

Uniform \mathcal{I} -Lacunary statistical convergence on time scales

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Received: 3 June 2018, Accepted: 1 August 2018

Published online: 24 December 2018.

Abstract: In this paper, we define m -uniform \mathcal{I} -statistical convergence, (θ, m) -uniform \mathcal{I} -lacunary statistical convergence and $(\mathcal{I}_{\theta}, m)$ -uniform strongly p -lacunary summability of functions on an arbitrary time scale. Also, by using m -uniform and (λ, m) -uniform density of the subset of the time scale, we will focus on constructing concepts of $(\mathcal{I}_{\lambda}, m)$ -uniform statistically convergence and $(\mathcal{I}_{\lambda}, m)$ -uniformly strongly p -summability of functions on time scale. Some inclusion relations about these new concepts are also presented.

Keywords: Statistical convergence, time scale, lacunary sequence, ideal convergence.

1 Introduction and background

The idea of statistical convergence goes back to the study of Zygmund [39] which was published in 1935. Statistical convergence of number sequences was formally introduced by Fast [11] and Steinhaus [38] independently in the same year. Over the years and under different names, statistical convergence has been discussed in Fourier analysis, ergodic theory, number theory, approximation theory, measure theory, trigonometric series, turnpike theory and Banach spaces. Later on, it was further investigated from the sequence space point of view and linked with summability theory by Connor [4], Fridy [13], Mohiuddine et al. [28], Rath and Tripathy [29], Tripathy [30], Belen and Mohiuddine [31], Maddox [34] and references therein.

The concept of lacunary statistical convergence was defined by Fridy and Orhan [14]. Also, Fridy and Orhan [15] gave the relationships between the lacunary statistical convergence and the Cesàro summability.

Mursaleen [5] defined λ -statistical convergence by using the λ sequence. In [8], Borwein introduced and studied strongly summable functions. Strongly summable number sequences and statistically convergent number sequences were studied by Maddox [34], Nuray and Aydın [17], and Et et al. [36]. Nuray [18] studied on λ -statistically convergent functions, λ -strong summable and λ -statistically convergent functions. Furthermore, Nuray and Aydın [17] introduced and studied strongly lacunary summable functions.

Kostyrko et al. [20] introduced the concept of \mathcal{I} -convergence of sequences in a metric space and studied some properties of this convergence.

Recently, the idea of statistical convergence and lacunary convergence was further extended by Das et al. [6] to \mathcal{I} -statistical convergence and \mathcal{I} -lacunary statistical convergence, respectively.