1. Record Nr. UNINA9910822321503321

Autore	Pert Geoffrey
Titolo	Introductory fluid mechanics : for physicists and mathematicians / / Geoffrey Pert
Pubbl/distr/stampa	Chichester, England, : John Wiley & Sons, c2013
ISBN	1118574052 9781118574058
Edizione	[1st ed.]
Descrizione fisica	1 online resource (xx, 468 p.) : ill
Classificazione	423.8 532
Disciplina	620.106
Soggetti	Fluid mechanics Heat - Transmission Hydrodynamics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes bibliographical references (p. 455-462) and index
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Title Page -- Copyright -- Contents -- Preface -- Chapter 1 Introduction -- 1.1 Fluids as a State of Matter -- 1.2 The Fundamental Equations for Flow of a Dissipationless Fluid -- 1.3 Lagrangian Frame -- 1.3.1 Conservation of Mass -- 1.3.2 Conservation of Momentum-Euler's Equation -- 1.3.3 Conservation of Angular Momentum -- 1.3.4 Conservation of Energy -- 1.3.5 Conservation of Entropy -- 1.4 Eulerian Frame -- 1.4.1 Conservation of Mass-Equation of Continuity -- 1.4.2 Conservation of Momentum -- 1.4.3 Conservation of Angular Momentum -- 1.4.4 Conservation of Energy -- 1.4.5 Conservation of Entropy -- 1.5 Hydrostatics -- 1.5.1 Isothermal Fluid-Thermal and Mechanical Equilibrium -- 1.5.2 Adiabatic Fluid-Lapse Rate -- 1.5.3 Stability of an Equilibrium Configuration -- 1.6 Streamlines -- 1.7 Bernoulli's Equation: Weak Form -- 1.8 Polytropic Gases -- 1.8.1 Applications of Bernoulli's Theorem -- 1.8.1.1 Vena Contracta -- 1.8.1.2 Flow of gas along a pipe of varying cross-section -- Case study 1.I Munroe Effect-Shaped Charge Explosive -- Chapter 2 Flow of Ideal Fluids -- 2.1 Introduction -- 2.2 Kelvin's Theorem -- 2.2.1 Vorticity and Helmholtz's Theorems -- 2.2.1.1 Simple or rectilinear vortex -- 2.2.1.2 Vortex sheet -- 2.3 Irrotational Flow -- 2.3.1 Crocco's Equation

Sommario/riassunto

This textbook presents essential methodology for physicists of the theory and applications of fluid mechanics within a single volume. Building steadily through a syllabus, it will be relevant to almost all undergraduate physics degrees which include an option on hydrodynamics, or a course in which hydrodynamics figures prominently.