SUM OF TWO MATRICES

The sum of two matrices is obtained by adding the corresponding elements of the matrices.

condition for addition →

Two matrices can be added only if they have the same order (same number of rows and columns).

If matrix A is of order $m \times n$, then matrix B must also be of order $m \times n$

If

$$A = [a_{ij}] \quad \text{and} \quad B = [b_{ij}]$$

Then the sum is

$$A + B = [a_{ij} + t$$

That means each element of matrix A is added to the corresponding element of matrix B.

Example →

Let

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

SUM AND PRODUCT OF A FINITE SERIES

Here's a clear explanation of sum and product of a finite series (usually referring to a finite sequence of numbers)

1 Sum of a Finite Series →

If you have a finite sequence:

$a_1, a_2, a_3, ---\ a_n$

The sum is

$$S_n = a_1 + a_2 + a_3 ---- + a_n$$

Special cases →

(A) Arithmetic series →

An arithmetic sequence has a constant difference.

$a, a + d, a + 2d,$

The sum of first n terms

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

OR

$$S_n = \frac{n}{2}(a + l)$$

Where

a = First term

d = common difference
l = last term
n = number of terms

(B) Geometric Series →

A geometric sequence has a constant ratio:

$$a, ar, ar^2, \ldots$$

The sum of first n terms

$$S_n = a\frac{1-r^n}{1-r}, \quad r \neq 1$$

where

a = First term
r = common ratio
n = number of terms

(2) Product of a Finite Series →

The product of a finite sequence:

$$P_n = a_1 \cdot a_2 \cdot a_3 \cdots a_n$$

This is often written using product notation.

$$\prod_{K=1}^{n} a_i$$

Special case: Geometric series product

If terms are:

$a, ar, ar^2, --- ar^{n-1}$

Product

$$P_n = a^n \cdot r^{\frac{n(n-1)}{2}}$$

Example

For sequence

2, 4, 8, 16

Sum

$2 + 4 + 8 + 16 = 30$

Product

$2 \times 4 \times 8 \times 16 = 1024$

— x —

since both are of order 2×2 we can add them.

$$A+B = \begin{bmatrix} 1+5 & 2+6 \\ 3+7 & 4+8 \end{bmatrix} = \begin{bmatrix} 6 & 8 \\ 10 & 12 \end{bmatrix}$$

Properties of matrix Addition

1. commutative property

$A+B = B+$

2. Associative property

$(A+B)+C = A+(B-$

3. Additive identity

$A+0 = -$

(0 is the zero matrix)

4. Additive inverse

$A+(-A) = 0$

conclusion →

The sum of two matrices is obtained by adding their corresponding elements, provided both matrices have the same order.