Continous random walk model of order 2 (CRW2)

Parametrization

The continous random walk model of order 2 (CRW2) for the Gaussian vector $\mathbf{x} = (x_1, \ldots, x_n)$ is descibed in the GMRF-book chapter 3. It is an exact representation of the continous CRW2 model augmented with its derivaties. The use its the same as for RW2.

Hyperparameters

The precision parameter τ is represented as

$$\theta = \log \tau$$

and the prior is defined on θ. Note that τ is the precision for the first order increments.

Specification

The CRW2 model is specified inside the `f()` function as

```
f(<whatever>, model="crw2", values=<values>, hyper = <hyper>)
```

The (optional) argument `values` is a numeric or factor vector giving the values assumed by the covariate for which we want the effect to be estimated. See next example for an application.

Hyperparameter spesification and default values

hyper

theta

name log precision
short.name prec
prior loggamma
param 1 5e-05
initial 4
fixed FALSE
to.theta `function(x) log(x)`
from.theta `function(x) exp(x)`

constr TRUE

nrow.ncol FALSE

augmented FALSE

aug.factor 2

aug.constr 1

n.div.by

n.required FALSE

set.default.values FALSE

Example

```
n=100
z=seq(0,6,length.out=n)
y=sin(z)+rnorm(n,mean=0,sd=0.5)
data=data.frame(y=y,z=z)

formula=y~f(z,model="crw2")
result=inla(formula,data=data,family="gaussian")
```

Notes

The CRW2 model is intrinsic with rank deficiency of 2.

The model RW2 is an good (enough) approximation to CRW2 and do not augment with the derivaties.