

Preface

This book includes state-of-the-art contributions in the field of multibody dynamics, an area of computational mechanics aimed at studying the dynamic behaviour of mechanical systems composed of several rigid or flexible bodies that are connected to each other by joints and actuated by forces. Applications of multibody dynamics are related to many fields of contemporary engineering, such as vehicle and railway systems, aeronautical and space vehicles, robotic manipulators, mechatronic and autonomous systems, smart structures, biomechanical systems, and nanotechnologies.

Each book chapter contains a revised and extended version of a paper that was presented at the ECCOMAS Thematic Conference on Multibody Dynamics 2015 held in the Barcelona School of Industrial Engineering, Universitat Politècnica de Catalunya, on 29 June–2 July 2015. The selected works reflect the state of the art in the application of multibody dynamics methodologies to different topics, namely, formulations and numerical methods, efficient methods and real-time applications, flexible multibody dynamics, contact dynamics and constraints, multiphysics and coupled problems, control and optimization, software development and computer technology, aerospace and maritime applications, biomechanics, railroad vehicle dynamics, road vehicle dynamics, and robotics. The result is a comprehensive text that covers fundamental and applied topics, which can serve as a reference handbook for senior researchers, doctoral students and engineers who aim to apply multibody dynamics techniques to different fields of engineering and applied physics.

The ECCOMAS Thematic Conference on Multibody Dynamics is an international meeting held once every two years in a European country. Continuing the very successful series of past conferences that have been organized in Lisbon (2003), Madrid (2005), Milan (2007), Warsaw (2009), Brussels (2011) and Zagreb (2013), the 2015 edition organized in Barcelona served once again as a meeting point for the international researchers, scientists and experts from academia, research laboratories and industry working in the area of multibody dynamics.

The conference was organized by the Department of Mechanical Engineering of the Universitat Politècnica de Catalunya (UPC) in Barcelona, and brought together 360 participants from 35 countries spanning 5 continents. The total number of presentations was 281, which were grouped in 5 parallel tracks giving a total number of 65 sessions. Moreover, four keynote lectures were organized covering the areas of robotics, biomechanics, vehicle dynamics, and design and control of mechanical systems. Two awards to the best scientific contribution and the best work by a young researcher were given during the closing ceremony of the conference.

I would like to take this opportunity to thank the authors for submitting their excellent contributions, the keynote lecturers for accepting the invitation and for the quality of their outstanding talks, the awards and scientific committees for their support to the organization of the conference, the session organizers for reviewing all extended abstracts and selecting the awards nominees, and last but not least, the local organizing committee for all the hard work that made the conference possible. I am also grateful to ECCOMAS, the principal supporting institution; the other international supporting organizations, IFToMM, IUTAM, JSME and KSME; and Springer for accepting the publication of this book.

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