POLITECNICO DI TORINO

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

Thursday October 24, 2019 at 14:30
Politecnico di Torino, DISMA, Aula Buzano (third floor)

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Decision-making in Multiagent Antagonistic Networks

Prof. Giacomo Como introduces the seminar.

Abstract

In our work we consider a decision-making process in a community of agents described by a nonlinear interconnected model with sigmoidal and saturated nonlinearities. The aim is to investigate this process under the assumption that the individuals can both cooperate and compete, meaning that the signed social network representing the community may not be structurally balanced. A "social effort" parameter, added to the model to represent the strength of the commitment between the agents, plays the role of bifurcation parameter in our analysis.

We show that the decision-making dynamic exhibits a pitchfork bifurcation behavior: when the social effort among the agents is low, the origin is the unique equilibrium point of the system, which can be seen as a deadlock situation for the community ("no decision"). When the commitment increases, a pitchfork bifurcation occurs and two opposite equilibria arise, representing two (alternative) decision states for the community. However, multiple decision states appear if the social effort among the agents grows even further ("overcommitment" situation). The value of social effort needed for the first bifurcation to occur is shown to increase with the frustration of the signed network, meaning that if the frustration is high, a high commitment will be required from the agents in order to reach a decision.

Biography

Angela Fontan received a B.Sc. degree in Information Engineering in 2013 and a M.Sc. degree in Automation Engineering in 2016, from the University of Padova, Italy. She is currently a Ph.D. student at the Division of Automatic Control, Department of Electrical Engineering, Linköping University, Sweden. Her main supervisor is Professor Claudio Altafini. Her current research interests are in the area of nonlinear systems, with applications to social networks and collective decision-making processes.

Save the date for the next event: October 29, 2019
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