

BOOK REVIEWS

dynamics with chemical reactions, electromagnetic effects (plasma dynamics), radiation effects, and low densities (rarefied gas dynamics). A final chapter focuses primarily on continuum models for mixtures (two-phase flows and multiple-species models for plasmas). It includes brief mentions of non-Newtonian fluids, superfluids, biofluid mechanics, and relativistic fluid mechanics.

This book presents the basic concepts and equations of certain topics in modern theoretical fluid mechanics and provides insights and understanding so that the reader knows when and how to use these tools. The book should prove extremely valuable for both technology transfer and research preparation. From this book someone who wants to apply recent advances in fluid dynamics and who has a good background in classical fluid dynamics can obtain the knowledge and understanding of concepts and equations needed to apply results in the research literature. The researcher can also turn to this book as the first step toward original research in a new area. This book could be used as a text for an advanced course for graduate students who are at the transition point between course work and thesis research.

Compressible Flow. By S. Schreier. Wiley, New York, 1982. 577 Pages. Price \$60.00.

REVIEWED BY M. MORDUCHOW⁶

A number of well-known and notable texts dealing specifically with compressible flows have appeared in the past. Mention may be made, for example, of the general compressible-flow texts of Shapiro, and of Liepmann and Roshko among others, of Ferri's book on supersonic-flow aerodynamics, of Stewartson's text on compressible laminar boundary layers, of the text of Hayes and Probstein, and of that of Dorrance, on hypersonic flow, and of the book of Vincenti and Kruger on physical gas dynamics. Due to the

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broad scope of compressible fluid dynamics, however, there remains of course room for further good texts on the subject. The book under review may be considered as in this category, its subject being primarily classical compressible flow. It is claimed on the book cover that this is the "first major new work" on compressible flow since 1972. Assuming that "work" here means "textbook" this may be close to true, but note must be made here at least of the 1976 text of Zucrow and Hoffman (*Gas Dynamics Vol. 1*, admittedly based at least in part on a well-known 1958 book of Zucrow) and of the quite recent (1982) text of J.D. Anderson (*Modern Compressible Flow, With Historical Perspective*).

Although there are various ways, depending on individual tastes and interests, of treating the subject of compressible flow, the 577-page text of Schreier's can serve quite well as the basis of at least a one-year graduate course on compressible flow. It could also be used for self-study. In fact, the explanations here are sufficiently detailed so that the text may be considered as essentially self-contained, although a knowledge of vector analysis is assumed and a previous knowledge of basic incompressible fluid mechanics and elementary thermodynamics would be desirable. An appreciable variety of topics is covered, including: the Navier-Stokes equations; sound waves, shock waves, and expansion waves; steady and unsteady one-dimensional flows with and without shock waves; two and three-dimensional steady subsonic and supersonic flow; characteristics; transonic flow (in unusual detail); (classical) compressible laminar and turbulent boundary layers; real gas effects, especially dissociating boundary layers; and computational methods, with emphasis on numerical solution of ordinary differential equations and finite-difference solutions of the standard partial differential equations, with the addition of a more complicated example, involving supersonic flow. A set of 241 references and certain working tables for compressible flow calculations are included. Moreover, a set of useful and interesting exercises for each chapter is given at the end of the book.

In summary this book may be regarded as a quite useful addition to the textbook literature on compressible flows.