

STRUCTURE-PRESERVING METHODS FOR THE DYNAMICS AND OPTIMAL CONTROL OF STRUCTURES AND MULTIBODY SYSTEMS

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Key words: Nonlinear Structural Dynamics, Flexible Multibody Dynamics, Optimal Control, Structure-preservation

ABSTRACT

About three decades ago structure-preserving numerical methods emerged in the field of nonlinear solid dynamics. The main goal of structure-preserving methods is to preserve under discretization fundamental balance laws and qualitative properties of the problem at hand.

Initially, the focus was on the dynamics of Hamiltonian systems with symmetry such as rigid bodies and nonlinear elastic structures. It turned out that structure-preserving methods typically yield improved numerical properties and a more realistic behavior of the solution when compared to standard schemes. This includes in particular an improvement of numerical stability and robustness. Due to these enhancements, a lot of further research has gone into the development of structure-preserving methods for more complex problems.

The focus of the present Minisymposium is on current developments of structure-preserving methods for structures, continuum bodies and flexible multibody systems, including the optimal control and inverse dynamics of multibody systems.