COURSE: MATHEMATICS-I
COURSE CODE: KAS-103T
MODULE-1: MATRICES

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## LECTURE-1 2

Course: Mathematics-I Module-1: Matrices

Course Code: KAS-103T Teacher: Dr. S. P. Gupta

Topic: Basics of Matrix Algebra and Types of Matrices.

LO: Define Matrix, Applications of Matrices and Different types of matrices.

$$x + 2y + 3z + 5t = 0$$
  
 $4x + 2y + 5z + 7t = 0$   
 $3x + 4y + 2z + 6t = 0$ 

now we write down the Coff of x, y, z, t of the above egh and enclose them with in brackets and then we get

$$A = \begin{bmatrix} .1 & 2 & 3 & 5 \\ 4 & 2 & 5 & 7 \\ 3 & 4 & 2 & 6 \end{bmatrix}$$

The above system of number, arranged in a rectangular array in rows and columns and bounded by the brackets is called a Matrix.

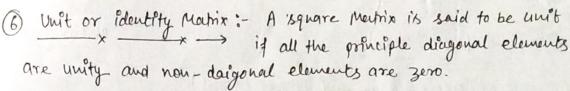
Various Types of Matrices :-

- O Row Matrix: If a Meetrix has only one row and any number of Columns. eg-[2739]
- 2) Column Matrix: A matrix having one column and any number of rows. eq- [1]
- 3 Null or Zero Matrix: Any Matrix i'n which all the elements are zero.

  eg [0 0 0 0]
- 4) Square Matrix: A matrix in which the number of rows is equal to the number of Column.

$$ey - \begin{bmatrix} 12 & 3 \\ 456 \\ 789 \end{bmatrix}_{3\times3}$$

(5) Diagonal Matrix: - A square matrix is called a diagonal if all its non-diagonal elements are zero.



$$eg - A = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 0 & 5 \\ 6 & 7 & 8 \end{bmatrix}, A' = \begin{bmatrix} 2 & 1 & 6 \\ 3 & 0 & 7 \\ 4 & 5 & 8 \end{bmatrix}$$

$$\overline{A} = \begin{bmatrix} 1-i & 2+3i & 4 \\ 7-2i & i & 3+2i \end{bmatrix}$$

Matrix 
$$A^0:$$
 Transpose of the Conjugate of a Matrix A is denoted by  $A^0:$ 

When  $A = \begin{bmatrix} 1+i & 2-3i & 4 \\ 7+2i & -i & 3-2i \end{bmatrix} \Rightarrow A = \begin{bmatrix} 1-i & 2+3i & 4 \\ 7-2i & i & 3+2i \end{bmatrix}$ 

$$(\overline{A})' = \begin{bmatrix} 1-i & 7-2i \\ 9+3i & i \\ 4 & 3+2i \end{bmatrix} = A^{0}$$

(16) Hermitian Matrix: - A square matrix A is said to be Hermitian if 
$$A = A^{O}$$

eg - 
$$A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$$
,  $B = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$   
Here  $A = B$ .

Addition of Matrices: If 
$$A = a_{ij}$$
 and  $B = b_{ij}$  of the same order, then addition is  $Possible$   $A+B = [a_{ij} + b_{ij}]$ 

Subtraction of Matrices: If A=aij and B=bij of the same ...

order then subtraction is possible.

A-B = [air - bir]

let A = [aii] . be an mxn

B= [bij] be an nxp.

Then the product . AB of these matrices is an . mxp order matrix e = [civi)

Cij = ai bij + ais baj + ais baj + -- . + ain bnj

Inverse of the Matrix:  $A^{-1} = \frac{adj \circ f A}{(A)}$