

Homework 3 - Due Friday, Feb. 18

Do Problems 8.39, 8.41, 8.47b, 8.59, 8.61, 8.73, 8.76 and the problem below.

Homework should be written neatly and clearly explained.

Problem 1. Let $X_1, X_2, X_3, \dots, X_{75}$ be exponential random variables with mean θ .

1. What is the large sample size pivotal quantity for the estimation of θ ?
2. Find the large sample size 90%-lower confidence interval for θ .
3. Set $\theta = 2$, and simulate your pivotal quantity, does θ lie in the confidence interval that you found?
(WARNING: Be careful not to simulate exponential random variables with mean 1/2)
4. Repeat your simulation part 3, 10,000 times, plot a histogram of your results. What proportion of the time does 2 lie outside of your interval?
(Hint: determine for what values of either \bar{X} or your pivotal quantity is $\theta = 2$ in the confidence interval that you created, then run your simulation 10,000 times and count the proportion of times that either \bar{X} or your pivotal quantity took on one of these values)