Linear Algebra

:(S, S2, S3) is a solution to the equation

Linear system -> Collection of linear equations

Gauss Elimination Method

Elementary Operations

Two systems have the same set of solutions even if

- -> An equation is swapped with another
- -> An equation is multiplied on both sides by a non-zero constant
- -> An equation is replaced by the sum of itself and a multiple of another pivoting and

Example

Solve the system

$$R_1 - N_1 = 0$$
 R_1
 $2n_1 - 2n_2 + 2n_3 + 2n_4 = 4$
 R_2
 $2n_2 + 2n_4 = 0$
 R_3
 $2n_3 + 2n_4 = 5$
 R_4

$$-2R_{1} + R_{2} - 7 \qquad \begin{cases} 91_{1} - 31_{2} = 0 \\ 91_{3} + 291_{4} = 1 \end{cases}$$

$$91_{2} + 31_{4} = 0$$

$$2n_{3} + 31_{4} = 5$$

94 MUST BE IN EQ 1

2 BJ W JB 78UM JK

and so on

$$-3n_{4} = -3$$

Solution (-1, -1, 2, 1)

Enample $\begin{cases}
3 & 31 + 32 + 23 = 9 \\
2 & 31 + 432 - 33 = 1
\end{cases}$ $\begin{cases}
2 & 31 + 632 - 533 = 0
\end{cases}$

$$-2R_1 + R_2$$
 and $\int R_1 + R_2 + 2R_3 = 9$
 $-3R_1 + R_3$ $2R_2 - 7R_3 = -17$
 $3R_2 - 11R_3 = -27$

$$3R_{2} - 2R_{3}$$

$$\begin{cases}
3R_{1} + 3R_{2} + 2R_{3} = 9 \\
2R_{2} - 3R_{3} = -17
\end{cases}$$

$$78_{3} = 3$$

$$\frac{n_2 = -17 + 7(3)}{2}$$

$$n_1 + n_2 + 2n_3 = 9$$
 $n_1 + 2 + 6 = 9$
 $n_1 = 1$

A linear system has

- 1. No Solution
- 2. Unique Solution
- 3. Infinite Solutions

on of variables > no of equations

Then there is no unique solution

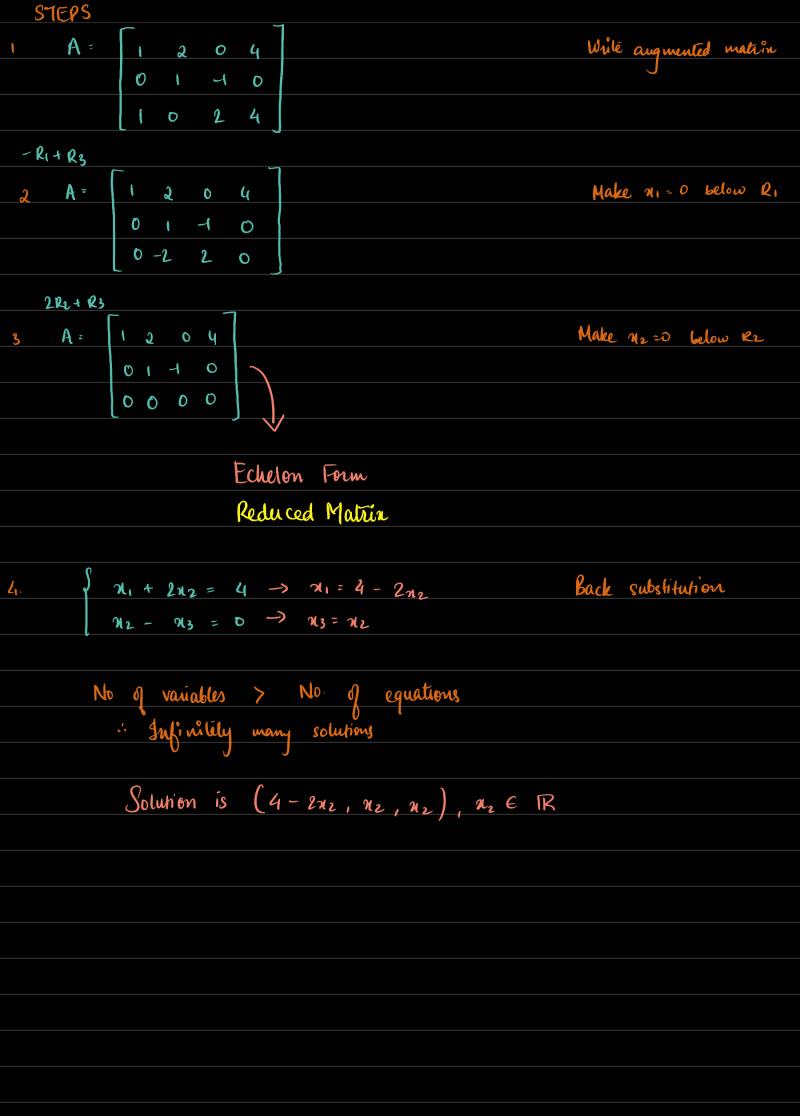
Matrin

Rectangular anay of numbers

Size of matin = rows x columns

Enample

$$N_1 + 2n_2 = 4$$



Enample

$$AB = \begin{bmatrix} -4 & -5 \\ 29 & 2 \\ -4 & -10 \end{bmatrix}$$