GaussianJW

Parametrisation

The GaussianJW likelihood is a two-part likelihood for $\{(y,v)_i\}$. First a Gaussian observation y

$$y|\ldots \sim \mathcal{N}(p, V(p, n))$$

with mean (probability) p and a variance function

$$V(p, n) = \exp(\beta_1 + \beta_2 \log(p(1-p)) + \beta_3 \log(n))$$

and then an (conditional independent) observed variance v, where

$$\nu \frac{v}{V(p,n)} | \dots \sim \chi_{\nu}^2.$$

The case $\beta_1 = 0, \beta_2 = 1, \beta_3 = -1$ resembles the case where a Binomial is approximated with a Normal. (n, ν) is considered as fixed.

Link-function

The probability p is linked to the linear predictor η with a (default) logit link

$$p = \frac{1}{1 + \exp(-\eta)}$$

but other links are also possible.

Hyperparameters

The hyperparameters are

$$\theta_1 = \beta_1$$

$$\theta_2 = \beta_2$$

$$\theta_3 = \beta_3$$

and the prior is defined on $(\theta_1, \theta_2, \theta_3)$.

Specification

- family="gaussianjw"
- Required arguments: y, n and ν (all vectors of the same length) as an inla.mdata()-object with this spesific ordering, see the example.

Hyperparameter spesification and default values

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hyper

theta1

hyperid 65101
name beta1
short.name beta1
output.name beta1 for GaussianJW observations

```
output.name.intern beta1 for GaussianJW observations
         initial 0
         fixed FALSE
         prior normal
         param 0 100
         to.theta function(x) x
         from.theta function(x) x
     theta2
         hyperid 65102
         name beta2
         short.name beta2
         output.name beta2 for GaussianJW observations
         output.name.intern beta2 for GaussianJW observations
         initial 1
         fixed FALSE
         prior normal
         param 1 100
         to.theta function(x) x
         from.theta function(x) x
     theta3
         hyperid 65103
         name beta3
         short.name beta3
         output.name beta3 for GaussianJW observations
         output.name.intern beta3 for GaussianJW observations
         initial -1
         fixed FALSE
         prior normal
         param -1 100
         to.theta function(x) x
         from.theta function(x) x
survival FALSE
discrete FALSE
link default logit probit
\mathbf{pdf} gaussianjw
Example
n <- 300
x \leftarrow rnorm(n, sd = 0.5)
eta <- 1 + x
p <- 1/(1 + exp(-eta))
df <- sample(10:100, n, replace = TRUE)</pre>
size <- df
```