

5.4.14

EE25BTECH11019 - Darji Vivek M.

Question:

Using elementary transformations, find the inverse of the following matrix.

$$\begin{pmatrix} 2 & 3 \\ 5 & 7 \end{pmatrix}$$

Solution:

Let us solve the given question theoretically and then verify the solution computationally.

To solve for the inverse of a matrix, we can employ the Gauss-Jordan approach.

$$\left(\begin{array}{cc|cc} 2 & 3 & 1 & 0 \\ 5 & 7 & 0 & 1 \end{array} \right) \xrightarrow[R_2 \leftarrow R_2 - 5R_1]{R_1 \leftarrow \frac{R_1}{2}} \left(\begin{array}{cc|cc} 1 & \frac{3}{2} & \frac{1}{2} & 0 \\ 0 & -\frac{1}{2} & -\frac{5}{2} & 1 \end{array} \right) \xrightarrow[R_2 \leftarrow -2R_2]{R_1 \leftarrow R_1 - \frac{3}{2}R_2} \left(\begin{array}{cc|cc} 1 & 0 & -7 & 3 \\ 0 & 1 & 5 & -2 \end{array} \right) \quad (1)$$

$$\therefore \text{Inverse of the given Matrix: } \begin{pmatrix} -7 & 3 \\ 5 & -2 \end{pmatrix} \quad (2)$$