

## GEOMETRIC ASPECTS OF MULTIPLE FOURIER SERIES CONVERGENCE ON THE SYSTEM OF CORRECTLY COUNTED SETS

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**Abstract.** For multiple Fourier series the convergence of partial sums essentially depends on the type of integer sets, to which the sequence numbers of their terms belong. The problem on the general form of such sets is studying in  $u$ -convergence theory ( $u(K)$ -convergence) for multiple Fourier series. An alternative method of summation is based on the concept of the so-called correctly denumerable sets. In the paper some results describing the  $u$ -convergence relations and convergence on the system or correctly denumerable sets are presented. It is shown that the system of  $U(K)$ -sets containing a sphere of infinitely increasing radius for fixed  $K$  is correctly denumerable. It is established that for the functions satisfying the Lipschitz condition and having a certain growing  $p - k$ -variation, the coefficients of multiple Fourier series decrease at the average on the system of  $U(K)$ -sets faster than it is predicted by their ordinary estimations. It is shown the accurate estimation of the Fourier coefficients of functions of several variables is achieved at a very “poor” set of elements of the integer lattice.

MSC: 42A24, 26B30, 40H05

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### 1. Introduction

Fourier series are the most effective tool for solving many technical problems, for example, in mechanics [1, 10] and control [13]. Let us consider a set of integer numbers which consists of coefficients of multiple Fourier series. Depending on