

TRIGONOMETRIC APPROXIMATION OF FUNCTIONS IN SEMINORMED SPACES

WŁODZIMIERZ ŁĘNSKI, UADAY SINGH* AND BOGDAN SZAL

Abstract. In this paper, we study the approximation properties of 2π -periodic functions in a seminormed space. We use a general matrix method of summability, and the moduli of continuity in the seminormed space as a measure of approximation. Our results generalize and improve some of the previous results available in the literature.

Mathematics subject classification (2010): 41A25, 46E30, 42A24, 42A10, 40C05.

Keywords and phrases: Seminorm, rate of approximation, the Jensen inequality, Fourier series, matrix means.

REFERENCES

- [1] P. CHANDRA, *Trigonometric approximation of functions in L_p -norm*, J. Math. Anal. Appl., **275** (2002), 13–26.
- [2] A. GUVEN, *Trigonometric approximation in reflexive Orlicz spaces*, Anal. Theory Appl., **27** (2) (2011), 125–137.
- [3] A. GUVEN, D. M. ISRAFILOV, *Approximation by trigonometric polynomials in weighted Orlicz spaces*, Stud. Math., **174** (2006), 147–168.
- [4] A. GUVEN, D. M. ISRAFILOV, *Improved inverse theorems in weighted Lebesgue and Smirnov spaces*, Bull. Belg. Math. Soc., **14** (2007), 681–692.
- [5] L. LEINDLER, *On the uniform convergence and boundedness of a certain class of sine series*, Analysis Math., **27** (2001), 279–285.
- [6] L. LEINDLER, *On the degree of approximation of continuous functions*, Acta Math. Hungar., **104** (2004), 105–113.
- [7] L. LEINDLER, *Trigonometric approximation in L_p -norm*, J. Math. Anal. Appl., **302** (1) (2005), 129–136.
- [8] E. LIFLYAND, S. TIKHONOV, *A concept of general monotonicity and applications*, Math. Nachr., **284** (8–9) (2011), 1083–1098.
- [9] U. S. PUGACHEV, I. N. SINITSY, *Lectures on functional analysis and applications*, Word Scientific Publ. (1999).
- [10] R. N. MOHAPATRA, B. SZAL, *On trigonometric approximation of functions in the L^q norm*, Demonstratio Mathematica, **51** (1) (2018), 17–26.
- [11] B. SZAL, *Trigonometric approximation by Nörlund type means in L^p -norm*, Comm. Math. Universitatis Carolinae, **50** (4) (2009), 575–589.
- [12] S. TIKHONOV, *Trigonometric series with general monotone coefficients*, J. Math. Anal. Appl., **326** (1) (2007), 721–735.
- [13] S. TIKHONOV, *On uniform convergence of trigonometric series*, Mat. Zametki, **81** (2) (2007), 304–310, Translation in Math. Notes, **81** (2) (2007), 268–274.
- [14] S. TIKHONOV, *Best approximation and moduli of smoothness: Computation and equivalence theorems*, J. Approx. Theory, **153** (2008), 19–39.
- [15] D. S. YU, S. P. ZHOU, *A generalization of monotonicity and applications*, Acta Math. Hungar., **115** (3) (2007), 247–267.
- [16] D. S. YU, S. P. ZHOU, P. ZHOU, *Ultimate generalization to monotonicity for uniform convergence of trigonometric series*, Sci. China Math., **53** (7) (2010), 1853–1862.

- [17] V. V. ZHUK, *Approximation of periodic functions*, (in Russian), Leningr. Gos. Univ. Press, Leningrad, (1982).
- [18] A. ZYGMUND, *Trigonometric Series, Vol I*, Cambridge Univ. Press, 2nd edition, (1959).