



"Topological Methods in Dynamical Systems: From Morse Theory to the Conley Index Theory"

SPEAKER/LECTURER: Dahisy Lima (*Universidade Federal do ABC Instituição Federal de Ensino Superior pública e gratuita*)

Site: <https://dahisylima.prof.ufabc.edu.br/>

Period and schedule: May 14 to June 04

Hours: 11:00 - 13:00

Conference Room:

1201 - Dedicated to "R. Dal Passo",

Only May 14 2026 Room: "1101 C. D'Antoni"

Venue: Dipartimento di Matematica - Tor Vergata:

Via della Ricerca Scientifica, 1 – 00133 - ROMA



ABSTRACT

This minicourse provides an introduction to topological methods in dynamical systems, with an emphasis on Conley Index Theory. Conley theory can be viewed as a far-reaching generalization of Morse theory, extending its applicability beyond gradient-like dynamics.

We begin by reviewing the main concepts and results of classical Morse theory, highlighting its role in understanding the topology of manifolds through the critical points of smooth functions. We then introduce the fundamental definitions and key properties of the Conley index, emphasizing its robustness and flexibility in the study of general dynamical systems.

Finally, we discuss Morse decompositions and their associated Morse–Conley inequalities, illustrating how these tools provide deep insights into the structure of invariant sets and the qualitative behaviour of flows.