

APPROXIMATION BY PARTIAL INTEGRALS OF DOUBLE FOURIER INTEGRALS

PRINCE ASHVINBHAI BHUVA

Abstract. In this paper, by giving rate of convergence under certain conditions we approximate the function of two variables by partial integrals of its Fourier integral. Also, in particular as a corollary, we get a two-dimensional analogue of the Dirichlet-Jordan theorem for Fourier integrals.

Mathematics subject classification (2020): 42B10, 41A25, 26B30, 40A10.

Keywords and phrases: Rate of convergence, pointwise convergence, function of bounded variation on $\mathbb{R}^2$, double Fourier integral.

REFERENCES

- [1] T. M. APOSTOL, *Mathematical Analysis*, 2nd ed., Addison-Wesley, 1974.
- [2] N. K. BARY, *A Treatise on Trigonometric Series*, Pregamon Press, 1964.
- [3] P. A. BHUVA AND B. L. GHODADRA, *Approximation by partial integrals and Nörlund means of Fourier integrals*, Riv. Mat. Univ. Parma, vol. 15 (2024), 411–431.
- [4] R. BOJANIĆ, *An estimate of the rate of convergence of Fourier series of functions of bounded variation*, Publ. Inst. Math. (Beograd), **26** (40), (1970), 57–60.
- [5] R. BOJANIĆ AND S. M. MAZHAR, *An estimate of the rate of convergence of the Nörlund-Voronoi means of the Fourier series of functions of bounded variation*, Approximation theory III (Proc. Conf., Univ. Texas, Austin, Tex., 1980), pp. 243–248, Academic Press, New York-London, 1980.
- [6] M. FRÉCHET, *Extension au cas des intégrals multiples d'une définition de l'intégrale due à Stieltjes*, Nouvelles Annales Math. **10** (1910), 241–256.
- [7] B. L. GHODADRA AND V. FÜLÖP, *On the convergence of double Fourier integrals of functions of bounded variation on $\mathbb{R}^2$* , Studia Sci. Math. Hungar. **53** (3) (2016), 289–313.
- [8] RICHARD GOLDBERG, *Fourier Transforms*, Cambridge University Press, 1970.
- [9] F. MÓRICZ, *A quantitative version of the Dirichlet-Jordan test for double Fourier series*, Journal of Approx. Theory **71** (1992), 344–358.
- [10] F. MÓRICZ, *Order of magnitude of double Fourier coefficients of functions of bounded variation*, Analysis (Munich) **22**, no. 4, (2002), 335–345.
- [11] I. P. NATANSON, *Theory of functions of a real variable*, vol. I, New York, 1964.
- [12] H. K. NIGAM AND K. SHARMA, *On double summability of double conjugate Fourier series*, Int. J. Math. Math. Sci., Art. ID 104592, (2012), 15 pp.
- [13] H. L. ROYDEN AND FITZPATRICK M. PATRICK, *Real Analysis*, 4th ed., Pearson, 2010.
- [14] WALTER RUDIN, *Principles of Mathematical Analysis*, 2nd ed., McGraw-Hill, Inc. 1964.
- [15] E. C. TITCHMARSH, *Introduction to the theory of Fourier integrals*, Clarendon Press, Oxford, 1937.
- [16] A. ZYGMUND, *Trigonometric series*, 3rd ed., vol. I and II combined, Cambridge University Press, 2002.