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Book reviews

Annual review of fluid mechanics, Volume 3 and 4, 1971 and 1972, edited by M. van Dyke, W. G. Vincenti and J. V. Wehausen. Annual Reviews Inc., Palo Alto, California, USA. 406, resp. 504 pp., price $10.50 each.

These are the third and fourth volume of the series of *Annual Reviews of Fluid Mechanics*, which has proved in the few years of its existence to be an indispensable source of information about the latest developments in the field of fluid mechanics. All contributions are review papers written by experts providing the reader also with extensive and up-to-date lists of references. From July 1970 on the possibility exists of ordering reprints of individual articles at the uniform rate of $1 each.

The contents of Volume 3, 1971, are:

Compressible flow in the thirties, by A. Busemann,
Peristaltic pumping, by M. Y. Jaffrin and A. H. Shapiro,
Magnetohydrodynamics at high Hartmann number, by J. C. R. Hunt and J. A. Shercliff,
Collisionless shocks in plasmas, by H. W. Friedman, L. M. Linson, R. M. Patrick and H. E. Petschek,
The coupling of radiative transfer and gas motion, by W. G. Vincenti and S. C. Traugott,
Nonlinear continuum mechanics of viscoelastic fluids, by R. S. Rivlin and K. N. Sawyers,
Unsteady force and pressure measurements, by W. W. Willmarth,
Theory of combustion in laminar flows, by F. A. Williams,
Microcirculation: mechanics of blood flow in capillaries, by Y. C. Fung and B. W. Zweifach,
Boiling, by W. M. Rohsenow,
The motion of floating bodies, by J. V. Wehausen,
Sonic boom, by W. D. Hayes,
Suspended particles in fluid flow through tubes, by R. G. Cox and S. G. Mason,
Gas dynamics of explosions, by V. P. Korobeinikov,
Nonlinear stability theory, by J. T. Stuart,
The theory of viscous hypersonic flow, by V. V. Mikhailov, V. Ya. Neiland and V. V. Sychev.

The contents of Volume 4, 1972, are:

As luck would have it—a few mathematical reflections, by H. Villat,
Fluid mechanics of heat disposal from power generation, by D. R. F. Harleman and K. D. Stolzenbach,
Mantle convection and the new global tectonics, by D. L. Turcotte and E. R. Oxburgh,
Finite amplitudes disturbances in the flow of inviscid rotating and stratified fluids over obstacles, by R. R. Long,
Locomotion of protozoa, by T. L. Jahn and J. J. Votta,
Magnetohydrodynamics of the earth's core, by P. H. Roberts and A. M. Soward,
Chemically reacting flows, by E. Becker,
Vortex breakdown, by M. G. Hall,
Self-gravitating gaseous disks, by C. Hunter,
Cavity and wake flows, by Th. Y. Wu,
Self-similar solutions as intermediate asymptotics, by G. I. Barenblatt and Y. A. Zel'dovich,
Periodic flow fenomena, by E. Berger and R. Wille,
Oil spreading on the sea, by D. P. Hoult,
One-dimensional flow of liquids containing small gas bubbles, by L. van Wijngaarden,
Sailing vessels and sails, by J. H. Milgram,
Wing-body aerodynamic interaction, H. Ashley and W. P. Rodden,
Bounds on flow quantities, by L. N. Howard.

H. W. Hoogstraten.

Richard E. Meyer, **Introduction to mathematical fluid dynamics.** John Wiley & Sons Ltd. 185 pages, 1972, price £ 6.15.

This book is grown out of lecture notes, which the author tested for years in graduate courses for students with a diverse technical interest. As is stated in the preface, the book is a suitable introduction in the field of fluid dynamics for readers who want study more specialized literature of diverse interest. The bulk of this book is devoted to a discussion of the relation between inviscid and viscous fluids. On the other hand an attempt is made to give an introduction at a sophisticated level appropriate to graduate students. Chapters 1 to 3 are written in a somewhat axiomatical manner. For mathematical students such a treatment helps to dispel the all too common impression that the whole subject is built on a quick-sand of assorted intuitions. For the students of physical or engineering sciences it helps to clear up common confusions between approximations of different types. Nevertheless, only a modest mathematical preparation is presupposed. Most elaborate technical tools are explained where they intrude.

To discuss the relation between viscous and ideal fluid the motions of boundary layer theory are explained clearly in a central chapter. (Ch. 4). This chapter is preceded by chapters on kinematics, momentum principle and ideal fluid and a chapter on Newtonian fluid where among other subjects a thorough treatment of the constitutive equation is presented. Chapters 5 and 6 treat some aspects of rotating fluids and take the effects of compressibility into account.

In the opinion of the reviewer the book gives new insight in teaching fluid dynamics. For this reason each teachter of graduate courses in fluid dynamics should have a look at this book to make use of years of teaching experience of the author.

A. J. Hermans

A. Kyrala, **Applied functions of a complex variable.** John Wiley & Sons Ltd., 1972, 374 pages price £ 7.90.

The book is written for readers primarily interested in applications of mathematics who wish to acquire a rapid but secure intuitive grasp of the subject which will permit them to apply basic principles with effectiveness and confidence. Among the subjects treated in this book a large part is covered in previous engineering books on the subject. What makes the book valuable, is the treatment of several topics which are important for engineering applications nowadays. For instance in chapter 9 on Laplace and Fourier transforms next to a treatment of the method of steepest descent and of stationary phase, which are covered in many books on complex variables, the author describes bandwidth-duration and uncertainty principles, linear systems and stability, filters and servomechanisms and feedback amplifiers. It is interesting to find these engineering subjects in a textbook on complex variables.

Another chapter of much interest for application is chapter 11 about dispersion relations, Hilbert transforms and Plemelj formulae. It is not the intention of the reviewer to give the impression that the treatment of the subjects mentioned above is digging very deep. The treatment is sufficient to give enough insight to apply the described theory.

To convey to the reader not only a grasp of the content and meaning of the principal theorems of the subject, but also a clear picture of the interrelationships with one another and with applications a remarkable amount of worked examples and unsolved problems have been included.

If one is interested in teaching a course on complex variables for engineering students it is worthwhile to have a look into the book.

A. J. Hermans