1. Record Nr. UNINA9911006795603321

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Titolo	Introduction to the numerical analysis of incompressible viscous flows / / William Layton
Pubbl/distr/stampa	Philadelphia, Pa., : Society for Industrial and Applied Mathematics (SIAM, 3600 Market Street, Floor 6, Philadelphia, PA 19104), 2008
ISBN	0-89871-890-2 1-68015-791-4
Descrizione fisica	1 electronic text (xix, 213 p.) : ill., digital file
Collana	Computational science and engineering series ; ; 6
Disciplina	532/.053301518
Soggetti	Viscous flow - Mathematical models Numerical analysis Fluid mechanics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Mathematical preliminaries: energy and stress -- Approximating scalars -- Vector and tensor analysis -- Approximating vector functions -- The equations of fluid motion -- The steady Navier-Stokes equations -- Approximating steady flows -- The time-dependent Navier-Stokes equations -- Approximating time-dependent flows -- Models of turbulent flow -- Appendix nomenclature.
Sommario/riassunto	Introduction to the Numerical Analysis of Incompressible Viscous Flows treats the numerical analysis of finite element computational fluid dynamics. Assuming minimal background, the text covers finite element methods; the derivation, behavior, analysis, and numerical analysis of Navier-Stokes equations; and turbulence and turbulence models used in simulations. Each chapter on theory is followed by a numerical analysis chapter that expands on the theory. This book provides the foundation for understanding the interconnection of the physics, mathematics, and numerics of the incompressible case, which is essential for progressing to the more complex flows not addressed in this book (e.g., viscoelasticity, plasmas, compressible flows, coating flows, flows of mixtures of fluids, and bubbly flows). With mathematical rigor and physical clarity, the book progresses from the mathematical preliminaries of energy and stress to finite element computational fluid

dynamics in a format manageable in one semester. Audience: this unified treatment of fluid mechanics, analysis, and numerical analysis is intended for graduate students in mathematics, engineering, physics, and the sciences who are interested in understanding the foundations of methods commonly used for flow simulations.