

Homework 8

Math 315, Fall 2019

Due 25 October by 4:00 p.m.

Instructions: Complete the following problem and submit it by 4 p.m. on the due date. Please make sure that your solution is neatly written, clearly organized, and stapled (if there are multiple pages). You may complete derivations by hand, but any R work should be completed using R Markdown to render the final write up. You may hide the plotting code chunks, but please do not hide the code chunks where you derive your posteriors or simulate from distributions, since we may need to “dig into” these to point out minor errors.

BSM Chapter 3 exercise 4 a-d

Hint: The full conditionals necessary for the Gibbs sampler are:

$$p(\sigma_1^2 | \sigma_2^2, \dots, \sigma_n^2, \delta, Y_1, \dots, Y_n)$$

$$p(\sigma_2^2 | \sigma_1^2, \sigma_3^2, \dots, \sigma_n^2, \delta, Y_1, \dots, Y_n)$$

$$\vdots$$

$$p(\sigma_n^2 | \sigma_1^2, \dots, \sigma_{n-1}^2, \delta, Y_1, \dots, Y_n)$$

$$p(\delta | \sigma_1^2, \dots, \sigma_n^2, Y_1, \dots, Y_n)$$

Notice that all of the $p(\sigma_i^2 | \text{rest})$ posteriors will have the same distributional form, which is why part (a) only asks about the first.