

Let

$$\mathbf{A} = \begin{bmatrix} 4 & 10 \\ -1 & \pi \end{bmatrix}, \mathbf{B} = \begin{bmatrix} 2 & 8 \\ \sqrt{2} & \sin 1 \end{bmatrix}, \mathbf{C} = \begin{bmatrix} 2 & 0 \\ 1 & 6 \end{bmatrix}, \mathbf{D} = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 0 \\ 3 & 6 & 9 \end{bmatrix}, \mathbf{E} = \begin{bmatrix} -3 & -4 & 7 \\ -9 & 16 & 6 \\ 2\pi & 3 & -10 \end{bmatrix}$$

$$\mathbf{v}_1 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}, \mathbf{v}_2 = \begin{bmatrix} 100 \\ -1 \end{bmatrix}, \mathbf{v}_3 = \begin{bmatrix} 1016 \\ -4 \end{bmatrix}, \mathbf{v}_4 = \begin{bmatrix} 4 \\ -4 \\ 17 \end{bmatrix}, \mathbf{v}_5 = \begin{bmatrix} 1 \\ 14 \\ 3 \end{bmatrix}$$

1. Calculate determinants of matrices  $\mathbf{A}, \mathbf{B}, \mathbf{C}, \mathbf{D}, \mathbf{E}$ .

Solve the following linear system of equations, using elimination method.

2.

$$\mathbf{A}\mathbf{x} = \mathbf{v}_2$$

3.

$$\mathbf{B}\mathbf{x} = \mathbf{v}_3$$

4.

$$\mathbf{C}\mathbf{x} = \mathbf{v}_1$$

5.

$$\mathbf{D}\mathbf{x} = \mathbf{v}_4$$

6.

$$\mathbf{D}\mathbf{x} = \mathbf{v}_5$$

7.

$$\mathbf{E}\mathbf{x} = \mathbf{v}_5$$

8. Find eigenvalues and corresponding eigenvectors of matrices  $\mathbf{A}, \mathbf{B}, \mathbf{C}, \mathbf{D}$ .