

Second International Workshop on Scientific  
Computing and Applications.  
Kananaskis, Canada, May 28 - June 1, 2000

Program

May 28 (Sunday)

19:00-21:00 Registration and reception

May 29 (Monday)

Session Chairman: Y. Wong

Porous Media Flows (I)

08:30-09:20 **R. Ewing** Modelling and Simulation of Multiphase Flow in Porous Media.

09:20-09:50 J. Douglas, **D. Frias**, N. Henderson & F. Pereira, Numerical Simulation of Compressible Reservoir Flow Problems by Eulerian-Lagrangian Technique.

09:50-10:20 **I. Yotov**, Domain Decompositions for Multiphase Flow in Heterogeneous Multiblock Porous Media.

10:20-10:40 Coffee Break

Session Chairman: R. Lazarov

10:40-11:30 **T. Tang** Moving Mesh Methods for Partial Differential Equations based on Harmonic Maps.

11:30-12:00 **B. Bialecki**, Domain Decomposition for Orthogonal Spline Collocation Problems.

12:00-13:30 Lunch Break

Session Chairman: P. Minev

Numerical Methods for Incompressible Fluid Flow (I)

13:30-14:20 **P. Gresho**, On Rapid and Impulsive Transients for Viscous Incompressible Flow.

14:20-14:50 **M.C. Kropinsky**, Time-Evolving Interfaces in Viscous Flows.

14:50-15:20 **I. Bazhlekov**, F.N. van de Vosse & H. E.H. Meijer, 3D numerical simulation of drop coalescence.

15:20-15:40 Coffee Break

Session Chairman: M. Fortin

15:40-16:10 **C. Christov** & R.S. Marinova, Vectorial Operator Splitting for Navier-Stokes Equations in Primitive Variables.

16:10-16:40 **J. Bowman**, Numerical Challenges for Turbulence Computation: Statistical Equipartition and the Method of Spectral Reduction.

16:40-17:10 **B. Guo**, Effective Parallel and Iterative Solvers for General-Setting h-p Finite Element Approximation.

17:10-17:40 **J. Zhou**, A Local Minimax Methods for Finding Multiple Saddle Points and Their Instability Indices.

May 30 (Tuesday)

Session Chairman: R. Ewing

Porous Media Flows (II)

08:30-09:20 **R. Lazarov**, Mortar Methods for Locally Conservative Schemes on Non-matching Grids.

09:20-09:50 **S. Kang**, Spatial Estimation of Groundwater Contaminant Concentrations.

09:50-10:20 **W. Sun**, The Collocation Method for PDE's.

10:20-10:40 Coffee Break

Session Chairman: Y. Lin

Finite Volume Methods

10:40-11:10 **C. Guenther**, The Effect of Numerical Diffusion on Gas-Solids Fluidized Beds and the Use of Deferred Correction in Finite Volume methods to Stabilize High Order Discretization of Convective Terms.

11:10-11:40 **P. Wilders**, A Positive Spatial Advection Scheme on Triangular Meshes for Tracer Transport.

11:40-13:00 Lunch Break

Session Chairman: Z. Shi

Efficient Iterative Methods for Linear Systems

13:00-13:50 **O. Axelsson** and S. Margenov, An Optimal Order Multilevel Preconditioner with Respect to Problem and discretization parameters.

13:50-14:20 **M. Schäfer**, Multigrid Methods for Coupled Fluid-Solid Problems.

14:20-14:50 **B.A. Shadwick**, W.F. Buell & J.C. Bowman, Structure Preserving Integration Algorithms.

14:50-15:20 Coffee Break

Session Chairman: P. Gresho

Numerical Methods for Incompressible Fluid Flow (II)

15:20-16:10 **M. Salcudean**, Mathematical Modelling of Industrial Processes.

16:10-16:40 S. Berrabaai, **P. Fraunié** & J.M. Redondo, Large Eddy Simulation of Highly Stratified Flows: The Layering Effect.

16:40-17:10 **P. Oosthuizen**, Effect of Aspect Ratio on Three- Dimensional Natural Convection in a Horizontal Enclosure with a Uniform Heat Flux on the Lower Surface.

17:10-17:40 **K. Hegewisch** and H.-M. Yin, On Some Mathematical and Numerical Issues about the Microwave Heating Process.

19:00-22:00 Banquet

**May 31 (Wednesday)**

Session Chairman: G. Fairweather

08:30-09:20 **Zhong-ci Shi**, A Class of High Accuracy Unconventional Finite Elements.

09:20-10:10 **K.Y. Fung**, Time-Domain Computation of Waves with Realistic Geometry and Impedance Boundary Conditions.

10:10-11:00 **J. Zou**, Edge and Nodal FEM's and Their Convergence Theory for Electromagnetic Problems in Continuous and Discontinuous Media.

11:30-19:30 Excursion

**June 1 (Thursday)**

Session Chairman: O. Axelsson

**Finite Element Methods**

08:30-09:20 **M. Fortin**, A Mesh Adaptation Procedure Based on a Hierarchical Error Estimator.

09:20-09:50 **T. Lin**, A Non-conformal Rectangular Immersed Finite Element Method for Interface Problems.

09:50-10:20 **G. Fairweather** & M. Khebchareon, Alternating Direction Implicit Finite Element Methods for Schrödinger-Type Problems.

10:20-10:50 Coffee Break

Session Chairman: C. Christov

**Numerical Methods for Incompressible Fluid Flow (III)**

10:50-11:20 **V. John**, Numerical Performance of Smoothers in Coupled Multi-grid Methods for the Parallel Solution of the Incompressible Navier-Stokes Equations.

11:20-11:50 **M. Speetjens**, A Spectral Solver for the Three-Dimensional Navier-Stokes Equations in Velocity-Vorticity Formulation.

11:50-13:30 Lunch Break

Session Chairman: M. Schäfer

Applications

13:30-14:20 **B. Lee**, Fluid-Structure Interaction: Application in Nonlinear Aeroelasticity.

14:20-14:50 **Y.J. Wu**, A Dynamic Market Equilibrium Model for Assessing and Optimizing Energy-related  $CO_2$  Emission.

14:50-15:20 **H. Yang**, A Fast and Highly Accurate Numerical Method for Validation of American Options.

15:20-15:50 Coffee Break

Session Chairman: B. Lee

15:50-16:20 **L. Liu**, Y.S. Wong & B.H.K. Lee, Study on Nonlinear Aeroelasticity.

16:20-16:50 **S. Ma**, A Non-local Problem from Microelectronics Simulations

16:50-17:20 **G. Cao**, Analysis of a Chemotaxis Model.