MATHEMATIKKOLLOQUIUM

Das Institut für Mathematik lädt zu folgendem Vortrag ein:

Ernst Hairer

Institut für Mathematik, Universität Genf

Numerical energy conservation over long times

The flow of a Hamiltonian (ordinary or partial) differential equation exactly preserves the energy for all times. Along numerical solutions obtained by classical integrators, one typically observes a linear energy drift. This talk discusses numerical integrators that have an improved behaviour concerning energy conservation. Situations where the energy error remains bounded and small over long times are:

• symplectic methods applied to ordinary Hamiltonian differential equations;
• symmetric integrators for nearly integrable reversible ordinary differential equations;
• exponential integrators and the leap-frog method for one-dimensional nonlinear wave equations subject to periodic boundary conditions.

There are situations where the numerical error in the energy behaves like a random walk and therefore grows like the square root of time:
• symmetric methods applied to reversible chaotic differential equations;
• propagation of round-off errors in situations where the theoretical error in the energy remains bounded (without drift).

Zeit: **Dienstag, den 10. Juni 2008 um 17:15 Uhr**

Ort: **Viktor-Franz-Hess-Haus, Technikerstraße 25, HS F**

Alexander Ostermann

Gäste sind herzlich willkommen!