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Leges Motus*



Friedrich-Alexander-Universität
Erlangen-Nürnberg



Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Donnerstag, **06.12.2012, 08:30 Uhr**, Konrad-Zuse-Str. 3-5, Raum 2.030

Lie group and Lie algebra variational integrators for flexible beam and plate in \mathbb{R}^3

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The purpose of this this talk is to present variational integrators synchronous or asynchronous, which can be used as tools to study complex structures composed of plates and beams subjected to large deformations and stress.

We consider the geometrically exact models of beam and plate, whose configuration spaces are Lie groups. These models are suitable for modeling objects subjected to large deformations, where the stored energy chosen is adapted for the types of materials used in our field (isotropic or composite).

The work of J.E. Marsden, and of his doctoral and post-doctoral students, were the basis for the development of variational integrators which are symplectic and perfectly preserve symmetries. Furthermore, discrete mechanical systems with symmetry can be reduced. In addition, by a "good discretization", the strain measures are unchanged by superposed rigid motion.

The idea behind this work is to take advantage of the properties of these integrators to define the equilibrium position of structures, which are generally unknown, as well as to determine the constraints, while preserving the invariants of the structure.

Along with solving these problems, we continue to develop the ideas of J.E. Marsden who laid the foundations of discrete mechanics, with its theorems, axioms, and definitions, which parallel those in continuum mechanics but for a discrete domain. That is, the discrete trajectories of a motion obtained by variational integrators satisfy these discrete laws.

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