MATHEMATIKKOLLOQUIUM

Das Institut für Mathematik, Arbeitsgruppe Numerical Analysis
lädt zu folgendem Vortrag ein:

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High-order forward splitting algorithms for solving time-irreversible equations

The solution of many physical evolution equations can be expressed as an exponential of two operators acting on initial data. Higher order algorithms can be systematically derived by decomposing the exponential in a product form. For time-reversible equations, such as the Hamilton or the real time Schrodinger equation, it is immaterial whether or not the decomposition coefficients, or time-steps, are all positive. In fact, such a decomposition into a single product form beyond second-order must contain some negative coefficients. However, for solving time-irreversible systems, such as the diffusion-advection equation or the imaginary time Schrödinger equation, only forward algorithms, with all positive time-steps respecting time-irreversibility of the diffusion kernel, can yield practical algorithms. Thus traditional non-forward splitting algorithms cannot be applied to time-irreversible equations beyond the second-order. This talk will review the fundamental structure of forward time step splitting, derive fourth and higher order algorithms, and demonstrate their utility in solving the imaginary time Schrödinger, Gross-Pitaevskii, Langevin equations, as well as in doing Diffusion Monte Carlo and Path-Integral Monte Carlo simulations.

Zeit: **Donnerstag, den 10. Juni 2010 um 17:15 Uhr**

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

Gäste sind herzlich willkommen

Alexander Ostermann