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Titolo	Fundamentals of Fluid Mechanics [[electronic resource]] : For Scientists and Engineers / / by Patrick Chassaing
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ISBN	9783031100864 9783031100857
Edizione	[1st ed. 2022.]
Descrizione fisica	1 online resource (579 pages)
Disciplina	620.106
Soggetti	Fluid mechanics Soft condensed matter Mechanics Aerospace engineering Astronautics Engineering Fluid Dynamics Fluids Classical Mechanics Aerospace Technology and Astronautics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Physical concepts and mathematical tools -- Flow kinematics -- The fundamental balances of a fluid motion -- Fluid motion models -- Flow classes -- Irrotational 2D-plane motions -- Sound wave propagation and the shock phenomenon -- The incompressible Navier-Stokes model -- Very low Reynolds number flows.
Sommario/riassunto	This textbook provides a coherent and structured overview of fluid mechanics, a discipline concerned with many natural phenomena and at the very heart of the most diversified industrial applications and human activities. The balance between phenomenological analysis, physical conceptualization and mathematical formulation serve both as a unifying educational marker and as a methodological guide to the three parts of the work. The thermo-mechanical motion equations of a homogeneous single-phase fluid are established, from which flow

models (perfect fluid, viscous) and motion classes (isovolume, barotropic, irrotational, etc.) are derived. Incompressible, potential flows and compressible flows, both in an isentropic evolution and shock, of an ideal inviscid fluid are addressed in the second part. The viscous fluid is the subject of the last one, with the creeping motion regime and the laminar, dynamic and thermal boundary layer. Historical perspectives are included whenever they enrich the understanding of modern concepts. Many examples, chosen for their pedagogical relevance, are dealt with in exercises. The book is intended as a teaching tool for undergraduate students, wishing to acquire a first command of fluid mechanics, as well as graduates in advanced courses and engineers in other fields, concerned with completing what is sometimes a scattered body of knowledge.
