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Soggetti	Gravitation Statistics Physics Classical and Quantum Gravitation, Relativity Theory Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences Numerical and Computational Physics, Simulation
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Universal Tools -- The Sea of Wavelets -- Fisher Matrices and All That: Experimental Design and Data Compression -- Data Compression, Classification and Parameter Estimation. Methods: Examples from Astronomy -- Statistics of Cosmic Background Radiation -- Cosmic Microwave Background Anisotropies: The Power Spectrum and Beyond -- Cosmic Microwave Background Polarization Analysis -- Diffuse Source Separation in CMB Observations -- Techniques for Compact Source Extraction in CMB Maps -- Determination of Cosmological Parameters from Cosmic Microwave Background Anisotropies -- Cosmic Microwave Background Data Analysis: From Time-Ordered Data to Angular Power Spectra -- Statistics of Large-Scale Structure -- The Large-Scale Structure in the Universe: From Power Laws to Acoustic Peaks -- The Cosmic Web: Geometric Analysis -- Power Spectrum

Estimation. I. Basics -- Power Spectrum Estimation II. Linear Maximum Likelihood -- to Higher Order Spatial Statistics in Cosmology -- Phase Correlations and Topological Measures of Large-Scale Structure -- Multiscale Methods -- Gaussian Fields and Constrained Simulations of the Large-Scale Structure -- Weak Gravitational Lensing -- Mass Reconstruction from Lensing.

Sommario/riassunto

The amount of cosmological data has dramatically increased in the past decades due to an unprecedented development of telescopes, detectors and satellites. Efficiently handling and analysing new data of the order of terabytes per day requires not only computer power to be processed but also the development of sophisticated algorithms and pipelines. Aiming at students and researchers the lecture notes in this volume explain in pedagogical manner the best techniques used to extract information from cosmological data, as well as reliable methods that should help us improve our view of the universe.
