

Contents

A Review of the Finite Cell Method for Nonlinear Structural Analysis of Complex CAD and Image-Based Geometric Models 1
Dominik Schillinger, Quanji Cai, Ralf-Peter Mundani, and Ernst Rank

Immersed Boundary Methods for Fluid-Structure Interaction and Shape Optimization within an FEM-Based PDE Toolbox 25
Janos Benk, Hans-Joachim Bungartz, Miriam Mehl, and Michael Ulbrich

Numerical Simulation of Transport in Porous Media: Some Problems from Micro to Macro Scale 57
Quanji Cai, Sheema Kooshapur, Michael Manhart, Ralf-Peter Mundani, Ernst Rank, Andreas Springer, and Boris Vexler

Optimal Control of Partially Miscible Two-Phase Flow with Applications to Subsurface CO₂ Sequestration 81
Moritz Simon and Michael Ulbrich

A Newton-CG Method for Full-Waveform Inversion in a Coupled Solid-Fluid System 99
Christian Boehm and Michael Ulbrich

Advances in the Parallelisation of Software for Quantum Chemistry Applications 119
Martin Roderus, Alexei Matveev, Hans-Joachim Bungartz, and Notker Rösch

Designing Spacecraft High Performance Computing Architectures 137
Fisnik Kraja, Georg Acher, and Arndt Bode

Requirements Engineering for Computational Seismology Software 157
Yang Li, Bernd Bruegge, Simon Stähler, Nitesh Narayan,
and Heiner Igel

**A High-Performance Interactive Computing Framework
for Engineering Applications 177**
Jovana Knežević, Ralf-Peter Mundani, and Ernst Rank

**A Framework for the Interactive Handling
of High-Dimensional Simulation Data
in Complex Geometries 201**
Amal Benzina, Gerrit Buse, Daniel Butnaru, Alin Murarasu, Marc
Treib, Vasco Varduhn, and Ralf-Peter Mundani

**Experiences with a Flexibly Reconfigurable Visualization
System on Software Development and Workplace Ergonomics 223**
Marcus Tönnis, Amal Benzina, and Gudrun Klinker

Advanced Computing

Bader, M.; Bungartz, H.-J.; Weinzierl, T. (Eds.)

2013, XII, 240 p. 117 illus., 81 illus. in color., Hardcover

ISBN: 978-3-642-38761-6