Ellipsoidal Figures Of Equilibrium

The Nobel Laureate's monumental study surveys hydrodynamic and hydromagnetic stability as a branch of experimental physics, surveying thermal instability of a layer of fluid heated from below, Benard problem, more.

The extraordinary range of cultural interests of renowned physicist David Speiser—including the sciences, art, architecture, music, and history of science—has inspired generations of later scientists to look beyond the boundaries of their own disciplines. In this book, seventeen scholars from various fields pay tribute to his multifaceted career, addressing topics as varied as music theory and the nuclear arms race.

Dear Reader, Here is your book. Take it, run with it, pass it, punt it, enjoy all the many things that you can do with it, but-above all-read it. Like all textbooks, it was written to help you increase your knowledge; unlike all too many textbooks that you have bought, it will be fun to read. A preface usually tells of the author's reasons for writing the book and the author's goals for the reader, followed by a swarm of other important matters that must be attended to yet fit nowhere else in the book. I am fortunate in being able to include an insightful prepublication review that goes directly to my motivations and goals. (Look for it following this preface.) That leaves only those other important matters. In preparing the text, I consulted a number of books, chief of which included these: • S. Chandrasekhar, Ellipsoidal Figures of Equilibrium, Yale Uni versity Press, 1969. • J .M.A. Danby, Fundamentals of Celestial Mechanics, Macmil lan, 1962. Now available in a 2nd edition, 3rd printing, revised, corrected and enlarged, Willmann-Bell, 1992. • Y. Hagihara, Theories of Equilibrium Figures of a Rotating Ho mogeneous Fluid Mass, NASA, 1970. • R.A. Lyttleton, The Stability of Rotating Liquid Masses, C- ix x PREFACE bridge University Press, 1953. • C.B. Officer, Introduction to Theoretical Geophysics, Springer Verlag, 1974. • A.S. Ramsey, Newtonian Attraction, Cambridge University Press, 1949. • W.M. Smart, Celestial Mechanics, Longmans, Green, and Co, 1953.

William Thomson, first Baron Kelvin (1824-1907), is best known for devising the Kelvin scale of absolute temperature and for his work on the first and second laws of thermodynamics, though throughout his 53-year career as a mathematical physicist and engineer at the University of Glasgow he investigated a wide range of scientific questions in areas ranging from geology to transatlantic telegraph cables. The extent of his work is revealed in the six volumes of his Mathematical and Physical Papers, published from 1882 until 1911, consisting of articles that appeared in scientific periodicals from 1841 onwards. Volume 4, published in 1910, includes articles from the period 1867-1906. Themes covered in this book examine issues relating to water, such as hydrodynamics, tidal theory and deep sea ship waves.

This book provides a comprehensive overview of the history of ideas about the sun and the stars, from antiquity to modern times. Two theoretical astrophysicists who have been active in the field since the early 1960s tell the story in fluent prose. About half of the book covers most of the theoretical research done from 1940 to the close of the twentieth century, a large body of work that has to date been little explored by historians. The first chapter, which outlines the period from about 3000 B.C. to 1700 A.D., shows that at every stage in history human beings have had a particular understanding of the sun and stars, and that this has continually evolved over the centuries. Next the authors systematically address the immense mass of observations astronomy accumulated from the early seventeenth century to the early twentieth. The remaining four chapters examine the history of the field from the physicists perspective, the emphasis being on theoretical work from the mid-1840s to the late 1990s--from thermodynamics to quantum mechanics, from nuclear physics and magnetohydrodynamics to the remarkable advances through to the late 1960s, and finally, to more recent theoretical work. Intended mainly for students and teachers of astronomy, this book will also be a useful reference for practicing astronomers and scientifically curious general readers.

This book develops a general approach that can be systematically refined to investigate the statics and dynamics of deformable solid bodies. These methods are then employed to small bodies in the Solar System. With several space missions underway and more being planned, interest in our immediate neighbourhood is growing. In this spirit, this book investigates various phenomena encountered in planetary science, including disruptions during planetary fly-bys, equilibrium shapes and stability of small rubble bodies, and spin-driven shape changes. The flexible procedure proposed here will help readers gain valuable insights into the mechanics of solar system bodies, while at the same time complementing numerical investigations. The technique itself is built upon the virial method successfully employed by Chandrasekhar (1969) to study the equilibrium shapes of spinning fluid objects. However, here Chandrasekhar’s approach is modified in order to study more complex dynamical situations and include objects of different rheologies, e.g., granular aggregates, or “rubble piles”. The book is largely self-contained, though some basic familiarity with continuum mechanics will be beneficial.

This is the fourth of six volumes collecting significant papers of the distinguished astrophysicist and Nobel laureate S. Chandrasekhar. His work is notable for its breadth as well as for its brilliance; his practice has been to change his focus from time to time to pursue new areas of research. The result has been a prolific career full of discoveries and insights, some of which are only now being fully appreciated. Chandrasekhar has selected papers that trace the development of his ideas and that present aspects of his work not fully covered in the books he has periodically published to summarize his research in each area. Volume 4 has three parts. The first, on plasma physics, includes joint work with A. N. Kaufman and K. M. Watson on the stability of the pinch, as well as a paper on Chandrasekhar's own approach to the topic of adiabatic invariants. Part 2 includes work with specific scientific applications of hydrodynamic and hydromagnetic stability not covered in his monograph on the subject. The final part contains Chandrasekhar's papers on the scientific applications of the tensor-virial theorem, in which he restores to its proper place Riemann's neglected work with ellipsoidal figures.

This book makes more widely accessible the text of Lyapunov's major memoir of the general problem of the stability of motion. Translated by A. T. Fuller (University of Cambridge), the work is now available for the first time in the English language, and marked the centenary of the Russian publication in the late 1800s. Including a biography of Lyapunov and a comprehensive bibliography of his work, this excellent volume will prove to be of fundamental interest to all those concerned with the concept of the stability of motion, boundaries of stability, and with nonlinear dynamics.

This book collects contributions to the conference" Dynamics, Bifurcation and Symmetry, new trends and new tools", which was held at the Institut d'Etudes Sci entifiques de Cargese (France), September 3-9, 1993. The first aim of this conference was to gather and summarize the work of the European Bifurcation Theory Group after two years of existence (the EBTG links european laboratories in five countries via an EC grant). Thanks to a NATO ARW grant, the conference developed into an international meeting on bifurcation theory and dynamical systems,

with the partic ipation of leading specialists not only from Europe but also from overseas countries (Canada, USA, South America). It was a great satisfaction to notice the active, and quite enthusiastic participation of many young scientists. This is reflected in the present book for which many contributors are PhD students or post-doc researchers. Although several "big" themes (bifurcation with symmetry, low dimensional dynam ics, dynamics in EDP's, applications, . . .) are present in these proceedings, we have divided the book into corresponding parts. In fact these themes overlap in most contributions, which seems to reflect a general tendancy in nonlinear science. I am very pleased to thank for their support the NATO International Exchange Scientific Program as well as the EEC Science Program, which made possible the suc cess of this conference.

During the last three decades geosciences and geo-engineering were influenced by two essential scenarios: First, the technological progress has changed completely the observational and measurement techniques. Modern high speed computers and satellite based techniques are entering more and more all geodisciplines. Second, there is a growing public concern about the future of our planet, its climate, its environment, and about an expected shortage of natural resources. Obviously, both aspects, viz. efficient strategies of protection against threats of a changing Earth and the exceptional situation of getting terrestrial, airborne as well as spaceborne data of better and better quality explain the strong need of new mathematical structures, tools, and methods. Mathematics concerned with geoscientific problems, i.e., Geomathematics, is becoming increasingly important. The ‘Handbook Geomathematics’ as a central reference work in this area comprises the following scientific fields: (I) observational and measurement key technologies (II) modelling of the system Earth (geosphere, cryosphere, hydrosphere, atmosphere, biosphere) (III) analytic, algebraic, and operator-theoretic methods (IV) statistical and stochastic methods (V) computational and numerical analysis methods (VI) historical background and future perspectives.

"Letters to the Editor" issued as Part 2 and separately paged from v. 148, 1967. Beginning in 2009, the Letters published only online.

A complete and self-contained introduction to modern galactic dynamics for graduate students.

This is the first of six volumes collecting significant papers of the distinguished astrophysicist and Nobel laureate S. Chandrasekhar. His work is notable for its breadth as well as for its brilliance; his practice has been to change his focus from time to time to pursue new areas of research. The result has been a prolific career full of discoveries and insights, some of which are only now being fully appreciated. Chandrasekhar has selected papers that trace the development of his ideas and that present aspects of his work not fully covered in the books he has periodically published to summarize his research in each area.

This book by a Nobel Laureate provides the foundation for analysis of stellar atmospheres, planetary illumination, and sky radiation. Suitable for students and professionals in physics, nuclear physics, astrophysics, and atmospheric studies. 1950 edition.

This book describes in detail the various theories on the shape of the Earth from classical antiquity to the present day and examines how measurements of its form and dimensions have evolved throughout this period. The origins of the notion of the sphericity of the Earth are explained, dating back to Eratosthenes and beyond, and detailed attention is paid to the struggle to establish key discoveries as part of the cultural heritage of humanity. In this context, the roles played by the Catholic Church and the philosophers of the Middle Ages are scrutinized. Later contributions by such luminaries as Richer, Newton, Clairaut, Maupertuis, and Delambre are thoroughly reviewed, with exploration of the importance of mathematics in their geodetic enterprises. The culmination of progress in scientific research is the recognition that the reference figure is not a sphere but rather a geoid and that the earth’s shape is oblate. Today, satellite geodesy permits the solution of geodetic problems by means of precise measurements. Narrating this fascinating story from the very beginning not only casts light on our emerging understanding of the figure of the Earth but also offers profound insights into the broader evolution of human thought.

This invaluable book presents selected papers of S Chandrasekhar, co-winner of the Nobel Prize for Physics in 1983 and a scientific giant well known for his prolific and monumental contributions to astrophysics, physics and applied mathematics. The reader will find here most of Chandrasekhar's articles that led to major developments in various areas of physics and astrophysics. There are also articles of a popular and historical nature, as well as some hitherto unpublished material based on Chandrasekhar's talks at conferences. Each section of the book contains annotations by the editor.

Taking both a theoretical and observational perspective, this book is an introduction to recent developments in the field of celestial mechanics. It emphasizes the application to extended celestial bodies and devotes much attention to rotational aspects. In particular, it explains the state of art for accurate modelling of the rotation of celestial bodies such as the Earth, the Moon, and Mercury, which involves principles related to hydrodynamics and geodesy. Comparisons between the light curves of the asteroids and their rotational state are made and spatial techniques leading to the determination of the Earth's gravitational field are explained. Also, the book provides a general overview of the collisional processes in the solar system and of the dynamics of the rings. It is addressed to graduate students and researchers in space sciences and celestial dynamics.

This book provides the most complete academic treatment on the application of polytropes ever published. It is primarily intended for students and scientists working in Astrophysics and related fields. It provides a full overview of past and present research results and is an indispensible guide for everybody wanting to apply polytropes.

Ellipsoidal Figures of EquilibriumDover PublicationsEllipsoidal Figures of Equilibrium S. ChandrasekharOn the Ellipsoidal Figures of Equilibrium of Homogeneous MassesSelected Papers, Volume 4Plasma Physics, Hydrodynamic and Hydromagnetic Stability, and Applications of the Tensor-Virial TheoremUniversity of Chicago Press

This is the fifth of six volumes collecting significant papers of the distinguished astrophysicist and Nobel laureate S. Chandrasekhar. His work is notable for its breadth as well as for its brilliance; his practice has been to change his focus from time to time to pursue new areas of research. The result has been a prolific career full of discoveries and insights, some of which are only now being fully appreciated. Chandrasekhar has selected papers that trace the development of his ideas and that present aspects of his work not fully covered in the books he has periodically published to summarize his research in each area. Volume 5 covers all of Chandrasekhar's contributions to the general theory of relativity and relativity's astrophysical applications (except his research on black holes and colliding gravitational waves, which is covered in Volume 6). The major topics include the influence of general relativity on the pulsations and stability of stars; the back reaction of gravitational waves on their sources; and post-Newtonian approximations to general relativity and their astrophysical applications. In addition to research papers, the volume includes two 1972 lectures in which

Chandrasekhar assessed the past, present, and future of relativistic astrophysics. The foreword by astrophysicist Kip S. Thorne is an absorbing, brief history of the field since 1961, capturing the atmosphere of the early research and clarifying Chandrasekhar's dominant role in it. Chandrasekhar has never written a monograph synthesizing his research in relativistic astrophysics, and therefore this volume of his papers serves as a summary of that work for students and more senior researchers.

In these selections readers are treated to a rare opportunity to see the world through the eyes of one of the twentieth century's most brilliant and sensitive scientists. Conceived by Chandrasekhar as a supplement to his Selected Papers, this volume begins with eight papers he wrote with Valeria Ferrari on the non-radial oscillations of stars. It then explores some of the themes addressed in Truth and Beauty, with meditations on the aesthetics of science and the world it examines. Highlights include: "The Series Paintings of Claude Monet and the Landscape of General Relativity," "The Perception of Beauty and the Pursuit of Science," "On Reading Newton's Principia at Age Past Eighty," and personal recollections of Indira Gandhi, Jawaharlal Nehru, and others. Selected Papers, Volume 7 paints a picture of Chandra's universe, filled with stars and galaxies, but with space for poetics, paintings, and politics. The late S. Chandrasekhar was best known for his discovery of the upper limit to the mass of a white dwarf star, for which he received the Nobel Prize in Physics in 1983. He was the author of many books, including The Mathematical Theory of Black Holes and, most recently, Newton's Principia for the Common Reader.