

LINEAR ALGEBRA

SPRING 2024 – SECTIONS L2, L4, L6

QUIZ 3 (25th Jan, 2024)

Max Marks: 10

Time: 8 minutes

Q. Solve the following system of linear equations by Gaussian Elimination Method.

$$x + 3y + 6z = 12$$

$$x + 4y + 5z = 14$$

$$x + 6y + 7z = 18$$



LINEAR ALGEBRA

SPRING 2024 – SECTIONS L1, L3, L5

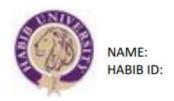
QUIZ 3 (30th Jan, 2024)

Max Marks: 10

Time: 8 minutes

Q. Prove the following:

- (a) If $A \underline{X} = B$ represents a system of "m" equations in "m" variables, then prove that the solution is unique if A is invertible.
- (b) Show that $(A^{-1})^T = (A^T)^{-1}$



QUIZ 3 SOLUTIONS

SECTIONS L2, L4, L6 (3:30 – 4:45)

Thursday 25th Jan, 2024

*			٥		0 00
The augm	ented	marine	associa	Ked/	well.
te give	N Syst	en of	linear	egyns	inth. , is gwen as:
A. =	1	3	6 12	7	
Ъ	- 1	4	5 14		
	1	6	6 12 5 14 7 18		
* Perform	Rz-Ri	→ R2 &	R3 - R1	$\rightarrow R_3$	· we get:
To Joseph	12-1-1	, , , ,		,,,	0
0/	[)	3	6 12	7	
	0	1 .	6 12		
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* Perform	R2-3 R	$R_2 \rightarrow R_2$, we	gee :	
" ,)	гІ	3	6 1	12	1
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y Parlace	1110	- 2	2 / 11 2	3 - 2	
* Perfor	(A)	3	3 9 000	900	3
~		3	6		
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	10	0	1 1	0	echelon form
Thus to	given	lineal	Sustem	Se.	Lindag
Thus by given linear system of what form equations is reduced to					
June	21 +	34 +	67 = 18	-1)
	~ /	0, -	7 = 2		
		A -		, ->(2	
			7 = 0	->(5)

@ => y = 2	
$0 \Rightarrow 2 = 12 - 3y - 6z = 12 - 3(2) - 6(0)$	
= 12 - 3(2) - 6(0)	



QUIZ 3 SOLUTIONS

SECTIONS L1, L3, L5 (1:15 – 2:30)

Tuesday 30th Jan, 2024

* Part (a)	
hat X, & X2 be two solutions	* Past (b)
Such that	kk know that
$A \times I = B \longrightarrow \widehat{I}$	I = I
	⇒
$A \times_{2} = B \longrightarrow \widehat{R}$	GA-1) = I-D; since A-1/A=I
On Compains (1) & (1), we get	Applying transfore on both sides, we get
A×1 = A×2	$(AA^{-1})^{\top} = (I)^{\top}$ $\Rightarrow A^{\top}(A^{-1})^{\top} = I \qquad (AB)^{\top} = B^{\top}A^{\top} & I^{\top} = I$
Further are know that A & invertie	$A^{T} = A^{T} A^{T} A^{T} A^{T} A^{T} $
$= \downarrow \qquad \qquad = \downarrow \times_2$	$\Rightarrow I(A^{-1})^{T} = (A^{T})^{-1}$ $\Rightarrow [(A^{-1})^{T} = (A^{T})^{-1}]$
which proves the required yealt	which proves the required result
OR	which proves be regioned result
We know that A' is uneque	-
Therefore,	
$A \times = B \Rightarrow A^{-1}(A \times) = A^{-1}B$	
$\Rightarrow I \times = A^{-1}B \Rightarrow \times = A^{-1}B & unigne$	