University of Pavia

Ph.D. School of Electrical and Electronics Engineering and Computer Science

Doctoral Seminars on

Formal Methods for Discrete-Time Dynamical Systems

Prof. Calin Belta, Boston University

September 4 – 6, 2019, Aula Seminari Magenta (ex Dip. di Elettronica), D floor
Università degli Studi di Pavia – Via Ferrata 5 - Pavia

The main objective of these seminars is to present formal verification and control algorithms for a class of discrete-time systems generically referred to as linear. Most of the results are formulated for piecewise linear (or affine) systems, which are described by a collection of linear (affine) dynamics associated to the regions of a polytopic partition of the state space. Such systems are quite general, as they have been shown to approximate nonlinear system with arbitrary accuracy. There also exist computational tools for identifying such systems (both the polytopes and the corresponding dynamics) from experimental data. The seminars are organized in three parts. Part I covers the types of systems and specifications used throughout the rest of the seminars. Part II focuses on finite systems, i.e., transition systems with finitely many states, inputs, and observations. In Part III, we bring together the concepts and techniques introduced in Parts I and II and present computational frameworks for verification and control of (infinite) discrete-time linear and piecewise affine systems from LTL specifications.

Date	Seminars topics
04/09/19 11:00 – 13:00	Motivation, transition systems, equivalence relations, quotients, bisimulations, abstractions
04/09/19 14:00 – 16:00	Linear Temporal logic (LTL), automata, and LTL model checking
05/09/19 11:00 – 13:00	Verification and temporal logic control for finite systems
05/09/19 14:00 – 16:00	Automata-based approaches to verification of infinite systems
06/09/19 11:00 – 13:00	Automata-based approaches to temporal logic control of infinite systems
06/09/19 14:00 – 16:00	Optimization-based approaches to temporal logic control of infinite systems

Organizer

Prof. Davide M. Raimondo

Ph.D. Coordinators

Prof. Paolo Di Barba

The seminars will be taught in English
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