

# Scientific Computing

Volume 31, Number 5

Articles originally published online August 2009 to November 2009

---

## CONTENTS

- 3217 Computing Beltrami Fields  
*Tahar Amari, Cédric Boulbe, and Tahar Zamène Boulmezaoud*
- 3255 Another Look at Velocity Extensions in the Level Set Method  
*David L. Chopp*
- 3274 Accurate Uncertainty Quantification Using Inaccurate Computational Models  
*Phaedon-Stelios Koutsourelakis*
- 3301 A General Perfectly Matched Layer Model for Hyperbolic-Parabolic Systems  
*Daniel Appelö and Thomas Hagstrom*
- 3324 A Space-Time Adaptive Finite Element Algorithm Based on Dual Weighted Residual Methodology for Parabolic Equations  
*R. Bermejo and J. Carpio*
- 3356 A Two-Scale Solution Algorithm for the Elastic Wave Equation  
*Tetyana Vdovina, Susan E. Minkoff, and Sean M. L. Griffith*
- 3387 Generalized Two-Dimensional Delaunay Mesh Refinement  
*Andrey N. Chernikov and Nikos P. Chrisochoides*
- 3404 Tether Force Constraints in Stokes Flow by the Immersed Boundary Method on a Periodic Domain  
*Joseph M. Teran and Charles S. Peskin*
- 3417 Algebraic Multilevel Krylov Methods  
*Yogi A. Erlangga and Reinhard Nabben*
- 3438 Moving Mesh Generation Using the Parabolic Monge–Ampère Equation  
*C. J. Budd and J. F. Williams*
- 3466 Ultimately Fast Accurate Summation  
*Siegfried M. Rump*
- 3503 Smoothed Aggregation Multigrid for the Discontinuous Galerkin Method  
*F. Prill, M. Lukáčová-Medvid'ová, and R. Hartmann*
- 3529 Ranks and Representations for Spectral Graph Bisection  
*Jacob G. Martin and E. Rodney Canfield*
- 3547 Multidimensional Fast Gauss Transforms by Chebyshev Expansions  
*Johannes Tausch and Alexander Weckiewicz*
- 3566 Quantum Control with Piecewise Constant Control Functions  
*Ilan Degani, Antonella Zanna, Lene Sælen, and Raymond Nepstad*
- 3595 Schwarz Waveform Relaxation Algorithms for the Linear Viscous Equatorial Shallow Water Equations  
*Véronique Martin*
- 3626 Scalable Heuristic Algorithms for the Parallel Execution of Data Flow Acyclic Digraphs  
*Zeyao Mo, Aiqing Zhang, and Gabriel Wittum*
- 3643 Collocation Coarse Approximation in Multigrid  
*Roman Wienands and Irad Yavneh*
- 3661 Coupling Stokes–Darcy Flow with Transport  
*Danail Vassilev and Ivan Yotov*
- 3685 A Generalized-Laguerre–Fourier–Hermite Pseudospectral Method for Computing the Dynamics of Rotating Bose–Einstein Condensates  
*Weizhu Bao, Hailiang Li, and Jie Shen*

*Continued on inside back cover*

CODEN: SJOCE3

Continued from back cover

- 3712 Parametric Maximum Flow Algorithms for Fast Total Variation Minimization  
*Donald Goldfarb and Wotao Yin*
- 3744 Breaking the Curse of Dimensionality, or How to Use SVD in Many Dimensions  
*I. V. Oseledets and E. E. Tyrtshnikov*
- 3760 Solution of Large Scale Evolutionary Problems Using Rational Krylov Subspaces with Optimized Shifts  
*Vladimir Druskin, Leonid Knizhnerman, and Mikhail Zaslavsky*
- 3781 Algebraic Multilevel Preconditioner for the Helmholtz Equation in Heterogeneous Media  
*Matthias Bollhöfer, Marcus J. Grote, and Olaf Schenk*
- 3806 Solving Optimization-Constrained Differential Equations with Discontinuity Points, with Application to Atmospheric Chemistry  
*Chantal Landry, Alexandre Caboussat, and Ernst Hairer*
- 3827 A Hybridizable Discontinuous Galerkin Method for Steady-State Convection-Diffusion-Reaction Problems  
*Bernardo Cockburn, Bo Dong, Johnny Guzmán, Marco Restelli, and Riccardo Sacco*
- 3847 High Order Accurate Methods for the Evaluation of Layer Heat Potentials  
*Jing-Rebecca Li and Leslie Greengard*
- 3861 A Scalable Newton-Krylov-Schwarz Method for the Bidomain Reaction-Diffusion System  
*M. Munteanu, L. F. Pavarino, and S. Scacchi*
- 3884 A General Asymptotic Expansion Formula for Integrals Involving High-Order Orthogonal Polynomials  
*Emmanuel Perrey-Debain and I. David Abrahams*
- 3905 Running Relative Error for the Evaluation of Polynomials  
*Jorge Delgado and J. M. Peña*
- 3922 Chirplet Approximation of Band-Limited, Real Signals Made Easy  
*J. M. Greenberg and Laurent Gosse*
- 3946 Numerical Algorithm for Spatial Segregation of Competitive Systems  
*Farid Bozorgnia*
- 3959 An Iterative Method for the Stokes-Type Problem with Variable Viscosity  
*Piotr P. Grinevich and Maxim A. Olshanskii*
- 3979 Three-Dimensional Adaptive Central Schemes on Unstructured Staggered Grids  
*Aziz Madrane and Rémi Vaillancourt*
- 4000 Fast Discrete Orthonormal Stockwell Transform  
*Yanwei Wang and Jeff Orchard*