DMat
Universidade de Aveiro

CIDMA
CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND APPLICATIONS

SEMINAR

Grupo de Análise Funcional e Aplicações
Functional Analysis and Applications Group

Stable laws for random dynamical systems

Romain Aimino
Universidade do Porto

Abstract

In many chaotic dynamical systems, statistical properties of orbits resemble those of stochastic processes. Classical results such as the Central Limit Theorem describe fluctuations of Birkhoff sums for sufficiently regular observables with finite variance, yielding Gaussian limits. However, when observables exhibit heavy tails, the variance may be infinite and Gaussian limits no longer apply. In such cases, stable laws provide the appropriate probabilistic description.
In this talk I will discuss results on stable limit laws for random dynamical systems generated by independent random compositions of interval maps. The systems considered include random piecewise expanding maps as well as intermittent maps with a neutral fixed point. For a class of unbounded observables with regularly varying tails, we prove that suitably normalized Birkhoff sums converge in distribution to α-stable laws. Moreover, we establish a functional stable limit theorem, showing convergence of the associated partial sum processes to an α-stable Lévy process.
A notable aspect of these results is that the stable limits hold both in the annealed and quenched settings with the same normalization constants determined by the stationary measure of the random system. The proofs combine techniques from extreme value theory, Poisson point process convergence, and the analysis of transfer operators.
This is a joint work with Matthew Nicol and Andrew Török.

Room Sousa Pinto
March 20, 2026 - 15:00

This seminar is supported in part by CIDMA (https://ror.org/05pm2mw36) under the Portuguese Foundation for Science and Technology (FCT, https://ror.org/00snfqn58), Grants UID/04106/2025 (https://doi.org/10.54499/UID/04106/2025) and UID/PRR/04106/2025 (https://doi.org/10.54499/UID/PRR/04106/2025).

fct Fundação para a Ciência e a Tecnologia

REPÚBLICA PORTUGUESA