



The Phenomena of Fluid Motions

Robert S Brodkey

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Notable for its thoroughness and clarity, this well-written graduate-level text presents the theoretical background of fluid flow from the standpoint of the transport phenomena, relating momentum transport to other transport mechanisms. The book is divided into three main sections: Part I-A Theoretical Background to Fluid Flow; Part II-Applications of the Basic Flow Equations; Part III-Extensions of the Basic Flow Equations. When this book was first written, there was no single text, suitable for graduate students, dealing with fluid motion. It remained for Professor Brodkey (Emeritus, Chemical Engineering, Ohio State University) to tie together the disparate threads of the topic in a clear, well-organized exposition. To make the book as accessible as possible to first-year graduate students, the author introduces the simplifying method of vector notation, and vector and tensor notation are developed as an integral part of the first few chapters. Part I provides a theoretical background to fluid flow, as well as introducing the equations of change and the various flux vectors of transport theory, and culminates in the derivation of the Navier-Stokes equations. Part II focuses on standard applications of the flow equations: inviscid flows, exact and boundary-layer solutions of the laminar-flow equations, integral methods, dimensional analysis and one-dimensional compressible flow. Part III, comprising the major portion of the book, covers phenomenological and statistical theories of turbulence, non-Newtonian phenomena and multiphase flow. Although it is designed for chemical engineering students, this book covers a wide range of topics not ordinarily found in fluid mechanics textbooks, making it an invaluable sourcebook for any engineer concerned with real-life fluid flow problems. The text includes carefully selected problems throughout to strengthen the reader's grasp of the material, and an exhaustive bibliography suggests further reading. Unabridged and corrected republication (2005) of the edition first published by Addison-Wesley Publishing Company, Reading, Mass., 1967. 268 illustrations (including 27 photographs). Preface. Author and subject indexes. Bibliography. Problems. xiv + 737pp. 6% x 9%. Paperbound.

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