

Contents

Mathematical and Numerical Techniques in Energy and Environmental Modeling <i>Zhangxin Chen and Richard E. Ewing</i>	1
Domain Decomposition for Some Transmission Problems in Flow in Porous Media <i>Clarisse Alboin, Jérôme Jaffré, Jean E. Roberts, Xuewen Wang, and Christophe Serres</i>	22
Numerical Subgrid Upscaling of Two-Phase Flow in Porous Media <i>Todd Arbogast</i>	35
Numerical Simulation of Multiphase Flow in Fractured Porous Media <i>Peter Bastian, Zhangxin Chen, Richard E. Ewing, Rainer Helmig, Hartmut Jacobs, and Volker Reichenberger</i>	50
The Modified Method of Characteristics for Compressible Flow in Porous Media <i>Aijie Cheng and Gaohong Wang</i>	69
A Numerical Algorithm for Single Phase Fluid Flow in Elastic Porous Media <i>Hongsen Chen, Richard E. Ewing, Stephen L. Lyons, Guan Qin, Tong Sun, and David P. Yale</i>	80
On the Discretization of Interface Problems with Perfect and Imperfect Contact <i>Tatiana Chernogorova, Richard E. Ewing, Oleg Iliev, and Raytcho Lazarov</i>	93
Finite Element Analysis for Pseudo-Hyperbolic Integral-Differential Equations <i>Xia Cui</i>	104

**A CFL-Free Explicit Scheme with Compression
for Linear Hyperbolic Equations**

Ronald A. DeVore, Hong Wang, Jiang-Guo Liu, and Hong Xu 116

**Maximizing Cache Memory Usage for Multigrid Algorithms
for Applications of Fluid Flow in Porous Media**

*Craig C. Douglas, Jonathan Hu, Mohamed Iskandarani,
Markus Kowarschik, Ulrich Rde, and Christian Weiss* 124

**A Locally Conservative Eulerian-Lagrangian Method
for Flow in a Porous Medium of a Mixture
of Two Components Having Different Densities**

Jim Douglas, Jr., Felipe Pereira, and Li-Ming Yeh 138

**Validation of Non-darcy Well Models
Using Direct Numerical Simulation**

*Vladimir A. Garanzha, Vladimir N. Konshin, Stephen L. Lyons,
Dimitrios V. Papavassiliou, and Guan Qin* 156

**Mathematical Treatment of Diffusion Processes of Gases
and Fluids in Porous Media**

Norbert Herrmann 170

**Implementation of a Locally Conservative Eulerian-Lagrangian
Method Applied to Nuclear Contaminant Transport**

Chieh-Sen Huang and Anna M. Spagnuolo 179

**Application of a Class of Nonstationary Iterative Methods
to Flow Problems**

Xiuren Lei and Hong Peng 190

**Reservoir Thermal Recover Simulation
on Parallel Computers**

Baoyan Li and Yuanle Ma 195

**A Class of Lattice Boltzmann Models
with the Energy Equation**

Yuanxiang Li, Shengwu Xiong, and Xiufen Zou 208

**Block Implicit Computation of Flow Field
in Solid Rocket Ramjets**

Zhibo Ma and Jianshi Zhu 216

**Stable Conforming and Nonconforming Finite Element
Methods for the Non-newtonian Flow**

Pingbing Ming and Zhong-Ci Shi 222

Numerical Simulation of Compositional Fluid Flow in Porous Media

Guan Qin, Hong Wang, Richard E. Ewing, and Magne S. Espedal . . . 232

Parallelization of a Compositional Reservoir Simulator

*Hilde Reme, Geir Åge Øye, Magne S. Espedal,
and Gunnar E. Fladmark* 244

Relationships among Some Conservative Discretization Methods

Thomas F. Russell 267

Parallel Methods for Solving Time-Dependent Problems Using the Fourier-Laplace Transformation

Dongwoo Sheen 283

Cascadic Multigrid Methods for Parabolic Pressure Problems

Zhong-Ci Shi and Xuejun Xu 292

Estimation in the Presence of Outliers: The Capillary Pressure Case

Sam Subbey and Jan-Erik Nordtvedt 299

A Comparison of ELLAM with ENO/WENO Schemes for Linear Transport Equations

Hong Wang and Mohamed Al-Lawatia 311

An Accurate Approximation to Compressible Flow in Porous Media with Wells

*Hong Wang, Dong Liang, Richard E. Ewing,
Stephen L. Lyons, and Guan Qin* 324

Fast Convergent Algorithms for Solving 2-D Integral Equations of the First Kind

Yan-Fei Wang and Ting-Yan Xiao 333

A Two-Grid Finite Difference Method for Nonlinear Parabolic Equations

Ziting Wang and Xianggui Li 345

A Compact Operator Method for the Omega Equation

Francisco R. Villatoro and Jesús García-Lafuente 351

Domain Decomposition Algorithm for a New Characteristic Mixed Finite Element Method for Compressible Miscible Displacement <i>Danping Yang</i>	362
A Boundary Element Method for Viscous Flow on Multi-connected Domains <i>Dequan Yang, Tigui Fan, and Xinyu Yang</i>	373
A Characteristic Difference Method for 2D Nonlinear Convection-Diffusion Problems <i>Xi-Jun Yu and Yonghong Wu</i>	378
Fractional Step Methods for Compressible Multicomponent Flow in Porous Media <i>Yirang Yuan</i>	390
A Model and Its Solution Method for a Generalized Unsteady Seepage Flow Problem <i>Guoyou Zhang, Tigui Fan, Zhongsheng Zhao, and Dequan Yang</i>	404
Domain Decomposition Preconditioners for Non-selfconjugate Second-Order Elliptic Problems <i>Huaiyu Zhang and Jiachang Sun</i>	409
Performance of MOL for Surface Motion Driven by a Laplacian of Curvature <i>Wen Zhang and Ian Gladwell</i>	419
A High-Order Upwind Method for Convection-Diffusion Equations with the Newmann Boundary Condition <i>Weidong Zhao</i>	430
Author Index	442
Subject Index	444

Numerical Treatment of Multiphase Flows in Porous Media

Proceedings of the International Workshop Held at Beijing, China, 2-6 August 1999

Chen, Z.; Ewing, R.E.; Shi, Z.-C. (Eds.)

2000, XXI, 446 p., Hardcover

ISBN: 978-3-540-67566-2