



Seminars on Mathematical Analysis

29 Gennaio 2026, 15:00

Sala Riunioni - Dipartimento di Matematica

Dott. Lorenzo Liverani

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“A Taxonomy of Neural ODEs”

Abstract:

Neural Ordinary Differential Equations (Neural ODEs, or NODEs) constitute a key class of models in modern machine learning. Introduced in 2018 as a continuous-time analogue of ResNets, NODEs offer a natural framework for studying deep neural networks through tools from mathematical analysis and control theory. Since their introduction, a wide variety of NODE architectures has been proposed, each exhibiting distinct modeling capabilities and limitations.

In this talk, I present a taxonomy of several classical NODE models. Starting from standard (time-dependent) NODEs, I then consider semi-autonomous and fully autonomous architectures. These models are compared from a controllability perspective, highlighting their classification and trajectory-tracking properties.

The talk is based on joint work with Z. Li, K. Liu, and E. Zuazua, as well as ongoing work with A. Álvarez-López.

Organizzatori: Federica Gregorio, Vincenzo Leone, Cristian Tacelli.



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