

Student- t

Parametrization

The Student- t likelihood is defined so that

$$\sqrt{s} \tau (y - \eta) \sim T_\nu$$

for continuous response y where

τ : is the precision parameter

s : is a fixed scaling $s > 0$

η : is the linear predictor

T_ν : is a **reparameterized standard** Student- t with $\nu > 2$ degrees of freedom with **unit variance for all values of ν . Please see the example for details!**

Link-function

Identity

Hyperparameters

This likelihood has two hyperparameters

$$\begin{aligned}\theta_1 &= \log(\tau) \\ \theta_2 &= \log(\nu - 2)\end{aligned}$$

and the prior is defined on $\theta = (\theta_1, \theta_2)$.

Specification

- family = T
- Required argument: y and s (keyword **scale**, default to 1).

Hyperparameter specification and default values

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hyper

```
theta1
  hyperid 100001
  name log precision
  short.name prec
  initial 0
  fixed FALSE
  prior loggamma
  param 1 5e-05
  to.theta function(x) log(x)
  from.theta function(x) exp(x)
theta2
```

```
hyperid 100002
name log degrees of freedom
short.name dof
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)
```

survival FALSE

discrete FALSE

link default identity

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Example

```
#simulate data
n=100
phi=0.85
mu=0.5
eta=rep(0,n)
for(i in 2:n)
  eta[i]=mu+phi*(eta[i-1]-mu)+rnorm(1)
nu=3
t=rt(n,df=nu)
y=eta+t/(sqrt(nu/(nu-2)))
data=list(y=y,z=seq(1:n))
#define the model and fit
formula=y~f(z,model="ar1")
result=inla(formula,family="T",data=data)
```

Notes

None