

# INFINITE SERIES IN COHOMOLOGY AND THE DISCRETE CONLEY INDEX

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This talk is about joint work with L. Hernández Corbato and F. R. Ruiz del Portal. In [1] these two authors, together with P. le Calvez, gave a description of the trace of the (first) homological Conley index of an isolated acyclic continuum  $X$ : very roughly, it is the number of components of the exit set of an index pair that remain fixed under the dynamics. It is natural to ask whether a similar description is possible for arbitrary continua (not necessarily acyclic) when the dynamics is generated by a continuous map (not necessarily a homeomorphism).

In this talk we answer this question. Our focus will mainly be on the technique used to obtain our results. Exploiting certain attractor-repeller decomposition of the unstable manifold of  $X$  the problem reduces to the study of the relation between the cohomology of an attractor and its basin of attraction. This is a classical question that, in the present case, is particularly difficult because the dynamics is discrete and the topology of the unstable manifold can be very complicated. To address it we develop a new method that involves the summation of power series in cohomology: if  $Z$  is a metric space and  $K \subseteq Z$  is a compact, global attractor for a continuous map  $g: Z \rightarrow Z$ , an arbitrary series of the form  $\sum_{j \geq 0} a_j (g^*)^j$  can be interpreted as an endomorphism of the cohomology group of the pair  $(Z, K)$ .

Time permitting, we will also discuss some consequences about the fixed point index in the plane or in  $\mathbb{R}^3$ .

## REFERENCES

- [1] L. Hernández-Corbato, P. Le Calvez, and F. R. Ruiz del Portal. About the homological discrete Conley index of isolated invariant acyclic continua. *Geom. Topol.*, 17:2977–3026, 2013.

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