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High-Order Methods for the Numerical Simulation of Vortical and Turbulent Flows

Foreword

This volume contains selected contributions presented at the EUROMECH Colloquium on "*High-Order Methods for the Numerical Simulation of Vortical and Turbulent Flows*" which was held in March 2003 near Darmstadt, Germany. The colloquium took place in the framework of a very fruitful, long-term cooperation of French and German research groups in the field of Computational Fluid Dynamics, and supported by CNRS and DFG.

The main objective of the colloquium was to bring together researchers with interest in theoretical, computational, and applied aspects of high-order methods for the simulation of vortical and turbulent flows. Much progress has been achieved in this research field in recent years, and it appears to be promising with respect to enlarging the possibilities for a reliable and efficient simulation of complex problems in fluid dynamics.

The papers in the present volume discuss current research and developments defining the state of the art in the field. The topics cover: spectral methods, pseudo-spectral methods, spectral-element methods, high-order finite-volume, finite-difference and finite-element methods, h–p finite-element methods, wavelet based methods, efficient solvers and preconditioners, involvement of multigrid, adaptive methods, parallel computing aspects, basic flow phenomena, and technical applications.

Coming from the about twenty contributions given in Euromech Colloquium 446, 11 are published in this thematic issue. Other contributions were given by E. Krause, as guest speaker, W. Gerlinger, D. Krasnov. Details from the contributions by Bogey and Bailly [1], Roussel and Schneider [2], Serre et al. [3], Theofilis et al. [4] and Daru and Tenaud [5], have been published elsewhere.

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References

[1] C. Bogey, C. Bailly, A family of low dispersive and low dissipative explicit schemes for noise computation, J. Comput. Phys. 194 (1) (2004) 194–214.

[2] O. Roussel, K. Schneider, An adaptative multiresolution method for combustion problems: application to flame ball-vortex interaction, Comput. Fluids (2004), in press.

1631-0721/$ – see front matter
doi:10.1016/j.crme.2004.11.007

[3] E. Serre, E. Tuliska-Sznitko, P. Bontoux, Coupled theoretical and numerical study of the flow transition between a rotating and a stationary disk, Phys. Fluids 16 (3) (2004) 688–706.
[4] V. Theofilis, A. Karabis, S.J. Shaw, Complex-grid spectral algorithms for inviscid linear instability of boundary layer flows, Comput. Fluids 32 (5) (2003) 691–726.
[5] V. Daru, Ch. Tenaud, High order one-step monotonicity-preserving schemes for unsteady flow calculations, J. Comput. Phys. 193 (2004) 563–594.

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