Inhomogeneous multiplicative Diophantine approximation on matrix approximation

By YUAN ZHANG (Benbu), WEILIANG WANG (Luan) and LU LI (Luan)

Abstract. 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 $\psi : \mathbb{N} \to [0, \infty)$ be a positive non-increasing function, and $\alpha_1, \alpha_2, \ldots, \alpha_n$ be positive reals with $A(n) = \alpha_1 + \cdots + \alpha_n$. A dichotomy law of the Hausdorff measure for the following set

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

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

YUAN ZHANG
INSTITUTE OF STATISTICS
AND APPLIED MATHEMATICS
ANHUI UNIVERSITY OF
FINANCE AND ECONOMICS
233030 BENBU
CHINA

WEILIANG WANG &
LU LI
SCHOOL OF FINANCE
AND MATHEMATICS
WEST ANHUI UNIVERSITY
237012 LUAN
CHINA