MATLAB exercise

Maximum likelihood estimation

Overview: In this exercise, you will implement two maximum likelihood estimators and investigate their performance and applications.

**Part 1:** Generate random draws from both of the exponential and Rayleigh random variables. You can use the EXPRND and RAYRND functions in MATLAB for this. Derive by hand, and implement ML estimators in MATLAB and plot the MSE with respect to # of observations. On separate plots, plot the bias and the variance of your estimators, with respect to the # of observations. Do this for a couple of values of l.

**Part 2:** The data in the .mat file, data.mat, has been drawn from either an exponential distribution, or a Rayleigh distribution. Compute the max-likelihood estimate of the parameter using both. Using your estimators that you developed in part 2, compute the max-likelihood estimates of the parameter. Which distribution do you think the data was drawn from? Justify your answer.