRUE, plot.prior = TRUE)
plot(result, single = TRUE, pdf = TRUE, paper = "a4")

## End(Not run)
```

plot.inla.CRS

*Plot CRS and inla.CRS objects***Description**

Plot the outline of a CRS or inla.CRS projection, with optional graticules (transformed parallels and meridians) and Tissot indicatrices.

Usage

```
## S3 method for class 'inla.CRS'
plot(
  x,
  xlim = NULL,
  ylim = NULL,
  outline = TRUE,
  graticule = c(15, 15, 45),
  tissot = c(30, 30, 30),
  asp = 1,
  add = FALSE,
  eps = 0.05,
  ...
)

## S3 method for class 'CRS'
plot(
  x,
  xlim = NULL,
  ylim = NULL,
  outline = TRUE,
  graticule = c(15, 15, 45),
  tissot = c(30, 30, 30),
  asp = 1,
  add = FALSE,
  eps = 0.05,
  ...
)
```

Arguments

x	A CRS or inla.CRS() object.
xlim	Optional x-axis limits.
ylim	Optional y-axis limits.
outline	Logical, if TRUE, draw the outline of the projection.
graticule	Vector of length at most 3, to plot meridians with spacing graticule[1] degrees and parallels with spacing graticule[2] degrees. graticule[3] optionally specifies the spacing above and below the first and last parallel. When graticule[1]==0 no meridians are drawn, and when graticule[2]==0 no parallels are drawn. Use graticule=NULL to skip drawing a graticule.

tissot	Vector of length at most 3, to plot Tissot's indicatrices with spacing tissot[1] degrees and parallels with spacing tissot[2] degrees. tissot[3] specifies a scaling factor. Use tissot=NULL to skip drawing a Tissot's indicatrices.
asp	The aspect ratio for the plot, default 1.
add	If TRUE, add the projection plot to an existing plot.
eps	Clipping tolerance for rudimentary boundary clipping
...	Additional arguments passed on to the internal calls to plot and lines.

Author(s)

Finn Lindgren finn.lindgren@gmail.com

See Also

[inla.CRS\(\)](#)

Examples

```
if (require("sf") && require("sp")) {
  for (projtype in c("longlat_norm", "lambert_norm", "mollweide_norm", "hammer_norm")) {
    plot(fmesher::fm_CRS(projtype), main = projtype)
  }
}

if (require("sf") && require("sp")) {
  oblique <- c(0, 45, 45, 0)
  for (projtype in c("longlat_norm", "lambert_norm", "mollweide_norm", "hammer_norm")) {
    INLA:::plot.inla.CRS(fmesher::fm_CRS(projtype), oblique = oblique, main = paste("oblique", projtype))
  }
}
```

plot.inla.mesh

Draw a triangulation mesh object

Description

Plots an [inla.mesh\(\)](#) object using either standard graphics or with rgl.

Usage

```
## S3 method for class 'inla.mesh'
plot(
  x,
  col = "white",
  t.sub = 1:nrow(mesh$graph$tv),
  add = FALSE,
  lwd = 1,
  xlim = range(mesh$loc[, 1]),
  ylim = range(mesh$loc[, 2]),
  main = NULL,
  rgl = FALSE,
```

```

    size = 2,
    draw.vertices = FALSE,
    vertex.color = "black",
    draw.edges = TRUE,
    edge.color = rgb(0.3, 0.3, 0.3),
    draw.segments = draw.edges,
    ...
)

```

Arguments

<code>x</code>	An <code>inla.mesh()</code> object.
<code>col</code>	Color specification. A single named color, a vector of scalar values, or a matrix of RGB values. Requires <code>rgl=TRUE</code> .
<code>t.sub</code>	Optional triangle index subset to be drawn.
<code>add</code>	If TRUE, adds to the current plot instead of starting a new one.
<code>lwd</code>	Line width for triangle edges.
<code>xlim</code>	X-axis limits.
<code>ylim</code>	Y-axis limits.
<code>main</code>	The main plot title. If not specified, a default title is generated based on the mesh type.
<code>rgl</code>	When TRUE, generates an <code>rgl</code> plot instead of a generic graphics plot. Allows 3D plotting and color surface plotting.
<code>size</code>	Size of vertex points in <code>rgl</code> plotting. See <code>rgl.material</code> .
<code>draw.vertices</code>	If TRUE, draw triangle vertices.
<code>vertex.color</code>	Color specification for all vertices.
<code>draw.edges</code>	If TRUE, draw triangle edges.
<code>edge.color</code>	Color specification for all edges.
<code>draw.segments</code>	If TRUE, draw boundary and interior constraint edges more prominently.
<code>...</code>	Further graphics parameters, interpreted by the respective plotting systems.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

`plot.inla.trimesh()`

Examples

```

mesh <- inla.mesh.create(globe = 10)
plot(mesh)

if (require(rgl)) {
  plot(mesh, rgl = TRUE, col = mesh$loc[, 1])
}

```

plot.inla.trimesh *Low level triangulation mesh plotting*

Description

Plots a triangulation mesh using rgl.

Usage

```
## S3 method for class 'inla.trimesh'
plot(
  x,
  S,
  color = NULL,
  color.axis = NULL,
  color.n = 512,
  color.palette = cm.colors,
  color.truncate = FALSE,
  alpha = NULL,
  lwd = 1,
  specular = "black",
  draw.vertices = TRUE,
  draw.edges = TRUE,
  edge.color = rgb(0.3, 0.3, 0.3),
  ...
)
```

Arguments

x	A 3-column triangle-to-vertex index map matrix.
S	A 3-column vertex coordinate matrix.
color	Color specification. A single named color, a vector of scalar values, or a matrix of RGB values.
color.axis	The min/max limit values for the color mapping.
color.n	The number of colors to use in the color palette.
color.palette	A color palette function.
color.truncate	If TRUE, truncate the colors at the color axis limits.
alpha	Transparency/opaqueeness values. See rgl.material.
lwd	Line width for edges. See rgl.material.
specular	Specular color. See rgl.material.
draw.vertices	If TRUE, draw triangle vertices.
draw.edges	If TRUE, draw triangle edges.
edge.color	Edge color specification.
...	Additional parameters passed to and from other methods.

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

See Also

[plot.inla.mesh\(\)](#)

PRborder	<i>The PRborder data</i>
----------	--------------------------

Description

A data matrix with Longitude and Latitude coordinates for the boundary of Parana State.

Format

Longtiude The Longtiude coordinate

Latitude The Latitude coordinate

See Also

PRprec

print.inla	<i>Print an INLA fit</i>
------------	--------------------------

Description

Print an INLA fit

Usage

```
## S3 method for class 'inla'
print(x, digits = 3L, ...)
```

Arguments

x	An inla-object (output from an inla() -call).
digits	Number of digits to print
...	other arguments.

Value

None

Author(s)

Havard Rue

See Also

[inla\(\)](#)

PRprec*The PRprec data*

Description

A data frame with daily rainfall in the Parana State.

Format

A data frame TODO

Altitude TODO

Latitude TODO

Longitude TODO

d0101 Daily rainfall at day "mmdd"

d0102 Daily rainfall at day "mmdd"

d0103 Daily rainfall at day "mmdd"

d0104 Daily rainfall at day "mmdd"

d0105 Daily rainfall at day "mmdd"

d0106 Daily rainfall at day "mmdd"

d0107 Daily rainfall at day "mmdd"

d0108 Daily rainfall at day "mmdd"

d0109 Daily rainfall at day "mmdd"

d0110 Daily rainfall at day "mmdd"

d0111 Daily rainfall at day "mmdd"

d0112 Daily rainfall at day "mmdd"

d0113 Daily rainfall at day "mmdd"

d0114 Daily rainfall at day "mmdd"

d0115 Daily rainfall at day "mmdd"

d0116 Daily rainfall at day "mmdd"

d0117 Daily rainfall at day "mmdd"

d0118 Daily rainfall at day "mmdd"

d0119 Daily rainfall at day "mmdd"

d0120 Daily rainfall at day "mmdd"

d0121 Daily rainfall at day "mmdd"

d0122 Daily rainfall at day "mmdd"

d0123 Daily rainfall at day "mmdd"

d0124 Daily rainfall at day "mmdd"

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d0221 Daily rainfall at day "mmdd"
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d0301 Daily rainfall at day "mmdd"
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d0321 Daily rainfall at day "mmdd"
d0322 Daily rainfall at day "mmdd"
d0323 Daily rainfall at day "mmdd"
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d0331 Daily rainfall at day "mmdd"
d0401 Daily rainfall at day "mmdd"
d0402 Daily rainfall at day "mmdd"
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d0505 Daily rainfall at day "mmdd"
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d0507 Daily rainfall at day "mmdd"
d0508 Daily rainfall at day "mmdd"
d0509 Daily rainfall at day "mmdd"
d0510 Daily rainfall at day "mmdd"
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d0604 Daily rainfall at day "mmdd"
d0605 Daily rainfall at day "mmdd"
d0606 Daily rainfall at day "mmdd"
d0607 Daily rainfall at day "mmdd"
d0608 Daily rainfall at day "mmdd"
d0609 Daily rainfall at day "mmdd"
d0610 Daily rainfall at day "mmdd"
d0611 Daily rainfall at day "mmdd"
d0612 Daily rainfall at day "mmdd"
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d0701 Daily rainfall at day "mmdd"
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d0808 Daily rainfall at day "mmdd"
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d0830 Daily rainfall at day "mmdd"
d0831 Daily rainfall at day "mmdd"
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d0903 Daily rainfall at day "mmdd"
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d0905 Daily rainfall at day "mmdd"
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d1001 Daily rainfall at day "mmdd"
d1002 Daily rainfall at day "mmdd"
d1003 Daily rainfall at day "mmdd"
d1004 Daily rainfall at day "mmdd"
d1005 Daily rainfall at day "mmdd"
d1006 Daily rainfall at day "mmdd"
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d1008 Daily rainfall at day "mmdd"
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d1010 Daily rainfall at day "mmdd"
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d1012 Daily rainfall at day "mmdd"
d1013 Daily rainfall at day "mmdd"
d1014 Daily rainfall at day "mmdd"
d1015 Daily rainfall at day "mmdd"
d1016 Daily rainfall at day "mmdd"
d1017 Daily rainfall at day "mmdd"
d1018 Daily rainfall at day "mmdd"
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d1111 Daily rainfall at day "mmdd"
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d1121 Daily rainfall at day "mmdd"
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d1123 Daily rainfall at day "mmdd"
d1124 Daily rainfall at day "mmdd"
d1125 Daily rainfall at day "mmdd"
d1126 Daily rainfall at day "mmdd"
d1127 Daily rainfall at day "mmdd"
d1128 Daily rainfall at day "mmdd"
d1129 Daily rainfall at day "mmdd"
d1130 Daily rainfall at day "mmdd"
d1201 Daily rainfall at day "mmdd"
d1202 Daily rainfall at day "mmdd"
d1203 Daily rainfall at day "mmdd"
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d1230 Daily rainfall at day "mmdd"
d1231 Daily rainfall at day "mmdd"

See Also

PRborder

qinv

Computes (parts of) the inverse of a SPD sparse matrix

Description

This routine use the GMRFLib implementation which compute parts of the inverse of a SPD sparse matrix. The diagonal and values for the neighbours in the inverse, are provided.

Usage

```
inla.qinv(Q, constr, reordering = INLA::inla.reorderings(), num.threads = NULL)
```

Arguments

Q	A SPD matrix, either as a (dense) matrix or sparseMatrix.
constr	Optional linear constraints; see ?INLA::f and argument extraconstr
reordering	The type of reordering algorithm to be used for TAUCS; either one of the names listed in inla.reorderings() or the output from inla.qreordering(Q). The default is "auto" which try several reordering algorithm and use the best one for this particular matrix.
num.threads	Maximum number of threads the inla-program will use, or as 'A:B' defining the number threads in the outer (A) and inner (B) layer for nested parallelism.

Value

`inla.qinv` returns a `sparseMatrix` of type `dgTMatrix` with the diagonal and values for the neighbours in the inverse. Note that the full inverse is NOT provided!

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
## dense matrix example
n = 10
A = matrix(runif(n^2), n, n)
Q = A %*% t(A)
print(mean(abs(inla.qinv(Q) - solve(Q))))

## sparse matrix example
rho = 0.9
Q = toeplitz(c(1+rho^2, -rho, rep(0, n-3), -rho)) / (1-rho^2)
Q = inla.as.dgTMatrix(Q)
Q.inv = inla.qinv(Q)

## compute the marginal variances as a vector from a precision matrix
marginal.variances = diag(inla.qinv(Q))

## read the sparse matrix from a file in the 'i, j, value' format
filename = tempfile()
write(t(cbind(Q@i+1L, Q@j+1L, Q@x)), ncol=3, file=filename)
Qinv = inla.qinv(filename)
unlink(filename)
```

qreordering

Compute the reordering using the GMRFLib implementation

Description

This function compute the reordering (or find the best reordering) using the GMRFLib implementation

Usage

```
inla.qreordering(graph, reordering = inla.reorderings())
```

Arguments

<code>graph</code>	A (inla-)graph object
<code>reordering</code>	The name of the reordering algorithm to be used; either one of the names listed in <code>inla.reorderings()</code> . The default is "auto" which try several reordering algorithm and use the best one for this particular matrix.

Value

inla.qreordering returns a list with the name of the reordering algorithm used or found, the reordering code for the reordering algorithm, the actual reordering and its inverse.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
g = system.file("demodata/germany.graph", package="INLA")
r = inla.qreordering(g)
m = inla.graph2matrix(g)
r = inla.qreordering(m)
```

qsample

Generate samples from a GMRF using the GMRFLib implementation

Description

This function generate samples from a GMRF using the GMRFLib implementation

Usage

```
inla.qsample(
  n = 1L,
  Q,
  b,
  mu,
  sample,
  constr,
  reordering = INLA::inla.reorderings(),
  seed = 0L,
  logdens = ifelse(missing(sample), FALSE, TRUE),
  compute.mean = ifelse(missing(sample), FALSE, TRUE),
  num.threads = if (seed == 0L) "0:0" else NULL,
  selection = NULL,
  verbose = inla.getOption("verbose"),
  .debug = FALSE
)
```

Arguments

n	Number of samples. Only used if missing(sample)
Q	The precision matrix or a filename containing it.
b	The linear term
mu	The mu term
sample	A matrix of optional samples where each column is a sample. If set, then evaluate the log-density for each sample only.

constr	Optional linear constraints; see ?INLA::f and argument extraconstr
reordering	The type of reordering algorithm to be used for TAUCS; either one of the names listed in <code>inla.reorderings()</code> or the output from <code>inla.qreordering(Q)</code> . The default is "auto" which try several reordering algorithm and use the best one for this particular matrix.
seed	Control the RNG. If <code>seed=0L</code> then GMRFLib will set the seed intelligently/at 'random', and this is and should be the default behaviour. If <code>seed < 0L</code> then the saved state of the RNG will be reused if possible, otherwise, GMRFLib will set the seed intelligently/at 'random'. If <code>seed > 0L</code> then this value is used as the seed for the RNG. PLEASE NOTE1: If <code>seed!=0</code> then the computations will run in serial mode, over-riding whatever is set in <code>num.threads</code> (a warning might be issued). PLEASE NOTE2: If the PARDISO sparse matrix library is used, continuity of the samples with respect to small changes in the precision matrix, can be expected but is not guaranteed. If this feature is required, please use the TAUCS sparse matrix library.
logdens	If TRUE, compute also the log-density of each sample. Note that the output format then change.
compute.mean	If TRUE, compute also the (constrained) mean. Note that the output format then change.
num.threads	Maximum number of threads the inla-program will use, or as 'A:B' defining the number threads in the outer (A) and inner (B) layer for nested parallelism. <code>seed!=0</code> requires serial computations.
selection	A vector of indices of each sample to return. NULL means return the whole sample. (Note that the log-density returned, is for the whole sample.) The use of selection cannot be combined with the use of sample.
verbose	Logical. Run in verbose mode or not.
.debug	Logical. Internal debug-mode.

Value

The log-density has form $-1/2(x-\mu)^T Q (x-\mu) + b^T x$

If `logdens` is FALSE, then `inla.qsample` returns the samples in a matrix, where each column is a sample. If `logdens` or `compute.mean` is TRUE, then a list with names `sample`, `logdens` and `mean` is returned. The samples are stored in the matrix `sample` where each column is a sample, and the log densities of each sample are stored as the vector `logdens`. The mean (include corrections for the constraints, if any) is store in the vector `mean`.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
g = system.file("demodata/germany.graph", package="INLA")
Q = inla.graph2matrix(g)
diag(Q) = dim(Q)[1L]
x = inla.qsample(10, Q)
## Not run: matplot(x)
x = inla.qsample(10, Q, logdens=TRUE)
## Not run: matplot(x$sample)
```

```

n = 3
Q = diag(n)
ns = 2

## sample and evaluate a sample
x = inla.qsample(n, Q=Q, logdens=TRUE)
xx = inla.qsample(Q=Q, sample = x$sample)
print(x$logdens - xx$logdens)

## the use of a constraint
constr = list(A = matrix(rep(1, n), 1, n), e = 0)
x = inla.qsample(n, Q=Q, constr=constr)
print(constr$A %*% x)

## control the RNG (require serial mode)
x = inla.qsample(n, Q=Q, seed = 123, num.threads="1:1")
## restart from same seed, only sample 1
xx = inla.qsample(n=1, Q=Q, seed = 123, num.threads="1:1")
## continue from the save state, sample the remaining 2
xxx = inla.qsample(n=n-1, Q=Q, seed = -1, num.threads="1:1")
## should be 0
print(x - cbind(xx, xxx))

```

qsolve

Solves linear SPD systems

Description

This routine use the GMRFLib implementation to solve linear systems with a SPD matrix.

Usage

```

inla.qsolve(
  Q,
  B,
  reordering = inla.reorderings(),
  method = c("solve", "forward", "backward")
)

```

Arguments

Q	A SPD matrix, either as a (dense) matrix or sparse-matrix
B	The right hand side matrix, either as a (dense) matrix or sparse-matrix.
reordering	The type of reordering algorithm to be used for TAUCS; either one of the names listed in <code>inla.reorderings()</code> or the output from <code>inla.qreordering(Q)</code> . The default is "auto" which try several reordering algorithm and use the best one for this particular matrix (using the TAUCS library).
method	The system to solve, one of "solve", "forward" or "backward". Let $Q = L L^T$, where L is lower triangular (the Cholesky triangle), then <code>method="solve"</code> solves $L L^T X = B$ or equivalently $Q X = B$, <code>method="forward"</code> solves $L X = B$, and <code>method="backward"</code> solves $L^T X = B$.

Value

`inla.qsolve` returns a matrix X , which is the solution of $Q X = B$, $L X = B$ or $L^T X = B$ depending on the value of `method`.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
n = 10
nb <- n-1
QQ = matrix(rnorm(n^2), n, n)
QQ <- QQ %*% t(QQ)

Q = inla.as.sparse(QQ)
B = matrix(rnorm(n*nb), n, nb)

X = inla.qsolve(Q, B, method = "solve")
XX = inla.qsolve(Q, B, method = "solve", reordering = inla.qreordering(Q))
print(paste("err solve1", sum(abs( Q %*% X - B))))
print(paste("err solve2", sum(abs( Q %*% XX - B))))

## the forward and backward solve is tricky, as after permutation and with Q=LL', then L is
## lower triangular, but L in the original ordering is not lower triangular. if the rhs is iid
## noise, this is not important. to control the reordering, then the 'taucs' library must be
## used.
inla.setOption(smtp = 'taucs')

## case 1. use the matrix as is, no reordering
r <- "identity"
L = t(chol(Q))
X = inla.qsolve(Q, B, method = "forward", reordering = r)
XX = inla.qsolve(Q, B, method = "backward", reordering = r)
print(paste("err forward ", sum(abs(L %*% X - B))))
print(paste("err backward", sum(abs(t(L) %*% XX - B))))

## case 2. use a reordering from the library
r <- inla.qreordering(Q)
im <- r$ireordering
m <- r$reordering
print(cbind(idx = 1:n, m, im) )
Qr <- Q[im, im]
L = t(chol(Qr))[m, m]

X = inla.qsolve(Q, B, method = "forward", reordering = r)
XX = inla.qsolve(Q, B, method = "backward", reordering = r)
print(paste("err forward ", sum(abs( L %*% X - B))))
print(paste("err backward", sum(abs( t(L) %*% XX - B))))
```

Description

Construct a graph-object from a file or a matrix; write graph-object to file

Usage

```
inla.read.graph(..., size.only = FALSE)

inla.write.graph(
  graph,
  filename = "graph.dat",
  mode = c("binary", "ascii"),
  ...
)

## S3 method for class 'inla.graph'
plot(x, y, ...)

## S3 method for class 'inla.graph'
summary(object, ...)

## S3 method for class 'inla.graph.summary'
print(x, ...)
```

Arguments

...	Additional arguments. In <code>inla.read.graph</code> , then it is the graph definition (object, matrix, character, filename), plus extra arguments. In <code>inla.write.graph</code> it is extra arguments to <code>inla.read.graph</code> .
<code>size.only</code>	Only read the size of the graph
<code>graph</code>	An <code>inla.graph</code> -object, a (sparse) symmetric matrix, a filename containing the graph, a list or collection of characters and/or numbers defining the graph, or a neighbours list with class <code>nb</code> (see <code>spdep::card</code> and <code>spdep::poly2nb</code> for details of <code>nb</code> and an example a function returning an <code>nb</code> object)
<code>filename</code>	The filename of the graph.
<code>mode</code>	The mode of the file; <code>ascii</code> -file or a (gzip-compressed) binary.
<code>x</code>	An <code>inla.graph</code> -object
<code>y</code>	Not used
<code>object</code>	An <code>inla.graph</code> -object

Value

The output of `inla.read.graph`, is an `inla.graph` object, with elements

<code>n</code>	is the size of the graph
<code>nnbs</code>	is a vector with the number of neighbours
<code>nbs</code>	is a list-list with the neighbours
<code>cc</code>	list with connected component information <ul style="list-style-type: none"> <code>i</code> is a vector with the connected component id for each node (starting from 1)

- `nis` the number of connected components
- `nodesis` a list-list of nodes belonging to each connected component
- `meanis` a factor with one level for each connected component of size larger than one, otherwise NA

Methods implemented for `inla.graph` are `summary` and `plot`. The method `plot` require the libraries `Rgraphviz` and `graph` from the Bioconductor-project, see <https://www.bioconductor.org>.

Author(s)

Havard Rue <hrue@r-inla.org>

See Also

[inla.spy\(\)](#)

Examples

```
## a graph from a file
g.file1 <- tempfile() # E.g. "g.dat"
cat("3 1 1 2 2 1 1 3 0\n", file = g.file1)
g = inla.read.graph(g.file1)
## writing an inla.graph-object to file
g.file2 = inla.write.graph(g, mode="binary", filename = tempfile())
## re-reading it from that file
gg = inla.read.graph(g.file2)
summary(g)
summary(gg)

## Not run:
plot(g)
inla.spy(g)
## when defining the graph directly in the call,
## we can use a mix of character and numbers
g = inla.read.graph(c(3, 1, "1 2 2 1 1 3", 0))
inla.spy(c(3, 1, "1 2 2 1 1 3 0"))
inla.spy(c(3, 1, "1 2 2 1 1 3 0"), reordering=3:1)
inla.write.graph(c(3, 1, "1 2 2 1 1 3 0"))

## building a graph from adjacency matrix
adjacent = matrix(0, nrow = 4, ncol = 4)
adjacent[1,4] = adjacent[4,1] = 1
adjacent[2,4] = adjacent[4,2] = 1
adjacent[2,3] = adjacent[3,2] = 1
adjacent[3,4] = adjacent[4,3] = 1
g = inla.read.graph(adjacent)
plot(g)
summary(g)

## End(Not run)
```

rgeneric.define	<i>rgeneric models</i>
-----------------	------------------------

Description

A framework for defining latent models in R

Usage

```
inla.rgeneric.ar1.model(  
  cmd = c("graph", "Q", "mu", "initial", "log.norm.const", "log.prior", "quit"),  
  theta = NULL  
)  
  
inla.rgeneric.ar1.model.opt(  
  cmd = c("graph", "Q", "mu", "initial", "log.norm.const", "log.prior", "quit"),  
  theta = NULL  
)  
  
inla.rgeneric.iid.model(  
  cmd = c("graph", "Q", "mu", "initial", "log.norm.const", "log.prior", "quit"),  
  theta = NULL  
)  
  
inla.rgeneric.define(  
  model = NULL,  
  debug = FALSE,  
  compile = TRUE,  
  optimize = FALSE,  
  ...  
)  
  
inla.rgeneric.wrapper(  
  cmd = c("graph", "Q", "mu", "initial", "log.norm.const", "log.prior", "quit"),  
  model,  
  theta = NULL  
)  
  
inla.rgeneric.q(  
  rmodel,  
  cmd = c("graph", "Q", "mu", "initial", "log.norm.const", "log.prior", "quit"),  
  theta = NULL  
)
```

Arguments

cmd	An allowed request
theta	Values of theta
model	The definition of the model; see <code>inla.rgeneric.ar1.model</code>
debug	Logical. Enable debug output

<code>compile</code>	Logical. Compile the definition of the model or not.
<code>optimize</code>	Logical. With this option TRUE, then <code>model</code> pass only the values of <code>Q</code> and not the whole matrix. Please see the vignette for details and <code>inla.rgeneric.ar1.model.opt</code> for an example.
<code>...</code>	Named list of variables that defines the environment of <code>model</code>
<code>rmodel</code>	The rgeneric model-object, the output of <code>inla.rgeneric.define</code>

Value

This allows a latent model to be defined in R. See `inla.rgeneric.ar1.model` and `inla.rgeneric.iid.model` and the documentation for worked out examples of how to define latent models in this way. This will be somewhat slow and is intended for special cases and prototyping. The function `inla.rgeneric.wrapper` is for internal use only.

Author(s)

Havard Rue <hrue@r-inla.org>

Salm

Extra-Poisson variation in dose-response study

Description

Breslow (1984) analyses some mutagenicity assay data (shown below) on salmonella in which three plates have been processed at each dose i of quinoline and the number of revertant colonies of TA98 Salmonella measured

Format

A data frame with 18 observations on the following 3 variables.

y number of salmonella bacteria

dose dose of quinoline (mg per plate)

rand indicator

Source

WinBUGS/OpenBUGS manual Examples VOL.I

Examples

```
data(Salm)
```

scale.model

*Scale an intrinsic GMRF model***Description**

This function scales an intrinsic GMRF model so the geometric mean of the marginal variances is one

Usage

```
inla.scale.model.internal(Q, constr = NULL, eps = sqrt(.Machine$double.eps))

inla.scale.model(Q, constr = NULL, eps = sqrt(.Machine$double.eps))
```

Arguments

Q	A SPD matrix, either as a (dense) matrix or sparseMatrix
constr	Linear constraints spanning the null-space of Q; see ?INLA::f and argument extraconstr
eps	A small constant added to the diagonal of Q if constr

Value

inla.scale.model returns a sparseMatrix of type dgTMatrix scaled so the geometric mean of the marginal variances (of the possible non-singular part of Q) is one, for each connected component of the matrix.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
## Q is singular
data(Germany)
g = system.file("demodata/germany.graph", package="INLA")
Q = -inla.graph2matrix(g)
diag(Q) = 0
diag(Q) = -rowSums(Q)
n = dim(Q)[1]
Q.scaled = inla.scale.model(Q, constr = list(A = matrix(1, 1, n), e=0))
print(diag(MASS::ginv(as.matrix(Q.scaled))))

## Q is singular with 3 connected components
g = inla.read.graph("6 1 2 2 3 2 2 1 3 3 2 1 2 4 1 5 5 1 4 6 0")
print(paste("Number of connected components", g$cc$n))
Q = -inla.graph2matrix(g)
diag(Q) = 0
diag(Q) = -rowSums(Q)
n = dim(Q)[1]
Q.scaled = inla.scale.model(Q, constr = list(A = matrix(1, 1, n), e=0))
print(diag(MASS::ginv(as.matrix(Q.scaled))))
```

```
## Q is non-singular with 3 connected components. no constraints needed
diag(Q) = diag(Q) + 1
Q.scaled = inla.scale.model(Q)
print(diag(MASS::ginv(as.matrix(Q.scaled))))
```

Scotland

*Conditional Autoregressive (CAR) model for disease mapping***Description**

The rate of lip cancer in 56 counties in Scotland is recorder. The data set includes the observed and expected cases (based on the population and its age and sex distribution in the country), a covariate measuring the percentage of the population engaged in agriculture, fishing or forestry and the "position" of each county expressed as a list of adjacent counties

Format

A data frame with 56 observations on the following 4 variables.

Counts The number of lip cancer registered

E The expected number of lip cancer

X The percentage of the population engaged in agriculture, fishing or forestry

Region The county

Source

OpenBUGS Example manual, GeoBUGS

References

Clayton and Kaldor (1987) and Breslow and Clayton (1993)

Examples

```
data(Scotland)
```

Seeds

*Factorial design***Description**

Proportion of seeds that germinated on each of 21 plates arranged according to a 2 by 2 factorial layout by seed and type of root extract

Format

A data frame with 21 observations on the following 5 variables.

r number of germinated seeds per plate

n number of total seeds per plate

x1 seed type

x2 root extracted

plate indicator for the plate

Source

WinBUGS/OpenBUGS Manual Example, Vol. I

Examples

```
data(Seeds)
```

SPDEtoy

toy simulated data set for the SPDE tutorial

Description

Simulated data set on 200 location points. The simulation process is made at the introduction of the SPDE tutorial.

Format

A data frame with 200 observations on the following 3 variables.

s1 First element of the coordinates

s2 Second element of the coordinates

y data simulated at the locations

Source

SPDE tutorial

Examples

```
data(SPDEtoy)
```

summary.inla	<i>Summary for a INLA fit</i>
--------------	-------------------------------

Description

Takes a fitted inla or surv.inla object produced by inla or surv.inla and produces a summary from it.

Usage

```
## S3 method for class 'inla'
summary(object, digits = 3L, include.lincomb = TRUE, ...)

## S3 method for class 'summary.inla'
print(x, digits = 3L, ...)
```

Arguments

object	a fitted inla object as produced by inla.
digits	Integer Number of digits
include.lincomb	Logcial Include the summary for the the linear combinations or not
...	other arguments.
x	a summary.inla object produced by summary.inla

Details

Posterior mean and standard deviation (together with quantiles or cdf) are printed for the fixed effects in the model.

For the random effects the function summary() prints the posterior mean and standard deviations for the hyperparameters

If the option short.summary is set to TRUE using inla.setOption, then a less verbose summary variant will be used, which might be more suitable for Markdown documents.

Value

summary.inla returns an object of class summary.inla, a list of components to print.

Author(s)

Sara Martino and Havard Rue

See Also

[inla\(\)](#)

summary.inla.mesh	<i>Summarizing triangular mesh objects</i>
-------------------	--------------------------------------------

Description

Construct and print inla.mesh object summaries

Usage

```
## S3 method for class 'inla.mesh'
summary(object, verbose = FALSE, ...)

## S3 method for class 'summary.inla.mesh'
print(x, ...)
```

Arguments

object	an object of class "inla.mesh", usually a result of a call to inla.mesh.create() or inla.mesh.2d() .
verbose	If TRUE, produce a more detailed output.
...	further arguments passed to or from other methods.
x	an object of class "summary.inla.mesh", usually a result of a call to summary.inla.mesh() .

Author(s)

Finn Lindgren <finn.lindgren@gmail.com>

summary.scopy	<i>Computes the mean and stdev for the spline from scopy</i>
---------------	--------------------------------------------------------------

Description

This function computes the mean and stdev for the spline function that is implicate from an scopy model component

Usage

```
inla.summary.scopy(result, name, by = 0.05, range = c(0, 1))
```

Arguments

result	An inla-object, ie the output from an inla() call
name	The name of the scopy model component see ?inla::f and argument extraconstr
by	The resolution of the results, in the scale where distance between two nearby locations is 1
range	The range of the locations, in (from, to)

Value

A `data.frame` with locations, mean and stdev. if name is not found, NULL is returned.

Author(s)

Havard Rue <hrue@r-inla.org>

Examples

```
## see example in inla.doc("scopy")
```

Surg	<i>Surgical: Institutional ranking</i>
------	----------------------------------------

Description

This example considers mortality rates in 12 hospitals performing cardiac surgery in babies

Format

A data frame with 12 observations on the following 3 variables.

n Number of deaths

r Total number of cases

hospital a factor with levels A B C D E F G H I J K L

Source

WinBUGS/OpenBUGS Manual Examples Vol. I

Examples

```
data(Surg)
```

SurvSim	<i>Survival data</i>
---------	----------------------

Description

Simulated data set for Weibull survival model

Format

A data frame with 100 observations on the following 3 variables.

y a numeric vector of survival times

cens a numeric vector of event indicator (0=censored 1=failure)

x a numeric vector of covariate

Tokyo	<i>Binomial time series</i>
-------	-----------------------------

Description

Recorded days of rain above 1 mm in Tokyo for 2 years, 1983:84

Format

A data frame with 366 observations on the following 3 variables.

y number of days with rain

n total number of days

time day of the year

Source

<http://www.math.ntnu.no/~hrue/GMRF-book/tokyo.rainfall.data.dat>

References

Rue, H and Held, L. (2005) *Gaussian Markov Random Fields - Theory and Applications* Chapman and Hall

Examples

```
data(Tokyo)
```

Zambia	<i>Semiparametric regression</i>
--------	----------------------------------

Description

Undernutrition of children in each region of Zambia is measured through a score computed on the basis of some anthropometric measures. The data set contains also other information about each child.

Format

A data frame with 4847 observations on the following 10 variables.

hazstd standardised Z score of stunting

bmi body mass index of the mother

age age of the child in months

district district where the child lives

rcw mother employment status with categories "working" (1) and "not working" (-1)

edu1 mother's education status with categories "complete primary but incomplete secondary" (edu1=1), "complete secondary or higher" (edu2=1) and "no education or incomplete primary" (edu1=edu2=-1)

edu2 see above

tpr locality of the domicile with categories "urban" (1) and "rural" (-1)

sex gender of the child with categories "male" (1) and "female" (-1)

edu DO NOT KNOW; check source

Source

BayesX Manual <http://www.stat.uni-muenchen.de/~bayesx/bayesx.html>

Examples

```
data(Zambia)
```

Index

* Survival

inla.surv, 398

* control

control.bgev, 11
control.compute, 12
control.expert, 13
control.family, 14
control.fixed, 16
control.gcpo, 17
control.group, 19
control.hazard, 20
control.inla, 21
control.lincomb, 25
control.link, 26
control.lp.scale, 27
control.mix, 27
control.mode, 28
control.pardiso, 29
control.pom, 30
control.predictor, 31
control.scopy, 32
control.update, 33
control.vb, 34

* datasets

BivMetaAnalysis, 9
Cancer, 10
Drivers, 39
Epil, 40
Germany, 46
Kidney, 404
Leuk, 407
Munich, 415
nwEngland, 416
Oral, 417
PRborder, 438
PRprec, 439
Salm, 457
Scotland, 459
Seeds, 459
SPDEtoy, 460
Surg, 463
SurvSim, 463
Tokyo, 464

Zambia, 464

* fmesher

inla.stack.remove.unused, 394

* graph

graph.convert, 47

* models

inla.surv, 398

* plot

plot.inla, 432

1djmarginal (joint.marginal), 401

agaussian (inla.agaussian), 55

aggregate.gaussian (inla.agaussian), 55

ar.dpacf (pc.ar), 420

ar.pacf2acf (inla.ar.pacf2phi), 56

ar.pacf2phi (inla.ar.pacf2phi), 56

ar.phi2acf (inla.ar.pacf2phi), 56

ar.phi2pacf (inla.ar.pacf2phi), 56

ar.rpacf (pc.ar), 420

as.inla.mdata (inla.mdata), 87

as.inla.mesh.segment, 8

as.inla.surv (inla.surv), 398

barrier (inla.barrier.pcmatern), 59

barrier (inla.barrier), 58

binary.install (inla.binary.install), 60

BivMetaAnalysis, 9

Cancer, 10

cbind.data.frames (inla.coxph), 63

cgeneric, 10

changelog (inla.changelog), 61

collect.results (inla.collect.results),
62

contour(), 106

control.bgev, 11, 13, 14, 16–18, 20, 21,
25–33, 35

control.compute, 11, 12, 14, 16–18, 20, 21,
25–33, 35

control.compute(), 75

control.expert, 11, 13, 13, 16–18, 20, 21,
25–33, 35

control.family, 11, 13, 14, 14, 17, 18, 20,
21, 25–33, 35

- `control.fixed`, [11](#), [13](#), [14](#), [16](#), [16](#), [18](#), [20](#), [21](#), [25–33](#), [35](#)
- `control.gcpo`, [11](#), [13](#), [14](#), [16](#), [17](#), [17](#), [20](#), [21](#), [25–33](#), [35](#)
- `control.group`, [11](#), [13](#), [14](#), [16–18](#), [19](#), [21](#), [25–33](#), [35](#)
- `control.hazard`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [20](#), [25–33](#), [35](#)
- `control.inla`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [21](#), [26–35](#)
- `control.lincomb`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25](#), [25](#), [27–33](#), [35](#)
- `control.link`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25](#), [26](#), [26](#), [27–33](#), [35](#)
- `control.lp.scale`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–27](#), [27](#), [28–33](#), [35](#)
- `control.mix`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–27](#), [27](#), [29–33](#), [35](#)
- `control.mode`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–28](#), [28](#), [30–33](#), [35](#)
- `control.pardiso`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–29](#), [29](#), [31–33](#), [35](#)
- `control.pom`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–30](#), [30](#), [32](#), [33](#), [35](#)
- `control.predictor`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–31](#), [31](#), [33](#), [35](#)
- `control.scopy`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–32](#), [32](#), [33](#), [35](#)
- `control.update`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–33](#), [33](#), [35](#)
- `control.vb`, [11](#), [13](#), [14](#), [16–18](#), [20](#), [21](#), [25–33](#), [34](#)
- `control.vb()`, [25](#)
- `cormat.dim2p` (`pc.cormat`), [423](#)
- `cormat.dtheta` (`pc.cormat`), [423](#)
- `cormat.p2dim` (`pc.cormat`), [423](#)
- `cormat.permute` (`pc.cormat`), [423](#)
- `cormat.R2r` (`pc.cormat`), [423](#)
- `cormat.r2R` (`pc.cormat`), [423](#)
- `cormat.R2theta` (`pc.cormat`), [423](#)
- `cormat.r2theta` (`pc.cormat`), [423](#)
- `cormat.rtheta` (`pc.cormat`), [423](#)
- `cormat.theta2R` (`pc.cormat`), [423](#)
- `cormat.theta2r` (`pc.cormat`), [423](#)
- `coxph` (`inla.coxph`), [63](#)
- `cpo.inla` (`inla.cpo`), [64](#)
- `crs_wkt`, [35](#)
- `crs_wkt()`, [66](#)
- `cut`, [37](#)
- `debug.graph`, [38](#)
- `dev.new()`, [68](#)
- `dmarginal` (`marginal`), [411](#)
- `Drivers`, [39](#)
- `dryrun`, [39](#)
- `emarginal` (`marginal`), [411](#)
- `Epil`, [40](#)
- `extract.groups`, [40](#)
- `f`, [41](#)
- `f()`, [51](#), [54](#), [74](#), [80](#)
- `fgn`, [45](#)
- `fmesher::fm_as_segm()`, [8](#), [9](#)
- `fmesher::fm_bary()`, [72](#)
- `fmesher::fm_CRS()`, [65](#)
- `fmesher::fm_crs_is_geocent()`, [36](#)
- `fmesher::fm_crs_is_identical()`, [79](#)
- `fmesher::fm_ellipsoid_radius()`, [36](#)
- `fmesher::fm_fem()`, [71](#)
- `fmesher::fm_mesh_1d()`, [88](#)
- `fmesher::fm_mesh_2d_inla()`, [89](#)
- `fmesher::fm_nonconvex_hull()`, [357](#)
- `fmesher::fm_nonconvex_hull_inla()`, [357](#)
- `fmesher::fm_proj4string()`, [66](#)
- `fmesher::fm_raw_basis()`, [71](#), [72](#), [92](#)
- `fmesher::fm_rcdt_2d_inla()`, [96](#)
- `fmesher::fm_segm()`, [105](#)
- `fmesher::fm_split_lines()`, [72](#)
- `fmesher::fm_transform()`, [391](#), [392](#)
- `fmesher::fm_wkt()`, [35](#), [66](#)
- `fmesher::fm_wkt_as_wkt_tree()`, [57](#)
- `fmesher::fm_wkt_is_geocent()`, [36](#)
- `fmesher::fm_wkt_predef()`, [66](#)
- `fmesher::fm_wkt_set_ellipsoid_radius()`, [36](#)
- `fmesher::fmesher_split_lines()`, [72](#)
- `geobugs2inla` (`graph.convert`), [47](#)
- `Germany`, [46](#)
- `get.inlaEnv` (`inla.get.inlaEnv`), [73](#)
- `graph.convert`, [47](#)
- `graph.matrix`, [47](#)
- `graph2matrix` (`graph.matrix`), [47](#)
- `hpdmarginal` (`marginal`), [411](#)
- `hyperpar.inla` (`inla.hyperpar`), [76](#)
- `hyperpar.inla()`, [45](#), [47](#)
- `hyperpar.sample` (`inla.hyperpar.sample`), [78](#)
- `hyperpar.sampler` (`inla.hyperpar.sample`), [78](#)
- `idx`, [49](#)
- `iidkd.sample` (`inla.iidkd.sample`), [79](#)
- `INLA` (`INLA-package`), [8](#)

- inla, [50](#), [55](#), [406](#)
- inla(), [11–14](#), [16](#), [17](#), [19–21](#), [25–34](#), [45](#), [47](#),
[62](#), [65](#), [77](#), [81](#), [87](#), [364](#), [365](#), [378](#),
[398](#), [399](#), [402](#), [410](#), [412](#), [433](#), [438](#),
[461](#)
- inla-class, [55](#)
- INLA-package, [8](#)
- inla.1djmarginal (joint.marginal), [401](#)
- inla.agaussian, [55](#)
- inla.ar.pacf2acf (inla.ar.pacf2phi), [56](#)
- inla.ar.pacf2phi, [56](#)
- inla.ar.phi2acf (inla.ar.pacf2phi), [56](#)
- inla.ar.phi2pacf (inla.ar.pacf2phi), [56](#)
- inla.as.CRS.list (inla.CRSargs), [66](#)
- inla.as.CRSargs.list (inla.CRSargs), [66](#)
- inla.as.dgTMatrix (inla.as.sparse), [57](#)
- inla.as.list.CRS (inla.CRSargs), [66](#)
- inla.as.list.CRSargs (inla.CRSargs), [66](#)
- inla.as.sparse, [57](#)
- inla.as.wkt.wkt_tree
 (inla.as.wkt_tree.wkt), [57](#)
- inla.as.wkt_tree.wkt, [57](#)
- inla.barrier, [58](#)
- inla.barrier (inla.barrier.pcmatern), [59](#)
- inla.barrier.pcmatern, [59](#)
- inla.binary.install, [60](#)
- inla.cgeneric.define (cgeneric), [10](#)
- inla.cgeneric.q (cgeneric), [10](#)
- inla.changelog, [61](#)
- inla.changes (inla.changelog), [61](#)
- inla.collect.results, [62](#)
- inla.contour.segment
 (inla.mesh.segment), [105](#)
- inla.coxph, [63](#)
- inla.cpo, [64](#)
- inla.CRS, [65](#)
- inla.CRS(), [67](#), [392](#), [434](#), [435](#)
- inla.crs_get_ellipsoid_radius
 (crs_wkt), [35](#)
- inla.crs_get_lengthunit (crs_wkt), [35](#)
- inla.crs_get_wkt (crs_wkt), [35](#)
- inla.crs_is_geocent (crs_wkt), [35](#)
- inla.crs_set_ellipsoid_radius
 (crs_wkt), [35](#)
- inla.crs_set_lengthunit (crs_wkt), [35](#)
- inla.CRSargs, [66](#)
- inla.cut (cut), [37](#)
- inla.debug.graph (debug.graph), [38](#)
- inla.delaunay (inla.mesh.create), [96](#)
- inla.delaunay(), [90](#)
- inla.dev.new, [68](#)
- inla.diameter, [68](#)
- inla.dmarginal (marginal), [411](#)
- inla.doc, [69](#)
- inla.doc(), [42](#), [51](#), [85](#)
- inla.dryrun (dryrun), [39](#)
- inla.emarginal (marginal), [411](#)
- inla.external.lib, [70](#)
- inla.extract.el, [70](#)
- inla.fallback_PROJ6 (inla.has_PROJ6), [75](#)
- inla.fgn (fgn), [45](#)
- inla.fmesher.smorg, [71](#)
- inla.generate.colors, [72](#)
- inla.geobugs2inla (graph.convert), [47](#)
- inla.get.inlaEnv, [73](#)
- inla.getOption (inla.option), [358](#)
- inla.graph (read.graph), [453](#)
- inla.graph2matrix (graph.matrix), [47](#)
- inla.group, [73](#)
- inla.group.cv, [74](#)
- inla.has_PROJ6, [75](#)
- inla.hpdmarginal (marginal), [411](#)
- inla.hyperpar, [76](#)
- inla.hyperpar(), [412](#)
- inla.hyperpar.sample, [78](#)
- inla.hyperpar.sampler
 (inla.hyperpar.sample), [78](#)
- inla.identical.CRS, [79](#)
- inla.identical.CRS(), [66](#)
- inla.idx (idx), [49](#)
- inla.iidkd.sample, [79](#)
- inla.inla.doc (inla.doc), [69](#)
- inla.is.marginal (marginal), [411](#)
- inla.joint.marginal (joint.marginal),
 [401](#)
- inla.jp.define (jp), [403](#)
- inla.knmodels, [80](#)
- inla.knmodels(), [83](#)
- inla.knmodels.sample, [82](#)
- inla.knmodels.sample(), [81](#)
- inla.ks.plot, [83](#)
- inla.lattice2node (lattice2node), [405](#)
- inla.likelihood, [84](#)
- inla.link (link), [408](#)
- inla.list.models, [85](#)
- inla.list.models(), [41](#)
- inla.make.lincomb (make.lincomb), [410](#)
- inla.make.lincombs (make.lincomb), [410](#)
- inla.marginal (marginal), [411](#)
- inla.matern.cov, [86](#)
- inla.matrix2graph (graph.matrix), [47](#)
- inla.matrix2vector (lattice2node), [405](#)
- inla.mdata, [87](#)
- inla.merge (merge.inla), [413](#)

- `inla.mesh(inla.mesh.create)`, 96
- `inla.mesh()`, 92, 93, 98–100, 102, 103, 105, 360, 371, 372, 380, 384, 386, 388, 417, 435, 436
- `inla.mesh.1d`, 88
- `inla.mesh.1d()`, 89, 92, 98, 99, 103, 371, 372, 384, 385, 388, 389
- `inla.mesh.1d.A(inla.mesh.1d.bary)`, 89
- `inla.mesh.1d.bary`, 89
- `inla.mesh.1d.fem()`, 99
- `inla.mesh.2d`, 89
- `inla.mesh.2d()`, 92, 94, 96, 98, 106, 381, 385, 389, 415, 462
- `inla.mesh.assessment`, 91
- `inla.mesh.basis`, 92
- `inla.mesh.basis()`, 381, 385, 389
- `inla.mesh.boundary`, 93
- `inla.mesh.components`, 94, 95
- `inla.mesh.create`, 96
- `inla.mesh.create()`, 90, 93, 94, 104–106, 385, 389, 415, 462
- `inla.mesh.create.helper()`, 93
- `inla.mesh.deriv`, 98
- `inla.mesh.fem`, 99
- `inla.mesh.interior`
 - `(inla.mesh.boundary)`, 93
- `inla.mesh.lattice`, 99
- `inla.mesh.lattice()`, 97, 98, 103, 104
- `inla.mesh.map(inla.mesh.map.lim)`, 101
- `inla.mesh.map.lim`, 101
- `inla.mesh.project`, 102
- `inla.mesh.project()`, 102
- `inla.mesh.projector`
 - `(inla.mesh.project)`, 102
- `inla.mesh.query`, 104
- `inla.mesh.query()`, 98
- `inla.mesh.segment`, 105
- `inla.mesh.segment()`, 9, 41, 90, 93, 97, 98, 104, 358, 407, 408
- `inla.mmarginal(marginal)`, 411
- `inla.models`, 107
- `inla.nmix.fitted`
 - `(inla.nmix.lambda.fitted)`, 355
- `inla.nmix.lambda.fitted`, 355
- `inla.node2lattice(lattice2node)`, 405
- `inla.nonconvex.hull`, 357
- `inla.nonconvex.hull()`, 90
- `inla.not_for_PROJ4(inla.has_PROJ6)`, 75
- `inla.not_for_PROJ6(inla.has_PROJ6)`, 75
- `inla.option`, 358
- `inla.options(inla.option)`, 358
- `inla.over_sp_mesh`, 360
- `inla.pardiso(pardiso)`, 418
- `inla.pc.alphaw(pc.alphaw)`, 418
- `inla.pc.ar(pc.ar)`, 420
- `inla.pc.cor0(pc.cor0)`, 420
- `inla.pc.cor1(pc.cor1)`, 421
- `inla.pc.cormat(pc.cormat)`, 423
- `inla.pc.dalphaw(pc.alphaw)`, 418
- `inla.pc.dcor0(pc.cor0)`, 420
- `inla.pc.dcor1(pc.cor1)`, 421
- `inla.pc.ddof(pc.ddof)`, 424
- `inla.pc.dgamma(pc.gamma)`, 425
- `inla.pc.dgammacount(pc.gammacount)`, 426
- `inla.pc.dgevtail(pc.gevtail)`, 427
- `inla.pc.dof(pc.ddof)`, 424
- `inla.pc.dprec(pc.prec)`, 429
- `inla.pc.dsn(pc.sn)`, 431
- `inla.pc.gamma(pc.gamma)`, 425
- `inla.pc.gammacount(pc.gammacount)`, 426
- `inla.pc.gevtail(pc.gevtail)`, 427
- `inla.pc.multvar(pc.multvar)`, 428
- `inla.pc.palphaw(pc.alphaw)`, 418
- `inla.pc.pcor0(pc.cor0)`, 420
- `inla.pc.pcor1(pc.cor1)`, 421
- `inla.pc.pgamma(pc.gamma)`, 425
- `inla.pc.pgammacount(pc.gammacount)`, 426
- `inla.pc.pgevtail(pc.gevtail)`, 427
- `inla.pc.pprec(pc.prec)`, 429
- `inla.pc.prec(pc.prec)`, 429
- `inla.pc.psn(pc.sn)`, 431
- `inla.pc.qalphaw(pc.alphaw)`, 418
- `inla.pc.qcor0(pc.cor0)`, 420
- `inla.pc.qcor1(pc.cor1)`, 421
- `inla.pc.qgamma(pc.gamma)`, 425
- `inla.pc.qgammacount(pc.gammacount)`, 426
- `inla.pc.qgevtail(pc.gevtail)`, 427
- `inla.pc.qprec(pc.prec)`, 429
- `inla.pc.qsn(pc.sn)`, 431
- `inla.pc.ralphaw(pc.alphaw)`, 418
- `inla.pc.rcor0(pc.cor0)`, 420
- `inla.pc.rcor1(pc.cor1)`, 421
- `inla.pc.rgamma(pc.gamma)`, 425
- `inla.pc.rgammacount(pc.gammacount)`, 426
- `inla.pc.rgevtail(pc.gevtail)`, 427
- `inla.pc.rprec(pc.prec)`, 429
- `inla.pc.rsn(pc.sn)`, 431
- `inla.pc.sn(pc.sn)`, 431
- `inla.pc.t(pc.ddof)`, 424
- `inla.plot(plot.inla)`, 432
- `inla.pmarginal(marginal)`, 411
- `inla.posterior.sample(inla.sample)`, 366
- `inla.priors.used`, 361
- `inla.prune`, 362

- `inla.q (inla.qstat)`, 363
- `inla.qdel (inla.qstat)`, 363
- `inla.qget (inla.qstat)`, 363
- `inla.qinv (qinv)`, 448
- `inla.qlog (inla.qstat)`, 363
- `inla.qmarginal (marginal)`, 411
- `inla.qnuke (inla.qstat)`, 363
- `inla.qreordering (qreordering)`, 449
- `inla.qreordering()`, 48
- `inla.qsample (qsample)`, 450
- `inla.qsample()`, 379, 380
- `inla.qsolve (qsolve)`, 452
- `inla.qstat`, 363
- `inla.rbind.data.frames (inla.coxph)`, 63
- `inla.read.graph (read.graph)`, 453
- `inla.read.graph()`, 48
- `inla.remote (inla.ssh.copy.id)`, 393
- `inla.reorderings`, 364
- `inla.requires_PROJ6 (inla.has_PROJ6)`, 75
- `inla.rerun`, 365
- `inla.rgeneric.ar1.model`
(`rgeneric.define`), 456
- `inla.rgeneric.define (rgeneric.define)`, 456
- `inla.rgeneric.iid.model`
(`rgeneric.define`), 456
- `inla.rgeneric.q (rgeneric.define)`, 456
- `inla.rgeneric.wrapper`
(`rgeneric.define`), 456
- `inla.rjmarginal (joint.marginal)`, 401
- `inla.rmarginal (marginal)`, 411
- `inla.row.kron`, 365
- `inla.sample`, 366
- `inla.scale.model (scale.model)`, 458
- `inla.set.control.bgev.default`
(`control.bgev`), 11
- `inla.set.control.compute.default`
(`control.compute`), 12
- `inla.set.control.expert.default`
(`control.expert`), 13
- `inla.set.control.family.default`
(`control.family`), 14
- `inla.set.control.fixed.default`
(`control.fixed`), 16
- `inla.set.control.gcpo.default`
(`control.gcpo`), 17
- `inla.set.control.group.default`
(`control.group`), 19
- `inla.set.control.hazard.default`
(`control.hazard`), 20
- `inla.set.control.inla.default`
(`control.inla`), 21
- `inla.set.control.lincomb.default`
(`control.lincomb`), 25
- `inla.set.control.link.default`
(`control.link`), 26
- `inla.set.control.lp.scale.default`
(`control.lp.scale`), 27
- `inla.set.control.mix.default`
(`control.mix`), 27
- `inla.set.control.mode.default`
(`control.mode`), 28
- `inla.set.control.pardiso.default`
(`control.pardiso`), 29
- `inla.set.control.pom.default`
(`control.pom`), 30
- `inla.set.control.predictor.default`
(`control.predictor`), 31
- `inla.set.control.scopy.default`
(`control.scopy`), 32
- `inla.set.control.update.default`
(`control.update`), 33
- `inla.set.control.vb.default`
(`control.vb`), 34
- `inla.setOption (inla.option)`, 358
- `inla.simplify.curve`, 370
- `inla.simplify.curve()`, 106, 357
- `inla.smarginal (marginal)`, 411
- `inla.sp2segment (as.inla.mesh.segment)`, 8
- `inla.sp_get_crs`, 392
- `inla.sp_get_crs()`, 36, 66
- `inla.spde.make.A`, 371
- `inla.spde.make.A()`, 365, 366, 373, 374, 396
- `inla.spde.make.block.A`, 373
- `inla.spde.make.block.A()`, 372
- `inla.spde.make.index`, 374
- `inla.spde.make.index()`, 372, 396
- `inla.spde.models`, 375
- `inla.spde.models()`, 377, 379
- `inla.spde.precision`, 376
- `inla.spde.precision()`, 379, 380
- `inla.spde.result`, 377
- `inla.spde.sample`, 379
- `inla.spde1 (inla.spde1.create)`, 380
- `inla.spde1()`, 375
- `inla.spde1.create`, 380
- `inla.spde1.models (inla.spde.models)`, 375
- `inla.spde1.precision`
(`inla.spde.precision`), 376
- `inla.spde1.result (inla.spde.result)`, 377

- `inla.spde2 (inla.spde2.generic)`, 382
- `inla.spde2()`, 375, 381, 383
- `inla.spde2.generic`, 382
- `inla.spde2.generic()`, 377, 385, 389
- `inla.spde2.matern`, 383
- `inla.spde2.matern()`, 372, 378, 379, 381, 383, 387, 389, 418
- `inla.spde2.matern.sd.basis`, 386
- `inla.spde2.models (inla.spde.models)`, 375
- `inla.spde2.models()`, 383
- `inla.spde2.pcmatern`, 387
- `inla.spde2.pcmatern()`, 385
- `inla.spde2.precision`
 - `(inla.spde.precision)`, 376
- `inla.spde2.result (inla.spde.result)`, 377
- `inla.spde2.result()`, 374
- `inla.spde2.theta2phi0`
 - `(inla.spde2.matern)`, 383
- `inla.spde2.theta2phi0()`, 377
- `inla.spde2.theta2phi1`
 - `(inla.spde2.matern)`, 383
- `inla.spde2.theta2phi1()`, 377
- `inla.spde2.theta2phi2`
 - `(inla.spde2.matern)`, 383
- `inla.spde2.theta2phi2()`, 377
- `inla.spTransform`, 391
- `inla.spy (graph.matrix)`, 47
- `inla.spy()`, 455
- `inla.ssh.copy.id`, 393
- `inla.stack (inla.stack.remove.unused)`, 394
- `inla.stack.remove.unused`, 394
- `inla.summary.scopy (summary.scopy)`, 462
- `inla.surv`, 398
- `inla.surv()`, 47
- `inla.tjmarginal (joint.marginal)`, 401
- `inla.tlmarginal (marginal)`, 411
- `inla.update`, 400
- `inla.upgrade (inla.update)`, 400
- `inla.vector2matrix (lattice2node)`, 405
- `inla.version`, 401
- `inla.wkt_get_ellipsoid_radius`
 - `(crs_wkt)`, 35
- `inla.wkt_get_lengthunit (crs_wkt)`, 35
- `inla.wkt_is_geocent (crs_wkt)`, 35
- `inla.wkt_predef (inla.CRS)`, 65
- `inla.wkt_set_ellipsoid_radius`
 - `(crs_wkt)`, 35
- `inla.wkt_set_lengthunit (crs_wkt)`, 35
- `inla.wkt_tree_get_item`
 - `(inla.as.wkt_tree.wkt)`, 57
- `inla.wkt_tree_set_item`
 - `(inla.as.wkt_tree.wkt)`, 57
- `inla.wkt_unit_params (crs_wkt)`, 35
- `inla.write.graph (read.graph)`, 453
- `inla.zmarginal (marginal)`, 411
- `is.inla.mdata (inla.mdata)`, 87
- `is.inla.surv (inla.surv)`, 398
- `joint.marginal`, 401
- `jp`, 403
- Kidney, 404
- `knmodels (inla.knmodels)`, 80
- `ks.plot (inla.ks.plot)`, 83
- `ks.test()`, 83, 84
- `lattice2node`, 405
- Leuk, 407
- Leukemia (Leuk), 407
- `likelihood (inla.likelihood)`, 84
- `lines.inla.mesh.segment`, 407
- link, 408
- `list.models (inla.list.models)`, 85
- `make.lincomb`, 410
- `make.lincombs (make.lincomb)`, 410
- `marginal`, 411
- `matrix2vector (lattice2node)`, 405
- `mdata (inla.mdata)`, 87
- `merge.inla`, 413
- `meshbuilder`, 415
- `meshbuilder()`, 91
- `mmarginal (marginal)`, 411
- Munich, 415
- NewEngland (nwEngland), 416
- `nmix.lambda.fitted`
 - `(inla.nmix.lambda.fitted)`, 355
- `node2lattice (lattice2node)`, 405
- nwEngland, 416
- Oral, 417
- `pacf2acf (inla.ar.pacf2phi)`, 56
- `pacf2phi (inla.ar.pacf2phi)`, 56
- `param2.matern.orig`, 417
- pardiso, 418
- `pc.alphaw`, 418
- `pc.ar`, 420
- `pc.cor0`, 420
- `pc.cor1`, 421
- `pc.cormat`, 423
- `pc.dalphaw (pc.alphaw)`, 418

- pc.dcor0 (pc.cor0), 420
- pc.dcor1 (pc.cor1), 421
- pc.ddof, 424
- pc.dgamma (pc.gamma), 425
- pc.dgammacount (pc.gammacount), 426
- pc.dgevtail (pc.gevtail), 427
- pc.dof (pc.ddof), 424
- pc.dprec (pc.prec), 429
- pc.dsn (pc.sn), 431
- pc.gamma, 425
- pc.gammacount, 426
- pc.gevtail, 427
- pc.multvar, 428
- pc.palphaw (pc.alphaw), 418
- pc.pcor0 (pc.cor0), 420
- pc.pcor1 (pc.cor1), 421
- pc.pgamma (pc.gamma), 425
- pc.pgammacount (pc.gammacount), 426
- pc.pgevtail (pc.gevtail), 427
- pc.pprec (pc.prec), 429
- pc.prec, 429
- pc.psn (pc.sn), 431
- pc.qalphaw (pc.alphaw), 418
- pc.qcor0 (pc.cor0), 420
- pc.qcor1 (pc.cor1), 421
- pc.qgamma (pc.gamma), 425
- pc.qgammacount (pc.gammacount), 426
- pc.qgevtail (pc.gevtail), 427
- pc.qprec (pc.prec), 429
- pc.qsn (pc.sn), 431
- pc.ralphaw (pc.alphaw), 418
- pc.rcor0 (pc.cor0), 420
- pc.rcor1 (pc.cor1), 421
- pc.rgamma (pc.gamma), 425
- pc.rgammacount (pc.gammacount), 426
- pc.rgevtail (pc.gevtail), 427
- pc.rprec (pc.prec), 429
- pc.rsn (pc.sn), 431
- pc.sn, 431
- pc.t (pc.ddof), 424
- phi2acf (inla.ar.pacf2phi), 56
- phi2pacf (inla.ar.pacf2phi), 56
- plot.CRS (plot.inla.CRS), 434
- plot.CRS(), 66
- plot.inla, 432
- plot.inla.CRS, 434
- plot.inla.graph (read.graph), 453
- plot.inla.mesh, 435
- plot.inla.mesh(), 438
- plot.inla.surv (inla.surv), 398
- plot.inla.trimesh, 437
- plot.inla.trimesh(), 436
- pmarginal (marginal), 411
- posterior.sample (inla.sample), 366
- PRborder, 438
- print.inla, 438
- print.inla.graph.summary (read.graph), 453
- print.inla.jmarginal (joint.marginal), 401
- print.inla.mdata (inla.mdata), 87
- print.inla.q (inla.qstat), 363
- print.inla.surv (inla.surv), 398
- print.summary.inla (summary.inla), 461
- print.summary.inla.jmarginal (joint.marginal), 401
- print.summary.inla.mesh (summary.inla.mesh), 462
- priors.used (inla.priors.used), 361
- PRprec, 439
- prune (inla.prune), 362
- qinv, 448
- qmarginal (marginal), 411
- qreordering, 449
- qsample, 450
- qsolve, 452
- read.graph, 453
- reorderings (inla.reorderings), 364
- rerun (inla.rerun), 365
- rgeneric (rgeneric.define), 456
- rgeneric.define, 456
- rjmarginal (joint.marginal), 401
- rmarginal (marginal), 411
- Salm, 457
- scale.model, 458
- Scotland, 459
- Seeds, 459
- smarginal (marginal), 411
- sp::CRS(), 66
- sp::over(), 360
- sp::SpatialPolygons(), 360
- SPDEtoy, 460
- spy (graph.matrix), 47
- ssh.copy.id (inla.ssh.copy.id), 393
- summary.inla, 461
- summary.inla.graph (read.graph), 453
- summary.inla.jmarginal (joint.marginal), 401
- summary.inla.mesh, 462
- summary.inla.mesh(), 462
- summary.inla.q (inla.qstat), 363
- summary.scopy, 462

`summary.surv.inla (summary.inla)`, [461](#)
`Surg`, [463](#)
`SurvSim`, [463](#)

`tjmarginal (joint.marginal)`, [401](#)
`Tokyo`, [464](#)

`vector2matrix (lattice2node)`, [405](#)
`version (inla.version)`, [401](#)

`write.graph (read.graph)`, [453](#)

`Zambia`, [464](#)
`zmarginal (marginal)`, [411](#)