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Titolo	An Introduction to Computational Fluid Mechanics by Example [[electronic resource]]
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Altri autori (Persone)	ChowChuen-Yen <1932->
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Nota di contenuto	AN INTRODUCTION TO COMPUTATIONAL FLUID MECHANICS BY EXAMPLE; CONTENTS; Preface; 1 Flow Topics Governed by Ordinary Differential Equations: Initial-Value Problems; 1.1 Numerical Solution of Ordinary Differential Equations: Initial-Value Problems; 1.2 Free Falling of a Spherical Body; 1.3 Computer Simulation of Some Restrained Motions; 1.4 Fourth-Order Runge-Kutta Method for Computing Two-Dimensional Motions of a Body through a Fluid; 1.5 Ballistics of a Spherical Projectile; 1.6 Flight Path of a Glider-A Graphical

Presentation; 1.7 Rolling Up of the Trailing Vortex Sheet behind a Finite Wing
Appendix2 Inviscid Fluid Flows; 2.1 Incompressible Potential Flows; 2.2 Numerical Solution of Second-Order Ordinary Differential Equations: Boundary-Value Problems; 2.3 Radial Flow Caused by Distributed Sources and Sinks; 2.4 Inverse Method I: Superposition of Elementary Flows; 2.5 von Karman's Method for Approximating Flow Past Bodies of Revolution; 2.6 Inverse Method II: Conformal Mapping; 2.7 Classification of Second-Order Partial Differential Equations; 2.8 Numerical Methods for Solving Elliptic Partial Differential Equations
2.9 Potential Flows in Ducts or around Bodies-Irregular and Derivative Boundary Conditions2.10 Numerical Solution of Hyperbolic Partial Differential Equations; 2.11 Propagation and Reflection of a Small-Amplitude Wave; 2.12 Propagation of a Finite-Amplitude Wave: Formation of a Shock; 2.13 An Application to Biological Fluid Dynamics: Flow in an Elastic Tube; Appendix; 3 Viscous Fluid Flows; 3.1 Governing Equations for Viscous Flows; 3.2 Self-Similar Laminar Boundary-Layer Flows; 3.3 Flat-Plate Thermometer Problem-Ordinary Boundary-Value Problems Involving Derivative Boundary Conditions
3.4 Pipe and Open-Channel Flows3.5 Explicit Methods for Solving Parabolic Partial Differential Equations-Generalized Rayleigh Problem; 3.6 Implicit Methods for Solving Parabolic Partial Differential Equations-Starting Flow in a Channel; 3.7 Numerical Solution of Biharmonic Equations-Stokes Flows; 3.8 Flow Stability and Pseudo-Spectral Methods; Appendix; 4 Numerical Solution of the Incompressible Navier-Stokes Equation; 4.1 Flow around a Sphere at Finite Reynolds Numbers-Galerkin Method; 4.2 Upwind Differencing and Artificial Viscosity; 4.3 Benard and Taylor Instabilities
4.4 Primitive Variable Formulation: Algorithmic Considerations4.5 Primitive Variable Formulation: Numerical Integration of the Navier-Stokes Equation; 4.6 Flow Past a Circular Cylinder: An Example for the Vorticity-Stream Function Formulation; Appendix; Bibliography; Index

Sommario/riassunto

This new book builds on the original classic textbook entitled: An Introduction to Computational Fluid Mechanics by C. Y. Chow which was originally published in 1979. In the decades that have passed since this book was published the field of computational fluid dynamics has seen a number of changes in both the sophistication of the algorithms used but also advances in the computer hardware and software available. This new book incorporates the latest algorithms in the solution techniques and supports this by using numerous examples of applications to a broad range of industries from mec

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Autore	Craster Richard
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Nota di contenuto	1 Fundamentals of Acoustic Metamaterials -- 2 Locally Resonant Structures for Low Frequency Surface Acoustic Band Gap Applications -- 3 Band-Gap Properties of Prestressed Structures -- 4 Ultrasound Transmission Through Periodically Perforated Plates -- 5 Novel Ultrasound Imaging Applications -- 6 Subwavelength Focussing in Metamaterials Using Far Field Time Reversal -- 7 Anisotropic Metamaterials for Transformation Acoustics and Imaging -- 8 Transformation Acoustics -- 9 Acoustic Cloaking via Homogenization -- 10 Acoustic Cloaking with Plasmonic Shells -- 11 Cloaking Liquid Surface Waves and Plasmon Polaritons -- 12 Transformation Elastodynamics and Active Exterior Acoustic Cloaking -- 13 Experimental Acoustics and Metasurfaces -- 14 Resonators atop Surfaces -- 15 Elastic Metamaterials.
Sommario/riassunto	The revised edition of this book offers an expanded review of acoustic metamaterials; novel materials which can manipulate sound waves,

surface Rayleigh waves and water waves, in surprising ways, which include collimation, focusing, negative refraction, passive and active cloaking, sonic screening and extraordinary transmission. It covers both experimental and theoretical aspects of acoustic and elastic waves propagating in structured composites, with a focus on effective properties associated with negative refraction, lensing and cloaking. Updated chapters cover filtering effects, extraordinary transmission, sub-wavelength imaging via tomography or time-reversal techniques, cloaking via transformation acoustics, elastodynamics, and acoustic scattering cancellation. For this revised edition, six new chapters have been introduced to reflect recent developments in experimental acoustics and metasurfaces including acoustic impedance gratings and mirror symmetric metamaterials, phononic subsurfaces, time-modulated and topological crystals. The latter two are illustrated by simple Python program examples. The broad scope gives the reader an overview of the state of the art in acoustic metamaterials research and an indication of future directions and applications. It will serve as a solid introduction to the field for advanced students and researchers in physics, applied mathematics and mechanical engineering, and a valuable reference for those working in metamaterials and related areas.and researchers in physics, applied mathematics and mechanical engineering, and a valuable reference for those working in metamaterials and related areas.