CBinomial

Parametrisation

The clustered/clumped-Binomial distribution arrives from a transformation of Binomial observations. Let z be Binomial distributed

$$Prob(z) = \binom{n}{z} p^n (1-p)^{n-z}$$

for z = 0, 1, 2, ..., n, where

n: number of trials.

p: probability of success in each trial.

Then binary CB inomial distribution is the distribution for y, where

$$y = \begin{cases} 0 & z = 0 \\ 1 & z > 0 \end{cases}$$

It then follows that $\operatorname{Prob}(y=0)=(1-p)^n$ and $\operatorname{Prob}(y=1)=1-(1-p)^n$, i.e. y is Binomial distributed with size 1 and probability for success $1-(1-p)^n$. In general we have k independent experiments, y_1,\ldots,y_k , and let $w=y_1+\cdots+y_k$. Then w is $\operatorname{CBinomial}(k,n,p)$ distributed, i.e. w is $\operatorname{Binomial}(k,1-(1-p)^n)$.

Link-function

The probability p is by default linked to the linear predictor by

$$p(\eta) = \frac{\exp(\eta)}{1 + \exp(\eta)}$$

but other choices are also available.

Hyperparameters

None.

Hyperparameter spesification and default values

doc The clustered Binomial likelihood

hyper

survival FALSE

discrete TRUE

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Specification

- family="cbinomial"
- Required arguments: the response w and the parameters k and n (keyword Ntrials, where the argument is a two-column matrix: Ntrials = cbind(k,n))

Example

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

Notes

None.