

# Preface

The book is based on the material presented at a mini-symposium “Dynamics and Control of Hybrid Mechanical Systems” at the 6th European Nonlinear Dynamics Conference (ENOC) held in St Petersburg, Russia, in 2008. In turn, the abovementioned mini-symposium was based on results of a similarly entitled Dutch-Russian research project funded by the Dutch organization for Pure Research (now) and the Russian Foundation for Basic Research. The project “Dynamics and Control of Hybrid Mechanical Systems” (DyCoHyMS) ran over the period 2006–2008 and turned out to be quite successful in terms of cooperation and scientific output. This is partly reflected in this book. A number of other related contributions were included into the volume and it now contains results of several international and interdisciplinary collaborations in the field, and reflects state-of-the-art scientific and technological development in the area of hybrid mechanical systems.

The papers in this volume aim to provide a better understanding of the dynamics and control of a large class of hybrid dynamical systems that are described by possibly different models in different state space domains. They not only cover important aspects and tools for hybrid systems analysis and control, but also a number of experimental realizations. Special attention is given to synchronization — a universal phenomenon in nonlinear science that gained tremendous significance since its discovery by Huijgens in the 17th century, see chapter 1 for an introduction to the observations of Huijgens regarding the phase synchronization of pendulum-clocks. Possible applications of the results introduced in the book include control of mobile robots, control of CD/DVD players, flexible manufacturing lines, and complex networks of interacting agents or robots.

It is our honor and pleasure to dedicate this book to Ilya Izrailevich

Blekhman, on the occasion of his 80th birthday celebrated in 2008. Professor Blekhman is one of the most profound thinkers and contributors in the area of nonlinear oscillations and synchronization in the XXth and XXIth century. His biography, for the first time published in English in such detail, follows below. We take the chance to wish Ilya Izrailevich Blekhman good health and new scientific achievements.

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