Matrix

Def:- An mxn matrix A is rectangular array of m ,n real (or complex) numbers arranged in m horizontal rows and n vertical columns.

$$A = \begin{bmatrix} a11 & a12 & a1n \\ a21 & a22 & a2n \\ am1 & am2 & amn \end{bmatrix}$$

We shall say that A is m by n (m x n).

If m = n , we say that A is sequin matrix of order n. and the numbers a11,a22,a33,.....ann called the main diagonal of A . and we can write it by A = [aij].

Ex// $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 1 \end{bmatrix}_{2x3}$

$B = \begin{bmatrix} 1 & 4 \\ 2 & -3 \end{bmatrix}_{2x2}$

$C = \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}_{3x1}$

$D = \begin{bmatrix} 1 & 1 & 0 \\ 2 & 0 & 1 \\ 3 & -1 & 2 \end{bmatrix}_{3x3}$

$E = [3]_{1x1}$

$F = [-1 \quad 0 \quad 2]_{1x3}$

B and D are squares matrix

Some special matrix

1- **Def: A square matrix A = [aij] which every elements aij=0 and I ≠ j is called diagonal matrix.**

Ex// $G = \begin{bmatrix} 4 & 0 \\ 0 & -2 \end{bmatrix}$, $H = \begin{bmatrix} -3 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

Def : A matrix A = [aij] is called upper an if aij = 0 for I > j

Ex// $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 1 \\ 0 & 0 & 3 \end{bmatrix}$

A matrix A = [aij] is called lower triangular if aij=0 for i< j