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Autore	Santos Andres
Titolo	A Concise Course on the Theory of Classical Liquids : Basics and Selected Topics // by Andrés Santos
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Descrizione fisica	1 online resource (XXX, 271 p. 124 illus., 94 illus. in color.)
Collana	Lecture Notes in Physics, , 0075-8450 ; ; 923
Disciplina	530.42
Soggetti	Amorphous substances Complex fluids Statistical physics Dynamics Chemistry, Physical and theoretical Thermodynamics Fluids Soft and Granular Matter, Complex Fluids and Microfluidics Complex Systems Physical Chemistry Fluid- and Aerodynamics Statistical Physics and Dynamical Systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Foreword -- Preface -- Summary of Thermodynamic Potentials -- Summary of Equilibrium Statistical Ensembles -- Density Expansion of the Equation of State -- Spatial Correlation Functions and Thermodynamic Routes -- One-Dimensional Systems. Exact Solution for Nearest-Neighbor Interactions -- Density Expansion of the Radial Distribution Function. Approximate Integral Equations -- Exact Solution of the Percus–Yevick Approximation for Hard Spheres ... and Beyond -- Index -- References.
Sommario/riassunto	This short primer offers non-specialist readers a concise, yet comprehensive introduction to the field of classical fluids – providing

both fundamental information and a number of selected topics to bridge the gap between the basics and ongoing research. In particular, hard-sphere systems represent a favorite playground in statistical mechanics, both in and out of equilibrium, as they represent the simplest models of many-body systems of interacting particles, and at higher temperature and densities they have proven to be very useful as reference systems for real fluids. Moreover, their usefulness in the realm of soft condensed matter has become increasingly recognized – for instance, the effective interaction among (sterically stabilized) colloidal particles can be tuned to almost perfectly match the hard-sphere model. These lecture notes present a brief, self-contained overview of equilibrium statistical mechanics of classical fluids, with special applications to both the structural and thermodynamic properties of systems made of particles interacting via the hard-sphere potential or closely related model potentials. In particular it addresses the exact statistical-mechanical properties of one-dimensional systems, the issue of thermodynamic (in)consistency among different routes in the context of several approximate theories, and the construction of analytical or semi-analytical approximations for the structural properties. Written pedagogically at the graduate level, with many figures, tables, photographs, and guided end-of-chapter exercises, this introductory text benefits students and newcomers to the field alike. .
