

## Seminar

16. Dezember 2010 16:00h HS 44-465



zu folgendem Vortrag wird herzlich eingeladen:

### **Phase-fitted and Local-path fitted discrete Lagrangian Integrators for oscillatory problems**

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Problems requiring numerical integration are faced within the discrete variational Lagrangian formalism. By exploiting the benefits of such integrators in stiff oscillatory problems and symmetric methods an improved energy behavior is provided.

More specifically, by embedding phase fitting techniques in high order discrete Lagrangian integrators we create integrators with zero phase lag in test Lagrangians similarly as in phase fitted numerical methods for ordinary differential equations. An efficient method for frequency evaluation is presented based on the eccentricities of moving objects.

By exploiting the principle of local path fitting, variational integrators are constructed that do not need the estimation of the action integral. The obtained results show that the new method tremendously improves the accuracy and total energy behavior in Hamiltonian systems. The new techniques are tested for high order solutions in the two-body problem with high eccentricity (up to 0.99), to the perturbed Kepler problem, to the Henon-Heiles Hamiltonian system (with chaotic behavior), in the outer solar system (five outer planets problem).



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