

DegreeLive

B.Com Honours

Semester II

Calicut University

Fundamentals of Business Mathematics and Statistics

Course Code: COM2MN104 • Module 2 Notes

1. Progression Theory: Arithmetic, Geometric, and Harmonic Progressions

Progression theory is essential for financial mathematics, particularly in calculating interest compounding, investment growth rates, loan amortizations, and depreciation schedules. A sequence is an ordered list of numbers, a series is the sum of a sequence, and a progression is a sequence that follows a specific mathematical rule. This module covers the concepts, formulas, and business applications of Arithmetic, Geometric, and Harmonic progressions.

Arithmetic Progression (AP)

A sequence where the difference between any two consecutive terms is constant (called the common difference, d). E.g., (5, 10, 15, 20 dots)

- **(n)-th Term Formula:**
 $[t_n = a + (n - 1)d]$ Where a is the first term, and n is the term number.
- **Sum of (n) Terms Formula:**
 $[S_n = \frac{n}{2} [2a + (n - 1)d]]$
- **Arithmetic Mean (AM):** If three numbers are in AP, the middle number is the AM of the other two. Multiple AMs can be inserted between two numbers.

Geometric Progression (GP)

A sequence where the ratio of any two consecutive terms is constant (called the common ratio, r). E.g., (2, 6, 18, 54 dots) Used to model compound interest growth and population growth.

- **(n)-th Term Formula:**
 $[t_n = a r^{n-1}]$
- **Sum of (n) Terms Formula:**
 $[S_n = \frac{a(r^n - 1)}{r - 1} \text{ quad } (\text{ ext{for } } r > 1)]$
 $[S_n = \frac{a(1 - r^n)}{1 - r} \text{ quad } (\text{ ext{for } } r < 1)]$
- **Geometric Mean (GM):** If three numbers are in GP, the middle number is the GM of the other two: $(G = \sqrt{ab})$.

Harmonic Progression (HP)

A sequence is in HP if the reciprocals of its terms form an Arithmetic Progression. E.g., ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$ dots) is in HP because (2, 4, 6, 8 dots) is in AP. Used to calculate average speeds or average purchase prices of shares bought with fixed monthly cash allocations.

DegreeLive

Acing your exams is just a click away!

Visit www.degreeelive.in to download the next module for free.

DegreeLive