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Sinopsis

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This book accompanies another book by the same authors, Introduction to the Theory of the Early Universe: Hot Big Bang Theory and presents the theory of the evolution of density perturbations and relic gravity waves, theory of cosmological inflation and post-inflationary reheating. Written in a pedagogical style, the main chapters give a detailed account of the established theory, with derivation of formulas. Being self-contained, it is a useful textbook for advanced undergraduate students and graduate students. Essential materials from General Relativity, theory of Gaussian random fields and quantum field theory are collected in the appendices. The more advanced topics are approached similarly in a pedagogical way. These parts may serve as a detailed introduction to current research.

Contents:
Jeans Instability in Newtonian Gravity
Cosmological Perturbations in General Relativity. Equations of Linearized Theory
Evolution of Vector and Tensor Perturbations
Scalar Perturbations: Single-Component Fluids
Primordial Perturbations in Real Universe
Scalar Perturbations Before Recombination
Structure Formation
Beyond Ideal Fluid Approximation
Temperature of Cosmic Microwave Background
CMB Polarization
Drawbacks of the Hot Big Bang Theory. Inflation as Possible Way Out
Inflation in Slow Roll Regime
Generation of Cosmological Perturbations at Inflation
Further Aspects of Inflationary Theory
Preheating After Inflation
Bouncing Universe
Color Pages