



Tuesday **November 28, 2019** at 14:30

Politecnico di Torino, DISMA, Aula Buzano (third floor)

Nicolò PAGAN

PhD candidate at ETH Zürich

Game-theoretical Inference of Human Behaviour in Social Networks

Prof. Giacomo Como introduces the seminar.

Abstract

Social networks emerge as the result of actors' linking decisions. We propose a novel game-theoretical model of socio-strategic network formation on directed weighted graphs, with continuous action spaces, where actors are endowed with individual parametric payoff functions. In our previous work, we provided a theoretical analysis of specific network motifs of homogeneous rational agents. Here, we relax these assumptions and deal with complex, real-world networks of heterogeneous and irrational actors.

The goal is to learn the parameters of the payoff functions constructing an inverse optimization problem using the Nash equilibrium condition. In other words, we want to provide the most rational estimate of the heterogeneous individual parameters from an observed state of the network, e.g., a Nash equilibrium. We show that, when agents are rational, the solution set results from the intersection of finitely many half-spaces. Conversely, when agents are irrational, an exact solution does not exist and we deliver Least Square estimates of the parameters with confidence intervals analysis

We provide evidence that our results are consistent with empirical, historical, and sociological observations on real-world data-sets. Furthermore, our method offers sociological and strategic interpretations of random network models, e.g., preferential attachment and small-world networks.

Biography

Since January 2016 Nicolò Pagan is a Ph.D. candidate at the Automatic Control Laboratory at ETH Zürich, working under the supervision of Prof. F. Dörfler. He was born in Venice, Italy, in 1988 and he received his B.Sc. in Mathematical Engineering in 2010 from Politecnico di Torino, Italy, and his M.Sc. in Computational Science and Engineering in 2013 from EPF Lausanne, Switzerland. From May 2013 to December 2015 he was Software Engineer at Ascomp AG, a spin-off of ETH Zürich, working as full-stack developer in the Computational Fluid-Dynamics field. His current research focus can be found at the intersection between Social Networks and Human Decision Making, where he can work on mathematical modelling, complex systems, and data science.

Save the date for the next event: **December 3, 2019**

More info on www.polito.it/disma-excellence