Tutorial Sheet 1 – Eigenvalues & Eigenvectors

1. Eigenvalues

Calculate the eigenvalues of the system $AX = \lambda X$ where A is given by:

(a) $\begin{pmatrix} 5 & 6 \\ 2 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} -3 & 4 \\ -4 & 5 \end{pmatrix}$ (c) $\begin{pmatrix} 7 & -2 \\ 1 & 4 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & -1 & 2 \\ -3 & -2 & 3 \\ 2 & -1 & 1 \end{pmatrix}$

Answers

(a) -1, 7   (b) 1 (twice)   (c) 5, 6   (d) -2, -1, 3

2. Eigenvectors

Calculate the eigenvectors of the matrices given in questions 1.

Answers

(a)   1, -1 : 1, 1/3   (b) 1, 1   (c) 1, 1 :   1, $\frac{1}{2}$ (d) 1, 5, 1 : 1, 12, 5 :   1, 0, 1

Extension

Solve all above examples in MATLAB