Friedrich-Alexander-Universität Erlangen-Nürnberg

Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Mittwoch, 23.01.2013, 15:00 Uhr, Konrad-Zuse-Str. 3-5, Raum 2.030

Phase fitted variational integrators using interpolation techniques for the general N-body problem

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Physical problems where the corresponding components of the Lagrangian, i.e. kinetic and potential energy, depend only on the generalized velocity and the generalized position, respectively, are faced within the discrete variational integrators formalism. For that, we present a methodology to derive higher order variational integration methods that use phase lag properties for the numerical integration of systems with oscillatory solutions.

More specifically, for the derivation of those integrators, the action integral along the curve segment must be defined, using a discrete Lagrangian that depends only on the end points of the interval. High order integrators can then be obtained by defining the discrete Lagrangian in any time segment (on regular or non regular time grid) as a weighted sum of the Lagrangian at intermediate points, where positions and velocities are interpolated using trigonometric functions. The methods derived depend on a frequency, which needs to be estimated. The new methodology, which improves the phase lag characteristics by letting the phase lag vanish at a specific frequency, will be presented and discussed with the help of the general N-body problem as a numerical example.

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