

# Unit 1 - MATRICES

Defn: Matrix

A rectangular arrangement of elements having  $m$  rows &  $n$  columns, enclosed by brackets  $[\ ]$ .

Real matrix

A matrix is said to be real if all the elements are real.

Square matrix:

A matrix is said to be square if the row and column of the matrix are equal.  $A = [a_{ij}]_{m \times n}$ ,  $m = n$

Row matrix: A matrix contained only one row.

Column matrix: A matrix contained only one column.

Diagonal matrix:

A square matrix in which all non-diagonal elements are zero.

Scalar matrix

A square matrix in which all diagonal elements are equal to the scalar  $k$ .

Unit matrix

A square matrix in which all diagonal elements are unity.

Singular matrix

A square matrix  $A$  is said to be singular if  $|A| = 0$

Characteristic Equation:

If  $A$  is square matrix of order  $n$ , we can write the matrix  $A - \lambda I$ , where  $\lambda$  - scalar,  $I$  - unit matrix  
the det. of matrix equated to zero  $|A - \lambda I| = 0$  is c.e

Polynomial eqn of degree  $n$

$\lambda^n - c_1 \lambda^{n-1} + c_2 \lambda^{n-2} - \dots + (-1)^n c_n = 0$ . The roots of this eqn is called eigen value of  $A$