Topological **M**ethods in **N**onlinear **A**nalysis
Volume 59, No. 2B, 2022, 867–895
DOI: 10.12775/TMNA.2021.043

TOPOLOGICAL ENTROPY OF DIAGONAL MAPS ON INVERSE LIMIT SPACES

Ana Anušić — Christopher Mouron

Abstract. We give an upper bound for the topological entropy of maps on inverse limit spaces in terms of their set-valued components. In a special case of a diagonal map on the inverse limit space $\varprojlim(I,f)$, where every diagonal component is the same map $g\colon I\to I$ which strongly commutes with f (i.e. $f^{-1}\circ g = g\circ f^{-1}$), we show that the entropy equals $\max\{\mathrm{Ent}(f),\mathrm{Ent}(g)\}$. As a side product, we develop some techniques for computing topological entropy of set-valued maps.

1. Introduction

Topological entropy is one of the most popular (topological) measures of complexity of a dynamical system. It was introduced by Adler, Konheim and McAndrews [1] for compact topological spaces, and further refined by Bowen [4] and Dinaburg [8] in case of metrizable spaces. We are interested in describing entropy of maps on complicated spaces in terms of much simpler, one-dimensional maps.

The spaces we study can be described as *inverse limits* on compact, connected, metric spaces (often called *continua*) X_i, $i\geq 0$, with continuous and

2020 *Mathematics Subject Classification.* 37B40, 37E05, 37B45, 54C60.

Key words and phrases. Topological entropy; inverse limit space; set-valued maps.

The first named author was supported by grant 2018/17585-5, São Paulo Research Foundation (FAPESP).