

PIPGES · WEBINARS

SEP · 16
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02:00 PM

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The video call link will be available at:

<https://tiny.one/chazottes-j>

Interinstitutional Graduate Program in Statistics (PIPGES) of Federal University of São Carlos with University of São Paulo promotes seminars groups (temporarily webinars, due to pandemic issues) of researches involving Probability, Statistics, Machine Learning etc. Our interest, among other things, is to stimulate the sharing of knowledge, as well as the connection between members of the program and researchers in other institutions.

Organizer

Michel H. Montoril, Department of Statistics,
Federal University of São Carlos.

UFSCar

QUASI-STATIONARY DISTRIBUTIONS, EXTINCTION AND RESILIENCE IN ECOLOGICAL MODELS

We consider birth-and-death processes going eventually to extinction with probability one, accounting for the finiteness of resources. A classical result says that if we rescale such a process by a parameter K and fix a finite horizon time, then the resulting sample paths are very close to the solutions of a differentiable equation (deterministic dynamical system) with high probability, when K goes to infinity. The corresponding vector field is given by the difference between the birth and death rates. In particular, the limit when times goes to infinity does not commute with the limit when K goes to infinity.

In this talk, I will try to explain what can be said for finite times and for finite K . A central object is the so-called quasi-stationary distribution which plays the role of a stationary distribution when conditioning upon non-extinction. Another one is the mean-time to extinction. Finally, I will touch upon the following question. Observing a realization of the process, can we determine the so-called engineering resilience? This quantity can be defined as the reciprocal of the characteristic return time to, say, a fixed point after a (small) perturbation. To answer this question, we establish two relations which intermingle the resilience, which is a macroscopic quantity defined for the dynamical system, and the fluctuations of the process, which are microscopic quantities.

SPEAKER

Jean-René Chazottes · Ecole Polytechnique, France

BIO

Jean-René is a Senior Researcher at CNRS at Ecole Polytechnique in France. His main research interests are in probabilistic properties of dynamical systems (limit theorems and concentration inequalities), statistical physics, and mathematical ecology. He defended his PhD thesis in 1999 in mathematical physics in Marseille. Before joining CNRS, he did a postdoc in Mexico and then at IME in São Paulo. He is also the director of the Centre de Physique Théorique of Ecole Polytechnique.

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