

Advanced Statistics - Lab 9

- 1) Generate three figures, for three different values of d , respectively, where you would confirm by simulations the eigenvalue distribution in Wigner's Semicircle Law.
- 2) Generate three figures, for three different values of r , respectively, where you would confirm by simulations the eigenvalue distribution in Marchenko-Pastur's Law.
- 3) Confirm by simulations expression (5) in Lecture Notes 10. Plot a figure that confirms that the theoretical and simulation results match.
- 4) Confirm by simulations expression (6) in Lecture Notes 10. Plot a figure that confirms that the theoretical and simulation results match.
- 5) Confirm by simulations expression (8) in Lecture Notes 10. Plot a figure that confirms that the theoretical and simulation results match.
- 6) Confirm by simulations expression (9) in Lecture Notes 10. Plot a figure that confirms that the theoretical and simulation results match.

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.
- Use a log-scale when plotting probabilities or tails.
- You must provide comments in your code in order for anyone to understand the code.
- You must not use in-build 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 must clearly define what are the x and y axis in your figures.
- Finally, you must use caption that fully explains the figure.