POLITECNICO DI TORINO

DISMA Dipartimento di Scienze Matematiche G. L. Lagrange
ECCELLENZA 2018 · 2022

Wednesday the 18 July 2018 at 11:00
Politecnico di Torino, DISMA, Aula Buzano (third floor)

Daniele CAPPELLETTI

Visiting Assistant Professor, University of Wisconsin–Madison

Approximations of Stochastic Models for Reaction Networks

Prof. Enrico Bibbona moderates the discussion

Abstract

Stochastic reaction networks are mathematical models mainly used to describe the time evolution of a system of chemical species undergoing chemical transformations. Despite this being the main application, the models are also fruitfully used in Ecology and Epidemiology. In particular, stochastic reaction networks are continuous time Markov chains whose allowed transitions (potentially infinitely many) are described by a finite set of reactions, or a finite graph. A central part of research in the field concerns linking properties of this graph with dynamical features of the model.

In this seminar, Dr Cappelletti will formally describe stochastic reaction networks and discuss different possible approximations thereof when the number of molecules is so high that model simulations become cumbersome. He will explain in which sense these approximations hold and what they fail to capture, describe some of his contributions in this setting and illustrate some open problems in the field.

Biografy

Daniele Cappelletti is currently working as Visiting Assistant Professor at the University of Wisconsin-Madison, his principal collaborators being Prof. David Anderson and Prof. Thomas Kurtz. His research in the field of reaction networks started during his PhD studies, which took place at the University of Copenhagen under the supervision of Prof. Carsten Wiuf. He got his Bachelor's and Master's degree at the Pisa University, under the supervision of Prof. Franco Flandoli.

He will soon start working in the research group of Prof. Mustafa Khammash located in Basel, which is part of the ETH Zurich and whose primary focus is investigating stochastic reaction networks and direct applications thereof in designing biological controls.

Enjoy a great summer time!
Weekly seminars will be back on September 2018. Stay tuned!
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