

## Beta prior for correlation parameters: betacorrelation

This is a prior for the correlation parameter  $\rho \in (-1, 1)$  which is internally represented as

$$\theta = \log \frac{\rho + 1}{\rho - 1}$$

### Parametrization

The prior defined on  $\theta$  so that the correlation parameter  $\rho$  has a Beta( $a, b$ ) distribution scaled to have domain in  $(-1, 1)$ :

$$\pi(\rho|a, b) = 0.5 \frac{\Gamma(a+b)}{\Gamma(a)\Gamma(b)} \rho^{a-1} (1-\rho)^{b-1}$$

### Specification

The Beta prior for the correlation is specified in the `hyper` argument as follows:

```
hyper = list(<theta> = list(prior = "betacorrelation", param=c(<a>,<b>)))
```

### Example

#### Notes

The prior is internally defined on the  $\theta$  parameter therefore initial values have to be provided in the  $\theta$ -scale. For example if the desired initial value is  $\rho = 0.5$ , which means  $\theta = \log(1/3) = -1.098$  the following specification has to be provided:

```
hyper = list(<theta> = list(prior = "betacorrelation",  
                           param=c(<a>,<b>),initial=-1.098))
```