Circular Normal (von Mises distribution)

Parametrisation

The circular/wrapped Normal or von Mises distribution, has density

$$f(y) = \frac{1}{2\pi I_0(\kappa s)} \exp(\kappa s \cos(y - \mu)),$$

for continuously responses y where $0 \leq y < 2\pi$ and $0 \leq \mu < 2\pi$. Here,

μ is a measure of location, and

κ is a measure of the precision, and

s is a fixed scaling (default 1), $s > 0$.

Link-function

The "mean" of y is given as μ and the mean is linked to the linear predictor as

$$\mu = 2 \arctan(\eta) + \pi$$

(Link function "`tan`")

Hyperparameters

The "precision" κ is represented as

$$\theta = \log \kappa$$

and the prior is defined on θ.

Specification

- family = `circularnormal`
- Required arguments: y and s (keyword `scale`).

The scaling have default value 1.

Hyperparameter spesification and default values

hyper

theta

name log precision parameter
short.name prec
initial 4
fixed FALSE
prior loggamma
param 1 0.005
to.theta
from.theta

survival FALSE

discrete FALSE

link default tan

pdf circular-normal

Example

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

Notes

None.