BMTRY 763 Tutorial 5   Open/WinBUGS

Bayesian Hierarchical Models

1) Using the doodle editor construct a DAG for the model:

$$L = \prod_{i=1}^{m} f(y_i; e_i, \theta)$$

where $f(y_i; e_i, \theta)$ is the Poisson
 distribution with expectation $e_i\theta$
$p(\theta)$ is a *gamma*(α, β) distribution.

Assume that the gamma parameters have uniform priors on a finite range

2) For the model:

$$[y_i \mid e_i, \theta_i] \sim Pois(e_i\theta_i)$$
$$\ln\theta_i = \beta_0$$
$$[\beta_0] \sim N(0, \tau_0)$$
$$\tau_0 = 3$$

Generate the WinBUGS code (up to compilation stage)
What type of model is specified here?

3) For the Falkirk data in tutorial 3, fit the following model on WinBUGS and produce maps of the mappable estimated components:

$$[y_i \mid e_i, \theta_i] \sim Pois(e_i\theta_i)$$
$$\ln\theta_i = \beta_0 + \beta_1 dep_i + u_i$$
$$[\beta_0] \sim U(-1000, 1000)$$
$$[\beta_1] \sim N(0, \tau_1)$$
$$[u_i] \sim N(0, \tau_u)$$
$$\tau_u, \tau_1 = 3$$