



Key Takeaways



Inverse of a matrix by elementary transformations :

Example: By using elementary row transformation, find inverse of $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$

Solution:

$$\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} -2 & 1 & 0 \\ 1 & 0 & 0 \\ 5 & 3 & 1 \\ 2 & -\frac{3}{2} & \frac{1}{2} \end{bmatrix} A$$

$$R_1 = R_1 + R_3$$

$$R_2 = R_2 - 2R_3$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & -1 \\ 5 & -\frac{3}{2} & \frac{1}{2} \end{bmatrix} A$$

$$A^{-1} = \begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & -1 \\ 5 & -\frac{3}{2} & \frac{1}{2} \end{bmatrix}$$