

Kolloquium



RUHR-UNIVERSITÄT BOCHUM

UNIVERSITÄT DORTMUND



Mechanik

Vortragsankündigung

Referent:	PETER BETSCH Chair of Computational Mechanics, University of Siegen
Thema:	THE DISCRETE NULL SPACE METHOD FOR CONSTRAINED MECHANICAL SYSTEMS AND ITS APPLICATION TO FLEXIBLE MULTIBODY DYNAMICS
Ort:	Ruhr-Universität Bochum Raum IA 3/21
Zeit:	Mittwoch, den 11.05.2005 15:00 Uhr

Inhalt:

The talk deals with computational methods for discrete mechanical systems subject to (primarily holonomic) constraints. In particular, the newly developed discrete null space method* is introduced. This method rests on the direct discretization of the differential-algebraic equations (DAEs) which govern the motion of the constrained mechanical system. A subsequent size-reduction of the discrete system is achieved by introducing a discrete null space matrix which might be accompanied by a reparametrization of the unknowns. The resulting algorithm possesses a number of advantageous properties such as energy consistency, conservation of momentum maps corresponding to specific symmetries of the mechanical system and satisfaction of the constraints. Moreover, the conditioning problem resulting from the direct discretization of the DAEs is completely eliminated.

In the second part of the talk a specific constrained formulation of rigid bodies, nonlinear beams and shells is proposed. The constrained formulation facilitates a uniform description of typical multibody components by means of the previously considered DAEs. Moreover, the constrained formulation can easily account for additional constraints due to the presence of joints which interconnect the components of a multibody system.

[*] Betsch P. The discrete null space method for the energy consistent integration of constrained mechanical systems. Part I: Holonomic constraints. *Comput. Methods Appl. Mech. Engrg.*, in print.

Veranstalter:

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