

PREFACE: SPECIAL ISSUE ON RATE-INDEPENDENT EVOLUTIONS AND HYSTERESIS MODELLING

The interest in hysteresis and rate-independent phenomena is shared by scientists with a great variety of different backgrounds. We can encounter these processes in several situations of common life: for instance in elasto-plasticity, ferromagnetism, shape-memory alloys, phase transitions. Beyond physics, hysteresis and rate-independent phenomena appear also in engineering, biology, economics as well as in many other settings, playing an important role in many applications. The complexity arising in these fields necessarily requires a joint contribution of experts with different backgrounds and skills. Therefore, only synergy and cooperation among these several people can lead to concrete advances in the technological capabilities of our society.

This special issue of *Discrete and Continuous Dynamical Systems* is devoted to the latest advances and trends in the modelling and in the analysis of this family of complex phenomena. In particular, we gathered contributions from different fields of science (mathematical analysis, mathematical physics, engineering) with the intent of presenting an updated picture of current research directions, offering a new and interdisciplinary perspective in the study of these processes.

Motivated by the *Spring School on Rate-independent Evolutions and Hysteresis Modelling*, held at the Politecnico di Milano and University of Milano on May 27-31, 2013, this special issue contains different kinds of original contributions: some of them originate from the courses held in that occasion and from the discussions they stimulated, but are here presented in a new perspective; some others instead are original contributions in related topics. All the papers are written in the clearest possible language, accessible also to students and non-experts of the field, with the intent to attract and introduce them to this topic.

Final acceptance of all the papers in this volume was made by the normal referee procedure and standard practices of AIMS journals.

We wish to thank all the referees, who kindly agreed to devote their time and effort to read and check all the papers carefully, providing useful comments and recommendations. We are also grateful to all the authors for their great job and the high quality of their contributions. We finally wish to express our gratitude to AIMS and in particular to Prof. Alain Miranville for the opportunity to publish this special issue and for the technical support.

Guest editors:

Stefano Bosia
Michela Eleuteri
Elisabetta Rocca
Enrico Valdinoci