

New Special Issue

"Recent advances and current trends in numerical multibody dynamics"

The development of numerical multibody system (MBS) dynamics is characterized by a steady increase of efficiency of simulation codes and of the complexity captured by the MBS models. This allows for interactive real-time simulations and has established high fidelity simulations as integral part of analysis, design and control. In such a comfortable situation the fruits are hanging high, and current challenges in numerical MBS dynamics are to reach a realistic level of detail and to achieve seamless integration. Advanced numerical algorithms together with tailored mathematical models and modeling paradigms are the enabling factors to reach this goal. The unprecedented efficient large scale simulation capabilities also allow for a deeper understanding of the intrinsic dynamics of complex technical and biological systems facilitating reduced order modeling and the design of embedded model-based control systems.

This special issue of Mechanical Sciences is intended to provide a panoramic overview of recent advances and current trends in MBS dynamics. Contributions are solicited in all areas relevant to this topic including:

- MBS algorithms and modeling approaches;
- Flexible MBS, structure dynamics;
- Contact mechanics;
- Multi-disciplinary simulation;
- Low-Order Algorithms, Real-Time Methods;
- Visualization, Virtual Reality, Post Processing;
- Parallel computing, GPU and stream computing;
- Model reduction methods;
- Integration schemes for MBS, constraint reinforcement strategies;
- Optimization, optimal control;
- Nonlinear control, embedded Models;
- Applications: robotics, manipulation and machine tool, automotive engineering, aerospace systems, legged and humanoid systems, locomotion, biomechanics.

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