BASIC LINEAR ALGEBRA

INTRODUCTION

BASIC DEFINITIONS OF LINEAR ALGEBRA

An **m by n** matrix is an arrangement of numbers in an ordered set of **m** rows with each row consisting of an ordered set of **n** numbers. It is called **m x n** matrix, as well.

In general matrices are represented by upper case letters A, B, C, and most of the time, if A is a matrix of order **m x n** then it can be represented as:

Being **i** and **j** the positions of each element of the matrix.

TYPES OF MATRICES

**Rectangular matrix**: An **m x n** matrix in which **m ≠ n.**

Examples:

**Square matrix**: An **m x n** matrix in which **m = n.**

Examples: 🡪 Also represented as: , due to columns and rows being equal in number

**Row matrix:** A matrix having a single row

Examples:

**Column matrix:** A matrix having a single column

Examples:

**Null matrix**: A matrix in which all the elements are zero

Examples: 🡪 Also represented as:

**Diagonal matrix:** A matrix in which all the elements of it besides de diagonal ones are zero

Examples: 🡪 Also represented as:

**Upper triangular matrix**: A square matrix in which all elements below the principal diagonal are zeros

Examples:

**Lower triangular matrix**: A square matrix in which all elements above the principal diagonal are zeros

Examples:

**Scalar matrix:** A matrix in which all the elements in the principal diagonal are equal

Examples:

**\*\*Identity matrix or Unit matrix:** A diagonal matrix in which all the elements are 1. An identity matrix of order n is denoted by

Examples:

MATRICES COMPARISION

The only way of comparing two matrices is whether they are equal or not. Two matrices **A** and **B** are equal if **A** and **B** are of same order and corresponding elements in **A** and **B** are same.

Example: if and and is given that A = B then:

a = 4 ; s = 23 ; f = 2 ; c = 3 for them to be equal