

CONVERGENCE IN MEASURE OF FEJÉR MEANS OF TWO PARAMETER CONJUGATE WALSH TRANSFORMS

USHANGI GOGINAVA* AND SALEM BEN SAID

Abstract. Weisz proved among others – that for $f \in L \log L$ the Fejér means $\tilde{\sigma}_{n,m}^{(t,u)}$ of conjugate transform of two-parameter Walsh-Fourier series a. e. converges to $f^{(t,u)}$. The main aim of this paper is to prove that for any Orlicz space, which is not a subspace of $L \log L$, the set of functions for which Walsh-Fejér Means of two parameter Conjugate Transforms converge in measure is of first Baire category.

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REFERENCES

- [1] A. GARSIA, *Topics in almost everywhere convergence. Lectures in Advanced Mathematics*, 4 Markham Publishing Co., Chicago, 1970.
- [2] G. GÁT, U. GOGINAVA AND G. TKEBUCHAVA, *Convergence in measure of logarithmic means of double Walsh-Fourier series*, Georgian Math. J. **12**, 4 (2005), 607–618.
- [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, *On the divergence of the $(C,1)$ means of double Walsh-Fourier series*, Proc. Amer. Math. Soc. **128**, 6 (2000), 1711–1720.
- [5] R. GETSADZE, *On the divergence in measure of multiple Fourier series*, Some problems of functions theory **4**, 1 (1988), 84–117.
- [6] B. I. GOLUBOV, A. V. EFIMOV AND V. A. SKVORTSOV, *Series and transformations of Walsh*, Nauka, 1987 (Russian); English transl.: Kluwer Acad. publ., Moscow, 1991.
- [7] S. A. KONJAGIN, *On subsequences of partial Fourier-Walsh series*, Mat. Notes, **54**, 4 (1993), 69–75.
- [8] A. N. KOLMOGOROV, *Sur les fonctions harmoniques conjuguées et les séries de Fourier*, Fund. Math. **7**, 1 (1925), 23–28.
- [9] G. MORGENTHALER, *Walsh-Fourier series*, Trans. Amer. Math. Soc. **84**, 2 (1957), 472–507.
- [10] F. MÖRICZ, F. SCHIPP AND W. R. WADE, *Cesàro summability of double Walsh-Fourier series*, Trans Amer. Math. Soc. **329**, 1 (1992), 131–140.
- [11] A. PALEY, *A remarkable series of orthogonal functions*, Proc. London Math. Soc. **3**, 4 (1932), 241–279.
- [12] F. SCHIPP, W. R. WADE, P. SIMON AND J. PÁL, *Walsh series: an introduction to dyadic harmonic analysis*, Adam Hilger, Bristol and New York, 1990.
- [13] M. A. KRASNOSEL'SKII AND YA. B. RUTICKII, *Convex functions and Orlicz space* (English translation), P. Noordhoff Ltd., Groningen, 1961.
- [14] G. TKEBUCHAVA, *On multiple Fourier, Fourier-Walsh and Fourier-Haar series in nonreflexive separable Orlicz space*, Bull. Georg. Acad. Sci. **149**, 2 (1994), 1–3.
- [15] C. WATARY, *On generalized Fourier-Walsh series*, Tōhoku Math. J. vol 10, 3 (1968), 211–241.
- [16] F. WEISZ, *Martingale Hardy spaces and their Applications in Fourier analysis*, Springer, Berlin–Heidelberg–New York, 1994.

- [17] F. WEISZ, *Summability of multi-dimensional Fourier series and Hardy space*, Kluwer Academic, Dordrecht, 2002.
- [18] F. WEISZ, *The maximal (C, α, β) operator of two-parameter Walsh-Fourier series*, J. Fourier Anal. Appl. **6**, 4 (2000), 389–401.
- [19] L. V. ZHIZHIASHVILI, *Some problems of multidimensional harmonic analysis*, TGU, Tbilisi, 1996.