On the Generalized Radimacher-Menchoff Theorem

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Abstract:
We study sufficient conditions for the almost everywhere convergence of the multiple Fourier series summed over domains bounded by levels of an elliptic polynomials. The elliptic differential operators have many applications in quantum mechanics. Such operators are unbound and have self adjoint extension in the Hilbert classes, which can be expanded into spectral decomposition unity, which is closely connected with the multiple Fourier series summed over the levels of elliptic polynomials. The main problem of the harmonic analysis is reconstruction of the function from its Fourier expansion. Obtaining the sufficient conditions for the almost everywhere convergence of the multiple Fourier series of the functions from different classes gives answer to the main problem of the harmonic analysis in the mentioned classes of functions. An analogue of the Radimacher-Menchoff Theorem for general spectral expansions corresponding to a self-adjoint extension of elliptic operators is obtained by using the spectral properties of the differential operators. The obtained theorem allows us to obtain a result on the almost everywhere convergence of the spectral decompositions from the Liouville classes.

Keywords: Elliptic Operators; Eigenfunctions; Expansions; Spectral Functions; Multiple Fourier Series