Preface

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Flexible multibody system dynamics is a growing branch of mechanics that can be used to analyze dynamic systems with deformable bodies. In multibody system dynamics, the deformation of one or more interconnected bodies must often be considered to achieve acceptable simulation accuracy. Due to the inherently nonlinear couplings between reference motions and their corresponding deformations, in general, the effects of compliance cannot be reconstructed from a rigid body simulation. Accounting for deformable bodies, which can be modelled as beams or solid bodies, adds a large spectrum of eigenfrequencies that not only affect overall system behavior, but also require the use of more sophisticated solvers. Specifically, when structural elements, such as beams and shells undergo large deformations, the resulting large rotations require a special and more computationally intensive treatments, which calls for more advanced numerical time integration methods. Using detailed finite element models to describe deformable bodies in multibody applications is an industry standard that demands more advanced computational methods such as model order reduction methods. Moreover, important questions arise in the analysis of contact conditions between deformable bodies and in the development of structural optimization algorithms for flexible multibody systems.

In spring 2020, in the context of the COVID-19 pandemic, we proposed establishing the Online Symposium on Flexible Multibody System Dynamics. Organized in a fully virtual format, the initial event took place on September 21. At a time when many other conferences had been cancelled or postponed, our participants enjoyed meeting for a full-day web conference that featured many questions and the exchange of numerous ideas. Even though socializing during real coffee breaks or participating in an evening social event was not possible, the symposium succeeded in reconnecting active scholars in the field and promoting stimulating community interactions.

After the meeting, the most outstanding presenters were invited to submit full papers to the Multibody System Dynamics journal. The full papers underwent a rigorous peer review process and now constitute a special issue on Flexible Multibody System Dynamics. Five papers have been accepted for publication in this issue that reflect recent developments and

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new perspectives on the analysis of dynamic systems with flexible bodies. We hope you enjoy reading it.

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