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Nota di contenuto	Part I Mathematics of compressible fluid flow: The state-of-the-art -- 1 Equations governing fluids in motion -- 2 Inviscid fluids: Euler system -- 3 Viscous fluids: Navier–Stokes–(Fourier) system -- Part II Generalized solutions to equations and systems describing compressible fluids -- 4 Classical and weak solutions, relative energy -- 5 Generalized weak solutions -- 6 Weak-strong uniqueness principle -- Part III Numerical analysis -- 7 Weak and strong convergence -- 8 Numerical methods -- 9 Finite volume method for the barotropic Euler system -- 10 Finite volume method for the complete Euler system -- 11 Finite volume method for the Navier–Stokes system -- 12 Finite volume method for the barotropic Euler system – revisited -- 13 Mixed finite volume – finite element method for the Navier–Stokes system -- 14 Finite difference method for the Navier–Stokes system.
Sommario/riassunto	This book is devoted to the numerical analysis of compressible fluids in the spirit of the celebrated Lax equivalence theorem. The text is aimed at graduate students in mathematics and fluid dynamics, researchers in applied mathematics, numerical analysis and scientific computing, and engineers and physicists. The book contains original theoretical material based on a new approach to generalized solutions (dissipative

or measure-valued solutions). The concept of a weak-strong uniqueness principle in the class of generalized solutions is used to prove the convergence of various numerical methods. The problem of oscillatory solutions is solved by an original adaptation of the method of K-convergence. An effective method of computing the Young measures is presented. Theoretical results are illustrated by a series of numerical experiments. Applications of these concepts are to be expected in other problems of fluid mechanics and related fields.