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   Titolo   A Primer on Fluid Mechanics with Applications / / by Sudhir Ranjan Jain, Bhooshan S. Paradkar, Shashikumar M. Chitre

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   Descrizione fisica   1 online resource (284 pages)

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   Soggetti   Mechanics
   Fluid mechanics
   Astrophysics
   Soft condensed matter
   Medical physics
   Classical Mechanics
   Engineering Fluid Dynamics
   Fluids
   Medical Physics

   Lingua di pubblicazione   Inglese

   Formato   Materiale a stampa

   Livello bibliografico   Monografia

   Nota di bibliografia   Includes bibliographical references and index.

   Nota di contenuto   Introduction -- Fluid Equations from Kinetic Theory -- Vorticity -- Potential Flows in Two Dimensions -- Viscous Flow -- Low Reynolds Number Flows -- Physiological Hydrodynamics -- Water Waves -- Magnetohydrodynamics -- Tensor Virial Theorem and Applications -- Stability Problems in Hydrodynamics and Hydromagnetics -- Shock Waves -- Astrophysical Fluid Mechanics -- An Introduction to Classical Turbulence -- Superfluid Hydrodynamics and Quantum Turbulence.

   Sommario/riassunto   This textbook is a pedagogic introduction to a number of phenomena employing fluid mechanics. Beginning with basic concepts and conservation laws for neutral and charged fluids, the authors apply and develop them to understand aerodynamics, locomotion of micro-organisms, waves in air and water, shock waves, hydrodynamic and hydromagnetic instabilities, stars and black holes, blood flow in

humans, and superfluids. The approach is to consider various striking topics on fluid mechanics, without losing necessary mathematical rigor. The book balances the qualitative explanations with formal treatment, in a compact manner. A special focus is given to the important and difficult subject of turbulence and the book ends with a discussion on turbulence in quantum fluids. The textbook is dotted by a number of illustrative examples, mostly from real life, and exercises. The textbook is designed for a one semester course and addresses students at undergraduate and graduate level in physics or engineering, who want to research in the fields as diverse as aeronautics, meteorology, cosmology, biomechanics, and mathematical physics. It is requested knowledge of an undergraduate level course on mathematical methods to better understand the topics presented here.