CONVERGENT SEQUENCE

Mathematics-III (Differential Calculus)
Code: BSC-301

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CONTENT

INTRODUCTION

- • What is a sequence ?
- • What is a convergent sequence ?
- **PROPERTIES OF CONVERGENT SEQUENCE**
- • A few basic theorems
- **APPLICATIONS**
- *REFERENCE*

SEQUENCE

× A collection S of real numbers is said to be a *sequence of numbers* if corresponding to every positive integer n, there exists a unique element a_n of S.

× *Example:* {5,7,9,11} is *finite* sequence.
{1,½,1/3,¼,...} is *harmonic* sequence.

CONVERGENT SEQUENCE

A sequence {a_n} is said to be convergent if $\lim\limits_{n \to \infty} a_n = L$ is finite.

Example: In {1,1/3,1/3²,…,1/3ⁿ,…} ,the sequence {an} where an = 1/3ⁿ , is convergent since $\lim\limits_{n \to \infty} a_n = L$,L=0 is finite.

A convergent sequence determines its limit uniquely. Every convergent sequence is bounded. A monotonic increasing or decreasing sequence which is bounded above or below respectively is said to be convergent.
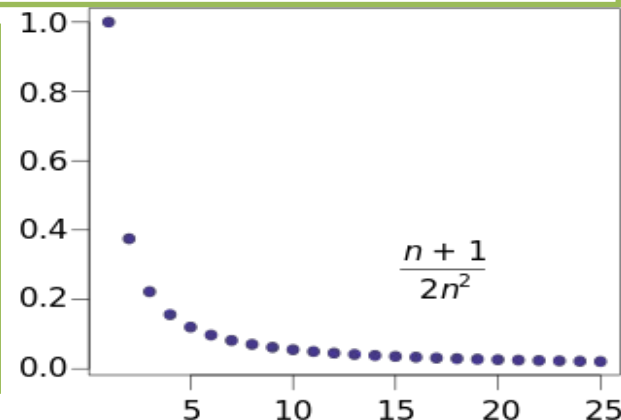
APPLICATIONS

Convergence is a concept used throughout calculus in the context of limits, sequences, and series.
A convergent sequence is one in which the sequence approaches a finite, specific value.

convergence is used to show that an algorithm is correct or behaves like it should, e.g. in machine learning and probabilistic algorithms.

REFERENCES

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The information in this presentation has been taken from the book ENGINEERING MATHEMATICS Volume IIIA by B.K. Pal , K. Das.

analysis - Applications of Convergence of a series in Algorithms - Mathematics Stack Exchange