

Contents

Invited Keynote Papers

Numerical Simulation “Airbus Vision and Strategy”	1
<i>Adel Abbas, Klaus Becker</i>	
Global vs. Zonal Approaches in Hybrid RANS-LES Turbulence Modelling	15
<i>Florian R. Menter, Jochen Schütze, Mikhail Gritskevich</i>	
Partially Averaged Navier Stokes (PANS) Method for Turbulence Simulations: Theory and Practice	29
<i>Sharath S. Girimaji, Sawan Suman</i>	
Role of RANS, Hybrid and LES for Wing Flow Simulations at Relatively Low Reynolds Numbers	45
<i>Kozo Fujii</i>	
ATAAC – An EU-Project Dedicated to Hybrid RANS/LES Methods	59
<i>Dieter Schwamborn, Mikhail Strelets</i>	
An Eddy-Resolving Reynolds Stress Transport Model for Unsteady Flow Computations	77
<i>R. Maduta, S. Jakirlic</i>	
Preliminary Evaluation and Applications of a Consistent Hybrid LES/RANS Method	91
<i>Heng Xiao, Michael Wild, Patrick Jenny</i>	
Development of a Hybrid RANS/LES Model for Heat Transfer Applications	101
<i>Stefano Rolfo, Juan C. Uribe, Flavien Billard</i>	

An Improved Blending Formulation for Wall-Modeled Large-Eddy Simulations	111
<i>Peng Wu, Johan Meyers</i>	
Constrained Large Eddy Simulation of Wall-Bounded Turbulent Flows	121
<i>Shiyi Chen, Yipeng Shi, Zuoli Xiao, Zhenhua Xia, Jianchun Wang</i>	
A New Very Large Eddy Simulation Model for Simulation of Turbulent Flow	131
<i>Xingsi Han, Siniša Krajnović</i>	
A High-Fidelity Turbulence Length Scale for Flow Simulation	141
<i>Jing-Lei Xu, Ning Hu, Ge Gao</i>	
Zonal RANS-LES Methods	
A Rapid Switch from RANS to WMLES for Spatially Developing Boundary Layers	147
<i>R. Laraufie, S. Deck, P. Sagaut</i>	
Interfacing Boundary Conditions towards Zonal RANS/LES	157
<i>Aurelien Hemon, Song Fu, Liang Shao</i>	
Embedded DDES of 2D Hump Flow	169
<i>R. Poletto, A. Revell, T. Craft, N. Ashton</i>	
Synthetic Turbulence Generation for a Zonal RANS-LES Method	181
<i>Benedikt Roidl, Alibek Issakhov, Matthias Meinke, Wolfgang Schröder</i>	
Random Flow Generation Technique for Civil Aircraft Jet Simulations with the ZDES Approach	193
<i>Vincent Brunet</i>	
Comparative Studies of Different Modelling Approaches	
Comparison of PANS and LES Simulations of the Flow around a Cuboid Influenced by Crosswind	205
<i>Siniša Krajnović, Per Ringqvist, Branislav Basara</i>	
Hybrid RANS-LES Modeling of a Strongly Detached Turbulent Flow around a Tandem Cylinders Configuration	219
<i>M. Gual Skopek, M. Braza, Y. Hoarau, F. Thiele</i>	
Comparisons of Three Improved DES Methods on Unsteady Flows Past Tandem Cylinders	231
<i>Zhixiang Xiao, Jian Liu, Jingbo Huang, Song Fu</i>	

Contents	IX
Feasibility of Hybrid RANS-LES Modeling of Shock/Boundary-Layer Interaction in a Duct	245
<i>S. Arvidson, S.-H. Peng, L. Davidson</i>	
Comparison of Hybrid RANS-LES Methods for Massively Separated Flows	257
<i>Naveed Durrani, Ning Qin</i>	
Comparison between Lattice Boltzmann Simulation and Detached-Eddy Simulation on the Cavity Problem	267
<i>Cédric Larricq, Xiao-Yu Yang, Hui-Liu Zhang, Da-Kai Lin</i>	
Applications to Noise Analysis and Flow Control	
Noise Prediction of a Rudimentary Landing Gear Using Detached-Eddy Simulation	279
<i>L. Wang, C. Mockett, T. Knacke, F. Thiele</i>	
Numerical Evaluation of URANS/Zonal-DES Models in the Acoustic Prediction of a High Reynolds Compressible Open Cavity Flow	291
<i>I. Gomez, M. Chavez, J. de Vicente, E. Valero</i>	
Hybrid RANS-LES Simulation of Turbulent High-Lift Flow in Relation to Noise Generation	303
<i>Bastian Nebenführ, Shia-Hui Peng, Lars Davidson</i>	
Noise Control of Supersonic Cavity Flow with Upstream Mass Blowing	315
<i>Weipeng Li, Taku Nonomura, Kozo Fujii</i>	
Study of Active Flow Control for a Simplified Vehicle Model Using PANS Turbulence Model	325
<i>Xingsi Han, Siniša Krajinović, Branislav Basara</i>	
Correlation and Spectra Analysis for Jet in Cross Flow Based on DES Results	335
<i>Junyu Liang, Shun Kang</i>	
Applications to High-Lift and Airfoil Flows	
Numerical Investigation of the Flow around a Three-Element High-Lift Airfoil Using Two Zonal Hybrid RANS/LES Methods: ZDES and NLDE	345
<i>M. Terracol, S. Deck</i>	

Hybrid RANS/LES Simulations of a Three-Element Airfoil	357
<i>S. Reuß, T. Knopp, D. Schwamborn</i>	
Delayed Detached-Eddy Simulation of the Transonic Flow around a Supercritical Airfoil in the Buffet Regime	369
<i>F. Grossi, M. Braza, Y. Hoarau</i>	
Balancing Destruction and Production in S-A Model-Based Hybrid RANS-LES for Flow around an Aerofoil with Mild Separation	379
<i>Wei Wang, Ning Qin</i>	
Zonal Detached Eddy Simulation of the Flow Downstream of a Spoiler Using the Chimera Method	389
<i>F. Gand, V. Brunet</i>	
Applications to Bluff-Body and Internal Flows	
Detailed Investigation of Detached-Eddy Simulation for the Flow Past a Circular Cylinder at $Re=3900$	401
<i>Rui Zhao, Jia Liu, Chao Yan</i>	
Helicopter Fuselage Wake Prediction Using Detached-Eddy Simulation	413
<i>Charles Mockett, Frédéric Le Chuiton, Marian Fuchs, Frank Thiele</i>	
Numerical Study of the Subsonic Base Flow with a Side Support	427
<i>Yancheng You, Kai Oßwald, Heinrich Lüdeke, Volker Hannemann</i>	
Delayed-Detached-Eddy Simulation of Near-Stall Axial Compressor Flow with Varying Passage Numbers	439
<i>Ruben van Rennings, Ke Shi, Song Fu, Frank Thiele</i>	
Application of Hybrid Methods to Calculations of Vortex Precession in Swirling Flows	449
<i>A. Gavrilov, A. Dekterev, A. Minakov, D. Platonov, A. Sentyabov</i>	
Large Eddy Simulation of Turbulent Flows in a Laboratory Reciprocating Engine	461
<i>T. Joelsson, R. Yu, X.S. Bai</i>	
URANS Investigation of the Transonic M219 Cavity	471
<i>L. Temmerman, B. Tartinville, Ch. Hirsch</i>	
Applications to Wind Flows	
Multiscale Finite Element Method Applied to Detached-Eddy Simulation for Computational Wind Engineering	483
<i>Yue Zhang, R.A. Khurram, Wagdi G. Habashi</i>	

Contents	XI
Modelling of Wind Flows over Complex Terrain Using a DES Method	493
<i>Cheng-Hu Hu</i>	
3D Flow and Pollutant Dispersion Simulation in Organized Cubic Structures	503
<i>D. Angelidis, V. Assimakopoulos, G. Bergeles</i>	
Author Index	515