Daniel Delgado Acosta 006896598 CSE 5350 Professor Mohsen Babaeian 5/15/2023

Assignment #4

Part A: Power Iteration

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} \qquad X_0 = \begin{bmatrix} 0 & 0 & 0 \end{bmatrix}^T = \begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} \begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 4 \\ 1 & 1 \end{bmatrix} = 2 \begin{bmatrix} 1 & 2 \\ 2 & 0.5 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 2 & 0.5 \end{bmatrix} = \begin{bmatrix} 11 & 44 \\ 22 & 89 \\ 16.72 \end{bmatrix} = \begin{bmatrix} 11.44 \\ 22 & 89 \\ 16.72 \end{bmatrix} = \begin{bmatrix} 11.44 \\ 1.46 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 21 & 84 \\ 16 & 46 & 46 & 46 & 46 \end{bmatrix} = \begin{bmatrix} 10.92 \\ 1.507 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 21 & 89 \\ 16 & 507 \end{bmatrix} = \begin{bmatrix} 11.014 \\ 22.028 \\ 16.507 \end{bmatrix} = \begin{bmatrix} 11.014 \\ 22 \\ 1.499 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 1.499 \end{bmatrix} = \begin{bmatrix} 143.09 & 10 \\ 22 & 16.5 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 1.5 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 1.499 \end{bmatrix} = \begin{bmatrix} 143.09 & 10 \\ 22 & 16.5 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 1.5 \end{bmatrix}$$

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Part B: Deflation

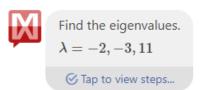
$$A = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix} = > RI = \begin{bmatrix} 2 & 2 & 2 \\ 2 & 3 & 2 \\ 3 & 6 & 1 \end{bmatrix} = > R2 = \begin{bmatrix} 10 & 3 & 4 \\ 2 & 3 & 2 \\ 3 & 6 & 1 \end{bmatrix} = > R3 = R3 + R1/2 = \begin{bmatrix} 10 & 3 & 4 \\ -3 & 1.5 & 0 \\ 8 & 7.5 & 3 \end{bmatrix}$$

$$= > CI = \begin{bmatrix} 2 & 2 & 2 \\ 2 & 3 & 2 \\ 3 & 6 & 1 \end{bmatrix} = > R3 = R3 + R1/2 = \begin{bmatrix} 10 & 3 & 4 \\ -3 & 1.5 & 0 \\ 8 & 7.5 & 3 \end{bmatrix}$$

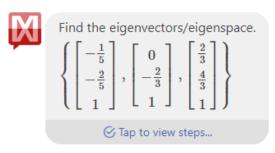
2nd largest eigenvalue: -3

Part C: Comparison





 $\begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix}$ Find the Eigenvectors/Eigenspace



Using Mathway, an online linear algebra calculator, we get eigenvalues 11, -3, and -2 with corresponding eigenvectors [[2/3][4/3][1]], [[0][-2/3][1]], and [[-1/5][-2/5][1]].

My obtained eigenvalues for parts a and b appear to be correct; however, my obtained eigenvector differs from what is shown in Mathway.