



# Approximation by weighted means of cubical partial sums of double Walsh-Fourier series

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## Abstract

In this article we investigate the rate of the approximation by the weighted means of cubical partial sums of Walsh-Fourier series of a function in  $L^p$  ( $1 \leq p \leq \infty$ ), in particular, in  $\text{Lip}(\alpha, p)$  (for  $\alpha > 0$ ,  $1 \leq p \leq \infty$ ). In case  $p = \infty$  by  $L^p$  we shall mean  $C_W$ , the collection of the uniformly  $W$ -continuous functions. We show that the approximation behavior of the two-dimensional weighted means of Marcinkiewicz type is so good as the approximation behavior of the one-dimensional weighted means discussed by Móricz and Rhoades [10].

**Keywords:** Walsh group, Walsh system, Walsh-Fourier series, weighted mean, two-dimensional system, approximation, Lipschitz class.

**MSC:** Primary 42C10; Secondary 42B10.

## §1. Introduction

Let  $\{p_k : k \geq 1\}$  be a sequence of nonnegative numbers. The weighted means  $t_n^w$  and kernels  $L_n^w$  for the Walsh-Fourier series are defined by

$$t_n^w(f, x) := \frac{1}{P_n} \sum_{k=1}^n p_k S_k^w(f, x), \quad L_n^w(x) := \frac{1}{P_n} \sum_{k=1}^n p_k D_k^w(x),$$

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