
Contents

Part I Plenary Presentations

Domain Decomposition and hp-Adaptive Finite Elements <i>Randolph E. Bank, Hieu Nguyen</i>	3
Domain Decomposition Methods for Electromagnetic Wave Propagation Problems in Heterogeneous Media and Complex Domains <i>Victorita Dolean, Mohamed El Bouajaji, Martin J. Gander, Stéphane Lanteri, Ronan Perrussel</i>	15
N–N Solvers for a DG Discretization for Geometrically Nonconforming Substructures and Discontinuous Coefficients <i>Maksymilian Dryja, Juan Galvis, Marcus Sarkis</i>	27
On Adaptive-Multilevel BDDC <i>B. Sousedik, J. Mandel</i>	39
Interpolation Based Local Postprocessing for Adaptive Finite Element Approximations in Electronic Structure Calculations <i>Jun Fang, Xingyu Gao, Xingao Gong, Aihui Zhou</i>	51
A New a Posteriori Error Estimate for Adaptive Finite Element Methods <i>Yunqing Huang, Huayi Wei, Wei Yang, Nianyu Yi</i>	63
Space-Time Nonconforming Optimized Schwarz Waveform Relaxation for Heterogeneous Problems and General Geometries <i>Laurence Halpern, Caroline Japhet, Jérémie Szeftel</i>	75
Convergence Behaviour of Dirichlet–Neumann and Robin Methods for a Nonlinear Transmission Problem <i>Heiko Berninger, Ralf Kornhuber, Oliver Sander</i>	87

Optimal Interface Conditions for an Arbitrary Decomposition into Subdomains

Martin J. Gander, Felix Kwok 101

Optimized Schwarz Methods for Domains with an Arbitrary Interface

Shiu Hong Lui 109

Can the Discretization Modify the Performance of Schwarz Methods?

Victorita Dolean, Martin J. Gander 117

The Pole Condition: A Padé Approximation of the Dirichlet to Neumann Operator

Martin J. Gander, Achim Schädle 125

Discontinuous Galerkin and Nonconforming in Time Optimized Schwarz Waveform Relaxation

Laurence Halpern, Caroline Japhet, Jérémie Szeftel 133

Two-Level Methods for Blood Flow Simulation

Andrew T. Barker, Xiao-Chuan Cai 141

Newton-Krylov-Schwarz Method for a Spherical Shallow Water Model

Chao Yang, Xiao-Chuan Cai 149

A Parallel Scalable PETSc-Based Jacobi-Davidson Polynomial Eigensolver with Application in Quantum Dot Simulation

Zih-Hao Wei, Feng-Nan Hwang, Tsung-Ming Huang, Weichung Wang 157

Two-Level Multiplicative Domain Decomposition Algorithm for Recovering the Lamé Coefficient in Biological Tissues

Si Liu, Xiao-Chuan Cai 165

Robust Preconditioner for $H(\text{curl})$ Interface Problems

Jinchao Xu, Yunrong Zhu 173

Mixed Multiscale Finite Element Analysis for Wave Equations Using Global Information

Lijian Jiang, Yalchin Efendiev 181

A Domain Decomposition Preconditioner for Multiscale High-Contrast Problems

Yalchin Efendiev, Juan Galvis 189

Weighted Poincaré Inequalities and Applications in Domain Decomposition

Clemens Pechstein, Robert Scheichl 197

Technical Tools for Boundary Layers and Applications to Heterogeneous Coefficients

Maksymilian Dryja, Marcus Sarkis 205

Coarse Spaces over the Ages

Jan Mandel, Bedřich Sousedík 213

FETI-DP for Stokes-Mortar-Darcy Systems

Juan Galvis, Marcus Sarkis 221

Multigrid Methods for Elliptic Obstacle Problems on 2D Bisection Grids

Long Chen, Ricardo H. Nochetto, Chen-Song Zhang 229

How Close to the Fully Viscous Solution Can One Get with Inviscid Approximations in Subregions ?

Martin J. Gander, Laurence Halpern, Veronique Martin 237

Schwarz Waveform Relaxation Algorithms with Nonlinear Transmission Conditions for Reaction-Diffusion Equations

Filipa Caetano, Martin J. Gander, Laurence Halpern, Jérémie Szeftel 245

Recent Advances in Schwarz Waveform Moving Mesh Methods – A New Moving Subdomain Method

Ronald D. Haynes 253

Optimized Schwarz Waveform Relaxation Methods: A Large Scale Numerical Study

Martin J. Gander, Loïc Gouarin, Laurence Halpern 261

Optimized Schwarz Methods for Maxwell's Equations with Non-zero Electric Conductivity

Victorita Dolean, Mohamed El Bouajaji, Martin J. Gander, Stéphane Lanteri .. 269

Robust Boundary Element Domain Decomposition Solvers in Acoustics

Olaf Steinbach, Markus Windisch 277

A Newton Based Fluid–Structure Interaction Solver with Algebraic Multigrid Methods on Hybrid Meshes

Huidong Yang, Walter Zulehner 285

Coupled FE/BE Formulations for the Fluid–Structure Interaction

Günther Of, Olaf Steinbach 293

Domain Decomposition Solvers for Frequency-Domain Finite Element Equations

Dylan Copeland, Michael Kolmbauer, Ulrich Langer 301

Deriving the X-Z Identity from Auxiliary Space Method

Long Chen 309

A Near-Optimal Hierarchical Estimate Based Adaptive Finite Element Method for Obstacle Problems	
<i>Qingsong Zou</i>	317

Efficient Parallel Preconditioners for High-Order Finite Element Discretizations of $H(\text{grad})$ and $H(\text{curl})$ Problems	
<i>Junxian Wang, Shi Shu, Liuqiang Zhong</i>	325

Part III Contributed Presentations

A Simple Uniformly Convergent Iterative Method for the Non-symmetric Incomplete Interior Penalty Discontinuous Galerkin Discretization	
<i>Blanca Ayuso, Ludmil T. Zikatanov</i>	335

A Study of Prolongation Operators Between Non-nested Meshes	
<i>Thomas Dickopf, Rolf Krause</i>	343

A Parallel Schwarz Method for Multiple Scattering Problems	
<i>Daisuke Koyama</i>	351

Numerical Method for Antenna Radiation Problem by FDTD Method with PML	
<i>Takashi Kako, Yoshiharu Ohi</i>	359

On Domain Decomposition Algorithms for Contact Problems with Tresca Friction	
<i>Julien Riton, Taoufik Sassi, Radek Kučera</i>	367

Numerical Solution of Linear Elliptic Problems with Robin Boundary Conditions by a Least-Squares/Fictitious Domain Method	
<i>JRoland Glowinski, Qiaolin He</i>	375

An Uzawa Domain Decomposition Method for Stokes Problem	
<i>Jonas Koko, Taoufik Sassi</i>	383

A Domain Decomposition Method Combining a Boundary Element Method with a Meshless Local Petrov-Galerkin Method	
<i>Li Maojun, Zhu Jialin</i>	391

A Domain Decomposition Method Based on Augmented Lagrangian with a Penalty Term in Three Dimensions	
<i>Chang-Ock Lee, Eun-Hee Park</i>	399

Spectral Element Agglomerate Algebraic Multigrid Methods for Elliptic Problems with High-Contrast Coefficients	
<i>Yalchin Efendiev, Juan Galvis, Panayot S. Vassilevski</i>	407

A FETI-DP Formation for the Stokes Problem Without Primal Pressure Components

Hyee Hyun Kim, Chang-Ock Lee 415

Schwarz Waveform Relaxation Methods for Systems of Semi-Linear Reaction-Diffusion Equations

Stéphane Descombes, Victorita Dolean, Martin J. Gander 423

A Sparse QS-Decomposition for Large Sparse Linear System of Equations

Wujian Peng, Biswa N. Datta 431

Is Additive Schwarz with Harmonic Extension Just Lions' Method in Disguise?

Felix Kwok 439

Domain Decomposition Methods for a Complementarity Problem

Haijian Yang, Xiao-Chuan Cai 447

A Posteriori Error Estimates for Semilinear Boundary Control Problems

Yanping Chen, Zuliang Lu 455