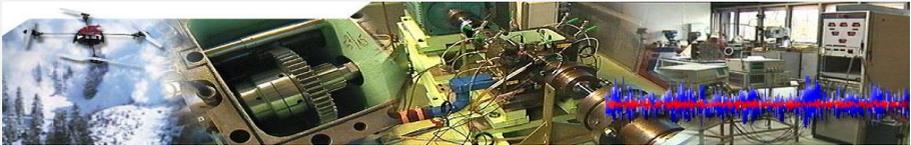# Modeling and Control of Distributed Parameter Systems

33th International Summer School
of Automatic Control
Grenoble, France
September, 10-14, 2012

http://www.gipsa-lab.fr/summerschool/auto2012/

Scientific Chair:
Christophe Prieur,   **CNRS/GIPSA-Lab, Grenoble.**
Local Organization:
Alexandre Seuret,   **CNRS/GIPSA-Lab, Grenoble.**

Lecturers:

F. Alabau-Boussouira, Univ. Metz, France;

G. Bastin, UCL, Louvain-la-Neuve, Belgium;

E. Cerpa, Univ. Técnica Federico Santa María, Valparaiso, Chile;

J.-M. Coron, Univ. P. et M. Curie, Paris, France;

M. Krstic, Univ. of California at San Diego, USA;

B. Maschke, Univ. of Lyon, Lyon, France;

E. Trélat, Univ. P. et M. Curie, Paris, France ;

C. Prieur, CNRS, Grenoble, France;

E. Witrant, Univ. of Grenoble, France;

H. Zwart, University of Twente, the Netherlands.

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Context and motivations

Distributed parameter systems are an area of research which appears in the 1960s. Their interests appear naturally because they are found in many situations, for example, in the modeling of traffic, plasma, chemical reactors, and in fluid mechanics. In this school, we will focus more specifically to issues of modeling and control of distributed parameter systems. Unlike conventional systems, the most useful models are written in terms of *Partial Differential Equations* (PDE) to reflect the distributed nature of the parameters. The issue of modeling is already interesting and difficult, especially for physical systems where the control and the sensors are only located at the edge of the field. *Controllability and Observability* are difficult concepts and relevant to this type of systems described mostly by a single PDE. The study of these questions involves *mathematical techniques* and sophisticated *automatic control tools*. Control of these systems allows the introduction of a loop (and hence coupling) which makes the study of the system even more complicated. There are already many mathematical tools to study and to formalize certain types of simple controls (even if there are open questions). The calculation of more sophisticated controls is difficult and remains a very current theory for distributed parameter systems.

In particular, the lectures of the school deal with

- **Partial Differential Equation,**
- **Port Hamiltonian System,**
- **System of Conservation laws,**
- **Hyperbolic system, ...**
- **Nonlinear equation,**
- **Delay,**
- **Fusion,**

Organization:

The school will consist of a series of courses in English on topics related to the subject.

Public Attend:

The summer school is aimed at PhD students, researchers and teachers in automatic engineering or in applied mathematics. Basic knowledge in automatic and in mathematics will be useful.

About Grenoble:

Capital of the French Alps, about 500 000 residents, 60 000 students, Grenoble is surrounded by the well known mountain ranges: Chartreuse, Vercors and Belledonne. Grenoble can be easily reached by plane from two airports: Lyon Saint-Exupery (LYS) or Geneva (GVA Switzerland). From LYS, a bus shuttle links Grenoble railway station in 1 hour (24 shuttles per day). From GVA, a bus shuttle (2 hours) or a train is possible. By train, frequent services stand from Paris (3 hours TGV, 8 per day) and from Lyon (1 hour by train).

Registration Fees: (including proceedings, lunches and welcome diner)

Non academics: **700€**   Academics: **450 €**   Students: **150€**   CNRS: **FREE**