The Gamma-distribution

Parametrisation

The Gamma-distribution has the following density

$$\pi(y) = \frac{b^a}{\Gamma(a)} y^{a-1} \exp(-by)$$

where $\mathrm{E}(y) = \mu = a/b$ and $\mathrm{Var}(y) = 1/\tau = a/b^2$, where τ is the precision and μ is the mean. We will use the following parameterisation for the precision

$$\tau = s\phi/\mu^2$$

where ϕ is the precision parameter (or $1/\phi$ is the dispersion parameter) and s is a fixed scaling, which gives this density

$$\pi(y) = \frac{1}{\Gamma(s\phi)} \left(\frac{s\phi}{\mu}\right)^{s\phi} y^{s\phi-1} \exp\left(-s\phi\frac{y}{\mu}\right)$$

Link-function

The linear predictor η is linked to the mean μ using a default log-link

$$\mu = \exp(\eta)$$

Hyperparameter

The hyperparameter is the precision parameter ϕ, which is represented as

$$\phi = \exp(\theta)$$

and the prior is defined on θ.

Specification

- family = `gamma`

- Required arguments: y and s (argument `scale`)

The scalings have default value 1.

Hyperparameter spesification and default values

Example

In the following example we estimate the parameters in a simulated example.

Notes

None.