5.4.21

EE25BTECH11026-Harsha

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

$$\begin{pmatrix} 2 & -6 \\ 1 & -2 \end{pmatrix}$$

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.

$$\left(\begin{array}{cc|cc} 2 & -6 & 1 & 0 \\ 1 & -2 & 0 & 1 \end{array}\right) \xleftrightarrow[R_2 \leftarrow R_2 - R_1]{R_1 \leftarrow \frac{R_1}{2}} \left(\begin{array}{cc|cc} 1 & -3 & \frac{1}{2} & 0 \\ 0 & 1 & -\frac{1}{2} & 1 \end{array}\right) \xleftrightarrow{R_1 \leftarrow R_1 + 3R_2} \left(\begin{array}{cc|cc} 1 & 0 & -1 & 3 \\ 0 & 1 & -\frac{1}{2} & 1 \end{array}\right) \tag{0.1}$$

$$\therefore \text{Inverse of the given Matrix:} \begin{pmatrix} -1 & 3 \\ -\frac{1}{2} & 1 \end{pmatrix} \tag{0.2}$$