Parallel Numerics '05, 11 M. Vajteršic, R. Trobec, P. Zinterhof, A. Uhl (Eds.)
Chapter 1: Abstracts of Invited Talks ISBN 961-6303-67-8

# Experiences with Large Scale Numerical Simulation

**Ulrich Rüde***

Lehrstuhl für Systemsimulation (Informatik 10)
University of Erlangen-Nürnberg
Cauerstraße 6, D-91058 Erlangen, Germany

Large scale simulation requires both scalable algorithms and the use of parallel supercomputers. Scalable algorithms for partial differential equations are often based on hierarchical methods, such as the multigrid method or multilevel methods, and are thus nontrivial to implement in parallel with satisfactory efficiency. Furthermore, many high performance applications on current computer architectures suffer from the insufficient performance of the memory system. In this presentation we will focus on the challenges of designing fully scalable methods, that is methods that scale linearly with problem size and processor number and that can achieve a satisfactory fraction of the peak performance on current supercomputer architectures.

*Corresponding author. E-mail: ulrich.ruede@informatik.uni-erlangen.de