1. Record Nr. UNINA9910735388203321

Autore	Musielak Dora
Titolo	Leonhard Euler and the foundations of celestial mechanics / / Dora Musielak
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	9783031123221 9783031123214
Descrizione fisica	1 online resource (228 pages)
Collana	History of physics
Disciplina	510.92
Soggetti	Celestial mechanics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Did you know? -- Preface -- Acknowledgements -- Author's Notes -- Prelude -- Euler's Contributions to Celestial Mechanics -- Planetary Perturbations -- Lunar Theories -- Three-Body Problem -- Contents -- List of Figures -- 1 Euler Study of Newtonian and Cartesian Physics -- The Birth and Nurturing of Genius -- Cartesian and Newtonian Natural Philosophy -- A Young Scholar Earns Recognition -- References -- 2 Euler's Grand Tour -- Saint Petersburg: Russian Bright Star -- Seeds for Euler Initiation into the Analysis of the Universe -- References -- 3 Introducing Analysis to Celestial Mechanics -- Euler at the St. Petersburg Observatory -- Euler Stellar Triangle -- Euler's Mechanica, First Newtonian Physics in Analytical Form -- Analysis of Planetary Motion -- Euler's Solution of Kepler's Problem -- First Prize from the French Academy of Sciences -- References -- 4 A Theory of Tides -- French Academy Prize Competition for a Theory of Tides -- Universal Gravitation Law -- Euler's Theory of Tides -- Elementary Analysis of Tides -- Leaving St. Petersburg -- A New Beginning in the Prussian Kingdom -- References -- 5 Theories of Motion in the Solar System -- The Berlin Observatory -- Euler's First Astronomy Book Based on Analytical Principles -- Euler Lunar Tables -- Solar Eclipse in July 1748 -- Lunar Eclipse in August 1748 -- Research on the Motion of Celestial Bodies-Newtonian Second Law Equation -- Precession of the Equinoxes -- The Great Inequality

That Links the Orbital Motions of Jupiter and Saturn -- Lunar Theory and Newton's Inverse Square Law -- St. Petersburg Academy First Astronomy Competition in 1751 -- Euler Second Lunar Theory (1751) -- Euler and the Variation of the Moon -- An Intriguing Little Mystery-A Riddle from the Father? -- Life in the Prussian Kingdom -- Adieu Berlin -- References.
6 Motion of Comets and Comet Tail Theory -- Comets as Objects in the Solar System -- The Comet of 1742 -- The Great Comet of 1744 -- Anonymous Lectures on Comets -- Prediction of Halley's Comet Return in 1758 -- The Great Comet of 1769 -- Euler's Theory of Comet Tail Formation -- Lexell and the Mysterious Comet -- What Is Known About Comets -- Comets and Their Place in Contemporary Space Exploration -- References -- 7 The Three-Body Problem and Lunar Theories -- Equations of Motion for the Three-Body System -- Euler's Three-Body Problem of Two Gravitational Centers (E. 337) -- Euler's Three-Body Problem in Collinear Configuration (E. 400) -- Euler's Last Moon Theory -- Aiming to Perfect the Lunar Theory: Prize Competition in 1770 -- To Perfect the Lunar Theory: Last Prize Competition -- Equilibrium Points of a Restricted Three-Body System -- References -- 8 Euler's Legacy to Astronautics -- The Personal Challenges -- St. Petersburg Fire, Vision and Family Loss -- The Triumphs -- Last Works Related to Celestial Mechanics -- Prizes from the French Academy -- To See Infinity -- Les Éloges -- The Scientific Legacy -- Euler Opera Omnia and Opera Postuma -- Astronomia Mechanica -- Euler's Legacy for Engineering and Physics -- Euler's Legacy for Observational Astronomy -- Legacy to Astronautics and Space Exploration -- Euler: Blind Mathematician, Astronomer, Engineer and Astrophysicist -- References -- Appendix -- A.1 Prizes Related to Celestial Mechanics Awarded to Euler by the French Academy of Sciences -- A.2 Euler Timeline -- A.3 The Restricted Three-Body System -- Index.