

Continuous random walk model of order 2 (CRW2)

Parametrization

The continuous random walk model of order 2 (CRW2) for the Gaussian vector $\mathbf{x} = (x_1, \dots, x_n)$ is described in the GMRF-book chapter 3. It is an exact representation of the continuous CRW2 model augmented with its derivatives. The use is 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 specification 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

pdf crw2

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 derivatives.