Gaussian

Parametrisation

The Gaussian distribution is

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

for continuously responses y where

μ: is the the mean

τ: is the precision

s: is a fixed scaling, $s > 0$.

Link-function

The mean and variance of y are given as

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

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 s (keyword `scale`)

The scalings have 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
        from.theta

survival   FALSE

discrete   FALSE

link   default identity

pdf   gaussian

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.