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ANALYSIS OF A THEOREM ON THE JACKSON–STECHKIN INEQUALITY IN THE BERGMAN SPACE B_2

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We present a refinement of a theorem of V. A. Abilov, F. V. Abilova, and M. K. Kerimov on the exact constant in a Jackson type inequality between the mean-square approximation of a function of a complex variable by Fourier series in a system orthogonal in a bounded domain and the generalized modulus of continuity of order $m \geq 1$.

Keywords: generalized modulus of continuity, generalized translation operator, orthonormal system, Jackson–Stechkin inequality.

REFERENCES

1. Korneichuk N.P. The exact constant in D. Jackson's theorem on best uniform approximation of continuous periodic functions. *Sov. Math., Dokl.*, 1962, vol. 3, pp. 1040–1041.
2. Chernykh N.I. On Jackson's inequality in L_2 . *Proc. Steklov Inst. Math.*, 1967, vol. 88, pp. 75–78.
3. Chernykh N.I. Best approximation of periodic functions by trigonometric polynomials in L_2 . *Math. Notes*. 1967, vol. 2, no. 5, pp. 803–808. doi: 10.1007/BF01093942.
4. Zhuk V.V. Some exact inequalities between best approximations and moduli of continuity. *Soviet Math. Dokl.*, 1971, vol. 12, pp. 223–226.
5. Taikov L.V. Inequalities containing best approximations and the modulus of continuity of functions in L_2 . *Math. Notes*, 1976, vol. 20, no. 3, pp. 797–800. doi: 10.1007/BF01097254.
6. Ligin A.A. Some inequalities between best approximation and moduli of continuity in L_2 space. *Math. Notes*, 1978, vol. 24, no. 6, pp. 917–921. doi: 10.1007/BF01140019.
7. Babenko A.G. The exact constant in the Jackson inequality in L^2 . *Math. Notes*, 1986, vol. 39, no. 6, pp. 355–363. doi: 10.1007/BF01156673.
8. Ivanov V.I., Smirnov O.I. *Konstanty Jeksona i konstanty Yunga v prostranstve L_p* [Jackson and Jung constants in the spaces L_p]. Tula: Tula State University Publ., 1995, 192 p.
9. Shabozov M.S., Yusupov G.A. Best polynomial approximations in L_2 of classes of 2π -periodic functions and exact values of their widths, *Math. Notes*, 2011, vol. 90, no. 5-6, pp. 748–757. doi: 10.1134/S0001434611110125.
10. Vakarchuk S.B., Zabutnaya V.I. Jackson — Stechkin type inequalities for special moduli of continuity and widths of function classes in the space L_2 , *Math. Notes*, 2012, vol. 92, no. 3-4, pp. 458–472. doi: 10.1134/S0001434612090180.
11. Smirnov V.I., Lebedev N.A. *Functions of a complex variable. Constructive theory*. Cambridge, Mass.: M.I.T. Press, 1968, 488 p. ISBN: 9780262190466. Original Russian text published in Smirnov V.I., Lebedev N.A. *Konstruktivnaya teoriya funktsii kompleksnogo peremennogo*. Moscow; Leningrad: Nauka Publ., 1964, 440 p.
12. Abilov V.A., Abilova F.V., Kerimov M.K. Sharp estimates for the convergence rate of Fourier series of complex variable functions in $L_2(D, p(z))$. *Comput. Mathematics and Mathematical Physics*, 2010, vol. 50, no. 6, pp. 946–950. doi: 10.1134/S0965542510060023.

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