

**Title:** Inhomogeneous multiplicative Diophantine approximation on matrix approximation

**Author(s):** Yuan Zhang, Weiliang Wang and Lu Li

In this paper, we establish a coherent theory for inhomogeneous multiplicative Diophantine approximation on matrix approximation. More specifically, for any  $n, m \in \mathbb{N}$  and  $\mathbf{y} \in [0, 1]^n$ , let  $\psi : \mathbb{N} \rightarrow [0, \infty)$  be a positive non-increasing function, and  $\alpha_1, \alpha_2, \dots, \alpha_n$  be positive reals with  $A(n) = \alpha_1 + \dots + \alpha_n$ . A dichotomy law of the Hausdorff measure for the following set

$$\mathcal{M}_{n,m}^{\mathbf{y}}(\psi; \alpha_1, \dots, \alpha_n) := \left\{ \mathbf{x} \in [0, 1]^{nm} : \prod_{i=1}^n \|q_1 x_{i1} + \dots + q_m x_{im} - y_i\|^{\alpha_i} < \psi(|\mathbf{q}|)^{A(n)} \text{ for i.m. } \mathbf{q} \in \mathbb{Z}^m \right\}$$

is obtained, which depends on the convergence or divergence of a certain series.

**Address:**

Yuan Zhang  
Institute of Statistics  
and Applied Mathematics  
Anhui University of  
Finance and Economics  
233030 Benbu  
China

**Address:**

Weiliang Wang  
School of Finance  
and Mathematics  
West Anhui University  
237012 Luan  
China

**Address:**

Lu Li  
School of Finance  
and Mathematics  
West Anhui University  
237012 Luan  
China