

ON THE TOPOLOGICAL PRESSURE OF THE SATURATED SET WITH NON-UNIFORM STRUCTURE

CAO ZHAO — ERCAI CHEN

ABSTRACT. We derive a conditional variational principle of the saturated set for systems with the non-uniform structure. Our result applies to a broad class of systems including β -shifts, S -gap shifts and their subshift factors.

1. Introduction

Most results in multifractal analysis are applied to study the local asymptotic quantities, such as Birkhoff averages, Lyapunov exponents, local entropies, and pointwise dimensions, which reveal information about a single point or trajectory. It is of interest to study the level set for these quantities. A topological dynamical system (X, d, σ) (or (X, σ) for short) consists of a compact metric space (X, d) and a continuous map $\sigma: X \rightarrow X$. For a continuous function $\psi: X \rightarrow \mathbb{R}$, we always consider the following set:

$$X(\psi, \alpha) = \left\{ x \in X : \lim_{n \rightarrow \infty} \frac{1}{n} \sum_{i=0}^{n-1} \psi(\sigma^i x) = \alpha \right\}.$$

2010 *Mathematics Subject Classification*. Primary: 37B10; Secondary: 37B40, 37D35.

Key words and phrases. Non-uniform structure; topology pressure; saturated set; irregular set.

This research was supported by the National Natural Science Foundation of China (Grant Nos. 11671208, 11431012, 11401581). We would like to thank the referee for very useful comments and helpful suggestions.