LogNormal

Parametrisation

The LogNormal has density

$$f(y) = \frac{1}{y\sqrt{2\pi}}\sqrt{\tau}\exp\left(-\frac{1}{2}\tau(\log y - \mu)^2\right), \qquad y > 0$$

where

$\tau > 0$ is the precision parameter,

μ is the mean parameter.

Link-function

The parameter μ is linked to the linear predictor as:

$$\eta = \mu$$

Hyperparameters

The τ parameter is represented as

$$\theta = \log\tau$$

and the prior is defined on θ.

Specification

- family = `lognormal`
- Required arguments: y (to be given in a format by using `inla.surv()` function)

Hyperparameter spesification and default values

hyper

theta

name log precision
short.name prec
initial 2
fixed FALSE
prior loggamma
param 1 5e-05
to.theta `function(x) log(x)`
from.theta `function(x) exp(x)`

survival TRUE

discrete FALSE

link default identity

pdf lognormal

Example

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

```
n = 1000
x = runif(n)
eta = 1+x
y = exp(rnorm(n, mean = eta,  sd = 1))
event = rep(1,n)
data = list(y=y, event=event, x=x)
formula = inla.surv(y, event) ~ 1 + x
r=inla(formula, family ="lognormal", data=data, verbose=T)
```

Notes

- Lognormal model can be used for right censored, left censored, interval censored data.
- A general frame work to represent time is given by `inla.surv`
- If the observed times y are large/huge, then this can cause numerical overflow in the likelihood routines giving error messages like

  ```
  file: smtp-taucs.c  hgid: 891deb69ae0c  date: Tue Nov 09 22:34:28 2010 +0100
  Function: GMRFLib_build_sparse_matrix_TAUCS(), Line: 611, Thread: 0
  Variable evaluates to NAN/INF. This does not make sense. Abort...
  ```

  If you encounter this problem, try to scale the observatios, `time = time / max(time)` or similar, before running `inla()`.