DSC 241 – Homework 5

Problem 1. Write a function named bootLS(x, y, conf = 0.95, B = 1000) that fits a simple linear model explaining y in terms of x, and returns a studentized bootstrap confidence interval at the desired level based on the specified number of repeats for each coefficient vector. (If conf = 0.95, then each interval will have nominal level 0.95, so the the confidence is individual and not simultaneous, as is the case with the function confint.)

Problem 2. Perform some simulations to compare the length and confidence level of the studentized bootstrap confidence interval (from Problem 1) and of the student confidence interval (the classical one). Compare them at various sample sizes and in settings involving different distributions, for example, the normal distribution and a skewed distribution like the exponential distribution (centered to have mean 0). In the code, first briefly explain in words what you intend to do, and then do it, and at the end offer some brief comments on the results of your simulation study.