Topological entropy of maps on inverse limit spaces

ANUŠIĆ Ana[1] and MOURON Chris[2]

[1] *University od São Paulo, Brazil*
E-mail anaanusic@ime.usp.br

[2] *Rhodes College, TN, USA*
E-mail mouronc@rhodes.edu

Given an inverse limit space $\varprojlim(X_i, f_i)$, we are interested in the dynamical properties (for example, topological entropy) of a map $\Psi\colon \varprojlim(X_i, f_i) \to \varprojlim(X_i, f_i)$. If the action of the map Ψ can be described by its "straight down" components, then they completely determine its dynamics. For example, it was shown by Ye in [3] that the entropy of Ψ equals the limit of the entropies of its straight down components.

In general, maps Ψ do not have to be "straight-down" maps, in which case there are no available tools for understanding their dynamics. We will show how to recover "straight-down" components of Ψ in general, with a small price to pay - we have to allow them to be set-valued maps. In that case, we obtain an upper bound for the topological entropy of Ψ in terms of its set-valued components [2]. 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 study strongly commuting interval maps in more detail [1], and develop some techniques for computing topological entropy of set-valued maps.

Acknowledgements: The support of the grant 2018/17585-5, São Paulo Research Foundation (FAPESP) is kindly acknowledged.

References

[1] A. Anušić, C. Mouron, *Strongly commuting interval maps*, preprint 2020, arXiv:2010.15328 [math.DS]

[2] A. Anušić, C. Mouron, *Topological entropy of diagonal maps on inverse limit spaces*, preprint 2020, arXiv:2010.15332 [math.DS]

[3] X. Ye, *Topological entropy of the induced maps of the inverse limits with bonding maps*, Topology Appl. **67** (1995), 113–118.