STAT 668
Homework 2
Assigned: February 11, 2019
Due: February 18, 2019

From *Bayesian Data Analysis*:

- Chapter 3.10: 6 (waterbuck in South Africa)
- Chapter 5.9: 13 (bike data)
- (optional) Chapter 5.9: 14 (bike data, continued)
- LD50 bioassay: Consider the data from Racine et al (1986) at the top of p. 74 in the book.

    1. Specify a model for the data along the lines of the Binomial-logit dose-response model in pp. 74–75. Justify any assumptions.
    2. Do you assume any dependence between α and β? Why or why not? If you were to assume α and β are dependent, how would you specify their correlation?
    3. Produce a contour plot of the joint posterior density of α and β. Overlay this contour plot with the results of 1000 draws from the joint posterior density.
    4. Show three contour plots alongside each other of the joint prior density, joint likelihood, and joint posterior density. Discuss in what sense the posterior can be regarded as a compromise between the prior and the likelihood.
    5. Assess the sensitivity of your analysis to prior assumptions.
    6. A new experiment is being performed with 20 animals and a dose of 0.00 log g/ml. Give an 80% posterior predictive interval for the number of deaths in this experiment. Assess whether your prediction is reasonable.