Student-t

Parametrization

The Student-t likelihood is defined so that

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

for continuous response y where

au: 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

$$\theta_1 = \log(\tau)$$

$$\theta_2 = \log(\nu - 2)$$

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