Approximation by Generalized Abel-Poisson Means of Hexagonal Fourier Series

Aslı Taşkan(1) and Ali Güven(2)

(1) *Balıkesir University, Department of Mathematics, Balıkesir, Türkiye*
e-mail: aslitaskan1016@hotmail.com

(2) *Balıkesir University, Department of Mathematics, Balıkesir, Türkiye*
e-mail: guvennali@gmail.com

Abstract

This seminar focuses on the approximation of hexagonal Fourier series using generalized Abel-Poisson means. It introduces Hilbert and Banach spaces, orthonormal bases, Fourier coefficients, and Fourier series as the mathematical foundation. It explains the Poisson kernel, Abel–Poisson means, Hölder spaces, generalized Abel means, and the Sharma-Varma theorem. The seminar then extends these ideas to hexagonal Fourier series and reviews approximation results by Ali Güven. The main goal is to obtain a Sharma-Varma type theorem for generalized Abel-Poisson means on hexagonal domains. This study contributes to approximation theory and has potential applications in harmonic analysis, signal processing, image processing, and numerical analysis.

Keywords: Hexagonal domain, Fourier series, Abel–Poisson means.

References:

[1] P. L. Butzer and R. J. Nessel, Fourier Analysis and Approximation. Pure Appl. Math., Vol. 40, Academic Press, New York-London, 1971.

[2] A. Guven, Approximation by $(C,1)$ and Abel-Poisson means of Fourier series on hexagonal domains. Math. Inequal. Appl. 16 (2013), no. 1, 175–191.

[3] A. Guven, Approximation by means of hexagonal Fourier series in Hölder norms. J. Class. Anal. 1 (2012), no. 1, 43–52.

[4] Y. Xu, Fourier series and approximation on hexagonal and triangular domains. Constr. Approx. 31 (2010), no. 1, 115–138.

[5] H. Li, J. Sun and Y. Xu, Discrete Fourier analysis, cubature and interpolation on a hexagon and a triangle. SIAM J. Numer. Anal. 46 (2008), no. 4, 1653–1681.

[6] S. Sharma and S. K. Varma, Hölder continuous functions and their Abel and logarithmic means. Tamkang J. Math. 30 (1999), no. 3, 167–173.