

## A NOTE ON DIMENSIONAL ENTROPY FOR AMENABLE GROUP ACTIONS

DOU DOU — RUIFENG ZHANG

---

**ABSTRACT.** In this short note, for countably infinite amenable group actions, we provide topological proofs for the following results: Bowen topological entropy (dimensional entropy) of the whole space equals the usual topological entropy along tempered Følner sequences; the Hausdorff dimension of an amenable subshift (for certain metric associated to some Følner sequence) equals its topological entropy. This answers questions by Zheng and Chen [10] and Simpson [9].

### 1. Introduction

Let  $(X, G)$  be a  $G$ -action topological dynamical system, where  $X$  is a compact Hausdorff space and  $G$  a topological group. Throughout this paper,  $G$  is always assumed to be a countably infinite amenable group, i.e. there exists a sequence of nonempty finite subsets  $\{F_n\}$  of  $G$  (a *Følner sequence*) such that

$$\lim_{n \rightarrow +\infty} \frac{|F_n \Delta gF_n|}{|F_n|} = 0, \quad \text{for all } g \in G.$$

---

2010 *Mathematics Subject Classification.* Primary: 37B40, 28D20, 54H20.

*Key words and phrases.* Topological entropy; dimensional entropy; amenable group; Hausdorff dimension; subshift.

The first author was partially supported by NNSF of China (Grant No. 11431012 and No. 11401220).

The second author was partially supported by NNSF of China (Grant No. 11671094).