Statistics 601, Spring 2026

Assignment 2 – Part 2

In Part 1 of this assignment we covered a number of issues connected with the hierarchical regression model for the length-weight regression of large mouth bass in 75 Iowa lakes. In this assignment we will focus on only one part of the question on presentation of inferential material from Part 1.

1. Following the solution or instructor's comments on Part 1, take the MCMC output files provided and approximate the posterior distribution of the weight of fish at length 15 inches for each of the 75 lakes. Also produce 90% credible intervals for the posterior mean weight. Order the posterior means small to large, and graph the posterior means along with line segments representing credible intervals with lake index on the vertical axis. An example for a hypothetical example with 5 situations (will be our lakes) is shown in Figure **??**. Your plot will have 75 intervals going up the vertical axis (and will be unlikely to extend to 5 on the horizontal axis). Note that you will have to re-index the lakes upon ordering the values. In real life we would want to retain a mapping from that re-indexing to the lake number of the original data so that IDNR could identify which lake is which.

2. Also take the MCMC output files and approximate, for each lake, the posterior mean of the probability that a 15 inch large mouth bass exceeds 1.83 pounds. Order these values and plot them on the horizontal axis against the re-indexed lakes (1 through 75) on the vertical axis. This plot will look quite a bit like an empirical distribution function.

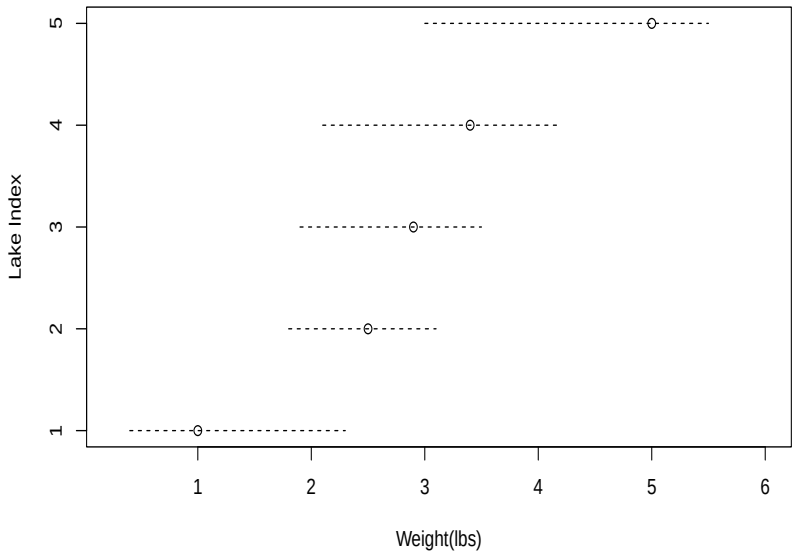

Figure 1: Forest plot of 5 credible intervals for hypothetical example.