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$\lambda-$STATISTICAL CONVERGENCE ON TIME SCALES

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Abstract. In this study, we will define $\lambda-$density of a set and $\lambda-$statistical convergence on an arbitrary time scale. Moreover, some relations about these new notions are also obtained.

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1 Introduction

The idea of statistical convergence was given by A. Zygmund [33] in the first edition of his monograph published in Warsaw in 1935. Then, the concept of statistical convergence was introduced by Fast [5] and Steinhaus [20] and later reintroduced by Schoenberg [18] independently for real and complex numbers. Over the years and under different names, statistical convergence has been discussed in the theory of Fourier analysis, ergodic theory, number 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 various authors (see [4], [7], [11], [16], [17], [23], [24], [25], [26], [27], [29], [30]).

The statistical convergence depends on the density of subsets of the set $\mathbb{N}$. The natural density of a subset A of $\mathbb{N}$ is defined by

$$\delta(A) = \lim_{n\to\infty} \frac{1}{n} \left|\{k \le n : k \in A\}\right|,$$

where $|\{k \le n : k \in A\}|$ denotes the number of elements of $A \subseteq \mathbb{N}$ not exceeding n and if the above limit exists. It is clear that any finite subset of $\mathbb{N}$ has zero natural density and $\delta(A^c) = 1 - \delta(A)$ (see [17]).

A sequence $x = (x_k)$ is said to be statistically convergent to a real number L if

$$\delta(\{k \in \mathbb{N}: |x_k - L| \ge \varepsilon\}) = 0,$$

for every $\varepsilon > 0$. In this case we write $S-\lim x = L$. The set of all statistically convergent sequences is denoted by S (see [7], [17]).