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Final Term Assignment

Subject :- Linear Algebra

$$\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 0 \\ 1 & 0 \end{pmatrix} \& \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$$

(d):- Det $A = \begin{vmatrix} ID & ID_1 & ID_1 \\ ID_2 & ID_3 & ID_2 \\ ID_4 & ID_1 & ID_5 \end{vmatrix}$ Eliminate R_3.

$$= ID_1 \begin{bmatrix} ID_3 & ID_2 \\ ID_1 & ID_1 \end{bmatrix} - ID \begin{bmatrix} ID_2 & ID_2 \\ ID_4 & ID_5 \end{bmatrix}$$

(a):- All 3×3 identity vertical are

$$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}, \begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

and $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$.

(c):- All 3×3 vertical zero zero det exp.

$$\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 0 \\ 1 & 0 \end{pmatrix} \& \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$$

(d):- Det $A = \begin{bmatrix} ID_1 & ID_1 & ID_1 \\ ID_2 & ID_3 & ID_2 \\ ID_4 & ID_1 & ID_5 \end{bmatrix}$ Eliminate R_3

$$= ID_1 \begin{bmatrix} ID_3 & ID_2 \\ ID_1 & ID_5 \end{bmatrix} - ID_1 \begin{bmatrix} ID_2 & ID_2 \\ ID_4 & ID_5 \end{bmatrix}$$

Q.No3:-

Ans:-

Solu:-

A vector space is a collection of objects is called vectors, which may be added together and multiplying (scaled) by number scales are after take are also vector spaces with scalar multiplication by comple numbers, rotation numbers or generally any field.

(a) Sol: $k\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} ka & b \\ kc & d \end{pmatrix} \forall k \in R$

According to the set of vectors by vector space then it will because vector space, so, itthe vectors numbers vertical numbers or finally any field.

So you can see each column of above R_3 vector are linearly and pendent of each other.

Then we can from we can write as
R_1 vector are linerly independent of each other.

Q No2:-

Ans:

Solu:-

In order form, we can write as

$$450x_1 + 250x_2 = 1000$$
$$400x_1 + 350x_2 = 500$$

$$\begin{bmatrix} 450 & 250 \\ 400 & 350 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 1000 \\ 500 \end{bmatrix}$$

A X B

$$\Rightarrow X = A^{-1} B$$

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 450 & 250 \\ 400 & 350 \end{bmatrix}^{-1} \begin{bmatrix} 1000 \\ 500 \end{bmatrix}$$

$$+ID_2\begin{bmatrix} ID_2 & ID_3 \\ ID_4 & ID_1 \end{bmatrix}$$

$$= ID_1\left(ID_2 \cdot ID_5 - ID_2 ID_1\right) - ID_1\left(ID_2 ID_5 - ID_2 ID_4\right)$$

$$+ ID_1\left(ID_2 ID_3 - ID_3 ID_4\right)$$

$$= ID_1 ID_3 \cdot ID_5 - ID_2 \cdot ID_1^2 - ID_1 ID_2 ID_5 + ID_1 ID_2$$
$$+ ID_1^2 D_2 - ID_1 ID_2 - ID_4$$

$$= ID_1 \cdot ID_3 \cdot ID_5 - ID_2 ID_1^2 - ID_1 ID_3 ID_5 + ID_1 ID_2$$
$$ID_4 + ID_1^2 D_4 - ID_1 ID_2 + ID_4$$

$$= ID_1\left(ID_1 D_5 - D_2 D_5 + D_2 D_4 - D_3 D_4\right)$$