Evolution Equations: Long Time Behavior and Control

Edited by

KAÏS AMMARI
University of Monastir, Tunisia

STÉPHANE GERBI
University Savoie Mont Blanc, Chambéry, France
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Preface

This volume constitutes the proceedings of the summer school MIS 2015, “Mathematics In Savoie 2015,” whose theme was: “Evolution Equations: long time behavior and control.”

This summer school was held at the University Savoie Mont Blanc, Chambéry in the period June 15–18, 2015 (see http://lama.univ-savoie.fr/MIS2015 for details). It was organized by Kaïs Ammari, UR Analysis and Control of PDE, University of Monastir, Tunisia, and Stéphane Gerbi, Laboratoire de Mathématiques, University Savoie Mont Blanc, France.

The summer school consisted of two mini-courses in the morning while the afternoons were devoted to various contributions on the theme.

The first mini-course was held by Farid Ammar-Khodja, University of Franche-Comté, France. The topic was: “Controllability of parabolic systems: the moment method.” This recent point of view on the controllability of parabolic systems permits to overview the moment method for parabolic equations. This course constitutes the first part of this volume.

The second part of this volume is devoted to the second mini-course which was held by Emmanuel Trélat, UPMC, Paris. The topic was “Stabilization of semilinear PDEs, and uniform decay under discretization.” This course was devoted to the numerical stabilization and control of partial differential equations and more specifically it addresses the problem of the construction of numerical feedback control that will preserve the theoretical rate of decay.

Several of the speakers agreed to write review papers related to their contributions to the summer school, while others have written more traditional research papers, which constitute the last part of this volume.

We believe that this volume therefore provides an accessible summary of a wide range of active research topics, along with some exciting new results,
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and we hope that it will prove a useful resource for both graduate students new to the area and to more established researchers.

The summer school brought together internationally leading researchers from the community of control theory and young researchers who came from all around the world. The organizers’ intention was to provide a wide angle snapshot of this exciting and fast moving area and facilitate the exchange of ideas on recent advances in its various aspects. The numerous formal, informal, and sometimes lively discussions that resulted from this interaction were for us a sign that we achieved something in the direction of fulfilling this aim.

Our second aim was to ensure that the diffusion of these recent results was not limited to established researchers in the area who were present at the summer school, but also available to newcomers and more junior members of the research community. This was reflected by the presence of many unfamiliar and/or young faces in the audience. The present proceedings should hopefully complete the fulfillment of our second aim.

This summer school would not have materialized without the help and support of the following institutions.

We are very grateful to the CNRS (Centre National de la Recherche Scientifique), the University Savoie Mont Blanc; La Région Auvergne-Rhône-Alpes; the GDRI LEM2I: “Laboratoire Euro-Maghrébin de Mathématiques et leurs Interactions;” the GDR MACS: “Modelisation, Analyse et Conduite des Systèmes dynamiques;” the GDR EDP: “Equations aux dérivées partielles;” the GDRE CONEDP: “Control of Partial Differential Equations;” the MaiMoSine: “Maison de la Modélisation et de la Simulation, Nanosciences et Environnement;” and the PERSYVAL-lab: “PERvasive SYstems and ALgorithms” for their financial support without which this summer school would not be accessible without fees.

Finally we would like to thank all the participants of the summer school who have made this event a success, the contributors to these proceedings, and the reviewers for their hard work.

Kais Ammari and Stéphane Gerbi
Chambéry, July 07, 2017
List of Contributors
Present at the Summer School

Farid Ammar Khodja
University and ESPE of Franche-Comté
16, Route de Gray, 25030 Besançon Cedex, France
fammarkh@univ-fcomte.fr

Carlos Castro
Department of Mathematics and Information
ETSI Roads, Canals, and Ports
Technical University of Madrid
Ciudad Universitaria
28040 Madrid, Spain
carlos.castro@upm.es

Taoufik Hmidi
University of Rennes1
Campus de Beaulieu, IRMAR
263, Avenue du Général Leclerc
35042 Rennes, France
thmidi@univ-rennes1.fr

Arnaud Münch
Blaise Pascal University
Laboratoire de Mathématiques, UMR CNRS 6620
Clermont-Ferrand, France
arnaud.munch@math.univ-bpclermont.fr
List of Contributors Present at the Summer School

Serge Nicaise  
*University of Valenciennes and of Hainaut Cambrésis*  
Le Mont Houy  
59313 Valenciennes Cedex 9, France  
snicaise@univ-valenciennes.fr

Cristina Pignotti  
*Department of Engineering and Computer Science and Mathematics*  
Via Vetoio, Loc. Coppito  
67010 L’Aquila, Italy  
pignotti@univaq.it

Reinhard Racke  
*Department of Mathematics and Statistics*  
University of Konstanz  
Fach D 187, 78457 Konstanz, Germany  
reinhard.racke@uni-konstanz.de

Lionel Rosier  
*Automatic Control and Systems Center*  
MINES ParisTech  
60 Bd Saint-Michel, 75272 Paris Cedex, France  
lionel.rosier@mines-paristech.fr

Armen Shirikyan  
*Department of Mathematics*  
Université de Cergy-Pontoise  
Site de Saint Martin  
2, Avenue Adolphe Chauvin  
95302 Cergy-Pontoise Cedex, France  
Armen.Shirikyan@u-cergy.fr

Emmanuel Trélat  
*University of Pierre et Marie Curie (Paris 6)*  
Laboratoire Jacques-Louis Lions  
CNRS, UMR 7598  
4 Place Jussieu, BC 187  
75252 Paris Cedex 05, France  
emmanuel.trelat@upmc.fr