Report on the International Tutorial Workshop "Control of Complex Networks of Nonlinear Circuits and Systems", Catania, September 7-8, 2017 founded by IEEE CASS Outreach Initiative 2017

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SICC Workshop 2017 - 12th SICC International Tutorial Workshop "Topics in Nonlinear Dynamics"

Control of Complex Networks of Nonlinear Circuits and Systems

Catania, September 7-8, 2017

Società Italiana Caos e Complessità
www.sicc-it.org

DIEEI
Dipartimento di Ingegneria Elettrica, Elettronica e Informatica

UNIVERSITÀ degli STUDI di CATANIA

The International Tutorial Workshop "Control of Complex Networks of Nonlinear Circuits and Systems " has been organized by the Società Italiana Caos e Complessità (Italian Society for Chaos and Complexity) and hosted by the Dipartimento di Ingegneria Elettrica Elettronica e Informatica of the Università degli Studi di Catania. The event has been supported by the IEEE Circuits and Systems Society in the framework of the 2017 IEEE CASS Outreach Initiative (ID #626).

The workshop was held from 7 to 8 september 2017 at the Aula Magna Oliveri of the Dipartimento di Ingegneria Elettrica Elettronica e Informatica of the Università degli Studi di Catania, with the following program.

Program of the workshop

Thursday, 7 september 2017

9.00-9.30 Registration

9.30-11.00 **Guanrong (Ron) Chen**, "Pinning Control and Controllability of Networked MIMO Dynamical Systems"

11.00-11.30 Coffee and face-to-face discussions

11.30-13.00 **Mario di Bernardo**, "Self-organizing and multiplex control of complex multi-agent systems"

13.00-14.30 Lunch

14.30-16.00 **Maurizio Porfiri**, "When zebrafish met engineering"

16.00-16.30 Coffee and face-to-face discussions

16.30-18.00 Presentations by the workshop participants

Friday, 8 september 2017

9.30-11.00 **Ernesto Estrada**, "Dynamics on networks under long-range influences"

11.00-11.30 Coffee and face-to-face discussions

11.30-13.00 **Georgios Sirakoulis**, "Cellular Automata Modeling for Analysis and Control of Complex Systems"

13.00-14.30 Lunch

14.30-16.00 **Sandro Zampieri**, "Information transmission in balanced neuronal networks: the role of matrix non-normality"

16.00-16.30 Coffee and face-to-face discussions

16.30-17.30 **Mattia Frasca**, "Symmetry-based distributed control of synchronization in complex networks"

17.30-18.00 Closing remarks

The workshop was organized to explore the emergence of new research fields in which the modeling, analysis and control of nonlinear phenomena play a role of growing importance. The workshop is devoted to an interdisciplinary audience with particular attention to PhD students and young researchers. In this spirit, the workshop on Control of Complex Networks of Nonlinear Circuits and Systems is addressed to researchers working in various areas of science and engineering.

Complex networks are omnipresent in natural and man-made systems, highlighting the dominant role played by interconnections in forming and shaping the collective behavior of a system made by interacting units. Our understanding of complex networks has nowadays reached a stage mature enough to investigate the problem of controlling the behavior of a network. Addressing this issue comprises a series of fundamental questions: can we drive the dynamical nodes of the network towards the same homogeneous trajectory? can we target a desired not homogeneous state? can we perform the control with a subset of all possible nodes? which nodes have to be selected to guarantee controllability of the network? which strategies can be used? which are the most efficient in terms of energy required to control?

The workshop covered the main topics related to network control starting from introductory material, to recent advances and applications and offered a unique opportunity to meet researchers working on various aspects of network control across several disciplines and fields of applications.

The participants also had the opportunity to present their own research in the form of short oral presentations.

The workshop was attended by 39 participants (the complete list is attached in the following). All of them expressed a satisfactory opinion on the event.

Budget justification

The support by the IEEE CASS ($3,500 USD, € 3079.39) was used to pay the travel expenses of three speakers: Prof. Chen, Prof Porfiri and Prof. Di Bernardo. All the other speakers and expenses (including lunches and stationery costs) were paid by the workshop organizers.

Photos of the event

Prof. Chen giving his seminar at the workshop.

Prof. Di Bernardo giving his seminar at the workshop.