TRINITY COLLEGE FOR WOMEN NAMAKKAL
Department of Mathematics

NME-BASIC STATISTICS-II
23USTN03 - EVEN Semester

Topic: SEQUENCE AND SERIES

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SEQUENCE

❖ A set of numbers arranged in a specific order is a sequence.

❖ Each number in the sequence is called a term.

❖ u_1, u_2, and u_3 are the first , second and third terms of the sequence respectively.

❖ From the first three terms, succeeding terms can be determined when they have specific relation.

❖ Example : (i) 1, 5, 9,..............
                    (ii) -7, 49, -343,..........

SERIES

➤ When the successive terms of a sequence are connected by plus or minus signs, the sequnce is called a series.

➤ Example : (i) $u_1+u_2+u_3+\ldots\ldots$

(ii) $1+5+9+\ldots\ldots\ldots$ are series.

➤ A series is called a finite series if it contains finite number of terms.

➤ It is called an infinite series if it contains infinite number of terms.
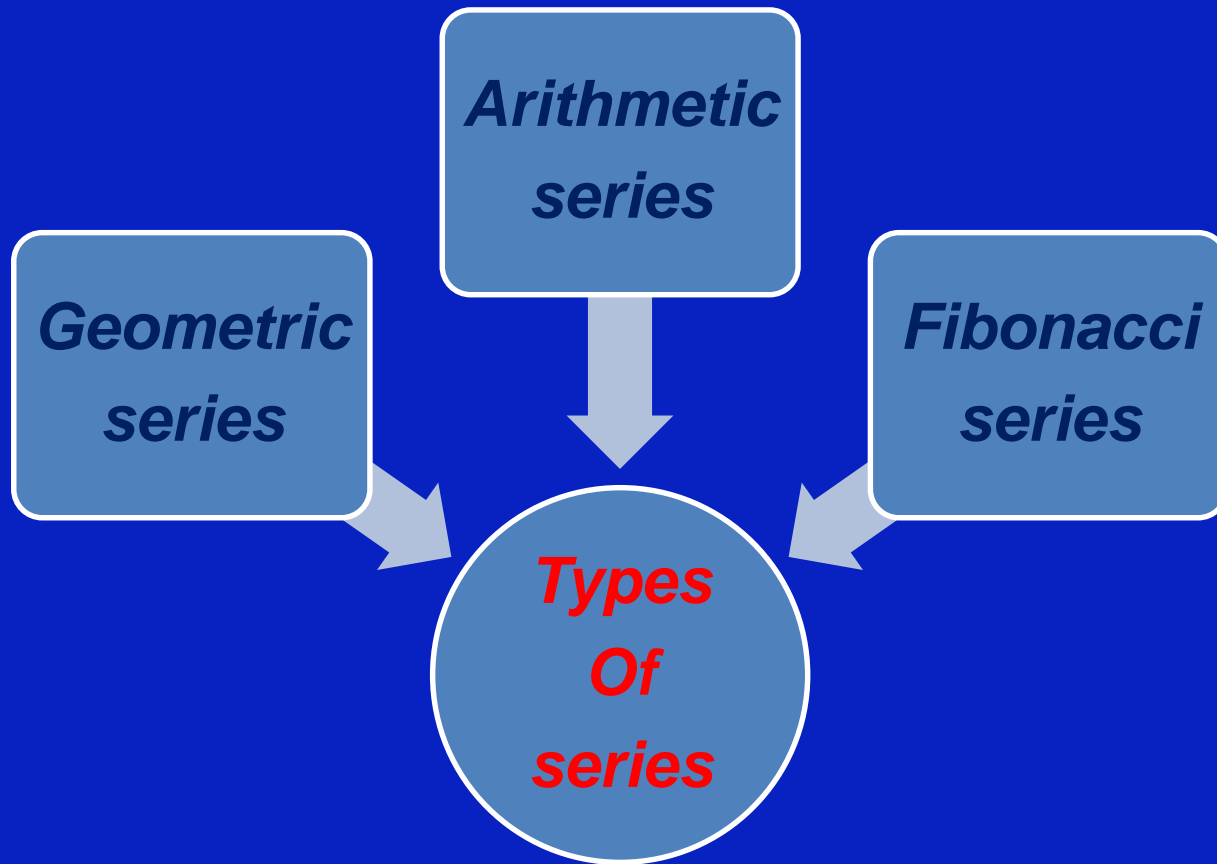
Arithmetic series

If the successive terms increase or decrease by a constant(quantity), the series is called Arithmetic series.

The constant quantity is called common difference.

The Standard form of an AP is

a, a+d, a+2d,.............

Where

a is first term,

d is a common difference.

Geometric Series

If the successive terms increase or decrease by a constant factor, the series is called Geometric series.

The constant factor is called common ratio.

The Standard form of an GP is

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

Where

a is first term,

r is a common ratio.

Harmonic Series

❖ A series of number is called harmonic series, if the reciprocal of the numbers of an arithmetic progression.

❖ The relation between harmonic Series and Arithmetic series helps to solve problems under harmonic series

The Formula of Arithmetic Series

The formula for the nth term is given by

$$a_n = a + (n - 1)\, d,$$

where   a is the first term,

d is the difference, and

n is the total number of the terms.

The formula for the calculation is given below.
Sum of an Arithmetic Series

$$S_n = n/2 * (2a) + (n-1)d$$

Using the above formula, sum to the nth term can be found.

The Formula of Geometric Series

we can define geometric series as

$$\sum_{n=1}^{\infty} ar^n = a + ar + ar^2 + \ldots\ldots\ldots + ar^n$$

Where a is the first term and
 r is the common ratio for the geometric series.

$$a_n = a_1\ r^{\,n\text{-}1}$$

Then the formula for the nth term is:
Sum of Geometric Series

$$Sn = a(1-rn)/1-r.$$

THANK YOU

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