Approximation theorems in weighted Lorentz spaces

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ABSTRACT.

In this paper we deal with the converse and simultaneous approximation problems of functions possessing derivatives of positive orders by trigonometric polynomials in the weighted Lorentz spaces with weights satisfying the so called Muckenhoupt's A_p condition.

REFERENCES

[1] Akgun, R. and Israfilov, D. M., *Approximation in weighted Orlicz spaces*, submitted

[2] Butzer, P. L., Dyckhoff, H., Görlich, E. and Stens, R. L., *Best trigonometric approximation, fractional order derivatives and Lipschitz classes* Can. J. Math. **29** (1977), No. 3, 781-793

[3] Chang, H. M., Hunt R. A. and Kurtz, D. S., *The Hardy-Littlewood maximal functions on $L(p,q)$ spaces with weights*, Indiana Univ. Math. J. **31** (1982), 109-120

[4] Czipszer, J. and Freud, G., *Sur l'approximation d'une fonktion périodique et de ses dérivées succesives par un polynome trigonometrique et par ses dérivées succesives*, Acta Math. **99** (1958), 33-51

[5] Genebashvili, I., Gogatishvili, A., Kokilashvili, V. and Krbec, M., *Weight theory for integral transforms on spaces of homogenous type*, Pitman Monographs, 1998

[6] Haciyeva, E. A., *Investigation of the properties of functions with quasimonotone Fourier coefficients in generalized Nikolskii-Besov spaces*, (in Russian), Author's summary of candidate dissertation, Tbilisi, 1986

[7] Hunt, R., Muckenhoupt, B. and Wheeden, R., *Weighted norm inequalities for the conjugate function and Hilbert transform*, Trans. Amer. Math. Soc. **176** (1973), 227-251

[8] Israfilov, D. M. and Guven, A., *Approximation by trigonometric polynomials in weighted Orlicz spaces*, Studia Math. **174** (2006), No. 2, 147-168

[9] Kokilashvili, V. M. and Yildirir, Y. E., *On the approximation in weighted Lebesgue spaces*, Proceedings of A. Razmadze Math. Inst. **143** (2007), 103-113

[10] Kokilashvili, V. M. and Yildirir Y. E., *On the approximation by trigonometric polynomials in weighted Lorentz spaces*, Journal of Function Spaces and Applications (accepted for publication)

[11] Kurtz, D. S., *Littlewood-Paley and multiplier theorems on weighted L^p spaces*, Trans. AMS, **259**(1980), No. 1, 235-254

[12] Ky, N. X., *Moduli of mean smoothness and approximation with A_p-weights*, Annales Univ. Sci., Budapest, **40** (1997), 37-48

[13] Ky, N. X., An Alexits's lemma and its applications in approximation theory, *Functions, Series, Operators*, Budapest, 2002 (L. Leindler, F. Schipp, J. Szabados, eds.), 287-296

[14] Muckenhoupt, B., *Weighted Norm Inequalities for the Hardy Maximal Function*, Transactions of the American Mathematical Society, **165** (1972), 207-226

[15] Samko, S. G., Kilbas, A. A. and Marichev, O. I., *Fractional integrals and derivatives*, Theory and applications, Gordon and Breach Science Publishers, 1993

[16] Steckin, S. B., *On the order of the best approximations of continuous functions*, Izv. Akad. Nauk SSSR, Ser. Mat. **15** (1951), 219-242

[17] Taberski, R., *Differences, moduli and derivatives of fractional orders*, Comment. Math. **19** (1977), 389-400

[18] Taberski, R., *Two indirect approximation theorems*, Demonstratio Math. **9** (1976), No. 2, 243-255

[19] Timan, A. F., *Investigation in the theory of approximation of functions*, Dissertation, Khar'kov, 1951

[20] Timan, A. F., *Theory of appoximation of functions of a real variable*, Pergamon Press and MacMillan, 1963; Russian original published by Fizmatzig, Moscow, 1960

[21] Zygmund, A., *Trigonometric Series*, Cambridge Univ. Press, Cambridge, 1968

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