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Unconditional convergence of wavelet expansion on the Cantor dyadic group

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Abstract

In this paper we prove that wavelet expansions on the Cantor dyadic group G converge unconditionally in the dyadic Hardy space $H_1(G)$. We will do it for wavelets satisfying the regularity condition of Hölder-Lipshitz type.

Keywords: wavelet expansion, Cantor dyadic group, unconditional convergence.

MSC: Primary 42C40; Secondary 42B30.

§1. Introduction

Let us recall definitions of the dyadic field $\mathbb{F}$ and the Cantor dyadic group G. Denote by $\mathbb{F}_2$ the field of order 2, with elements $\{0,1\}$. Then the *dyadic field* $\mathbb{F}$ is the subset of $\prod_{j\in\mathbb{Z}}\mathbb{F}_2$ consisting of sequences

$$x=(x_j)=(\dots,x_{-2},x_{-1},x_0,x_1,x_2,\dots),$$

for which $x_j\to 0$ as $j\to-\infty$. Addition on $\mathbb{F}$ is the coordinate-wise addition modulo 2:

$$(z_j)=(x_j)+(y_j)\iff z_j=x_j+y_j\,(\mathrm{mod}\,2),$$