

# Contents

---

## Part I Invited Lectures

---

### Topics in Detached-Eddy Simulation

*Philippe R. Spalart* ..... 3

### High-End Computing Challenges in Aerospace Design and Engineering

*F. Ronald Bailey* ..... 13

### Control of Shocks in CFD

*Claude Bardos, Olivier Pironneau* ..... 27

### A Domain Decomposition Framework for Fluid-Structure Interaction Problems

*Simone Deparis, Marco Discacciati, Alfio Quarteroni* ..... 41

### Micro Flow Simulation Using Kinetic and Continuum Approaches

*Koji Morinishi* ..... 59

---

## Part II Acoustics

---

### A Hybrid FE/Spectral Analysis of Turbofan Aeroacoustics

*M. C. Duta, M. B. Giles, A. Laird* ..... 77

### Numerical Simulation of the Oscillations in a Mixer - An Internal Aeroacoustic Feedback System

*Philip C. E. Jorgenson, Ching Y. Loh* ..... 83

### CFD Simulations of Acoustic Wave Phenomena in Combustion Chambers

*Venkateswaran Sankaran, Guoping Xia, Matthew Ellis, Charles Merkle* 89

### Computation on Wake/Stator Interaction in a 2D Cascade

*X.Y. Wang, A. Himansu, S.C. Chang, P. Jorgenson* ..... 95

---

**Part III Adaptive Meshing**


---

**An Error Indicator for Semidiscrete Schemes***Daniele Marodin, Gabriella Puppo* ..... 103**A Mesh Adjustment Scheme for Embedded Boundaries***J. S. Sachdev, C. P. T. Groth* ..... 109**Numerical Simulations of Flows Past 2D Complex Shapes  
Using Building Cube Method***Siro Kitamura, Yoshinori Inoue, Takehisa Iwai* ..... 115**High-Density Mesh Flow Computations by Building-Cube  
Method***Kazuhiro Nakahashi, LaeSung Kim* ..... 121

---

**Part IV Algorithms**


---

**A Matrix-Free Implicit Method for Flows at All Speeds***Alberto Beccantini, Christophe Corre, Thibaud Kloczko* ..... 129**An Efficient and Accurate Pressure-Correction Method for  
All Mach Numbers***Krista Nerinckx, Jan Vierendeels, Erik Dick* ..... 135**The Analysis of Electromagnetic Waves Using CIP Scheme  
with Soroban Grid***Yoichi Ogata, Takashi Yabe, Kenji Takizawa, Tomomasa Ohkubo* ..... 141**Multigrid Third-Order Least-Squares Solution of Cauchy-  
Riemann Equations on Unstructured Triangular Grids***Hiroaki Nishikawa* ..... 147**Solution of the Fluid Dynamical Formulation of Nonlinear  
Schrödinger Equation with Radial Basis Function  
Interpolation***T. Y. Hsieh, J. C. Huang, J. Y. Yang* ..... 153**High Resolution Schemes for Quantum Hydrodynamics  
Based on Nonlinear Schrödinger Equation***J. Y. Yang, J. C. Huang, T. Y. Hsieh* ..... 159**Multigrid Acceleration for Transonic Aerodynamic Flow  
Simulations Based on a Hierarchical Formulation***Mohamed Hafez, Essam Wahba* ..... 165

**A New Accurate and Stable Least-Square Method to Compute the Gradient on Non-Orthogonal Meshes**  
*Céline Béchaud, Khalid Yaqobi, Frédéric Archambeau, Namane Méchitoua* ..... 171

**Robustness of a Characteristic Finite Element Scheme of Second Order in Time Increment**  
*Masahisa Tabata, Shoichi Fujima* ..... 177

**Gas-Kinetic BGK Scheme for Hypersonic Viscous Flow**  
*Kun Xu, Meiliang Mao* ..... 183

**A Comparison of Space-Time Variational-Multiscale Discretizations**  
*S. J. Hulshoff, E. J. Munts, R. de Borst* ..... 189

---

**Part V Algorithms for Unsteady Flows**

---

**A Third-Order-Accurate Multidimensional Residual-Distribution Scheme for Unsteady Problems**  
*P. De Palma, G. Pascazio, G. Rossiello, M. Napolitano* ..... 199

**Unsteady Simulations for Flutter Prediction**  
*Julien Delbove* ..... 205

**Time-Accurate Navier-Stokes Calculations with Approximately Factored Implicit Schemes**  
*Richard P. Dwight* ..... 211

**Conservative Residual Distribution Schemes for General Unsteady Systems of Conservation Laws**  
*Mario Ricchiuto, Árpád Csík, Herman Deconinck* ..... 219

---

**Part VI Applications**

---

**Transonic Flows of BZT Fluids Through Turbine Cascades**  
*P. Cinnella, P.M. Congedo, D. Laforgia* ..... 227

**CFD Simulation of the Space Shuttle Launch Vehicle with Booster Separation Motor and Reaction Control System Plumes**  
*L. M. Gea, D Vicker* ..... 233

**An Efficient Numerical Method for 3D Viscous Ship Hydrodynamics with Free-Surface Gravity Waves**  
*Mervyn Lewis, Barry Koren* . . . . . 239

**Numerical Approach to the Analysis of Internal Pressure of M-V Rocket Fairing**  
*Ayako Yamamoto, Keiichiro Fujimoto, Kozo Fujii, Nobuyuki Tsuboi* . . . 245

**Automated Euler and Navier-Stokes Database Generation for a Glide-Back Booster**  
*Neal M. Chaderjan, Stuart E. Rogers, Mike J. Aftosmis, Shishir A. Pandya, Jasim U. Ahmad, Edward Tejnil* . . . . . 251

**Numerical Simulation of Radiative Heating for Atmospheric Reentry in Martian Atmosphere**  
*O. Rouzaud, J. Hylkema, L. Tessé, F. Longueteau* . . . . . 257

**An Implicit Preconditioned JFNK Method for Fully Coupled Radiating Flows. Application to Superorbital Re-Entry Simulations**  
*R. Turpault* . . . . . 263

**Two- and Three-Dimensional Flow Optimization in Chemical Engineering**  
*Günter Bärwolff* . . . . . 271

**Numerical Simulation of the Shock Wave / Boundary Layer Interaction in a Shock Tube by Using a High Resolution Monotonicity-Preserving Scheme**  
*V. Daru, C. Tenaud* . . . . . 277

**Accurate Flow Prediction for Store Separation from Internal Bay**  
*M. Mani, A. Cary, W. W. Bower* . . . . . 283

**A Coupled Navier-Stokes/Vortex-Panel Solver for the Numerical Analysis of Wind Turbines**  
*Sven Schmitz, Jean-Jacques Chattot* . . . . . 289

**Matematical Modeling of Supersonic Turbulent Flows in Inlets with Rotating Cowl**  
*Bedarev I.A., Fedorova N.N., Goldfeld M.A., Falempin F.* . . . . . 295

**Computational Fluid Dynamics of Crossflow Filtration in Suspension-Feeding Fishes**  
*A. Y. Cheer, S. Cheung, S. L. Sanderson* . . . . . 301

**Numerical Simulation of R-M Instability**  
*Fu Dexun, Ma Yanwan, Tian Baolin* ..... 307

**Thrust and Efficiency of Propulsion by Oscillating Foils**  
*J. Young, J.C.S. Lai, M.Kaya, I.H. Tuncer* ..... 313

**Part VII Biological Flows**

**Towards Numerical Simulation of Blood Flow in Small Vessels**  
*Zinedine Khatir, Adélia Sequeira* ..... 321

**Computational Fluid Dynamics and Wall Mechanics of Pre- and Post-Operative Abdominal Aortic Aneurysms**  
*Christine M. Scotti, Ender A. Finol, Cristina H. Amon* ..... 329

**Geometrical Considerations in Patient Specific Models of a Human Aorta with Stenosis and Aneurysm**  
*Johan Svensson, Roland Gårdhagen, Matts Karlsson*..... 335

**Part VIII Flow Control**

**Numerical Simulation and Control of Bluff-Body Flows Using the Penalization Method**  
*Charles-Henri Bruneau, Iraj Mortazavi, Gwendal Wilczyk* ..... 343

**Application of Genetic Algorithm to Two-jet Control System On NACA 0012 Airfoil**  
*L. Huang, R.P. LeBeau, T. Hauser*..... 349

**Reynolds-Averaged Navier-Stokes Computations of a Synthetic Jet in a Turbulent Boundary Layer**  
*Christopher L. Rumsey* ..... 355

**Active Control of Shock/Boundary Layer Interaction in Transonic Flow Over Airfoils**  
*Jose L. Vardillo, Ramesh K. Agarwal, Ahmed A. Hassan* ..... 361

**Part IX Fluid-Structure Interaction**

**Adaptive Solution of Some Steady-State Fluid-Structure Interactions**  
*S. Étienne, D. Pelletier* ..... 369

<b>Numerical Simulation for Impact of Elastic Deformable Body against Rigid Wall under Fluid Dynamic Force</b> <i>Tomohisa Hashimoto, Koji Morinishi, Nobuyuki Satofuka</i> . . . . .	375
<b>Fluid Structure Interaction of a Hypersonic Generic Body-Flap Model</b> <i>Andreas Mack, Roger Schäfer, Burkard Esser, Ali Gülhan</i> . . . . .	381
<b>The Coupled Analysis of Pipe Burst and Multicomponents Fluid of Very High Pressured Natural Gas Pipeline</b> <i>Tomoe Oda, Yoshiaki Tamura, Yoichiro Matsumoto, Tetuya Kawamura</i>	387
<hr/>	
<b>Part X High-Order Schemes</b>	
<hr/>	
<b>High-Order Residual-Based Compact Schemes</b> <i>Christophe Corre, Alain Lerat</i> . . . . .	395
<b>How Effective Are High-Order Approximations in Shock-Capturing Methods? Is There a Law of Diminishing Returns?</b> <i>William J. Rider, James R. Kamm</i> . . . . .	401
<b>Adaptive Numerical Dissipation Control in High Order Schemes for Multi-D Non-Ideal MHD</b> <i>H. C. Yee, B. Sjögren</i> . . . . .	407
<b>A NURBS-Based Shape Optimization Method for Hydraulic Turbine Stay Vane</b> <i>Didier Poueymirou-Bouchet, Christophe Tribes, Jean-Yves Trépanier</i> . .	415
<b>Super Compact Spatial Differencing for the Linear and Nonlinear Geophysical Fluid Dynamics Problems</b> <i>V. Esfahanian, S. Ghader, A.R. Mohebalhojeh</i> . . . . .	423
<b>A New Discretization Method of Governing Equations for High Order Accuracy</b> <i>Dehee Kim, Jang Hyuk Kwon</i> . . . . .	429
<b>A High-Order Accurate Unstructured GMRES Solver for the Compressible Euler Equations</b> <i>Amir Nejat, Carl Ollivier-Gooch</i> . . . . .	435
<b>Computation of Aeroacoustic Waves with High Order Spectral Volume Method</b> <i>Z.J. Wang</i> . . . . .	441

<b>Discontinuous Spectral Difference Method for Conservation Laws on Unstructured Grids</b>	
<i>Yen Liu, Marcel Vinokur, Z.J. Wang</i> .....	449

<b>Multigrid Solution for High-Order Discontinuous Galerkin Discretizations of the Compressible Navier-Stokes Equations</b>	
<i>Todd A. Oliver, Krzysztof J. Fidkowski, David L. Darmofal</i> .....	455

---

## Part XI Incompressible Flow

---

<b>Accurate Solution of Corner Singularities in Axisymmetric and Plane Flows Using Adjusted Mesh of Finite Elements</b>	
<i>Pavel Burda, Jaroslav Novotný, Jakub Šístek</i> .....	463

<b>Sensitivity Analysis of Transient Incompressible Laminar Flows</b>	
<i>H. Hristova, S. Etienne, D. Pelletier, J. Borggaard</i> .....	469

<b>Comparison of Artificial Compressibility Methods</b>	
<i>Cetin Kiris, Jeffrey Housman, Dochan Kwak</i> .....	475

---

## Part XII Magnetohydrodynamics

---

<b>A Central, Diamond-Staggered Dual Cell, Finite Volume Method for Ideal Magnetohydrodynamics</b>	
<i>P. Arminjon, R. Touma</i> .....	483

<b>Simulation of Supersonic Flows in Inductively Coupled Plasma Tunnels</b>	
<i>James R. Diebel, Thierry E. Magin, Marco Panesi, Pietro Rini, David Vanden Abeele, Gérard Degrez</i> .....	489

<b>Drift-Diffusion Model for Magneto-Fluid-Dynamics Interaction</b>	
<i>J.S. Shang, S.T. Surzhikov</i> .....	495

---

## Part XIII Meshless Methods

---

<b>Gridless Computation Using the Unified Coordinates</b>	
<i>W.H. Hui, J.J. Hu, G.P. Zhao</i> .....	503

<b>Viscous Flow Computations Using a Meshless Solver, LSF-D-U</b>	
<i>Anup Ninawe, N. Munikrishna, N. Balakrishnan</i> .....	509

---

**Part XIV Microscale Flows**

---

**Preconditioning Method for Compressible Near-critical Fluids in Micro-Channel**  
*Satoru Yamamoto* ..... 517

**Comparison of Kinetic and Navier-Stokes Solutions for Rarefied Gas Flows in Micro-channels**  
*Nobuyuki Satofuka, Koji Morinishi, Keigo Kamitsuji* ..... 523

**Application of the 10-Moment Model to MEMS Flows**  
*Yoshifumi Suzuki, Shintaro Yamamoto, Bram van Leer, Quanhua Sun, Iain D. Boyd* ..... 529

---

**Part XV Modelling and Simulation of Turbulence**

---

**Calculation of Static and Dynamic Stability Derivatives of the F/A-18E in Abrupt Wing Stall Using RANS and DES**  
*James R. Forsythe, Charles M. Fremaux, Robert M. Hall*..... 537

**Large Eddy Simulation of Flow Around a Slat with a Blunt Trailing Edge**  
*Saloua Ben Khelil*..... 543

**Implicit Large Eddy Simulation of a Flow Around a Subsonic Airfoil Near its Stall Angle**  
*Satoko Komurasaki, Kunio Kuwahara* ..... 549

**DNS of Compressible Turbulent Boundary Layer Over a Blunt Wedge**  
*Xinliang Li, Dexun Fu*..... 555

**Computation of the Turbulent Boundary Layer on a Long Circular Cylinder in Axial Flow with a Vorticity Boundary Condition**  
*Milton Woods, Max Bull* ..... 561

**LES of Combined Forced and Natural Turbulent Convection in a Vertical Slot**  
*J. Yin, D.J. Bergstrom* ..... 567

**Numerical Study on  $k - \omega$  Turbulence Models for Supersonic Impinging Jet Flow Field**  
*Eugene Kim, Soo Hyung Park, Jang Hyuk Kwon* ..... 573



**Comparative Study of Reynolds Stress Turbulence Models in Free-Shear and Wall-Bounded Flows**  
*Valerio Viti, George Huang, Peter Bradshaw* ..... 579

**Part XVI Multifluid and Multiphase Flows**

**Lattice Boltzmann Simulations in Chemical Engineering**  
*D. Hänel, U. Lantermann, R. Kaiser* ..... 587

**A Numerical Scheme for Compressible Multiphase Flows**  
*Rémi Abgrall and Vincent Perrier* ..... 593

**A New Accurate Method for Simulating Polydispersed Two-Phase Flows**  
*G. Dufour* ..... 601

**The Characteristics-Based Matching Method (CBM) for High-Speed Fluid-Fluid Flows**  
*Nourgaliev, R.R., Dinh, T.N., Liou, M.-S., Theofanous T.G.* ..... 607

**Simulation of Multifluid Multiphase Flows with AUSM<sup>+</sup>-up Scheme**  
*Chih-Hao Chang, Meng-Sing Liou* ..... 613

**Computational Framework for Complex Fluid Physics Applications**  
*Ding Li, Guoping Xia, Venkateswaran Sankaran, Charles L. Merkle* ... 619

**A Novel Physical Model and Computational Method for Non-Isentropic, Compressible Two-Fluid Flow**  
*Jeroen Wackers, Barry Koren* ..... 625

**Modeling Turbulent Interfacial Flows**  
*Ali Jafari, Nasser Ashgriz* ..... 631

**On Modeling of Collisions in Direct Numerical Simulation of High-Speed Multiphase Flows**  
*Nourgaliev, R.R., Dinh, T.N., Theofanous T.G.* ..... 637

**A Second-Order Adaptive Sharp-Interface Method for Incompressible Multiphase Flow**  
*M. Sussman, M.Y. Hussaini, K. M. Smith, Ren Zhi-Wei, V. Mihalef* .. 643

**Large-Scale Direct Simulation of Two-Phase Flow Structure Around a Spacer in a Tight-Lattice Nuclear Fuel Bundle**  
*Kazuyuki Takase, Hiroyuki Yoshida, Yasuo Ose, Hajime Akimoto* ..... 649

---

**Part XVII Optimization**


---

**Surface Mesh Movement for Aerodynamic Design of Body-Installation Junction**
*Hyounq-Jin Kim, Kazuhiro Nakahashi* ..... 657

**Formulation and Multigrid Solution of the Discrete Adjoint Problem on Unstructured Meshes**
*Dimitri J. Mavriplis* ..... 663

**Aerodynamic Design of Gas Turbine Cascades Using Global Optimizers and Artificial Neural Networks**
*Temesgen Mengistu, Wahid Ghaly* ..... 669

**An Analysis of Bodies Having Minimum Pressure Drag in Supersonic Flow: Exploring the Nonlinear Domain**
*Karthik Palaniappan, Antony Jameson* ..... 675

**Optimum Multidisciplinary and Multi-Objective Wing Design in CFD Using Evolutionary Techniques**
*L. González, E. Whitney, K. Srinivas, J. Périaux* ..... 681

**Advances in Aerodynamic Shape Optimization**
*Antony Jameson* ..... 687

**On the Use of Parametric-CAD Systems and Cartesian Methods for Aerodynamic Design**
*Marian Nemec, Michael J. Aftosmis, Thomas H. Pulliam* ..... 699

**Improvement of the Optimization Method of the TSTO Configuration – Application of Accurate Aerodynamics**
*Koji Shimoyama, Kozo Fujii, Hiroaki Kobayashi* ..... 705

---

**Part XVIII Parallel Algorithms**


---

**Parallel Simulation for Strong Blast Wave from TNT Explosion on Large-scale PC-Cluster**
*Takayuki Aoki, Kaori Kato, Tei Saburi, Masatake Yoshida* ..... 713

**A Parallel Implicit Adaptive Mesh Refinement Algorithm for Body-Fitted Multi-Block Mesh**
*Clinton P. T. Groth* ..... 719

**MPI Parallelization of Unstructured Mesh Adaptation**
*C.Y. Lepage, A. St-Cyr,, W.G. Habashi* ..... 727

**Parallel Implementation of a Dynamic Overset Unstructured Grid Approach**  
*A. Madrane* ..... 733

**A Parallel Multi-Block Method for the Unsteady Vorticity-Velocity Navier-Stokes Equations**  
*A. Grimaldi, G. Pascazio, M. Napolitano* ..... 741

**Parallelization of an Unstructured Data Based Cell Centre Finite Volume Code, HIFUN-3D**  
*Gopal N. Shinde, Nikhil V. Shende, N. Balakrishnan* ..... 747

**Parallel Turbulent Flow Computations Using a Hybrid Spectral/Finite-Element Method on Beowulf Clusters**  
*David Vanden-Abeele, Gérard Degrez, Deryl Owen Snyder* ..... 753

---

**Part XIX Upwind Schemes**

---

**An Upwind Moment Scheme for Conservation Laws**  
*H. T. Huynh* ..... 761

**Accurate and Efficient Re-evaluation of Cell-interface Convective Fluxes**  
*Sung-Hwan Yoon, Kyu-Hong Kim, Chongam Kim, Oh-Hyun Rho* ..... 767

**Computation of The Flow Around a Bluff Body By Multi-Directional Finite Difference Method**  
*Mi Young Lee, Tetuya Kawamura, Kunio Kuwahara* ..... 773

**A One Point Shock Capturing Kinetic Scheme for Hyperbolic Conservation Laws**  
*Dominic D.J. Chandar, S.V. Raghurama Rao, S.M. Deshpande* ..... 779

**Accurate and Efficient Multi-dimensional TVD Interpolation**  
*Sung-soo Kim, Kyu-Hong Kim, Chongam Kim* ..... 785

**Exact Flux Linearization for Convergence Improvement in the Implicit Godunov Method**  
*Igor Men'shov, Yoshiaki Nakamura* ..... 791

**On High-Order Fluctuation-Splitting Schemes for Navier-Stokes Equations**  
*Hiroaki Nishikawa, Philip Roe* ..... 799

**Computation of Weakly Ionized Atmospheric Entry Flows Using an Extended Roe Scheme**  
*Tristan Soubrié, Olivier Rouzaud, Jouke Hylkema* ..... 805

---

**Part XX Technical Notes**


---

**3D Prediction of Developing Turbulent Flow in a 90° Duct of Rectangular Cross-Section**
*H. Alemi, M. Raisee* . . . . . 813

**Numerical Simulation of Steady Newtonian and Non-Newtonian Flow Through Vascular Stenoses**
*Geoffrey R. Behrens, Ramesh K. Agarwal* . . . . . 815

**Finite Volume Methods for Fluid Flow Through Elastic Tubes**
*Marek Brandner* . . . . . 817

**Parallel 2D/3D Unsteady Incompressible Viscous Flow Computations Using an Unstructured CFD Code**
*H. Chen, P.G. Huang, R.P. LeBeau* . . . . . 819

**Adaptive Bounds to Outputs of the Three Dimensional Steady Incompressible Navier-Stokes Equations**
*Hae-Won Choi, Marius Paraschivoiu* . . . . . 821

**A Comparative Study of Three Composite Schemes: Lax-Wendroff/Lax-Friedrichs, Mac-Cormack/Lax-Friedrichs and Corrected Lax-Friedrichs Lax-FriedrichS Schemes, Based on Conservation Laws**
*M.Z. Dauhoo, A.R. Appadu* . . . . . 823

**Evaluation of Reynolds Number Effects on the CFD Simulation of Downwind Sails**
*G. Delussu, N. Erriu, R.G.J. Flay, M. Mulas, P. Puddu, M. Talice* . . . 825

**Assessment of the Immersed Boundary Technique for Compressible CFD codes**
*G. Delussu, M.Mulas, M. Talice* . . . . . 827

**Spectral Solution of High Speed Flows Over Blunt Bodies with Improved Boundary Treatment**
*V. Esfahanian, M. Boroomand, M. Najafi* . . . . . 829

**Verification of Mathematical Model of the Shock Wave/Dust Layer Interaction Problem**
*A.V. Fedorov, N.N. Fedorova, I.A. Fedorchenko* . . . . . 831

**Automated Unstructured Mesh Generation for Objects in Direct Contact**
*Dr. F. Fortin, T. Zoric* . . . . . 833

<b>Complex Flow Patterns in Realistic Geometry of Human Aorta</b> <i>R. Gårdhagen, J. Svensson, M. Karlsson</i> . . . . .	835
<b>Interplay Between Inertia and Gravity in Transient Thin-Jet Flow</b> <i>Radoslav German, Roger E. Khayat</i> . . . . .	837
<b>Numerical Modeling of Cell Deformation Passing Through a Nozzle to Determine its Viscosity and Surface Tension</b> <i>Amirreza Golpaygan, Nasser Ashgriz</i> . . . . .	839
<b>Gradient Computation for Variational Assimilation of Meteorological Observations</b> <i>Y. Horibata</i> . . . . .	841
<b>3-D Heat and Fluid Flow Analysis of Successively Variable Louver Angle of Louver Fin Geometry in Compact Heat Exchangers</b> <i>C. T. Hsieh, J. Y. Jang</i> . . . . .	843
<b>Pattern Formation in Viscoelastic Thermal Convection</b> <i>Zhenyu Li, Roger Khayat</i> . . . . .	845
<b>Turbulent Transport of Passive Scalar Emitted from Line Sources in an Open Channel Flow</b> <i>Chun-Ho Liu, Dennis Y.C. Leung</i> . . . . .	847
<b>Mass Transpiration Cooling Analysis at Hypersonic Mach Numbers Using CFD Tools</b> <i>P.S. Kulkarni, V.N. Kulkarni, K.P.J. Reddy, T. Saito, K. Takayama</i> . .	849
<b>FEM in Domain Decomposition for Fluid-Structure Interaction Problems</b> <i>Pavel Moses, Jaroslav Novotný, Pavel Burda</i> . . . . .	851
<b>LES of Turbulent Flow Around a Simplified Railway Vehicle Model Under Cross Winds</b> <i>Koji Nakade, Masahiro Suzuki</i> . . . . .	853
<b>Development of Compressible Navier-Stokes Equations into Higher Order DNS of Incompressible Turbulence</b> <i>Hidetoshi Nishida, Motoyoshi Hatta</i> . . . . .	855
<b>Direct Numerical Simulation of Mixed Convection in Horizontal Pipe Flow</b> <i>M. Piller</i> . . . . .	857

<b>Simulation of Inviscid, Unsteady Flows in Hypersonic Air Inlets Using an Adaptive, Unstructured, Multi-Block Method</b> <i>Räbi Bin Tahir, Eugene Timofeev, Peter Voinovich, Sannu Mölder . . . .</i>	859
<b>Fluid Structure Interaction for Strongly Coupled Problems Based on a Sensitivity Analysis</b> <i>Jan Vierendeels, Kris Dumont, Erik Dick, Pascal Verdonck . . . . .</i>	861
<b>Numerical Simulation of Flow Conditioners Used for Flow Meter Calibration</b> <i>E. von Lavante, G. Moniz Pereira, U. Banaszak, B. Mickan . . . . .</i>	863
<b>Large Eddy Simulation Using Tetrahedral Elements</b> <i>Tao Xu, German Cardenas, Marius Paraschivoiu . . . . .</i>	865



<http://www.springer.com/978-3-540-31800-2>

Computational Fluid Dynamics 2004  
Proceedings of the Third International Conference on  
Computational Fluid Dynamics, ICCFD3, Toronto, 12-16  
July 2004

Groth, C.; Zingg, D.W. (Eds.)  
2006, XX, 866 p., Hardcover  
ISBN: 978-3-540-31800-2