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ON ALMOST EVERYWHERE CONVERGENCE FOR LACUNARY SEQUENCES OF MULTIPLE RECTANGULAR FOURIER SUMS

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Let a sequence of d-dimensional vectors $\mathbf{n}_k = (n_k^1, n_k^2, \dots, n_k^d)$ with positive integer coordinates satisfy the condition $n_k^j = \alpha_j m_k + O(1),\ k \in \mathbb{N},\ 1 \leqslant j \leqslant d,$ where $\alpha_1 > 0, \dots, \alpha_d > 0$, and $\{m_k\}_{k=1}^{\infty}$ is an increasing sequence of positive integers. Under some conditions on a function $\varphi : [0, +\infty) \to [0, +\infty)$, it is proved that, if the sequence of Fourier sums $S_{m_k}(g, x)$ converges almost everywhere for any function $g \in \varphi(L)([0, 2\pi))$, then, for any $d \in \mathbb{N}$ and $f \in \varphi(L)(\ln^+ L)^{d-1}([0, 2\pi)^d)$, the sequence $S_{\mathbf{n}_k}(f, \mathbf{x})$ of rectangular partial sums of the multiple trigonometric Fourier series of the function f and the corresponding sequences of partial sums of all conjugate series converge almost everywhere.

Keywords: multiple trigonometric Fourier series, convergence almost everywhere.

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