Definition.

- Linear Equation.
- Matrix of Coefficients.
- Homogeneous Linear equations.
- Non Homogeneous Linear Equation.
- Solution set
- Elementary or Admissible operations.
- Augmented Matrix.
- Unique Solution
- Gaussian Elimination Method.
- Pivot, Pivotal Equation.
- Process of Baekward substitution. Recursively.
- Gauss - Jordan Elimination Method.
- Consistent System.
- In Consistant System.
- (4.10) Consistency criterion.
- Trivial Solu
- Non Trivial Solu.

Guass Jordan Method

$$6x_1 - 6x_2 + 6x_3 = 6$$
$$2x_1 - 4x_2 - 6x_3 = 12$$
$$10x_1 - 5x_2 + 5x_3 = 30$$

$$A_b = \left[\begin{array}{ccc|c} 6 & -6 & 6 & 6 \\ 2 & -4 & -6 & 12 \\ 10 & -5 & 5 & 30 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -1 & 1 & 1 \\ 1 & -2 & -3 & 6 \\ 2 & -1 & 1 & 6 \end{array}\right] \quad \frac{1}{6}R_1, \frac{1}{2}R_2, \frac{1}{5}R_3$$

$$\left[\begin{array}{ccc|c} 1 & -1 & 1 & 1 \\ 0 & -1 & -4 & 5 \\ 0 & 1 & -1 & 4 \end{array}\right] \quad R_2 - R_1, \; R_3 - 2R_1$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 5 \\ 0 & 0 & -5 & 9 \\ 0 & 1 & -1 & 4 \end{array}\right] \quad R_1 + R_3, \; R_2 + R_3$$

$$\left[\begin{array}{ccc:c} 1 & 0 & 0 & 5 \\ 0 & 0 & 1 & -9/5 \\ 0 & 1 & -1 & 4 \end{array}\right] \quad -\frac{1}{5}R_2$$

$$\left[\begin{array}{ccc:c} 1 & 0 & 0 & 5 \\ 0 & 0 & 1 & -9/5 \\ 0 & 1 & 0 & 11/5 \end{array}\right] \quad R_3 + R_2$$

$-9/5 + 4 = 11/5$

$$\left[\begin{array}{ccc:c} 1 & 0 & 0 & 5 \\ 0 & 1 & 0 & 11/5 \\ 0 & 0 & 1 & -9/5 \end{array}\right] \quad R_{23}$$

rank A = rank Ab.

So the Eq's have a unique solution.

$x_1 = 5, \quad x_2 = 11/5, \quad x_3 = -9/5$.

12, 13, 14, 15, 16, 18, 20.