Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Dienstag, 20.11.2012, 14:00 Uhr, Konrad-Zuse-Str. 3-5, Raum 2.030

Computing time investigations of variational multirate schemes

Tobias Gail

Lehrstuhl für Technische Dynamik, FAU-Erlangen-Nürnberg

For mechanical systems with dynamics on different time scales, multirate schemes split the system into different parts and simulate the dynamics on different time grids. We investigate the computing time of variational multirate schemes for unconstrained and constrained systems. We look at two specific example problems, the Fermi-Pasta-Ulam problem and a triple spherical pendulum. The first represents a system without constraints, the latter is formulated as a system with constraints. The dynamic simulation of both systems is implemented in Matlab using a variational multirate integrator. Depending on the number of micro steps per macro step and on the macro step size, the resolution to which the motion is captured varies. Normally, a finer resolution causes higher computing times. Furthermore, the choice of different quadrature rules in the discrete Lagrangian for different parts of the problem, is leading to fully implicit, fully explicit, or mixed implicitexplicit formulations and also influences the costs. We compare the computing times for different choices of quadrature rules in combination with different numbers of micro and macro nodes for dynamic simulations during a certain time interval.

Prof. Dr.-Ing. P. Steinmann
Prof. Dr.-Ing. K. Willner

Lehrstuhl für Technische Mechanik
Egerlandstraße 5, 91058 Erlangen

Prof. Dr.-Ing. S. Leyendecker

Lehrstuhl für Technische Dynamik
Konrad-Zuse-Straße 3-5, 91052 Erlangen