ALMOST EVERYWHERE CONVERGENCE OF DYADIC TRIANGULAR–FEJÉR MEANS OF TWO–DIMENSIONAL WALSH–FOURIER SERIES

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Abstract. It is proved that the maximal operators of the dyadic triangular-Fejér means of two-dimensional Walsh-Fourier series is of weak type (1,1). Moreover, the dyadic triangular-Fejér means of the function $f \in L_1$ converge almost everywhere to f as $n \to \infty$.

REFERENCES

[1] J. FINE, *Cesàro summability of Walsh–Fourier series*, Proc. Nat. Acad. Sci. U.S.A., **41**, (1955), 588–591.

[2] N. J. FUJII, *A maximal inequality for H^1-functions on a generalized Walsh-Paley group*, Proc. Amer. Math. Soc., **77**, 1 (1979), 111–116.

[3] G. GÁT, U. GOGINAVA AND G. TKEBUCHAVA, *Convergence in measure of logarithmic means of quadratical partial sums of double Walsh-Fourier series*, J. Math. Anal. Appl., **323**, 1 (2006), 535–549.

[4] G. GÁT, U. GOGINAVA AND K. NAGY, *On the Marcinkiewicz-Fejér means of double Fourier series with respect to the Walsh-Kaczmarz system*, Studia Sci. Math. Hungar., **46**, 3 (2009), 399–421.

[5] G. GÁT, *On almost everywhere convergence and divergence of Marcinkiewicz-Like means of integrable functions with respect to the two-dimensional Walsh system*, Journal of Approx. Theory **164**, 1 (2012), 145–161.

[6] G. GÁT, U. GOGINAVA, *Triangular Fejér Summability of Two-Dimensional Walsh-Fourier series*, Anal. Math. **40**, 2 (2014), 83–104.

[7] U. GOGINAVA, *Marcinkiewicz-Fejér means of d-dimensional Walsh-Fourier series*, J. Math. Anal. Appl., **307**, 1 (2005), 206–218.

[8] U. GOGINAVA, *The maximal operator of Marcinkiewicz-Fejér means of the d-dimensional Walsh-Fourier series*, East J. Approx., **12**, 3 (2006), 295–302.

[9] U. GOGINAVA, *Maximal operators of (C, α)-means of cubic partial sums of d-dimensional Walsh-Fourier series*, Anal. Math., **33**, 4 (2007), 263–286.

[10] U. GOGINAVA, *The weak type inequality for the Walsh system*, Studia Math., **185**, 1 (2008), 35–48.

[11] U. GOGINAVA, *The weak type inequality for the maximal operator of the Marcinkiewicz-Fejér means of the two-dimensional Walsh-Fourier series*, J. Approx. Theory, **154**, 2 (2008), 161–180.

[12] U. GOGINAVA AND F. WEISZ, *Maximal operator of the Fejér means of triangular partial sums of two-dimensional Walsh-Fourier series*, Georgian Math. J. **19**, 1 (2012), 101–115.

[13] H. LEBESGUE, *Recherches sur la convergence des series de Fourier*, Math. Ann., **61**, 2 (1905), 251–280.

[14] J. MARCINKIEWICZ, *Sur une méthode remarquable de sommation des séries doubles de Fourier*, Ann. Scuola Norm. Sup. Pisa Cl. Sci., **8**, 2 (1939), 149–160.

[15] J. MARCINKIEWICZ AND A. ZYGMUND, *On the summability of double Fourier series*, Fund. Math., **32**, (1939), 122–132.

[16] F. SCHIPP, *Über gewisse Maximaloperatoren*, Ann. Univ. Sci. Budapest. Eotvos Sect. Math. **18** (1975), 189–195 (1976).

[17] F. SCHIPP, W. R. WADE, P. SIMON AND J. PÁL, *Walsh Series. An Introduction to Dyadic Harmonic Analysis*, Adam Hilger, Ltd., Bristol, 1990.

[18] P. SIMON, *Investigations with respect to the Vilenkin system*, Ann. Univ. Sci. Budapest. Eotvos Sect. Math, **27**, (1984), 87–101 (1985).

[19] P. SIMON, *Cesàro summability with respect to two-parameter Walsh systems*, Monatsh. Math. **131**, 4 (2000), 321–334.

[20] F. WEISZ, *Cesàro summability of one- and two-dimensional Walsh-Fourier series*, Anal. Math., **22**, 3 (1996), 229–242.

[21] F. WEISZ, *Convergence of double Walsh–Fourier series and Hardy spaces*, Approx. Theory Appl. (N.S.), **17**, 2 (2001), 32–44.

[22] F. WEISZ, *Summability of Multi-Dimensional Fourier Series and Hardy Spaces*, Mathematics and its Applications, 541. Kluwer Academic Publishers, Dordrecht, 2002.

[23] F. WEISZ, *Triangular Cesàro summability of two-dimensional Fourier series*, Acta Math. Hungar. **132**, 1–2 (2011), 27–41.

[24] L. ZHIZHIASHVILI, *Generalization of certain theorem of Marcinkiewicz*, Izv. Akad. Nauk SSSR Ser. Mat. **32**, (1968), 1112–1122 (in Russian); translation in Math. USSR, Izv. **2**, (1968), 1065–1075.

[25] L. ZHIZHIASHVILI, *Trigonometric Fourier Series and Their Conjugates, Mathematics and its Applications*, 372. Kluwer Academic Publishers Group, Dordrecht, 1996.

[26] A. ZYGMUND, *Trigonometric Series*, Vol. I, II, Third edition. With a foreword by Robert A. Fefferman, Cambridge Mathematical Library, Cambridge University Press, Cambridge, 2002.

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