

APPROXIMATION OF FUNCTIONS IN A WEIGHTED LEBESGUE SPACE BY MEANS OF THE PICARD SINGULAR INTEGRAL

ABHAY PRATAP SINGH AND UDAY SINGH

Abstract. The integral transforms, particularly singular integrals, play an important role in approximation theory. In this paper, we study the approximation properties of the Picard singular integral in a weighted Lebesgue space and weighted Hölder space. We also show that many of the theorems in the literature dealing with approximation of functions by the Picard singular integral are the special cases of our results.

Mathematics subject classification (2020): 41A35, 41A36, 41A81.

Keywords and phrases: Modulus of smoothness, Picard singular integral, weighted Lebesgue spaces, weighted Hölder space.

REFERENCES

- [1] O. AGRATINI, A. ARAL, E. DENIZ, *On two classes of approximation process of integral type*, Positivity, **3** (21), 1189–1199, 2017.
- [2] A. ARAL, B. YILMAZ, E. DENIZ, *Weighted approximation by modified Picard operators*, Positivity, **24**, 427–439, 2020.
- [3] C. BARDARO, I. MANTELLINI, G. UYSAL AND B. YILMAZ, *A class of integral operators that fix exponential functions*, *Mediterr. J. Math.* **18**: 179, 2021.
- [4] K. BOGALSKA, E. GOJTKA, M. GURDEK, L. REMPULSKA, *The Picard and the Gauss-Weierstrass singular integrals of function of two variables*, *Le Mathematiche*, 71–84, 1997.
- [5] B. FIRLEJY, L. REMPULSKA, *On some singular integrals in Hölder spaces*, *Math. Nachr.* 93–100, 1994.
- [6] S. G. GAL, *Degree of approximation of continuous functions by some singular integrals*, *Revue d'Analyse Numérique et de Théorie de l'approximation*, **27** (2), 251–261, 1998.
- [7] S. G. GAL, *Remark on the degree of approximation of continuous functions by singular integrals*, *Math. Nachr.* 197–199, 1993.
- [8] A. LESNIEWICZ, L. REMPULSKA AND J. WASIAK, *Approximation properties of the Picard singular integral in exponential weighted spaces*, *Matematyki*, **40** (2), 233–242, 1996.
- [9] R. N. MOHAPATRA AND R. S. RODRIGUEZ, *On the rate of convergence of singular integrals for Hölder continuous functions*, *Math. Nachr.* **149** (1), 117–124, 1990.
- [10] L. REMPULSKA AND Z. WALCZAK, *On modified Picard and Gauss-Weierstrass singular integrals*, *Ukrain. Math. J.* **57** (11), 1844–1852, 2005.
- [11] B. YILMAZ, *On some approximation properties of the Gauss-Weierstrass operators*, *Commun. Fac. Sci. Univ. Ank. Ser. A1 Math. Stat.* **68** (2), 2154–2160, 2019.
- [12] M. M. YILMAZ, G. UYSAL, *Convergence of singular operators in weighted Lebesgue spaces*, *Eur. J. Pure Appl. Math.* **10** (2), 335–347, 2017.