

Step-1

Consider a matrix A which has 7 and 6 in the first row and Eigen values $i, -i$. Find the matrix A .

Let the matrix be as follows:

$$A = \begin{bmatrix} 7 & 6 \\ a & b \end{bmatrix}$$

Step-2

Recall that the sum of n Eigen values equals the sum of n diagonal entries and the product of n Eigen values equals the determinant of A .

Thus,

$$\begin{aligned} 7 + b &= i + (-i) \\ &= 0 \\ b &= -7 \end{aligned}$$

And

$$\begin{aligned} 7b - 6a &= i(-i) \\ 7(-7) - 6a &= 1 \\ -49 - 6a &= 1 \\ -6a &= 50 \end{aligned}$$

$$a = \frac{-50}{6}$$

$$a = \frac{-25}{3}$$

Step-3

Therefore, matrix A is as follows:

$$A = \begin{bmatrix} 7 & 6 \\ -25/3 & -7 \end{bmatrix}.$$