CS660
Homework 3

Complete all **five** problems. Put your pages in order and scan your solutions and upload one PDF. I will not grade multiple files, jpegs, Mac Pages, or any other image files. Each problem is worth 4 points for a total of 20 points.

1. Find the singular value decomposition (SVD) of matrix A.

$$\boldsymbol{A} = \begin{bmatrix} 4 & 2 \\ 2 & -7 \\ 4 & -2 \end{bmatrix}$$

2. Decompose matrix

$$\boldsymbol{B} = \begin{bmatrix} 11 & -8 & 4 \\ -8 & -1 & -2 \\ 4 & -2 & -2 \end{bmatrix}$$

Find the characteristic polynomial, the eigenvalues, and eigenvectors.

3. Find the determinant of the following matrix using LaPlace expansion.

$$\boldsymbol{C} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 15 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

4. Find the rank-1 approximation of

$$\boldsymbol{D} = \begin{bmatrix} 2 & 4 & 3 \\ -2 & 3 & 2 \end{bmatrix}$$

5. Find the Cholesky decomposition of

$$\boldsymbol{E} = \begin{bmatrix} 4 & 2 & 6 \\ 2 & 10 & 7 \\ 6 & 7 & 21 \end{bmatrix}$$