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Strong almost convergence and almost λ-statistical convergence

Ekrem SAVAŞ

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Abstract. The purpose of this paper is to define almost λ-statistical convergence by using the notion of (V, λ)-summability to generalize the concept of statistical convergence.

Key words: statistical convergence, almost statistical convergence, almost λ-statistical convergence, strongly almost convergence.

1. Introduction

Let s be the set of all real or complex sequences and let l_∞, c and c_0 denote the Banach spaces of bounded, convergent and null sequences $x = (x_k)$, respectively normed as usual by $||x|| = \sup_k |x_k|$. Let D be the shift operator on s, that is $D((x_k)) = (x_{k+1})$. It may be recalled that Banach limit L (Banach [1]) is a linear functional on l_∞ such that

(i) $L(x) \geq 0$ if $x_k \geq 0$, $k \geq 0$,
(ii) $L(Dx) = L(x)$ for all $x \in l_\infty$
(iii) $L(e) = 1$ where $e = (1, 1, 1, \ldots)$.

A sequence $x \in l_\infty$ is said to be almost convergent (Lorentz [13]) if all Banach limits of x coincide. Let $\hat{c}$ and $\hat{c}_0$ denote the sets of all sequences which are almost convergent and almost convergent to zero. Lorentz [13] proved that,

$$\hat{c} = \left\{ x : \lim_n \frac{1}{n} \sum_{k=1}^{n} x_{k+m} \text{ exists uniformly in } m \right\}$$

Several authors including Lorentz [13], Duran [4] and King [10] have studied almost convergent sequences.

A sequence $x = (x_k)$ is said to be summable $(C, 1)$ if and only if

$$\lim_n \frac{1}{n} \sum_{k=1}^{n} x_k \text{ exists}$$

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