1
20 Points

(a) Let A be a square matrix of dimension $m = 100$ whose entries are independent random numbers from the real normal distribution of mean 0 and standard deviation $m^{-1/2}$ (Exercise 12.3). Change a_{11} to 1.5.

Draw Figure 34.2 (page 263 in text book) (You need to draw circle using matlab not by hand)
Draw Figure 34.3 (page 263 in text book), Arnoldi lemniscates at steps n = 1,2,$\cdots$,8. (You need to make 8 figures, Using 34.4 / 34.5 you need to draw leminscates (curve) using matlab not by hand).
Explain which property you can observe from that figure.

(b) By using the guideline of Example 35.1 and Example 35.2 in the text book, draw Figure 35.2 / 35.3 / 35.4 / 35.5. Explain the relation between convergence speed and eigenvalue distribution.