

## Linkmodel: robit

### Parametrization

This is the link that map  $p \in (0, 1)$  into  $x \in \Re$ , where

$$F_{\nu}(x) = p$$

and  $F_{\nu}$  is the cummulative distribution function for Student-t with  $\nu$  degrees of freedom, normalized to have unit variance and  $\nu > 2$ .

### Hyperparameters

The parameter  $\nu$  represented as

$$\nu = 2 + \exp(\theta)$$

and the prior is defined on  $\theta$ .  $\nu$  is default fixed and set to 7 (to estimate  $\nu$  is somewhat challenging).

### Specification

Use `model="robit"` within `control.link`.

### Hyperparameter spesification and default values

`doc` Robit link

`hyper`

`theta`

```
hyperid 49021
name log degrees of freedom
short.name dof
initial 1.6094379124341
fixed TRUE
prior pc.dof
param 50 0.5
to.theta function(x) log(x - 2)
from.theta function(x) 2 + exp(x)
```

`pdf` robit

### Example

```
n = 300
Nt = 2
x = rnorm(n, sd = 0.3)
eta = 1 + x
df = 7
y = rbinom(n, size=Nt, prob = inla.link.invrobit(eta, df = df))

r = inla(y ~ 1 + x,
         family = "binomial",
         Ntrials = Nt,
         data = data.frame(y, x, Nt),
```

```
control.family = list(
  control.link = list(
    model = "robit",
    hyper = list(dof = list(
      initial = log(df - 2),
      fixed = FALSE))))
summary(r)
```

## Notes

- The link-function is also available as R-functions `inla.link.robit` and `inla.link.invrobit`
- This link-model is experimental for the moment.