On the strong summability almost ewerywhere of series with respect to block-orthonormal systems

Givi Nadibaidze

g.nadibaidze@gmail.com

Department of Mathematics, Iv. Javakhishvili Tbilisi State University, University str. 13

In the orthogonal theory it is well-known strong summability method of orthogonal series.

Below a question connected with the problems of almost everywhere strong summability of series with respect to block-orthonormal systems are considered.

The series $\sum\limits_{n=1}^{\infty} u_n$ is called strong (C,α) $(\alpha > 0)$ summable to the number s if

$$\lim_{n\to\infty}\frac{1}{n+1}\sum_{k=0}^{n}\left(\sigma_k^{\alpha-1}-s\right)^2 = 0,$$

where σ_k^α are Cesaro means of given series

Let $\{N_k\}$ be increasing sequences of natural numbers and

$$\Delta_k = \left(N_k,\, N_{k+1}\right], \quad (k \geq 1) .$$

Let $\{\varphi_n\}$ be a system of functions from $L^2(0,1)$. The system $\{\varphi_n\}$ will be called a Δ_k-orthonormal system if $\|\varphi_n\|_2 = 1$, $n = 1,2,...$ and $\left(\varphi_i,\varphi_j\right) = 0$, for $(i,j) \in \Delta_k$, $i \neq j$, $(k \geq 1)$.

It is established the conditions, when from the a. e. (C,α), $(\alpha > \frac{1}{2})$ summability follows strong (C,α) summability of series

$$\sum_{n=1}^{\infty} a_n \varphi_n(x)$$

with respect to any Δ_k-orthonormal system $\{\varphi_n\}$.