Gaussian

Parametrisation

The Gaussian distribution is

$$f(y) = \frac{\sqrt{w\tau}}{\sqrt{2\pi}} \exp\left(-\frac{1}{2} w\tau \left(y - \mu\right)^2\right)$$

for continuously responses y where

μ: is the the mean

τ: is the precision

w: is a fixed weight, $w > 0$.

Link-function

The mean and variance of y are given as

$$\mu \quad \text{and} \qquad \sigma^2 = \frac{1}{w\tau}$$

and the mean is linked to the linear predictor by

$$\mu = \eta$$

Hyperparameters

The precision is represented as

$$\theta = \log \tau$$

and the prior is defined on θ.

Specification

- family = `gaussian`
- Required arguments: y and w (keyword `weights`)

The weights has default value 1.

Hyperparameter spesification and default values

hyper

theta

name log precision
short.name prec
initial 4
fixed FALSE
prior loggamma
param 1 5e-05
to.theta `function(x) log(x)`
from.theta `function(x) exp(x)`

survival FALSE

discrete FALSE

Example

In the following example we estimate the parameters in a simulated example with Gaussian responses, giving τ a Gamma-prior with parameters $(1, 0.01)$ and initial value (for the optimisations) of $\exp(2.0)$.

```
n=100
a = 1
b = 1
z = rnorm(n)
eta = a + b*z
tau = 100
scale = exp(rnorm(n))
prec = scale*tau
y = rnorm(n, mean = eta, sd = 1/sqrt(prec))

data = list(y=y, z=z)
formula = y ~ 1+z
result = inla(formula, family = "gaussian", data = data,
        control.data = list(hyper = list(
                                    prec = list(
                                            prior = "loggamma",
                                            param = c(1.0,0.01),
                                            initial = 2))),
              scale=scale, keep=TRUE)
summary(result)
```

Notes

None.