

5.4.35

EE25BTECH11041 - Naman Kumar

Question:

Find inverse with elementary transformations of matrix

$$\begin{pmatrix} 0 & 1 & 2 \\ -1 & 0 & -3 \\ -2 & 3 & 0 \end{pmatrix} \quad (1)$$

Solution:

For elementary transformation, matrix can be written in form

$$\left[\begin{array}{ccc|ccc} 0 & 1 & 2 & 1 & 0 & 0 \\ -1 & 0 & -3 & 0 & 1 & 0 \\ -2 & 3 & 0 & 0 & 0 & 1 \end{array} \right] \quad (2)$$

Here, it is in form

$$[\mathbf{A}|\mathbf{I}] \quad (3)$$

With elementary transformation, we get

$$[\mathbf{I}|\mathbf{A}^{-1}] \quad (4)$$

So now in (2)

$$\left[\begin{array}{ccc|ccc} 0 & 1 & 2 & 1 & 0 & 0 \\ -1 & 0 & -3 & 0 & 1 & 0 \\ -2 & 3 & 0 & 0 & 0 & 1 \end{array} \right] \quad (5)$$

But before that check determinant of \mathbf{A}

$$\begin{vmatrix} 0 & 1 & 2 \\ -1 & 0 & -3 \\ -2 & 3 & 0 \end{vmatrix} \quad (6)$$

$$0(0 + 9) - 1(0 - 6) + 2(-3 - 0) \quad (7)$$

$$0 + 6 - 6 = 0 \quad (8)$$

Since determinant is zero , No inverse exists