MATRICES

2.1. MATRICES.

A. DEFINITONS. A rectangular array of the form

$$\begin{bmatrix} a_{11} & \cdots & a_{1j} & \cdots & a_{1n} \\ \vdots & & \vdots & & \vdots \\ a_{i1} & \cdots & a_{ij} & \cdots & a_{in} \\ \vdots & & \vdots & & \vdots \\ a_{m1} & \cdots & a_{nj} & \cdots & a_{mm} \end{bmatrix}$$

of mn entries (elements) is called a (rectangular) matrix of the size (shape) mxn (m by n). Some authors use the symbols ( ) or || || instead of [ ] to represent matrices. If $a_{ij} \epsilon \mathbb{R}$ for all i, j the matrix is called a real matrix. An $m \times n$ matrix consists of m rows and n columns. The element a_{ij} lies in the i^{th} row and the j^{th} column. A matrix consisting of a single row (column) is called a row matrix (column matrix).

The above matrix of size mxn is abbreviated by one of the following :

$$A_{m\times n} \text{ , } [a_{ij}]_{m\times n} \text{ , } (a_{ij})_{m\times n} \text{ , } ||a_{ij}||_{m \times n}$$

In some cases the subsecipt $m \times n$ may be omitted.

If $m = n$, the matrix is called a square matrix and is said to be an n^{th} ordered matrix or a matrix of order n. The elements a_{ii} matrix lying on the main diagonal are called the diagonal elements.

In an $m \times n$ $(m \neq n)$ matrix the elements a_{ii} may be called similarly the diagonal elements.