

Student-*t* with strata

Parametrization

This model is an extension to the Student-*t*, where different strata have their own precisions but the degrees-of-freedom parameter is common.

The Student-*t* likelihood is defined so that

$$\sqrt{w \tau_s}(y - \eta) \sim T_\nu$$

for continuous response y where

τ_s : is the precision parameter, depending on the stratum s

w : is a fixed weight $w > 0$

η : is the linear predictor

T_ν : is a standardized Student-*t* with ν degrees of freedom such that its variance is 1 for any value of ν , common for all strata.

Link-function

Identity

Hyperparameters

This likelihood $N_s + 1$ hyperparameters

$$\begin{aligned}\theta_1 &= \log(\nu - 2) \\ \theta_2 &= \log(\tau_1) \\ \theta_3 &= \log(\tau_2) \\ &\text{etc....} \\ \theta_{N_s+1} &= \log(\tau_{N_s})\end{aligned}$$

where N_s is the number of strata defined. The current implementation limits N_s to 10, but this is easy to fix if needed. The prior is defined on $\theta = (\theta_1, \theta_2, \dots)$.

Specification

- family = `tstrata`
- Required argument: y and w (keyword `weights`, default to 1), and `inla()`-argument “`strata`” which is either a integer vector with elements $1, 2, \dots, N_s$, or factor for which the levels defines the strata.

Hyperparameter specification and default values

doc A stratified version of the Student-t likelihood

hyper

theta1

hyperid 101001

name log degrees of freedom
short.name dof
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)

theta2

hyperid 101002
name log precision1
short.name prec1
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta3

hyperid 101003
name log precision2
short.name prec2
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta4

hyperid 101004
name log precision3
short.name prec3
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta5

hyperid 101005
name log precision4
short.name prec4
initial 2
fixed FALSE

prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta6

hyperid 101006
name log precision5
short.name prec5
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta7

hyperid 101007
name log precision6
short.name prec6
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta8

hyperid 101008
name log precision7
short.name prec7
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta9

hyperid 101009
name log precision8
short.name prec8
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta10

hyperid 101010
name log precision9
short.name prec9
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

theta11

hyperid 101011
name log precision10
short.name prec10
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta function(x) log(x)
from.theta function(x) exp(x)

survival FALSE

discrete FALSE

link default identity

pdf tstrata

Example

Notes

None