SAFETY AND REACHABILITY ANALYSIS FOR DYNAMICAL SYSTEMS

44th International Summer School
of Automatic Control
Grenoble, France
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http://www.gipsa-lab.grenoble-inp.fr/summerschools/EEAUTO2023

Scientific Chairs:

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Local Organizer: Mirko FIACCHINI (GIPSA-lab, CNRS, Grenoble, France)

Confirmed Speakers:

- **Piernicola BETTIOL** (Univ. Bretagne Occidentale, France)
- **Philipp BRAUN** (Australian National University, Australia)
- **Antoine GIRARD** (L2S, CNRS, Univ. of ParisSaclay, France)
- **Miroslav KRSTIC** (UC. San Diego, USA)
- **Gabor OROSZ** (Univ. Michigan, USA)
- **Necmiye OZAY** (Univ. Michigan, USA)
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Abstract:

Modern control applications are often linked to constrained environments. Consequently, it is necessary to guarantee tasks with increasing complexity. Such tasks go beyond stabilizing the origin or a reference trajectory. In particular, the reach-avoid paradigm is, nowadays, one of such key tasks. Indeed, we still want the system to reach its target but we also want it to act safely with respect to its environment. Depending on the application, reaching the unsafe zone may correspond to exceeding the system's operating limits, or, quite simply, hitting obstacles. In infinite-dimensional phenomena, safety may depict scenarios of solids not melting, liquids not spilling, or risks remaining away from sensitive areas. In this event, qualitative and control-oriented tools are explored, to tackle this topic from three different angles:

- Nonlinear methods, using Lyapunov/barrier functions, temporal funnels, or projecting a stabilizing controller on a safe set.
- Optimization under state constraints.
- Formal methods, where finite systems are constructed.

The objective of this thematic school is to take stock of the aforementioned basics, as well as recent developments in the field, show the links with modern applications, and identify new areas of research.

Organization: The school will consist of series of lectures and research talks.

Audience: The school is mainly intended for PhD students, researchers, and industrial participants. Basic knowledge in control theory, optimization, and mathematics is useful.

About Grenoble: Capital of the French Alps, Grenoble is easily accessible by plane from two airports: Lyon Saint-Exupery (LYS) or Geneva Cointrin (GVA Switzerland). From LYS, a bus shuttle reaches Grenoble's Railway Station in 1 hour (24 shuttles per day). From GVA, a bus shuttle (2 hours) or a train are available. By train, frequent services are also available from Paris (3-hour TGV, 8 per day) and from Lyon (1 hour and 20 minutes by train).

Deadlines: ***Pre-registration: 23 June*** ***Registration: 03 July***

Registration Fees: (including ***access to lectures, accommodation, lunches and Gala Dinner***)

Students:	**500 €**
Academics (post-doctoral researchers included) and French participants with EPST affiliation:	**650 €**
Industry participants and French participants with EPIC affiliation:	**1100 €**
CNRS:	**Free**