Assignment

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$$A = \begin{pmatrix} 1 & 2 & 2 \\ 1 & -1 & 2 \\ 2 & 1 & -1 \end{pmatrix} \quad B \begin{pmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{pmatrix} \quad C \begin{pmatrix} 3 & 4 & 1 \\ 3 & 6 & 7 \\ 9 & 5 & 8 \end{pmatrix}$$

if $\mathcal{X} = \begin{pmatrix} a \\ b \\ c \end{pmatrix}$

The linear tresofmation of $A =$

$$T \rightarrow A \begin{pmatrix} \mathcal{X} \end{pmatrix} \begin{pmatrix} 1 & 2 & 2 \\ 1 & -1 & 2 \\ 2 & 1 & -1 \end{pmatrix} \begin{pmatrix} a \\ b \\ c \end{pmatrix}$$

$$\begin{pmatrix} a & 2b & 2c \\ a & -b & 2c \\ 2a & b & -c \end{pmatrix}$$

sisula

$$2B = \begin{pmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{pmatrix} \quad C \begin{pmatrix} 2 & 4 & 1 \\ 3 & 6 & 7 \\ 9 & 5 & 8 \end{pmatrix}$$

$$B + C = \begin{pmatrix} 1+2 & 4+4 & 7+1 \\ 2+3 & 5+6 & 8+7 \\ 3+9 & 6+5 & 9+8 \end{pmatrix}$$

$$B + C = \begin{pmatrix} 3 & 8 & 8 \\ 5 & 11 & 15 \\ 12 & 11 & 17 \end{pmatrix}$$

$$B \cdot C^T = \begin{pmatrix} 3 & 5 & 12 \\ 8 & 11 & 11 \\ 8 & 15 & 17 \end{pmatrix} \quad A_{m \times n} \times_{n \times t} = B_{m \times t}$$

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

$$1\begin{vmatrix} -1 & 2 \\ 1 & -1 \end{vmatrix} - 2\begin{vmatrix} 1 & 2 \\ 2 & -1 \end{vmatrix} + 2\begin{vmatrix} 1 & -1 \\ 2 & 1 \end{vmatrix} = 0$$

$$= 1(1-2) - 2(-1-4) + 2(1+2) = 0$$
$$-1 + 10 + 6 = 0$$
$$15 \neq 0$$
$$\therefore A \text{ is non singular}$$

B $$\begin{pmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{pmatrix} = 0$$

$$= 1\begin{vmatrix} 3 & 8 \\ 6 & 9 \end{vmatrix} - 4\begin{vmatrix} 2 & 8 \\ 3 & 9 \end{vmatrix} + 7\begin{vmatrix} 2 & 5 \\ 3 & 6 \end{vmatrix} = 0$$

$$= 1(45-48) - 4(18-24) + 7(12-13) = 0$$
$$-3 + 24 - 21 \neq 0$$
$$\therefore \text{The matrix B is singular}$$

C $$\begin{pmatrix} 2 & 4 & 1 \\ 3 & 6 & 7 \\ 1 & 5 & 8 \end{pmatrix}$$

$$= 2\begin{vmatrix} 6 & 7 \\ 5 & 8 \end{vmatrix} - 4\begin{vmatrix} 3 & 7 \\ 9 & 8 \end{vmatrix} + 1\begin{vmatrix} 3 & 6 \\ 9 & 5 \end{vmatrix} = 0$$

$$2(48-35) - 4(24-63) + 1(15-54) = 0$$
$$145 \neq 0 \text{ The matrix C is non singular}$$