THE \( \widetilde{\lambda} \)-STATISTICALLY CONVERGENT DOUBLE SEQUENCES IN FUZZY NORMED SPACES

by

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Original scientific paper
https://doi.org/10.2298/TSCI180930339K

We introduce double \( \widetilde{\lambda} \)-statistically convergent sequences and double \( \widetilde{\lambda} \)-statistically Cauchy sequences in the fuzzy normed spaces. We study \([V,\widetilde{\lambda}]\) and \([C,\widetilde{\lambda}]\) \(\lambda\)-summabilities for double sequences. In addition, we obtain the relation between these concepts and \(\lambda\)-statistically convergence.

Key words: \(\lambda\)-convergence, double sequence, summabilities

Introduction

Theory of statistical convergence was firstly originated by Fast [1]. After Fridy [2] and Šalat [3], statistical convergence became a notable topic in summability theory.

Fuzzy set theory has become an important working area for 40 years. It has been used in many engineering applications, control of chaos, non-linear operator, and population changes. It affected many mathematicians to investigate new kinds of sequence spaces and to study this type convergence. Fuzzy norm idea was firstly considered by Katsaras [4] in the fuzzy topological vector spaces. Also, Alimoshmaday and Roohi [5] introduced compactness in fuzzy minimal spaces. Felbin [6] was inspired by Kaleva and Seikkala [7], and then he introduced fuzzy norm of the linear space. Topological characterizations of fuzzy normed linear spaces were found in [8, 9]. Other studies on the same spaces can also be found in [10, 11].


Mursaleen [22] introduced the idea of \( \lambda \)-statistical convergence. Using fuzzy numbers, \(\lambda\)-statistical convergence was presented Savas [23]. The \(\lambda\)-statistical convergence by using double sequences was obtained by Savas [24], and Savas and Patterson [25, 26]. Turkmen and Cinar [27] considered \(\lambda\)-statistical convergence within fuzzy normed linear space.

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