AUTOMATIC CONTROL METHODS AND TOOLS APPLIED TO ELECTROCHEMICAL GENERATORS FOR ELECTRIC VEHICLES

47th International Summer School of Automatic Control,

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https://gipsa-ecoledete.sciencesconf.org/

Scientific Chairs

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Confirmed Lecturers

Loïc BOULON   Institut de recherche sur l'hydrogène à Trois Rivières, Canada
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Aim and scope :
Electric vehicles, whether battery-powered or hydrogen-powered, use energy storage devices – either batteries and/or fuel cells - belonging to the same electrochemical generator technology family which high complexity requires a multi-disciplinary approach. Despite significant advance in their technology, their use under real operating conditions and on a large scale generates new scientific challenges. For example, their reliability, optimization of their dynamic behaviour and lifetime are research areas to be explored. Knowledge of the physical phenomena during system operation, detection and identification of faults that could lead to system failure, prognosis of the residual lifetime of a generator, and energy management in the system are all common issues.

The following key topics will be covered during the summer school:

1. How batteries and fuel cells work: their role in mobility, scientific advances, current and future challenges,
2. Modelling electrochemical generators, indicators for measuring their state of health: physical modelling, impedance spectroscopy,
3. Diagnosing the state of health and operating faults, data and model approaches,
4. Predict residual life, aging indicators, degradation models,
5. Managing energy in an electric vehicle, taking account of health and ageing, BMS and EMS.

The aim of this school is to bring together in a single place all the knowledge required for researchers in automation to meet the challenges of these complex systems. This summer school is resolutely interdisciplinary, i.e. it combines the viewpoints of several disciplines, to enable an integrated approach to scientific challenges.

Organization : The summer school will be made up of themed sessions, alternating presentations, questions and answers and exchanges, examples to work on, as well as practical sections. Visits will also be organized. Time will be set aside for more informal exchanges on questions and points of view on current developments in this field.

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 can be easily reached 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. From GVA, a bus shuttle (2 hours) or a train is available. By train, frequent services are also available from Paris (3-hour TGV) and from Lyon (1 hour and 20 minutes by train).

Registration: Pre-registration is open until the end of June 2024 (all information can be found on the Summer School website).

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

Students:	**400 €**
Academics (post-doctoral researchers included) and French participants with EPST affiliation:	**550 €**
Industry participants and French participants with EPIC affiliation:	**1000 €**
CNRS agents:	**Free**