NAME:
HABIB ID:

LINEAR ALGEBRA

SPRING 2024 – SECTIONS L1, L3, L5

QUIZ 2 (25th Jan, 2024)

Max Marks: 10

Time: 7 minutes

Q. Use the relationship between elementary matrices and elementary row operations (E.R.O.s) to show that the E.R.O.s that transform a non-singular matrix A to I will also transform I to A^{-1}.

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LINEAR ALGEBRA

SPRING 2024 – SECTIONS L2, L4, L6

QUIZ 2 (23rd Jan, 2024)

Max Marks: 10

Time: 8 minutes

Q. If A is a square matrix, then prove that:

(a) $A + A^T$ is symmetric

(b) $A - A^T$ is skew symmetric

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QUIZ 2 SOLUTIONS

L1, L3, L5 (1:15 – 2:30)
Thur 25th Jan

$O_n \dots O_2 O_1 A = E_n \dots E_2 E_1 (A)$ ∴ O_i is E.R.O

E_i is E. Matrices

let $P = E_n \dots E_2 E_1$

$P^{-1} = E_1^{-1} E_2^{-1} \dots E_{n-1}^{-1} E_n^{-1}$

$P(A) = I$

$PAA^{-1} = IA^{-1}$ ∴ A is non-singular

$P(I) = A^{-1}$

$A^{-1} = P(I)$ This implies I transform into A^{-1} by ER.Os

QUIZ 2 SOLUTIONS

L2, L4, L6 (3:30 – 4:45)
Tuesday 23rd Jan

Part (a):

Symmetric matrix means

$$B = B^T$$

For $A + A^T$ ~~be~~ to be symmetric

$$A + A^T = (A + A^T)^T$$
$$= A^T + (A^T)^T \quad \because (A^T)^T = A$$
$$= A^T + A$$
$$A + A^T = A + A^T$$

Skew Symmetric matrix means

$$B^T = -B$$

For $A - A^T$ to be skew-symmetric

$$-(A - A^T) = (A - A^T)^T$$
$$= A^T - (A^T)^T \quad \because (A^T)^T = A$$
$$= A^T - A$$
$$= -A + A^T$$
$$-(A - A^T) = -(A - A^T)$$