Preface

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The special issue of Multibody System Dynamics contains selected contributions to the EU-ROMECH Colloquium No. 495 on *Advances in Simulation of Multibody System Dynamics*, held in Bryansk, Russia during the period of 18–21 February 2008. Altogether, 42 participants from nine European countries as well as from the Republic of Korea attend this scientific meeting. The 31 presentations covered new developments in multibody system (MBS) dynamics:

- advanced methods of generation and solving equations of motion;
- new approaches in simulation of hybrid flexible/rigid MBS and electromechanical systems;
- recent applications to engineering systems (rail and road vehicles, wheel robots, etc.);
- efficiency of multibody dynamics software.

The talks during the colloquium covered all topics listed above and presented a good balanced combination of both theoretical and applied researches. Speakers of eight presentations were young scientists.

Some important theoretical results discussed during the colloquium were: simulations of MBS with redundant constraints, effective numerical iterative algorithms for solving linear equations during the simulation process taking into account small perturbations of mass matrix for successive steps; results on mapping of conventional FEM beam and plate elements by the absolute nodal coordinate formulation; and the extension of discrete element methods to the simulation of some mechanical models and processes, e.g., cutting process.

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Simulation of road and rail vehicle dynamics is one of the most frequent applications of MBS software. Real-time simulation of road vehicles was discussed in three presentations. Several talks in the field of rail vehicle dynamics presented recent results regarding the choice of a rational gauge value, methods of combined rail/wheel profile wear prediction, comparison of dynamics of different freight cars, and simulation of detailed electromechanical models of locomotives.

The present collection of articles reflects several subjects treated at the Colloquium. We hope that it will stimulate further interest in this important and rapidly developing field.

Guest Editors