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 to 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 spesification and default values

doc `Student-t likelihood`

hyper

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)`

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)`

survival `FALSE`

discrete `FALSE`

link `default identity`

pdf `student-t`

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