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

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

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

$$\nu \frac{v}{V(p, n)}|\ldots \sim \chi^2_\nu.$$

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

doc The GaussianJW likelihoood

hyper

theta1

hyperid 65101
name beta1
short.name beta1
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
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
initial -1
fixed FALSE
prior normal
param -1 100
to.theta `function(x) x`
from.theta `function(x) x`

status experimental

survival FALSE

discrete FALSE

link default logit probit

pdf gaussianjw

Example

```
n <- 300
x <- rnorm(n, sd = 0.5)
eta <- 1 + x
p <- 1/(1 + exp(-eta))
df <- sample(10:100, n, replace = TRUE)
size <- df
va <- p * (1.0 - p) / size
v <- rchisq(n, df = df) * va / df
phat <- rnorm(n, mean = p, sd = sqrt(v))
Y <- inla.mdata(phat, v, size, df)
```

```
r <- inla( Y ~ 1 + x,
           data = list(Y = Y, x = x),
           family = "gaussianjw",
           ## this might be needed
           control.inla = list(cmin = 0))
summary(r)
```