

REVIEWS

Surveys in Fluid Mechanics. Edited by R. NARASIMHA and S. M. DESHPANDE.
Indian Academy of Sciences, Bangalore, 1981. 310 pp. Rs. 30/U.S. \$30.

This volume, printed from two issues of the *Proceedings of the Indian Academy of Sciences*, contains extended versions of 16 invited lectures delivered at the First Asian Congress of Fluid Mechanics held at Bangalore in December 1980. The authors are Dhawan, Coles, Hussain, Huang & Chou, Ohji, Tani, Matsui, Whitham, Das, Krishnamurti, Gadgil, Lin & Jia, Niyogi, Oshima, Arakeri, Sivasegaram. Some of the articles are surveys of past work in a particular field, some describe new work on a specific problem, and some provide reflections on topics that are not yet well understood. The general level is high, and selection of any of the articles for comment is a matter of personal taste, but there are several that are likely to have wide appeal. One is by T. Matsui, whose beautiful flow visualizations are well known and who here presents and interprets observations of vortices in a number of familiar contexts, such as a Kármán street. Coherent structures in turbulent shear flows receive special attention. D. Coles describes his present understanding of the structures in six flow systems which are either turbulent or on the way to being turbulent, and searches for their common features; and A. K. M. F. Hussain gives a more detailed and factual review with the conclusion that coherent structures dominate the transport in the early stages of their formation but not in the later self-preserving regions. Judging by the invited lectures, the Asian Congresses of Fluid Mechanics are off to a good start. The next Congress is to be held in Peking in 1983.

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SHORTER NOTICES

Applied Functional Analysis. By D. H. GRIFFEL. Ellis Horwood, 1981. 386 pp.
£25 (hardback), £8.50 (paperback).

The preface states that this book is a simple and easy introduction to functional analysis. Readers who are not familiar with the subject area will find the book very clear and readable, although they may not at first appreciate that it is simple and easy. The author illustrates many of his results with equations from mathematical physics, although it is only with the discussion of swirling flow in §6.8 that the treatment of a physical topic becomes very detailed. The book is divided into four parts. The first part describes distribution theory with particular reference to Green functions and Fourier transforms; the second part introduces Banach spaces with applications to nonlinear problems; the third introduces Hilbert spaces, with applications to linear problems, and includes the spectral theorem; the final part sketches some further developments. The author's style is careful and precise, yet includes many informal 'Remarks' which help elucidate the material.

Singular Perturbations and Asymptotics. Edited by R. E. MEYER and S. V. PARTER. Academic Press, 1980. 409 pp. \$22.00.

This is a collection of invited lectures presented at an Advanced Seminar on Singular Perturbations and Asymptotics in May 1980 at Madison, Wisconsin in honour of Professor W. Wasow. The 15 papers – reproduced from typescript – have been

grouped by the editors into four sections, and an index covering all papers has been compiled. The sections are: Theory of Singular Layer Problems, Resonance in Singular Perturbations and Applications to Physical Chemistry, Multivariate Methods and Applications, and Turning-Point Theory and Applications. Only a few papers discuss fluid-mechanical problems directly, for example J. D. Cole on Gas dynamics and water waves, A. H. Nayfeh on nonlinear hyperbolic waves and W. H. Reid on the Orr-Sommerfeld equation.

Nonlinear Partial Differential Equations and their Applications. Collège de France Seminar. Vol. I. Edited by H. BRÉZIS and J. L. LIONS. Pitman, 1981. 388 pp. £11.75.

This book consists of written versions of lectures given at the weekly Seminar on Applied Mathematics at the College de France during 1978–1979. Nine papers are in English and 12 in French. Of these, the papers by Berger, Dias, Foias & Temam, Kato and Rauch have direct bearing on fluid mechanics, although in all cases the questions are discussed from a very mathematical point of view, and the areas of application range widely. The production is by reproduction of typescript.

Fluid Mechanics for Engineering Technology. By IRVING GRANET. Prentice-Hall Inc. 1981. 385 pp., £12.95. Hard cover.

This is the second edition of a book originally published in 1971. It is an elementary text, having a technical character of peculiarly oppressive nature. The level is typified by the following ‘illustrative problem’: ‘Water flows in a 2-in.-i.d. pipe at a velocity of 30 feet per second. If the water is at 100 °F, find its Reynolds number. Use the data of Table 2.2.’ The diligent student will confirm that the Reynolds number is 676615, and will then read ‘since this is greater than 2000, the flow is turbulent’. It can’t believe that any student of fluid mechanics should be encouraged to approach the subject in this way.