Advanced Statistics - Lab 02

1) Obtain by simulations the tail of the normalized sum of n i.i.d. Symmetric Bernoulli, as a function of t for 3 different values of n. Then plot them along with the theoretical bound on the same tail found in the lecture notes. Is the the derived theoretical bound correct? Is it tight?

2) Obtain by simulations the tail of the normalized sum of n i.i.d. general Symmetric Bernoulli, , as a function of t for 3 different values of p and fixed n. Then plot them along with the theoretical bound on the same tail found in the lecture notes. Is the the derived theoretical bound correct? Is it tight?

3) For the classical mean estimator from n samples find via simulations its mean as a function of n and plot it along with the theoretical. Then, for the median means estimator from n samples find via simulations its mean and plot it on the same figure. Generate 3 such figures each for different and increasing n.

4) For the classical mean estimator from n samples find via simulations its variance as a function of n and plot it along with the theoretical. Then, for the median means estimator from n samples find via simulations its variance as a function of n and plot it on the same figure. Generate 3 such figures each for different and increasing n.

5) For the classical mean estimator from n samples find via simulations its distribution and plot it. Then, for the median means estimator from n samples find via simulations its distribution and plot it on the same figure. Generate 3 such figures each for different and increasing n.

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.