

Preface

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Multibody system dynamics is nowadays a widely used toolbox in the development of modern engineering science and technology. It provides powerful dynamic design theories, computational and analytical methods, as well as test technology for innovative engineering applications. In order to systematically show the important effects of multibody system dynamics on the development of modern science and technology, and to strengthen the academic exchanges in the research field of multibody system dynamics and its applications, we organized the Special Issue “New Developments in Multibody System Dynamics and Its Applications” for the Journal “Advances in Mechanical Engineering” containing 12 papers selected from the contributions coming from Germany, Malaysia, P. R. China, Russia, Taiwan, United States, and other countries.

The 12 papers selected for this Special Issue are devoted to the following topics: the application of the transfer matrix method for multibody systems (MSTMM) in portal frame structure; the modeling and error analysis of a six-axis motorized optical fiber alignment stage; the two-link flexible mechanical arm system with periodic composite materials using TMM and Bloch theorem; the modeling, trajectory planning,

and tracking control of an optimal rendezvous and docking problem; the discrete element method for damage mechanism of articular cartilage with fluid–solid coupling; the modeling and design of the controlled vibration-driven system; the modeling and simulation of a boom system in the concrete pump truck; the modeling of the rock fracture and fragmentation using discrete element method; the optimization and algorithm for general multibody dynamics expressed by differential-algebraic equations; the theory and formulation of dynamical equations of multibody systems on Lie groups; and the modeling, formulation, simulation of the drilling process considering the drillstring–wellbore contact and the bit-rock interaction. Thus, the general fundamental theories and several key engineering applications are covered representing the state of the art of recent intensive and extensive research activities in the field of multibody system dynamics to a certain extent.

The guest editors hope that this Special Issue will provide some valuable information and guidance for scientists and engineers working on multibody system dynamics and its applications in modern engineering science and technology.

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