Advanced Statistics - Lab 03

1) Obtain by simulations the Poisson tail and plot it for three different values of μ as a function of t. Then, on the same figure, plot the theoretical bound on the same tail found in the lecture notes. Is the the derived theoretical bound correct? Is it tight?
2) Plot the same Poisson tail obtained by simulations as in 1). Then, on the same figure, plot the theoretical bound on the same tail using Hoeffding's inequality. Is the the derived theoretical bound correct? Is it tight? Provide comments on your findings.
3) In the lectures, we derived two conditions for random graphs. One when the graph is almost regular and the other when the graph is sparse.
   - Generate a random graph by simulations that satisfies the almost regular condition. Plot that graph and see if it resembles visually an almost regular graph. Provide comments on your findings.
   - Generate a random graph by simulations that satisfies the sparsity condition. Plot that graph and see if it resembles visually a sparse graph. Provide comments on your findings.

Upload the results on Moodle in a single PDF file or as the script itself that contains explanations, the code, and figures.

Important note: By failing to do the following, you will loose points:

- You must provide clear explanation of what your program is doing.
- You must provide comments in your code in order for anyone to understand the code.
- You must not use in-bulid functions for obtaining the PDF, mean, variance, and probability.
- You must use different colors, lines, and markers in the plots, along with legends for each curve and suitable line-widths of the curves so that the figure is understandable.
- You muse clearly define what are the x and y axis in your figures.
- Finally, you must use caption that fully explains the figure.