Practical 8

Module 1: Generate y, a N-length vector of CPG and non-CPG data.

Module 2: Defines the function to evaluate the log posterior of theta.

Module 3: Defines the function to propose theta\* based on the jump distribution.

Module 4: Initializes mchain, sets first theta

Module 5: Loop through mchain, proposing and accepting or rejecting new thetas

Module 6: Calculate acceptance ratio and means and plot

In terms of the parameters of the model, theta[0] is the proportion of CpG islands, theta[1] is the CpGs in CpG islands, and theta[2] is the proportion of CpGs in non-CpG islands.

1. At the start of the MCMC chain, theta is initialized to [0.2, 0.6, 0.1]. The default length of the MCMC chain is 3000. The correct values for simulating y are [0.179, 0.581, 0.103].
2. Using the default parameters, you can estimate the parameters accurately.
3. Using parameters [0.5, 0.9, 0.5], you can estimate the parameters approximately accurately.
4. The first 100 rows are excluded because they don’t accurately depict the activity of the model, they are not well-behaved and should be excluded.
5. Lower standard deviation parameters leads to a longer burn-in period, and higher standard deviation parameters leads to a shorter burn-in period. The posterior distributions are much less smooth with very high standard deviations and much more smooth with very small standard deviations.