1

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Paper Linear Algbra

Dpt BS(cs)

Submmited to

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2

Q#1

$$= \begin{bmatrix} 1 & ID3 & 3 & 0 & 5 \\ 0 & 1 & ID_{last} & 0 & 7 \\ 0 & 1 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 10 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 5 & 3 & 0 & 5 \\ 0 & 1 & -7 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 5 \end{bmatrix}$$

$R_1 - 5R_2 \rightarrow R_1$

$$= \begin{bmatrix} 1 & 0 & 38 & 0 & -30 \\ 0 & 1 & -7 & 0 & 7 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 5 \end{bmatrix}$$

$R_1 - 38R_3 - R_1 ; R_2 + 7R_3 \rightarrow R_2$

$$= \begin{bmatrix} 1 & 0 & 0 & 0 & 198 \\ 0 & 1 & 0 & 0 & -35 \\ 0 & 0 & 1 & 0 & -6 \\ 0 & 0 & 0 & 1 & 5 \end{bmatrix}$$

It is reduce echelon form

3

Q No.

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

R_3

$=$

No
to

QNo. 2 (a)

$$\begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix}, \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 0 & 3 & -5 \end{bmatrix}$$

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

$$R_3 - 2R_2 \rightarrow R_3$$

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

Note Hence IST metrix transformal into 2nd metrix

Now $\begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 0 & 3 & -5 \end{bmatrix}$

$$R_3 + R_2 \rightarrow R_3$$

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

4

again

$$R_3 + R_2 + R_3 \begin{bmatrix} 1 & 3 & -1 & 5 \\ 0 & 1 & -4 & 2 \\ 0 & 2 & -5 & -1 \end{bmatrix}$$

Hence 2nd metrix transformed into 1st metrix

Q No. 2 (b)

$$\begin{pmatrix} e & 0 & 0 & 0 \\ 0 & e & 0 & 0 \\ 0 & 0 & e & 0 \\ 0 & 0 & 0 & e \end{pmatrix}$$

It is echelon form because its 1st rows become exe and below it all zero 2nd row 2nd elemen become 1 and below it all zeto

Similarly in 3rd row become

5

1 and be

$b \rightarrow$

Q No. 2 (c)

$$\begin{bmatrix} 5 \\ 0 \\ 0 \end{bmatrix}$$

it is re

Because in

become

all all

2nd elem

its all

row 3rd

5

1 and below at add zero

$$b \rightarrow \begin{bmatrix} 1 & 0 & \pi \\ 0 & 1 & e \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Q No. 2 (c)

$$\begin{bmatrix} 5 & 0 & 0 & 7 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

it is reduced echelon form

Because in 1st row element become one and below its all all zero. In the 2nd row 2nd element is one and below its all zero similarly in 3rd row 3rd element is 1 and below

its all zero

No. ⑧ (d)

2 same $\begin{bmatrix} 1 & 0 & 0 & 7 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 4 \end{bmatrix}$

as in

Q (a) (c)

it is reduced echelon form

Because in first row first element is 1 and below all element are zero, 4th 2nd row 2nd element is zero and below above all zero, , and in 3rd row 3rd element is 1 and below above all element zero, So it is reduced echelon form.

(a) Dif

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row

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row

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2nd

one

all

7

Q No.3

(a) Difference b/w row echelon and reduced row echelon form.

in the row echelon form Ist element of 1st row is one and below its all zero, in 2nd row 2nd element is one and below all zero.. and so on..

while in reduced echelon form 1st element of 1st row in one and its below above all zero similarly 2nd elemen of 2nd row is one and its below above all zero. The row reduced

8

echelon form is used to solve the argument matrix. for example

$$2x_1 + 3x_2 - x_3 = 1$$

$$-x_1 + 5x_2 + 3x_3 = 0$$

$$4x_1 \quad x_2 - x_3 = 2$$

9

9

Q No. 3. (b)

$$\begin{bmatrix} 1 & ID2 & 8 \\ 2 & 8 & -1 \\ ID3 & 0 & 0 \\ 1 & -4 & ID\,last - 0ast \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 6 & 8 \\ 2 & 8 & 1 \\ -5 & 0 & 0 \\ 1 & -4 & 7 \end{bmatrix}$$

$R_2 - 2R_1 \rightarrow R_2$:

$R_3 + 5R_1 \Rightarrow R_3$;

$R_4 - R_1 \quad R_4$

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & 4 & -17 \\ 0 & 30 & 40 \\ 0 & -10 & 9 \end{bmatrix}$$

10

Divid by

$R_2/4$

$R_3/10$

$$= \begin{bmatrix} 1 & 6 & 8 \\ 0 & 1 & 17/4 \\ 0 & 3 & 4 \\ 0 & 10 & 9 \end{bmatrix}$$

$R_3 - R_2 \to R_3$

$R_4 + 10R_2 \to R_4$

$$\begin{bmatrix} 1 & 6 & 8 \\ 0 & 1 & 17/4 \\ 0 & 0 & 35/4 \\ 0 & 0 & 93/2 \end{bmatrix}$$

it is echelon form

11

$R_3(-4/35)$

$=$

11

$R_3(-4/35)$

$$= \begin{bmatrix} 1 & 6 & 8 \\ 0 & 1 & 17/4 \\ 0 & 0 & \underline{93} \\ 0 & 0 & 2 \end{bmatrix}$$