Student-t with strata

Parametrization

This model is an extention 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 variace is 1 for any value of ν, common for all strata.

Link-function

Identity

Hyperparameters

This likelihood $N_s + 1$ hyperparameters

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

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 $\theta = (\theta_1, \theta_2, \ldots)$.

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 $1, 2, \ldots, N_s$, or factor for which the levels defines the strata.

Hyperparameter spesification and default values

hyper

> **theta1**
>
> > **name** log degrees of freedom
> > **short.name** dof

initial 4

fixed FALSE

prior loggamma

param 1 0.01

to.theta function(x) log(x-5)

from.theta function(x) 5+exp(x)

theta2

    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

    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

    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

    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

    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

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

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

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

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

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