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Christoffel Transformation; Hodograph Method; 2.3 Three-Dimensional Irrotational Flows; Special Singular Solutions; The Source Flow; The Doublet Flow; d'Alembert's Paradox; Image of a Source in a Sphere; Flow Past an Arbitrary Body; Unsteady Flows; Added Mass of Bodies Moving Through a Fluid; 2.4 Vortex Flows; Vortex Tubes; Induced Velocity Field; Biot-Savart's Law; Vortex Ring Hill's Spherical Vortex Vortex Sheet; The Vortex Breakdown: Brooke Benjamin's Theory; 2.5 Rotating Flows; Governing Equations and Elementary Results; Taylor-Proudman Theorem; Propagation of Waves in a Rotating Fluid; Plane Inertial Waves; Forced Wavemotion in a Rotating Fluid; The Elliptic Case; The Hyperbolic Case; Slow Motion Along the Axis of Rotation; Rossby Waves; 2.6 Water Waves; Governing Equations; Surface Waves in a Semi-infinite Liquid; Surface Waves in a Liquid Layer of Finite Depth; Shallow-Water Waves; Water Waves Generated by an Initial Displacement Over a Localized Region Water Waves Generated by a Finite Train of Harmonic Waves Waves on a Steady Stream; One-Dimensional Gravity Waves; One-Dimensional Capillary-Gravity Waves; Ship Waves; Gravity Waves in a Rotating Fluid; Theory of Tides; Nonlinear Shallow Water Waves; Solitary Waves; Periodic Cnoidal Waves; Interacting Solitary Waves; Stokes Waves; Modulational Instability and Envelope Solitons; Nonlinear Resonant Three-Wave Interactions of Capillary-Gravity Waves; Second-Harmonic Resonance; Hydraulic Jump; 2.7 Applications to Aerodynamics; Airfoil Theory: Method of Complex Variables Force and Moments on an Arbitrary Body

Sommario/riassunto

"Although there are many texts and monographs on fluid dynamics, I do not know of any which is as comprehensive as the present book. It surveys nearly the entire field of classical fluid dynamics in an advanced, compact, and clear manner, and discusses the various conceptual and analytical models of fluid flow." - Foundations of Physics on the first edition Theoretical Fluid Dynamics functions equally well as a graduate-level text and a professional reference. Steering a middle course between the empiricism of engineering and the abstractions of pure mathematics, the author focuses on
