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Relation between Fourier series and Wiener algebras. (English. Ukrainian original)

Zbl 07378025

Summary: New relations between the Banach algebras of absolutely convergent Fourier integrals of complex-valued measures of Wiener and various issues of trigonometric Fourier series (see classical monographs by A. Zygmund [Trigonometric series. Volumes I and II combined. With a foreword by Robert Fefferman. Cambridge: Cambridge University Press (2002; Zbl 1084.42003] and N. K. Bary [A treatise on trigonometric series. Vol. I, II. Authorized translation by M. F. Mullins. Oxford-London-New York-Paris-Frankfurt: Pergamon Press (1964; Zbl 0129.28002)]) are described. Those bilateral interrelations allow one to derive new properties of the Fourier series from the known properties of the Wiener algebras, as well as new results to be obtained for those algebras from the known properties of Fourier series. For example, criteria, i.e. simultaneously necessary and sufficient conditions, are obtained for any trigonometric series to be a Fourier series, or the Fourier series of a function of bounded variation, and so forth. Approximation properties of various linear summability methods of Fourier series (comparison, approximation of function classes and single functions) and summability almost everywhere (often with the set indication) are considered. The presented material was reported by the author on 12.02.2021 at the Zoom-seminar on the theory of real variable functions at the Moscow State University.

MSC:

42A20 Convergence and absolute convergence of Fourier and trigonometric series
42A24 Summability and absolute summability of Fourier and trigonometric series
42B05 Summability in several variables
42B08 Fourier series and coefficients in several variables
41A50 Best approximation, Chebyshev systems

Keywords:
Wiener algebra; Fourier series; Fourier-Stieltjes series; best approximation; modulus of smoothness; convergence of summation methods in norm and almost everywhere; Lebesgue points; d-points; strong summability; grouped series

Full Text: DOI

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