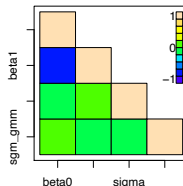## Estimation

Thanks to MCMC algorithms, one can obtain **a Monte Carlo sample from the *posterior* distribution** for a **Bayesian model**

Monte Carlo method can then be used to get *posterior* **estimates** :

- Point estimates (*posterior* mean, *posterior* median, . . .)

- Credibility interval (shortest: *Highest Density Interval – HDI* with ®️ package HDInterval)

- Correlations between parameters

- . . .

Intro
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Direct sampling
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MCMC Algorithms
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MCMC in pratice
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Inference

Deviance Information Criterion (DIC)

Deviance is: $D(\theta) = -2\log(p(\theta|\boldsymbol{y})) + C$ with C a constant

Deviance Information Criterion is then:

$$DIC = \overline{D(\theta)} + p_D$$

where $p_D = \left(D(\bar{\theta}) - \overline{D(\theta)}\right)$ represents a penalty for the effective number of parameters

$\Rightarrow$ *DIC* allows to compare different models estimated on the same data

the smaller the DIC, the better the model !

[M Plummer, Penalized loss functions for Bayesian model comparison, *Biostatistics*, 2008]

Intro
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Direct sampling
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MCMC Algorithms
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MCMC in pratice
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Inference

Your turn !

Practical: exercise 4