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International scientific online seminar on Analysis, Differential Equations and Mathematical Physics

Coordinators: Prof. Alexey Karapetyants, Prof. Vladislav Kravchenko

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Wiener algebras and trigonometric series in a coordinated fashion

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Let $W_0(\mathbb{R})$ be the Wiener Banach algebra of functions representable by the Fourier integrals of Lebesgue integrable functions. It is proven in the paper that, in particular, a trigonometric series $\sum_{k=-\infty}^{\infty} c_k e^{ikt}$ is the Fourier series of an integrable function if and only if there exists a $\phi \in W_0(\mathbb{R})$ such that $\phi(k) = c_k$, $k \in \mathbb{Z}$. If $f \in W_0(\mathbb{R})$, then the piecewise linear continuous function ℓ_f defined by $\ell_f(k) = f(k)$, $k \in \mathbb{Z}$, belongs to $W_0(\mathbb{R})$ as well. Moreover, $\|\ell_f\|_{W_0} \leq \|f\|_{W_0}$. Similar relations are established for more advanced Wiener algebras. These results are supplemented by numerous applications. In particular, new necessary and sufficient conditions are proved for a trigonometric series to be a Fourier series and new properties of W_0 are established.

This is a joint work with R. Trigub.

*Seminar website: <https://rmc.sfedu.ru/seminar>. The seminar uses Microsoft Teams online platform. Please send questions to pichugina@sfedu.ru (Olga Pichugina, scientific secretary).

The seminar is organized by the Regional Mathematical Center of the Southern Federal University in collaboration with Institute of Mathematics, Mechanics and Computer Sciences of the Southern Federal University and the special Interest ISAAC-OTHA group in Operator Theory and Harmonic Analysis.

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