MAT453 - Assignment 11

Spring 2025

Assignment Due (by 11:59 P.M.): Sunday, April 20th

Directions: You may discuss the exercises with other students and with the instructor, but the work you turn in must be your own. You will need the to submit your R code and answers to the questions below in **one** word or pdf file.

Exercises: (10 points total) Again, you will try to perform simulated data analysis in academic research. You have finished the following tasks in Assignment 5:

1. Simulate 100 variables (i.e., $X_1, X_2, ..., X_{100}$) from standard normal distributions. Each variables has a sample size of $n = 100$.
2. Calculate the mean parameter μ_i as

$$\mu_i = 2X_1 + X_2 + 0.5X_5 + 1.5X_{10},$$

   where $i = 1, ..., 100$ is the sample index.
3. Generate the count reponse Y_i from

$$Y_i \sim \text{Poisson}(\mu_i).$$

In this assignment:

1. Fit a Bayesian Poisson regression with Normal Prior using *RStan*.
2. Fit a Bayesian Poisson regression with Laplace Prior using *RStan*.
3. Compare their coefficients.