



EINLADUNG

zum

ZIH-Kolloquium

Titel: From Cellular Automata to Lattice Gas Cellular Automata to Lattice Boltzmann Models

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Kurzfassung:

More than 50 years ago John von Neumann, Stanislav Ulam, and Konrad Zuse invented cellular automata (CA) and investigated possible applications in the simulation of growth processes and signal propagation. Flows can be simulated by Lattice-Gas Cellular Automata (LGCA) which are cellular automata that respect conservation laws for mass and momentum. The first attempts to simulate flows were unsuccessful because of low lattice symmetry.

The discovery of the essential role of lattice symmetry in 1986 was like a spark that initiated an explosive development of various LGCA for the simulation of flows in 2 and 3 dimensions.

Lattice Boltzmann models (LBMs) were developed for the first time in 1988 as a modification of LGCA in order to avoid noise (caused by the discrete nature of CA) and to reach lower viscosities and thus higher Reynolds numbers.

I will discuss some of the basic principles for LGCA and LBM and point to advantages and disadvantages of both methods for particular applications. Lattice Boltzmann models are very powerful methods especially for the simulation of multiphase (liquid and gas) and multicomponent (oil and water) flows or of flows in complex geometries (porous media).

**Ort: Willers-Bau, C 207
Zellescher Weg 12 - 14, 01069 Dresden**

Zeit: Mittwoch, 24. September 2008, 11:00 Uhr

gez. Prof. Dr. Wolfgang E. Nagel