

## 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

**doc** Log-link with an offset

**hyper**

```
theta
  hyperid 49001
  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