Book Reviews

Turbulence and Random Process in Fluid Mechanics, by M. T. Landahl and
E. Mollo-Christensen, Cambridge University Press, New York, 1986, 154 pp., $34.50.

The main aim of this book (as stated in the Preface), is to give students the background that will enable them to follow the literature and to understand current results in the field of turbulence. Since the authors have been involved for some 20 years with the teaching of a course which is designed to do just that, they should be eminently qualified for that task. A look at the book indicates that they have, on the whole, been successful. The book will probably be best used with the guidance of a teacher, although it could be used for independent study. In either case it should be supplemented with other material.

After an introduction which includes historical notes, the authors consider in turn, the characteristic scales and nondimensional parameters of turbulence, the basic fluid equations, and the statistical tools used for the description of turbulence (ensemble averages, moments, spectra, etc.). The next chapter concerns homogeneous turbulent flows and covers flows that are homogeneous in only one or two space variables (e.g., fully developed flow in a two-dimensional channel), as well as isotropic turbulence. The next two chapters consider waves, instability, and transition to turbulence, including routes to turbulence such as period-doubling and quasi-periodic routes ending in a strange attractor. The last four chapters are concerned with shear-flow turbulence structure (as observed from experiments), turbulence modeling and closure schemes, aerodynamic noise, and convective transport.

In spite of its small size, the volume in general covers the field, and contains chapters on several subjects which are not usually covered, even in more extensive books on turbulence, (e.g., waves, routes to turbulence, and aerodynamic noise). On the other hand, only two sentences are devoted to direct numerical simulation, where it is dismissed as not being able to handle the high-Reynolds-number turbulent flows of practical interest. But it is not necessary to go to high Reynolds numbers to study the physics of turbulence, and much has been learned by considering numerical simulations at low and moderate Reynolds numbers. However, this is a small criticism. All in all, the book gives a good, as well as useful, introduction to the field of fluid turbulence.

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Photoelasticity, Proceedings of the International Symposium on Photoelasticity, Tokyo 1986, M. Nisida and K. Kawata, Editors, Springer-Verlag, Inc., New York, 1986, 292 pp., $51.60.

The 35 papers of these proceedings are grouped into the following sections: Survey; Viscoplastic Behavior; Moire-speckle; High-Speed Photoelasticity; Caustics; New Techniques in Photoelasticity; Stresses in Structures; and Numerical Methods of Stress Analysis. As can be seen from the titles of the sections, the symposium not only includes photoelastic topics but also optical techniques in general. The volume is a collection of papers on different subjects reflecting the personal interest of the authors. Because the list of authors includes a distinguished roster of international researchers in the area of optical techniques, there are many fine contributions reflecting the state-of-the-art in the corresponding fields. The volume is a valuable addition to the library of those interested in optical techniques.

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Abstracts from Soviet Aerospace Literature

Abstracts will not appear this month. For previous topics see the following 1987 issues: January, _Aerodynamic Research and Development_; February, _Structural Mechanics_; March, _Fluid Dynamics_; and April, _Propulsion_.