

## Linkmodel: logoffset

### Parametrization

This model is an extension of the “log”-link, to include an additional scaled offset, so that

$$y_i \sim \text{Poisson}(\beta x_i + \exp(\eta_i))$$

where  $\beta \geq 0$  is an optional hyperparameter (default fixed to be 1),  $x_i$  is a (required) non-negative covariate.

### Hyperparameters

The parameter  $\beta$  represented as

$$\theta = \log \beta$$

and the prior is defined on  $\theta$ .

### Specification

Use `model="logoffset"` within `control.link`. The `variant=0` in `control.link` gives the link function above, while `variant=1` gives  $\beta x_i - \exp(\eta_i)$  (for other likelihoods).

### Hyperparameter specification and default values

**hyper**

**theta**

```
name beta
short.name b
prior normal
param 0 100
initial 0
fixed TRUE
to.theta function(x) log(x)
from.theta function(x) exp(x)
```

**pdf** logoffset

### Example

```
n = 1000
off = rpois(n, lambda = 1)
x = rnorm(n)
lambda = off + exp(1 + x)
y = rpois(n, lambda = lambda)

r = inla(y ~ 1 + x, data = data.frame(y, x, link.cov = off),
        family = "poisson",
        control.family = list(
          control.link = list(
            model = "logoffset",
            hyper = list(
```

```
        beta = list(
            initial = 0,
            ##fixed = TRUE
            fixed = FALSE
        )))
link.covariates = link.cov)
```

## Notes