

## Book reviews

***Turbulence Modelling and Vortex Dynamics, Proceedings of a Workshop Held in Istanbul, Turkey, 2–6 September 1996***, Lecture Notes in Physics, Volume 491, edited by **O. Boratev, A. Eden, A. Erzan** (Springer-Verlag GmGH & Co. KG, Heidelberg, 1997, 245 pp.) DM 92.00 ÖS 671.60 sFr 81.00 GB£ 35.50 US\$ 68.00 hc ISBN 3 540 63051 1

This book comprises fifteen papers of which only two are by authors from Turkish institutions, in spite of the fact that the vast majority of the meeting's participants are from institutions from within Turkey. It therefore seems likely that one of the aims of the meeting was to stimulate further work in Turkey within this area.

A prospective reader from an engineering background might be forgiven for feeling somewhat misled by the title: Reynolds-averaged modelling is certainly not a concern of the authors (nearly all of whom are mathematicians or theoretical physicists rather than engineers), nor are the methods used to link coherent structures within the framework of traditional Reynolds-averaged modelling. Yet many of the papers are most refreshing, partly because most of them would otherwise have been published in journals not necessarily read by us.

While it is difficult to appreciate what the editors intended by collecting some of these papers into a single volume, this book is a rich vein to tap and a rewarding one for those readers prepared to persevere. Several papers draw on Chapter 8 of Frisch's book ("Turbulence", Cambridge University Press): those by L'vov and Procaccia, She and Biferale *et al.* deal with extensions to Kolmogorov's 1941 theory using various cascade models to include the effects of intermittency and using different techniques to estimate the scaling exponents of the velocity structure functions. Two papers by Frisch and Wirth, and Biferale and Wirth are concerned with intermittency models of a passive scalar advected in a Gaussian field. However of these, only Biferale *et al.*, in a complete and useful paper with a better perspective, make any reference to the obvious importance of this work to the development of subgrid models in large-eddy simulations.

Unfortunately, the perspective of the book as a whole fails to live up to its title. However, there are some very interesting contributions: Andreotti *et al.* in the only paper reporting experimental results, repeat Taylor's classical experiment using a four-rollers mill cell but with the benefits of modern measurement techniques. In a numerical 'experiment' Boratav and Pelz show the real value of simulation databases in an investigation of the scaling of pressure structure functions. Biringen and Reichert provide a useful review of their recent work with simulation databases of more complex flows. Yet there are other papers which appear somewhat out-of-place in this volume.

This is not a volume for postgraduate students. Rather it is one that an established worker will find refreshing when more 'conventional' fare cloy the palate. We hope that workers, especially engineers and experimentalists in North America and Europe, will respond positively to this book and take its title to be an exhortation

rather than a state of present affairs. More books of this nature are needed to stimulate the much needed dialogue between the mathematical physics and engineering communities: as L'vov and Procaccia suggests, "The marriage of physics and engineering will be the challenge of the 21st century".

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***Fifteenth International Conference on Numerical Methods in Fluid Dynamics, Proceeding of the Conference Held in Monterey, CA, USA, 24–28 June 1996***, Lecture Notes in Physics, Volume 490, edited by **P. Kutler, J. Flore, J.-J. Chattot** (Springer-Verlag GmbH & Co. KG, Heidelberg, 1997, 655 pp.) DM 168.00 ÖS 1226.40 sFr 152.00 FF 633.00 GB£ 64.50 US\$ 109.00 hc ISBN 3 540 63054 6

The volume 490 of Springer's "Lecture Notes in Physics" contains the papers of the three invited lectures and of about 100 papers (with 6 pages for each paper) of the contributed talks of the conference. The editors structured the material with the following subsections: Invited Lectures, Algorithms (Numerical Techniques, Euler, Incompressible Flows, Navier-Stokes), Applications, Design Methods, Grid Adaption, Internal Flows, LES and DNS, Parallel Computing, Special Topics, Turbulence Modeling, Unsteady Flows, Unstructured Grids.

The invited lectures cover the topics of "Numerical Simulation and Analysis of the Transition to Turbulence" (by Ch.-H. Bruneau), "Multidisciplinary Design Optimization of Advanced Aircraft Configurations" (by A.A. Giunta, O. Golivodov, D.L. Knill, B. Grossman, W.H. Mason and L.T. Watson) and "Turbulence Modeling – Progress and Future Outlook" (by J.G. Marvin and G.P. Huang).

The topics of the different contributed papers vary from new or improved numerical schemes to solve numerical problems of subsonic, transonic, supersonic and hypersonic flow. The reader interested in aerodynamic application will be pleased to find many examples of flow over airfoils, wings and complete aircraft configurations. There are also examples of application to internal flow, e.g. jets, shear layers, nozzles, piston engines and turbines. An important topic treated in several papers is the use of structured and unstructured grids, grid adaption and local grid refinement. Furthermore, there are papers about the proper implementation of the new and improved numerical methods on vector and parallel computers, a topic of growing importance.

In general, the Proceedings of the 15th International Conference on Numerical Methods in Fluid Dynamics offer a very interesting survey over new developments in the field.

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