

Survey on Statistical Convergence and its Application

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Abstract

Statistical convergence is an important generalization of the classical concept of convergence of sequences and has become a significant topic in mathematical analysis. The concept was introduced to provide a more flexible form of convergence by allowing a sequence to deviate from its limiting value on a set of indices having natural density zero. Since its development, statistical convergence has been extensively studied in relation to sum ability theory, sequence spaces, approximation theory, and functional analysis. This survey presents the fundamental concepts and major developments associated with statistical convergence, beginning with its definition and basic properties and proceeding to related notions such as statistical Cauchy sequences, statistically convergent sequences, and statistical limit points. Particular attention is given to the relationship between ordinary convergence and statistical convergence and to extensions involving strong sum ability and generalized convergence methods. The survey also discusses applications of statistical convergence in approximation theory, especially in the study of positive linear operators, as well as its relevance to sequence spaces and related areas of analysis. Recent generalizations, including statistical convergence in normed and metric spaces, are also briefly considered. The purpose of this survey is to provide a concise overview of the theoretical foundations, important results, and applications of statistical convergence, while indicating its continuing relevance in contemporary mathematical research.

Keywords: Statistical convergence, natural density, statistical Cauchy sequence, sum ability theory, sequence spaces, approximation theory, positive linear operators, metric spaces, functional analysis.

