November 6, 2020

AAE 564 Fall 2019

Homework Eleven

Due: Friday, November 13

Exercise 1 Determine (by hand) whether each one of the following matrices is pd, psd, nd, nsd, or none of the above.

$$\begin{pmatrix} 1 & \jmath & 0 \\ -\jmath & 2 & 1 \\ 0 & 1 & 4 \end{pmatrix} \qquad \begin{pmatrix} 1 & \jmath \\ -\jmath & 1 \end{pmatrix} \qquad \begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix} \qquad \begin{pmatrix} -1 & 1 \\ 1 & -2 \end{pmatrix}$$

Check your answers using the MATLAB command eig.

Exercise 2 Determine (by hand) the maximum singular value of the following matrices.

$$A = \begin{pmatrix} 3 \\ 4 \end{pmatrix}, \qquad A = \begin{pmatrix} 3 & 4 \end{pmatrix}, \qquad A = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$$

Exercise 3 Determine (by hand) the singular value decomposition of

$$A = \begin{pmatrix} 3 & 0 & 1 \\ 1 & 0 & 3 \end{pmatrix}$$

Check your answer in MATLAB.