farin Erz = A = Ta b7 IAI = ad - bc +,0

thisks the to minor of R=M=[b/ce]

cobactor of A = c = [d -c] Adj. A = cT = | 9 -67

A" = Adj.A = 1 ad-bel -c al

Ex: 
$$A = \begin{bmatrix} 2 & 0 \end{bmatrix} \Rightarrow A^{-1} = \begin{bmatrix} \sqrt{2} & 0 \\ 0 & \sqrt{2} \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix} \Rightarrow A^{-1} = \begin{bmatrix} \sqrt{2} & 0 \\ 0 & \sqrt{2} \end{bmatrix}$$

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

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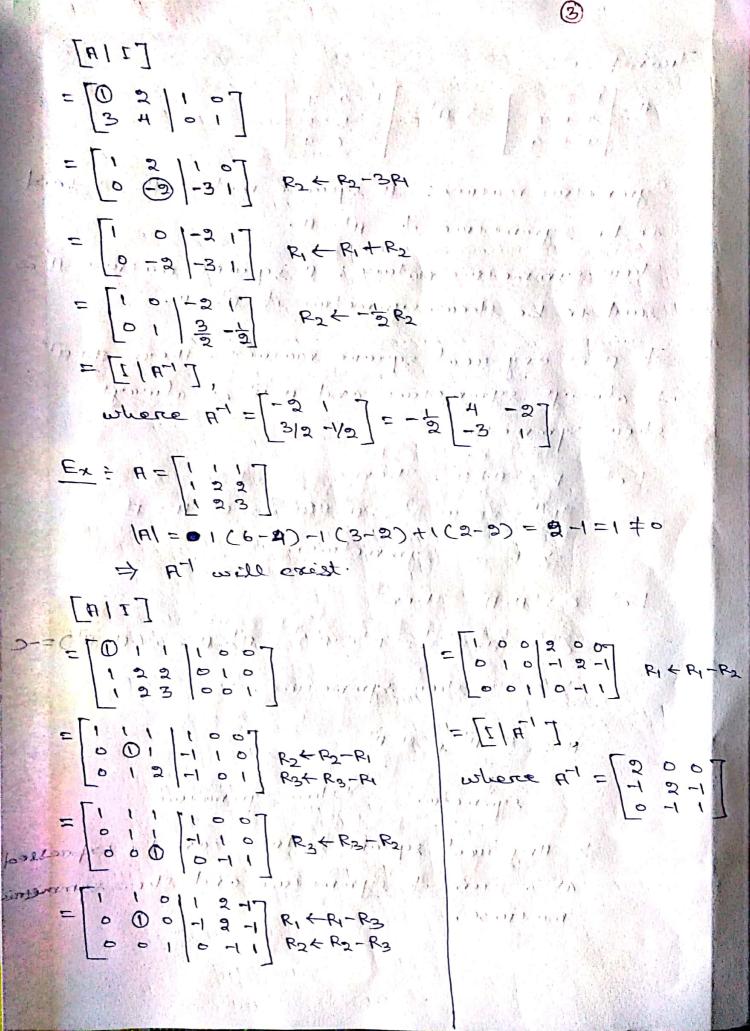
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$$A = \begin{bmatrix} 1 &$$



$$\hat{H} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

$$\Rightarrow \hat{H}^T = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}.$$

Symmetric matrix: A square matrix À is said to be symmetric it AT=A.

Show-eymmetric matrix: A square matrix A is send to be show-eymmetric it AE-A.

9/ A is any roal square matries, then A+AT is always show-symmetric.

Let  $B = A + A^T$ . Then  $B^T = (A + A^T)^T = A^T + (A^T)^T = A^T + B = B$   $\Rightarrow B \approx symmetric.$ 

Let C= A-AT. Then

 $C^{T} = (A - A^{T})^{T} = A^{T} - (A^{T})^{T} = A^{T} - A = -(A - A^{T}) = -C$ 

-> C is show-egometric.

A = A+AT + A-AT

Symmetric & Shew-Eynnetic

Any real section matrix can be expressed as a sum of symmetric and skew-symmetric matrix.

In this example sonce  $H^T = H$ , so LDU = A is COLDINA COLDENSINE COLLEGE BAR LDLT = A.

Note: If A= AT can loe pactored into A=LDU without now exchanges, then vis the transpose of L and A=LDLT.

## Points to rember:

$$\mu \cdot (\mu^{-1})^{T} = (\mu^{T})^{-1}$$

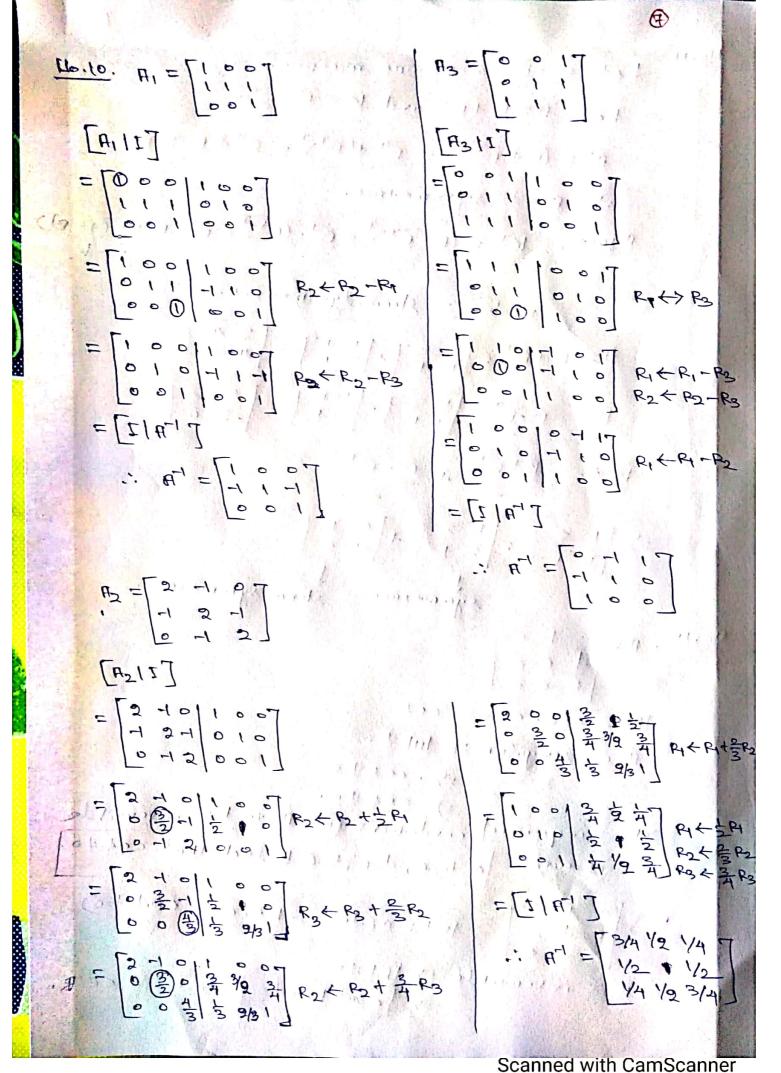
## Problem Set 1.6

No. 6. @ 36 A is invertible and AB=AC, prove that B=C.

Proof: Let A be invertible and AB = AC.

$$Sol^{n}$$
: Let  $R = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ ,  $C = \begin{bmatrix} 2 & 3 \\ 6 & 7 \end{bmatrix}$ .

$$AC = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 6 & 7 \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 0 & 0 \end{bmatrix}.$$



No.11. Let B loe a réplace matrix. Let A = B + BT and K = B-BT. AT = (B+BT)T = BT+(BT)T = BT+B = A / 1 A 1A 125 by monetaic. Agent, KT = (B-BT) = BT-(B-B) > k is shew-symmetric. A= B+BT=[1 3]+[3 1]= |2 4] K = B-BT = [1, 3] - [3] = [-2 0] B = B+BT + B-BT > [13] = [2] + [-10] symmetric shew-symmetric. IAI = c(0-ex) =- cex A is singular it IAI + 0 The required conditions for A to be invertible a coice la, b, c, d, e, & CR such that cof to B=[a b o] (B1 = a(de-o)-b(de) = e(ad-bc) Bis invertible > (B) to (a,b,c,d,ec)

A+B is not invertible although A and B are invertible.

A+B is invertible although A and B are not in vertible.

All of A, B and A+B are invertible.

For c=0, 2,7, the matrix is not invertible, as for these three values of c the determinant ob the matrix is zoro.

C=0 => Jerro column (08 Jerro \$ ROW).

c=2 => identical rows

c= 7 > identical columns.

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