Trends in Mathematics
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Andrei Korobeinikov
Magdalena Caubergh
Tomás Lázaro
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Editors

Extended Abstracts Spring 2018

Singularly Perturbed Systems, Multiscale Phenomena and Hysteresis: Theory and Applications

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Preface

This volume of the Trends in Mathematics: Research Perspectives CRM-Barcelona, offers to your attention a selection of short papers based on the presentations that were made at the joint *9th International Workshop on MUlti-Rate Processes and HYSteresis* (MURPHYS) and *4th International Workshop on Hysteresis and Slow-Fast Systems* (HSFS). The workshop was jointly organized by the Centre de Recerca Matemàtica, Barcelona, and the Collaborative Research Center 910, Berlin, and hosted by the Centre de Recerca Matemàtica, Barcelona, from May 28 to June 1, 2018. This meeting, MURPHYS-HSFS-2018, continued a successful series of biennial multidisciplinary conferences on Multi-Rate Processes and Hysteresis, that previously took place in Cork (Ireland, 2002–2008), Pécs (Hungary, 2010), Suceava (Romania, 2012), Berlin (Germany, 2014), and Barcelona (2016), as well as the series of workshops on Hysteresis and Slow-Fast Systems held in Lutherstadt, Wittenberg, Berlin, and Barcelona.

MURPHYS-HSFS-2018 workshop, dedicated to mathematical theory and applications of the singularly perturbed systems, systems with hysteresis and recent general trends in dynamical systems, brought together over 60 researchers working on hysteresis and multi-scale phenomena from Europe, USA, Russia, and other countries. Participants shared and discussed recent developments of analytical techniques in several areas of common interest. Topics in this volume include analysis of hysteresis phenomena, multiple scale systems, self-organizing nonlinear systems, singular perturbations, and critical phenomena, as well as applications of the hysteresis and the theory of singularly perturbed systems to fluid dynamics, chemical kinetics, cancer modeling, population modeling, mathematical economics, and control. This volume is intended to give to the contributors an opportunity to quickly report their latest research findings: the most of the short articles in this volume are brief preliminary summaries presenting new results that were not yet published in regular research journals.

We are happy to acknowledge support to the Workshop by the *Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR) of the Generalitat de Catalunya*, *Collaborative Research Center 910: Control of self-organizing nonlinear systems (Germany)*, *Ministerio de Economía, Industria y Competitividad*

of the Spanish government, and the *Centre de Recerca Matemàtica*. We also would like to express our gratitude to the CRM leadership and members of administrative staff whose enthusiastic work contributed a lot to the workshop success.

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October 2018

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