

1. Record Nr.	UNINA9910139748803321
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Titolo	Relativistic celestial mechanics of the solar system [[electronic resource]] / Sergei Kopeikin, Michael Efroimsky, and George Kaplan
Pubbl/distr/stampa	Weinheim [Germany], : Wiley-VCH, 2011
ISBN	3-527-63457-6 1-283-37053-0 9786613370532 3-527-63456-8 3-527-63458-4
Descrizione fisica	1 online resource (894 p.)
Altri autori (Persone)	EfroimskyMichael KaplanGeorge
Disciplina	523.2 530.1/5
Soggetti	Celestial mechanics Relativity (Physics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Relativistic Celestial Mechanics of the Solar System; Contents; Preface; Symbols and Abbreviations; References; 1 Newtonian Celestial Mechanics; 1.1 Prolegomena - Classical Mechanics in a Nutshell; 1.1.1 Kepler's Laws; 1.1.2 Fundamental Laws of Motion - from Descartes, Newton, and Leibniz to Poincare and Einstein; 1.1.3 Newton's Law of Gravity; 1.2 The N-body Problem; 1.2.1 Gravitational Potential; 1.2.2 Gravitational Multipoles; 1.2.3 Equations of Motion; 1.2.4 The Integrals of Motion; 1.2.5 The Equations of Relative Motion with Perturbing Potential; 1.2.6 The Tidal Potential and Force 1.3 The Reduced Two-Body Problem 1.3.1 Integrals of Motion and Kepler's Second Law; 1.3.2 The Equations of Motion and Kepler's First Law; 1.3.3 The Mean and Eccentric Anomalies - Kepler's Third Law; 1.3.4 The Laplace-Runge-Lenz Vector; 1.3.5 Parameterizations of the Reduced Two-Body Problem; 1.3.6 The Freedom of Choice of the Anomaly; 1.4 A Perturbed Two-Body Problem; 1.4.1 Prefatory Notes; 1.4.2 Variation of Constants - Osculating Conics; 1.4.3 The Lagrange

and Poisson Brackets; 1.4.4 Equations of Perturbed Motion for Osculating Elements
1.4.5 Equations for Osculating Elements in the Euler-Gauss Form 1.4.6 The Planetary Equations in the Form of Lagrange; 1.4.7 The Planetary Equations in the Form of Delaunay; 1.4.8 Marking a Minefield; 1.5 Re-examining the Obvious; 1.5.1 Why Did Lagrange Impose His Constraint? Can It Be Relaxed?; 1.5.2 Example - the Gauge Freedom of a Harmonic Oscillator; 1.5.3 Relaxing the Lagrange Constraint in Celestial Mechanics; 1.5.4 The Gauge-Invariant Perturbation Equation in Terms of the Disturbing Force; 1.5.5 The Gauge-Invariant Perturbation Equation in Terms of the Disturbing Function
1.5.6 The Delaunay Equations without the Lagrange Constraint 1.5.7 Contact Orbital Elements; 1.5.8 Osculation and Nonosculation in Rotational Dynamics; 1.6 Epilogue to the Chapter; References; 2 Introduction to Special Relativity; 2.1 From Newtonian Mechanics to Special Relativity; 2.1.1 The Newtonian Spacetime; 2.1.2 The Newtonian Transformations; 2.1.3 The Galilean Transformations; 2.1.4 Form-Invariance of the Newtonian Equations of Motion; 2.1.5 The Maxwell Equations and the Lorentz Transformations; 2.2 Building the Special Relativity
2.2.1 Basic Requirements to a New Theory of Space and Time 2.2.2 On the "Single-Postulate" Approach to Special Relativity; 2.2.3 The Difference in the Interpretation of Special Relativity by Einstein, Poincare and Lorentz; 2.2.4 From Einstein's Postulates to Minkowski's Spacetime of Events; 2.3 Minkowski Spacetime as a Pseudo-Euclidean Vector Space; 2.3.1 Axioms of Vector Space; 2.3.2 Dot-Products and Norms; 2.3.3 The Vector Basis; 2.3.4 The Metric Tensor; 2.3.5 The Lorentz Group; 2.3.6 The Poincare Group; 2.4 Tensor Algebra; 2.4.1 Warming up in Three Dimensions - Scalars, Vectors, What Next? 2.4.2 Covectors

Sommario/riassunto

This authoritative book presents the theoretical development of gravitational physics as it applies to the dynamics of celestial bodies and the analysis of precise astronomical observations. In so doing, it fills the need for a textbook that teaches modern dynamical astronomy with a strong emphasis on the relativistic aspects of the subject produced by the curved geometry of four-dimensional spacetime. The first three chapters review the fundamental principles of celestial mechanics and of special and general relativity. This background material forms the basis for understanding relativ

2. Record Nr.	UNIORUON00090576
Titolo	Arheoloska istrazivanja i kninskoj krajini = Archaeological research in Knin and the region of Knin
Pubbl/distr/stampa	Zagreb : Hrvatsko Arheolosko Drustvo, 1992 168 p., : ill. ; 27 cm Conferenza : Knin, 13-15 ott. 1987
Classificazione	N1
Disciplina	930.1
Soggetti	Archeologia - Croazia
Lingua di pubblicazione	Molteplice
Formato	Materiale a stampa
Livello bibliografico	Monografia