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MATHEMATIKKOLLOQUIUM

Das Institut für Mathematik lädt zu folgendem Vortrag ein:

Florian Potra

University of Maryland

Time-stepping schemes for multibody systems with contact and friction

The field of multi-body dynamics simulation is expected to have a major impact on the design of complex mechanical systems, such as robots and assembly line manipulators. Finding realistic models for impact and friction is very important for accurate simulation. Using the rigid body hypothesis substantially simplifies the model and therefore reduces the complexity of the governing equations. Unfortunately, it has been known for over a century that there are examples of rigid multi-body systems with Coulomb friction which have no mathematical solution in the classical sense. Various authors have proposed different settings in which the rigid multi-body system problem with Coulomb friction has a generalized solution either by allowing for impulsive forces (i.e., a solution in the sense of distributions) or by considering the equations of motion as differential inclusions rather than differential equations. In our talk we will present a discrete model that has a computable solution under general conditions and which is very well suited for simulating multi-body systems with friction. Several low order time-stepping procedures to integrate the equations of motion of multibody dynamics with contact and friction will be described. The friction and noninterpenetration constraints are modeled by complementarity equations. Stiffness is accommodated by a technique motivated by a linearly implicit Euler method. Simulations for one- and two-dimensional examples demonstrate the stability of the method. We prove that, as the discretization parameter tends to zero, the discrete solutions converge weakly to the solution of a measure differential inclusion.

Zeit: **Montag, den 2. Juli 2007 um 16:15 Uhr**

Ort: **Viktor-Franz-Hess-Haus, Technikerstrasse 25, HS D**

Alexander Ostermann

Gäste sind herzlich willkommen!