Automi Ibridi

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Indice del Corso (Dis)Ordinato

- Automi Ibridi: Sintassi e Semantica
- Sistemi a stati finiti (breve ripasso)
- Il problema della Raggiungibilità
- Risultati di Indecidibilità
- Classi notevoli di Automi Ibridi: timed, rectangular, o-minimal, . . .
- Tecniche di Decisione: (Bi)Simulazione, Cylindric Algebraic Decomposition, Teoremi di Selezione, Semantiche approssimate
- Equazioni Differenziali
- . . . e tanto altro:
  - Logiche temporali
  - Composizione di Automi
  - Il caso Stocastico
  - Stabilità, Osservabilità, Controllabilità
  - Strumenti Software
  - Applicazioni

Charon

- A language for modular specification of interacting hybrid systems based on the notions of agent and mode.
- Alur, Esposito, Fierro, Grosu, Hur, Ivancic, et al.
- UPenn, SunySB, NEC.
- R. Alur et al. "Hybrid Modeling of Biomolecular Networks.", HSCC 2001.

Checkmate

- A MATLAB-based tool for modeling, simulating, and verifying properties of hybrid dynamic systems.
- Chutinan, Fehnker, Han, Kapinski, Kumar, Krogh, et al.
- CMU.
- Silva and Krogh "Formal verification of hybrid systems using CheckMate: a case study.", ACC 2000.

- A tool for reachability analysis of continuous and hybrid systems with linear differential inclusions. The approximation of reachable states is based on numerical integration and polyhedral approximation.
- Dang, Maler.
- VERIMAG.
- Asarin et al. "Approximate Reachability Analysis of Piecewise Linear Dynamical Systems", HSCC 2000.

HSolver

- A program for verification of hybrid systems based on the constraint solver RSOLVER.
- Ratchan, She.
- Max-Planck-Institut.
- Ratschan and She. "Safety verification of hybrid systems by constraint propagation based abstraction refinement", ACM Transactions on Embedded Computing Systems, 2007.

Si veda anche: Campagna and Piazza. "Hybrid Automata, Reachability and Systems Biology." TCS 2010.

HyTech

- It computes the condition under which a linear hybrid system satisfies a temporal requirement.
- Henzinger.
- Berkeley.
- Henzinger, Ho, and Wong-Toi. "HyTech: A Model Checker for Hybrid Systems." Software Tools for Technology Transfer, 1997.

KeYmaera

- A hybrid verification tool for hybrid systems that combines deductive, real algebraic, and computer algebraic prover technologies.
- Platzer, Quesel, Rümmer.
- CMU.
- Platzer. "Logic and compositional verification of hybrid systems." CAV 2011.

Matisse

- A free MATLAB toolbox for safety verification and reachable set computation of large dimensional, constrained linear systems.
- Girard, Julius, Pappas.
- UPenn.
- Girard and Pappas. "Approximation Metrics for Discrete and Continuous Systems." IEEE Transactions on Automatic Control, 2005.

Ariadne

- A C++ package for set-based analysis of dynamical and control systems, including reachability analysis, robust simulation and safety verification.
- Balluchi, Casagrande, Collins, Ferrari, Villa, Sangiovanni-Vincentelli, et al.
- Udine, Parades, CWI, Verona
- Balluchi, Casagrande, Collins, Ferrari, Villa, Sangiovanni-Vincentelli, "Ariadne: a Framework for Reachability Analysis of Hybrid Automata", MNTS 2006.