qPoisson

Parametrisation

The Poisson distribution is

$$\text{Prob}(y) = \frac{\lambda^y}{y!}\exp(-\lambda)$$

for responses $y = 0, 1, 2, \ldots$, where

λ**:** the expected value.

Link-function

The mean and variance of y are given as

$$\mu = \lambda \qquad \text{and} \qquad \sigma^2 = \lambda$$

and the mean is linked to the linear predictor by

$$\lambda(\eta) = Eq_\alpha$$

where $E > 0$ is a known constant (or $\log(E)$ is an offset), and q_α is the α quantile of the continous Poisson distribution.

Hyperparameters

None.

Specification

- family = `qpoisson`
- Required arguments: y, E and α (given as `control.family = list(quantile =` α`)`.

Hyperparameter spesification and default values

doc The quantile Poisson likelihood

hyper

survival FALSE

discrete TRUE

link default log

status experimental

pdf qpoisson

Example

In the following example we estimate the parameters in a simulated example with Poisson responses.

```
n = 300
intercept = 2
x = rnorm(n, sd = 0.2)
beta = 1
eta = intercept + beta * x
alpha = 0.9
y = numeric(n)
E = runif(n, min=1, max=10)
for(i in 1:n) {
    lambda = E[i] * INLA:::inla.qcontpois(exp(eta[i]), alpha = alpha)
    y[i] = rpois(1, lambda)
}

r = inla(y ~ 1 + x,
         data = data.frame(y, x, E),
         family = "qpoisson",
         control.family = list(quantile = alpha),
         E =E)
summary(r)
```

Notes