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

doc A stratified version of the Student-t likelihood

hyper

    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)

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)

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)

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)

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)

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)

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)

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)`

    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)`

    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)`

    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)`

survival `FALSE`

discrete `FALSE`

link `default identity`

pdf `tstrata`

Example

Notes

None