

# Table of Contents

|  |    |
|--|----|
| <b>Invited Contributions</b> .....   | 1  |
| Multigrid Strategies for CFD Problems on Non-Structured Meshes ....                          | 1  |
| <i>G. Carré, G. Carte, H. Guillard, S. Lanteri</i>   |    |
| Detection of Strong Coupling in Algebraic Multigrid Solvers .....                            | 11 |
| <i>T.F. Chan, P. Vanek</i>   |    |
| Steady Euler Solutions in $O(N)$ Operations .....  | 24 |
| <i>B. van Leer, D. Darmofal</i>  |    |
| The Acceleration of Multigrid Convergence by Recombination Techniques                        | 34 |
| <i>C.W. Oosterlee, R. Wienands, T. Washio, F.J. Gaspar</i>                                   |    |
| <b>Other Contributions</b> .....   | 44 |
| Turbomachinery Computations on Parallel Computers Using a Multi-<br>grid Method .....        | 44 |
| <i>A. Arnone, P. Boncinelli, M. Marconcini</i>   |    |
| Approximate Schur Complement Multilevel Methods for General Sparse<br>Systems .....          | 52 |
| <i>M. Benzi, M. DeLong</i>   |    |
| A Multigrid Approach to the Optimal Control of Solid Fuel Ignition<br>Problems .....         | 59 |
| <i>A. Borzi, K. Kunisch, M. Vanmaele</i>   |    |
| Convergent Adaptive Wavelet Methods for the Stokes Problem .....                             | 66 |
| <i>S. Dahlke, R. Hochmuth, K. Urban</i>  |    |
| A Finite-Element/Equivalent-Circuit Two-Level Method for Magnetic<br>Field Simulations ..... | 73 |
| <i>H. De Gersem, S. Vandewalle, K. Hameyer</i>   |    |
| Some Aspects of Multigrid for Mixed Discretizations .....                                    | 80 |
| <i>J.E. Dendy, Jr., J.D. Moulton</i>   |    |
| Fixed and Adaptive Cache Aware Algorithms for Multigrid Methods ..                           | 87 |
| <i>C.C. Douglas, J. Hu, W. Karl, M. Kowarschik, U. Rüde, C. Weiß</i>                         |    |
| An Adaptive-Smoothing Multigrid Method for the Navier-Stokes Equa-<br>tions .....            | 94 |
| <i>D. Drikakis, O. Iliev, D. Vassileva</i>   |    |

|  |     |
|--|-----|
| Multigrid on Massively Parallel Architectures . . . . .  | 101 |
| <i>R.D. Falgout, J.E. Jones</i>  |     |
| Experiences with Multigrid-Prolongation for Two-Equation Turbulence Models in Flows with High Reynolds Numbers . . . . .   | 108 |
| <i>J. Fassbender</i>   |     |
| Additive Aspects of Hybrid Multigrid/Domain Decomposition Solution of Fluid Flow Problems on Parallel Computers . . . . .  | 115 |
| <i>L. Fournier, S. Lanteri</i>   |     |
| Bi-harmonic and Bi-Helmholtz Type Scattered Data Interpolation using Quad-trees and Multigrid Technique . . . . .          | 122 |
| <i>C. Gáspár</i>   |     |
| Algebraic Multigrid for Solving Electromechanical Problems . . . . .   | 129 |
| <i>M. Kaltenbacher, S. Reitzinger</i>  |     |
| Multigrid Methods for Mortar Finite Elements . . . . .   | 136 |
| <i>R.H. Krause, B.I. Wohlmuth</i>  |     |
| The Sparse-Grid Combination Technique Applied to Time-Dependent Advection Problems . . . . .                               | 143 |
| <i>B. Lastdrager, B. Koren, J. Verwer</i>  |     |
| Multigrid Acceleration in a 3D Navier-Stokes Solver Using Unstructured Hexahedral Meshes with Adaptation . . . . .         | 150 |
| <i>B. Leonard, A. Patel, C. Hirsch</i>   |     |
| Analysis of Several Multigrid Implicit Algorithms for the Solution of the Euler Equations on Unstructured Meshes . . . . . | 157 |
| <i>I. Lepot, P. Geuzaine, F. Meers, J.A. Essers, J.M. Vaassen</i>  |     |
| Efficient Large-Eddy Simulations of Compressible Flows Using Multigrid . . . . .   | 164 |
| <i>B. Lessani, S. Smirnov, C. Lacor, T. Baelmans, J. Meyers</i>  |     |
| Application of Multigrid in Two-Equation Turbulence Modelling . . . . .  | 171 |
| <i>B. Merci, J. Steelant, E. Dick</i>  |     |
| Evaluation of Multigrid as a Solver for Stress Analysis Problems in Semiconductor Process Simulation . . . . .             | 179 |
| <i>S. Mijalković</i>   |     |
| Multilevel Techniques for the Solution of the Inverse Problem of Electrocardiography . . . . .                             | 186 |
| <i>M. Mohr, U. Råde</i>  |     |

|   |     |
|---|-----|
| Robust Multigrid Algorithms for 3D Elliptic Equations on Structured<br>Grids .....                                    | 193 |
| <i>R.S. Montero, M. Prieto, I.M. Llorente, F. Tirado</i>  |     |
| A Multigrid Newton-Krylov Solver for Non-linear Systems .....   | 200 |
| <i>V.A. Mousseau, D.A. Knoll, W.J. Rider</i>  |     |
| Estimation of the Condition Number of Additive Preconditioners on<br>Tensor Product Grids .....                       | 207 |
| <i>C. Pflaum</i>  |     |
| Multigrid Algorithms for the Tracking of Electron Beams .....   | 214 |
| <i>G. Pöplau, U. van Rienen</i>   |     |
| Stable Semi-Iterative Smoother for Cascadic and Multigrid Algorithms .....  | 221 |
| <i>V.V. Shaidurov, G. Timmermann</i>  |     |
| Scalability of Parallel Multigrid Adaption .....  | 228 |
| <i>J. Stiller, W.E. Nagel, U. Fladrich</i>  |     |
| From Molecular Dynamics to Continuum Models .....   | 235 |
| <i>S. Ta'asan</i>   |     |
| Multigrid With an Immersed Interface .....  | 242 |
| <i>J.M. Thijssen</i>  |     |
| Analysis of a Non-Standard Multigrid Preconditioner by Spectral Por-<br>trait Computation .....                       | 249 |
| <i>X. Vasseur</i>   |     |
| Treatment of All Speed Flows and High Aspect Ratios in CFD Appli-<br>cations .....                                    | 256 |
| <i>J. Vierendeels, K. Rienslagh, B. Merci, E. Dick</i>  |     |
| On the Algebraic Construction of Multilevel Transfer Operators (for<br>Convection-Diffusion-Reaction Equations) ..... | 264 |
| <i>C. Wagner</i>  |     |
| Upwind Prolongations for a Highly-Unstructured Euler Solver .....   | 271 |
| <i>K. Warendorf, U. Küster, R. Rühle</i>  |     |
| Fourier Analysis for Krylov Subspace Acceleration of Multigrid with<br>Application to 3D Anisotropic Problems .....   | 278 |
| <i>R. Wienands, C.W. Oosterlee</i>  |     |
| Parallel Adaptively Refined Sparse Grids .....  | 285 |
| <i>G. Zumbusch, M. Griebel</i>  |     |
| <b>Author Index</b> .....   | 286 |

Multigrid Methods VI

Proceedings of the Sixth European Multigrid  
Conference Held in Gent, Belgium, September 27-30,  
1999

Dick, E.; Rienslagh, K.; Vierendeels, J. (Eds.)

2000, IX, 292 p. 19 illus., Softcover

ISBN: 978-3-540-67157-2