Assignment-8
Latex Report

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- **Exercise 2.68**

1 By elementary operations,find the inverse of the matrix A= $\begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix}$

1.1 Solution

1.1.1 Inverse

We know that,
A=IA

$$\begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \text{A}$$

Using operation

$$\text{R}_2 - - > R_2 - 2R_1$$

$$\begin{pmatrix} 1 & 2 \\ 0 & -5 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ -2 & 1 \end{pmatrix} \text{A}$$

$$\text{R}_2 - - > \frac{-1}{5}R_2$$

$$\begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ \\ \frac{2}{5} & \frac{-1}{5} \end{pmatrix} \text{A}$$

$$\text{R}_1 - - > R_1 - 2R_2$$

$$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} \frac{1}{5} & \frac{2}{5} \\ \\ \frac{2}{5} & \frac{-1}{5} \end{pmatrix} \text{A}$$

Since,I=$\text{A}^{-1}A$
$therefore$,

$$A^{-1} = \begin{pmatrix} \frac{1}{5} & \frac{2}{5} \\ \\ \frac{2}{5} & \frac{-1}{5} \end{pmatrix}$$

The End