

Stochastic Hybrid Systems: Theory and Applications

Workshop for the

43rd IEEE Conference on Decision and Control
Monday, December 13, 2004
Atlantis, Paradise Island, Bahamas

Organizers: John Lygeros

Address: Electrical & Computer Engineering
University of Patras
Rio, Patras, 26500
Greece

Tel. +30 2610 996458

Fax. +30 2610 991812

E-mail: lygeros@ee.upatras.gr

WWW: www.sml.ee.upatras.gr/lygeros

Arjan van der Schaft

Address: Department of Applied Mathematics
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

Tel. +31-53-4893449

Fax. +31-53-4893800

E-mail: a.j.vanderschaft@math.utwente.nl

WWW: www.math.utwente.nl/~schaftaj

In association with European Commission projects HYBRIDGE, IST-2001-32460, <http://www.nlr.nl/public/hosted-sites/hybridge/> and COLUMBUS, IST-38314, <http://www.columbus.gr>.

Scope: The main aim of the workshop on □Stochastic Hybrid Systems: Theory and Applications□ is to expose participants to recent research activity in the area of stochastic hybrid systems. Theoretical results will be illustrated and motivated by applications in different important fields.

Stochastic hybrid systems are systems that combine continuous dynamics with discrete/logic components and are affected by uncertainty. From a theoretical point of view, the study of this class of systems is particularly challenging because they exhibit the complexities that arise from the interaction of

- discrete-event systems, such as finite automata, Petri nets, etc.,
- continuous dynamics, governed for example by differential equations and

- stochastic processes, either affecting the discrete-event system transitions or entering the continuous dynamics.

Emphasis will be placed on fundamental theoretical advances for this complex and diverse class of systems, in particular on

- stochastic hybrid modeling
- compositional specification
- reachability analysis
- model checking
- hybrid observer design

Motivation for the theoretical results will be provided by a number of key applications:

- air traffic management
- automotive systems
- communication networks
- mathematical finance

Experts in all these areas have been invited to present their work.

Target audience: The workshop is addressed to graduate students and researchers with a background in automatic control, hybrid systems or stochastic systems. The material covered at the workshop will expose the participants to the state of the art in the area of stochastic hybrid systems as well as open research problems in this area.

Workshop program: The workshop will cover a full day. The program is:

8:30-9:00	J. Lygeros (University of Patras) <i>“Overview of stochastic hybrid models”</i>
9:00-9:30	A. van der Schaft (Twente University) <i>“Compositional specification”</i>
9:30-10:15	M. Prandini (Politecnico di Milano) <i>“Reachability: theoretical foundations and application to aircraft conflict detection”</i>
10:15-10:30	Break
10:30-12:00	J.-P. Katoen (Twente University) <i>“Model checking of stochastic hybrid systems”</i>
12:00-13:30	Lunch
13:30-14:30	M. Davis (Imperial College) <i>“Piecewise deterministic Markov processes revisited”</i>

14:30-15:30	J. Hespanha (U.C. Santa Barbara) <i>"Stochastic hybrid systems in communication networks"</i>
15:30-15:45	Break
15:45-16:30	M.D. di Benedetto (University of L'Aquila) <i>"Hybrid observer design: theory and automotive applications"</i>
16:30-17:15	H. Blom (NLR) <i>"Stochastic hybrid model based assessment of the risk of collision between aircraft"</i>

Workshop proceedings: Copies of all the presentations will be made available to the workshop participants.

For registration and conference information visit
<http://control.bu.edu/ieee/cdc04/>