Generic 0 model

Parametrization

The Type 0 generic model implements the following precision matrix

$$\mathbf{Q} = \tau \mathbf{C}$$

where $\mathbf{C}$ is the structure matrix.

Hyperparameters

The precision parameters of the generic0 model is represented as

$$\theta = \log(\tau)$$

and prior is assigned to θ

Specification

The generic0 models is specified inside the `f()` function as

```
f(<whatever>,model="generic0",Cmatrix = <Cmat>,
              prior=c(<prior.model.theta>),
              param=c(<param.prior.theta1>))
```

where `<Cmat>` can be given in two different ways:

- a dense matrix or a sparse-matrix defined be `Matrix::sparseMatrix()`.
- the name of a file giving the structure matrix. The file should have the following format

$$i \quad j \quad \mathbf{C}_{ij}$$

  where i and j are the row and column index and $\mathbf{C}_{ij}$ is the corresponding element of the precision matrix. Only the non-zero elements of the precision matrix need to be stored in the file.

See the following example for an application

Example

In the example below we define a RW1 model first using the `generic0` model and this using the `rw1` model.

```
## Simulate data
n=100
z=1:n
y=sin(z/n*2*pi)+rnorm(n,mean=0,sd=0.5)
data=data.frame(y=y,z=z)

Q = toeplitz(c(2,-1, rep(0,n-3),-1))
Q[1,1] = Q[n,n] = 1
Q[n,1] = Q[1,n] = 0

## Q as dense
```

```
formula1 = y ~ f(z, model="generic0", Cmatrix = Q,
                 rankdef=1, constr=TRUE, diagonal=1e-05)
result1 = inla(formula1, data=data, family="gaussian")

## Q as sparse
Q.sparse = as(Q, "dgTMatrix")
formula2 = y ~ f(z, model="generic0", Cmatrix = Q.sparse,
                 rankdef=1, constr=TRUE, diagonal=1e-05)
result2 = inla(formula2, data=data, family="gaussian")

## This is the same model defined using the rw1 model
formula3 = y ~ f(z,model="rw1")
result3 = inla(formula3, data=data, family="gaussian")
```

Notes

None