

Bym model for spatial effects

Parametrization

This model is simply the sum of a besag model and a iid model.

The benefite is that this allows to get the posterior marginals of the sum of the spatial and iid model; otherwise it offers no advantages.

Hyperparameters

The hyperparameters are the precision τ_1 of the iid model and the precision τ_2 of the besag model. The precision parameters are represented as

$$\theta = (\theta_1, \theta_2) = (\log \tau_1, \log \tau_2)$$

and the prior is defined on θ .

Specification

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

```
f(<whatever>, model="bym", graph.file=<graph file name>
    prior=c(<prior.model.theta1>, <prior.model.theta2>),
    param=c(<param.prior.theta1>, <param.prior.theta1>, <param.prior.theta2>, <param.prior.theta2>))
```

The neighbourhood structure of `x` is passed to the program through the `graph.file` argument. The structure of this file is described below.

Structure of the graph file

We describe the required format for the graph file using a small example. Let the file `gra.dat`, relative to a small graph of only 5 elements, be

```
5
1 1 2
2 2 1 3
3 3 2 4 5
4 1 3
5 1 3
```

Line 1 declares the total number of nodes in the graph (5), then, in lines 2-6 each node is described. For example, line 4 states that node 3 has 4 neighbours and these are nodes 2, 4 and 5.

The graph file can either have nodes indexed from 1 to n , or from 0 to $n - 1$. Note that in the latter case, node i seen from R corresponds to node $i - 1$ in the 0-indexed graph.

Example

For examples of application of this model see the Bym example in Volume I.

The model is modified accordingly is the graph has more than one connected components.

Notes

None