

GAUSS ELIMINATION METHOD

①

Solution of Linear Algebraic Method
by DIRECT METHOD

Direct Method

- 1) Gauss Elimination Method
- 2) Gauss Jordan Method

Indirect Method

- 1) Jacobi Method
- 2) Gauss Seidal Method

Q:- Solve the following equation by
Gauss Elimination Method.

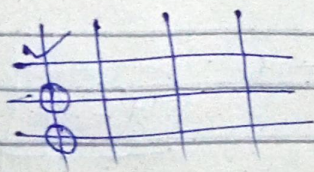
$$x - y + 2z = 3$$

$$x + 2y + 3z = 5$$

$$3x - 4y - 5z = -13$$

$$\begin{bmatrix} 1 & -1 & 2 \\ 1 & 2 & 3 \\ 3 & -4 & -5 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 5 \\ -13 \end{bmatrix}$$

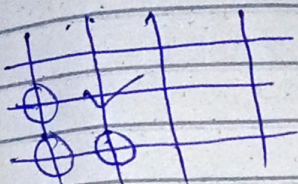
$$A \quad X \quad = \quad B$$



(2)

$$[A:B] = \left[\begin{array}{ccc|c} 1 & -1 & 2 & 3 \\ 1 & 2 & 3 & 5 \\ 3 & -4 & -5 & -13 \end{array} \right] \begin{array}{l} R_2 \rightarrow R_2 - R_1 \\ R_3 \rightarrow R_3 - 3R_1 \end{array}$$

$$= \left[\begin{array}{ccc|c} 1 & -1 & 2 & 3 \\ 0 & 3 & 1 & 2 \\ 0 & -1 & -11 & -22 \end{array} \right] R_3 \rightarrow 3R_3 + R_2$$



$$= \left[\begin{array}{ccc|c} 1 & -1 & 2 & 3 \\ 0 & 3 & 1 & 2 \\ 0 & 0 & -32 & -64 \end{array} \right]$$

$$\begin{aligned} x + y + 2z &= 3 \\ 3y + z &= 2 \\ -32z &= -64 \end{aligned}$$

$$-32z = -64$$

$$\boxed{z = 2}$$

$$3y + z = 2$$

$$y = \frac{2 - z}{3}$$

$$y = \frac{2 - 2}{3} = 0$$

$$\boxed{y = 0}$$

③

$$x - y + 2z = 3$$

$$x = y - 2z + 3$$

$$x = 0 - 2(2) + 3 = -1$$

$$\boxed{x = -1}$$

$$\begin{array}{l} x = -1 \\ y = 0 \\ z = 2 \end{array}$$

— x — x —