MATRIX

❖ What is Matrix ?

Definition:

- A rectangular array of numbers is called a matrix. We shall mostly be concerned with matrices having real numbers as entries. The horizontal arrays of a matrix are called its rows and the vertical arrays are called its columns. A matrix having m rows and n columns is said to have the order m× n. A matrix A of order m× n can be represented in the following form:

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix},$$

- Where a_{11} is the entry at the intersection of the i^{th} row and j^{th} column.

- In a more concise manner, we also denote the matrix A by $[a_{ij}]$ by suppressing its order.

Remark Some books also use,

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{pmatrix}$$

- A matrix having either a single row (m=1) or a single column (n=1) is defined to be a vector because it is often used to define the coordinates of a point in a multi-dimensional space. (In this note the convention has been adopted of representing a vector by a lower case "bold-face" letter such as **x**, and a general matrix by a "bold-face" upper case letter.

Examples.

$$A = \begin{bmatrix} 2 & 1 & 3 \\ -1 & 2 & 4 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$