



**POLITECNICO
DI TORINO**

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

Wednesday the **11 July 2018** at 10:00
Politecnico di Torino, DISMA, Aula Buzano (third floor)

Lorenzo ZINO

Research Assistant at Politecnico di Torino

Controlling Spreading Processes in Networks

Prof. Giacomo Como moderates the discussion

Abstract

The study of spreading processes on networks has improved our understanding of how ideas and innovations, as well as epidemics and mutations diffuse. The increased awareness of such spreading mechanisms has paved the way for the design of effective control techniques, with valuable potential societal benefits.

In this seminar, Lorenzo Zino will adopt the framework of spreading processes on networks to deal with a hot issue in epidemic control: the eradication of mosquito-borne diseases through a new technique. In details, teams of researchers have recently created harmless genetically modified organisms, which can be introduced in a geographic region to substitute the dangerous mosquitoes without altering the environmental equilibria.

The spreading-like approach to model evolutionary phenomena allows for a precise analysis of the system. Specifically, it clarifies how the topology of the geographic region and the control policy used to introduce the mutants influence the time and the effort needed to achieve global eradication of the disease-spreading mosquitoes. Based on these results, a feedback control policy to speed up the process is presented and discussed. Validation results on a case study conclude the talk.

This research program is in collaboration with prof. Fabio Fagnani and prof. Giacomo Como.

Biografy

Since June 2018, Lorenzo Zino has been a Research Assistant at Politecnico di Torino. He is also a PhD candidate in Pure and Applied Mathematics at Politecnico di Torino, under the supervision of prof. Fabio Fagnani. During his PhD, he visited the Department of Automatic Control, Lund University, Sweden, and the Dynamical System Laboratory, Tandon School of Engineering, New York University, US.

His scientific interests include the analysis and control of spreading processes over networks (epidemics, opinions dynamics, etc.), applied probability, network analysis, and game theory.

Save the date for the next event: Wednesday the 18th of July 2018