Preface

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The ECCOMAS Thematic Conference on Multibody Dynamics was initiated in 2003 in Lisbon, Portugal, to bring together researchers from different fields of multibody dynamics, covering not only theoretical fields but also applications in which multibody dynamics were contributing to new perspectives for practical, industrial, and medical challenges. Since then, the "ECCOMAS Multibody Dynamics Conference" was held every two years in changing locations and with large attraction in the international scientific community: Madrid (2005), Milan (2007), Warsaw (2009), Brussels (2011), Zagreb (2013), Barcelona (2015), and Prague (2017). The objective of this ninth edition of the ECCOMAS Thematic Conference on Multibody Dynamics in Duisburg (2019) was to bring again researchers from all over the world to share experiences in the various active multibody disciplines such as structural dynamics, multiphysics problems, computational mathematics, control theory and computer science, covering the wide spectrum from virtuality to reality through modelling, analysis, simulation, optimization, and validation. It became clear that the topic is very active and by far not "already solved material", with new methodologies and procedures being produced at a fast pace and finding more and more useful applications in the industry and medical technology.

The present thematic issue contains a selection of five especially recommended full papers from 174 contributions out of 24 countries presented at the 9th ECCOMAS Thematic Conference on Multibody Dynamics, held on July 15–18, 2019 at the University of Duisburg-Essen, Duisburg, Germany. The papers contained in this issue are the result of a strict selection and review process and were identified as spearheads of their corresponding disciplines within the topics covered by the conference and coinciding with general multibody objectives. The authors were invited to extend their contribution made in the conference and to complete their expositions such as to make of them reference publications of archival nature, after which a re-review process was conducted within the high standards of this journal.

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The five topics covered by this thematic issue are: (1) periodic flexible multibody systems with emphasis on simulation and stability, (2) co-simulation techniques with special application in vehicle dynamics, (3) contact mechanics using superellipsoids and nodal points, (4) highly efficient dynamics simulations of giga-particle systems, and (5) biomechanical multibody dynamics for better understanding of sports.

We believe the papers will receive great attention in the multibody community and become reference publications in the future research.

We thank the authors for submitting their valuable contributions for this issue, as well as the reviewers for the timely performing of the reviews. We also thank the editor-in-chiefs of this journal, for making this publication possible, as well as the publisher Springer for its prompt production. Last but not least, we thank the European Community on Computational Methods in Applied Sciences, ECCOMAS, for the ideal support of offering its patronage for this conference.

Guest Editors
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