The Mathematical Theory Of Huygens Principle Ams Chelsea Publishing

Newton's philosophical analysis of space and time /Robert Disalle --Newton's concepts of force and mass, with notes on the Laws of Motion /I. Bernard Cohen --Curvature in Newton's dynamics /J. Bruce Brackenridge and Michael Nauenberg --Methodology of the Principia /George E. Smith --Newton's argument for universal gravitation /William Harper --Newton and celestial mechanics /Curtis Wilson --Newton's optics and atomism /Alan E. Shapiro --Newton's metaphysics /Howard Stein --Analysis and synthesis in Newton's mathematical work /Niccolò Guicciardini --Newton, active powers, and the mechanical philosophy /Alan Gabbey --Background to Newton's chymistry /William Newman --Newton's alchemy /Karin Figala --Newton on prophecy and the Apocalypse /Maurizio Mamiani --Newton and eighteenth-century Christianity /Scott Mandelbrote --Newton versus Leibniz : from geomentry to metaphysics /A. Rupert Hall --Newton and the Leibniz-Clarke correspondence /Domenico Bertoloni Meli.

This new edition includes three updated chapters, a revised bibliography, new introduction and three entirely new chapters.

The 60th anniversary edition of this classic and unrivalled optics reference work includes a special foreword by Sir Peter Knight.

This book contains around 80 articles on major writings in mathematics published between 1640 and 1940. All aspects of mathematics are covered: pure and applied, probability and statistics, foundations and philosophy. Sometimes two writings from the same period and the same subject are taken together. The biography of the author(s) is recorded, and the circumstances of the preparation of the writing are given. When the writing is of some lengths an analytical table of its contents is supplied. The contents of the writing is reviewed, and its impact described, at least for the immediate decades. Each article ends with a bibliography of primary and secondary items. First book of its kind Covers the period 1640-1940 of massive development in mathematics Describes many of the main writings of mathematics Articles written by specialists in their field

The Mathematical Theory of Huygens' PrincipleAmerican Mathematical Soc.

In 1690, Christiaan Huygens (1629-1695) published Traité de la Lumière, containing his renowned wave theory of light. It is considered a landmark in seventeenth-century science, for the way Huygens mathematized the corpuscular nature of light and his probabilistic conception of natural knowledge. This book discusses the development of Huygens' wave theory, reconstructing the winding road that eventually led to Traité de la Lumière. For the first time, the full range of manuscript sources is taken into account. In addition, the development of Huygens' thinking on the nature of light is put in the context of his optics as a whole, which was dominated by his lifelong pursuit of theoretical and practical dioptrics. In so doing, this book offers the first account of the development of Huygens' mathematical analysis of lenses and telescopes and its significance for the origin of the wave theory of light. As Huygens applied his mathematical proficiency to practical issues pertaining to telescopes – including trying to design a perfect telescope by means of mathematical theory – his dioptrics is significant for our understanding of seventeenth-century relations between theory and practice. With this full account of Huygens' optics, this book sheds new light on the history of seventeenth-century optics and the rise of the new mathematical sciences, as well as Huygens' oeuvre as a whole. Students of the history of optics, of early mathematical physics, and the Scientific Revolution, will find this book enlightening.

Christiaan Huygens (1629-1695) wrote his famous treatise Traite de la Lumiere, 300 years ago. Today, his wave principle continues to play an important role in the understanding of wave phenomena. anniversary of the publication of his treatise. topics to which the Principle applies. Subjects covered include the historical background, geometrical optics, ray and field theory, the mathematical analysis of wave propagation, quantum electronics and nonlinear optics.

A. Sommerfeld's "Mathematische Theorie der Diffraction" marks a milestone in optical theory, full of insights that are still relevant today. In a stunning tour de force, Sommerfeld derives the first mathematically rigorous solution of an optical diffraction problem. Indeed, his diffraction analysis is a surprisingly rich and complex mix of pure and applied mathematics, and his often-cited diffraction solution is presented only as an application of a much more general set of mathematical results. This complete translation, reflecting substantial scholarship, is the first publication in English of Sommerfeld's original work. The extensive notes by the translators are rich in historical background and provide many technical details for the reader.

Ideal as a classroom text or for individual study, this unique one-volume overview of classical wave theory covers wave phenomena of acoustics, optics, electromagnetic radiations, and more.

The Twentieth Century has seen a dramatic rise in the use of probability and statistics in almost all fields of research. This has stimulated many new philosophical ideas on probability. Philosophical Theories of Probability is the first book to present a clear, comprehensive and systematic account of these various theories and to explain how they relate to one another. Gillies also offers a distinctive version of the propensity theory of probability, and the intersubjective interpretation, which develops the subjective theory.

Classic monograph presents connected account of mathematical theory of wave motion in a liquid with a free surface and subjected to gravitational and other forces, together with applications to concrete physical problems. 1957 edition.

This invaluable book presents most of the important papers of Emil Wolf, published over half-a-century. It covers chiefly diffraction theory (especially the analysis of the focal region), the theory of direct and inverse scattering, phase-space methods in quantum mechanics, the foundation of radiometry, phase conjugation and coherence theory. Several papers which have become classics of the optical literature are included, such as those on Wolf's rigorous formulation of the theory of partial coherence and partial polarization, the introduction of diffraction tomography, and his discovery of correlation-induced shifts of spectral lines (often called the Wolf effect). There are also papers dealing with the historical development of optics and some review articles.
Contents:DiffractionRadiation Theory and String ExcitationsCoherence and Statistical OpticsScatteringFoundations of RadiometryArticles of Historical InterestAnalyticity, Causality and Dispersion RelationsScientists Who Created the World of OpticsThe Development of Optical Coherence TheoryRecollectionsCommencement RemarksPublications of Emil Wolf
Readership: Physicists and engineers, particularly optical scientists and optical engineers. Keywords:Diffraction;Radiation Theory;Coherence and Statistical Optics;Scattering;Foundations of Radiometry;Articles of Historical InterestReviews:“The book is not only an honour to Emil Wolf with respect to his giant work, but also a valuable collection of basic papers in the field of optics.”Optik “The book will help to find original papers more easily than through a complicated search in old journals.”Optik “Any reader engaged in the study of optics will find material of interest here … Emil Wolf has been a generous, kind hearted and good humored mentor to a great many students past and present. It is a delight to whole-heartedly recommend this encapsulation of his scientific achievements.”Optics & Photonics News

Newly corrected, this highly acclaimed text is suitable foradvanced physics courses. The authors present a very accessiblemacroscopic view of classical electromagnetics thatemphasizes integrating electromagnetic theory with physicaloptics. The survey follows the historical development ofphysics, culminating in the use of four-vector relativity

tofully integrate electricity with magnetism.Corrected and emended reprint of the Brooks/Cole ThomsonLearning, 1994, third edition.

Research and scientific progress are based upqn intuition coordinated with a wide theoretical knowledge, experimental skill, and a realistic sense of the limitations of technology. Only a deep insight into physical phenomena will supply the necessary skills to handle the problems that arise in acoustics. The acoustician today needs to be well acquainted with mathematics, dynamics, hydrodynamics, and physics; he also needs a good knowledge of statistics, signal processing, electrical theory, and of many other specialized subjects. Acquiring this background is a laborious task and would require the study of many different books. It is the goal of this volume to present this background in as thorough and readable a manner as possible so that the reader may turn to specialized publications or chapters of other books for further information without having to start at the preliminaries. In trying to accomplish this goal, mathematics serves only as a tool; the better our understanding of a physical phenomenon, the less mathematics is needed and the shorter and more concise are our computa tions. A word about the choice of subjects for this volume will be helpful to the reader. Even scientists of high standing are frequently not acquainted with the fundamentals needed in the field of acoustics. Chapters I to IX are devoted to these fundamentals. After studying Chapter I, which dis cusses the units and their relationships, the reader should have no difficulty converting from one system of units to any other.

Shapiro reviews the formulation and reception of Newton's theories on the structure of matter and on fits.

The Mathematical Theory of Tone Systems patterns a unified theory defining the tone system in functional terms based on the principles and forms of uncertainty theory. This title uses geometrical nets and other measures to study all classes of used and theoretical tone systems, from Pythagorean tuning to superparticular pentatonics. Hundreds of examples of past and prevalent tone systems are featured. Topics include Fuzziness and Sonance, Wavelets and Nonspecificity, Pitch Granulation and Ambiguity, Equal Temperaments, Mean Tone Systems. Well Tempered Systems, Ptolemy Systems, and more. Appendices include extended lists of tone systems and a catalogue of historical organs with subsemitones.

Baker and Copson originally set themselves the task of writing a definitive text on partial differential equations in mathematical physics. However, at the time, the subject was changing rapidly and greatly, particularly via the developments coming from quantum mechanics. Instead, the authors chose to focus on a particular area of the broad theory, producing a monograph complete in itself. The resulting book deals with Huygens' principle in optics and its application to the theory of diffraction. Baker and Copson concern themselves with the general theory of the solution of the PDEs governing the propagation of light. Extensive use is made of Green's method. A chapter is dedicated to Sommerfeld's theory of diffraction, including diffraction of polarized light by a perfectly reflecting half-plane and by a black half-plane. New material was added for subsequent editions, notably Rayleigh's method of integral equations to the problem of diffraction by a planar screen. Some of the simpler diffraction problems are discussed as examples. Baker and Copson's book quickly became the standard reference on the subject of Huygens' principle. It remains so today.

Translated from the Russian by E.J.F. Primrose "Remarkable little book." -SIAM REVIEW V.I. Arnold, who is renowned for his lively style, retraces the beginnings of mathematical analysis and theoretical physics in the works (and the intrigues!) of the great scientists of the 17th century. Some of Huygens' and Newton's ideas. several centuries ahead of their time, were developed only recently. The author follows the link between their inception and the breakthroughs in contemporary mathematics and physics. The book provides present-day generalizations of Newton's theorems on the elliptical shape of orbits and on the transcendence of abelian integrals; it offers a brief review of the theory of regular and chaotic movement in celestial mechanics, including the problem of ports in the distribution of smaller planets and a discussion of the structure of planetary rings.

Newly corrected, this edition of a highly acclaimed text is suitable for advanced physics courses. Its accessible macroscopic view of classical electromagnetics emphasizes integrating electromagnetic theory with physical optics. 1994 edition.

This case study examines the interrelationship between mathematics and physics in the work of one of the major figures of the Scientific Revolution, the Dutch mathematician, physicist, and astronomer, Christiaan Huygens (1629-1695). Professor Yoder offers a detailed account of the discoveries that Huygens made at the end of 1659, including the invention of a pendulum clock that theoretically kept absolutely uniform time, and the creation of a mathematical theory of evolutes. She also describes the way that each of these important discoveries arose from the interaction of Huygens' mathematics and physics. A discussion of Huygens' relationship with other scientists and the priority disputes that sometimes motivated his research help place his work in the context of the period. The reception of Huygens' masterpiece, the Horologium Oscillatorium of 1673 and the place of evolutes in the history of mathematics are also analyzed. Finally, the role of Huygens in the rise of applied mathematics is addressed.

Survey of microwave antenna design problems. Circuit relations, reciprocity theorems. Radiation from current distributions. Wave fronts and rays. Scattering and diffraction. Aperture illumination and antenna patterns. Microwave transmission lines. Microwave dipole antennas and feeds. Linear array antennas and feeds. Waveguide and horn feeds. Dielectric and metal-plate lenses. Pencil-beam and simple fanned-beam antennas. Shaped-beam antennas. Antenna installation problems. Antenna measurements techniques and equipment.

This 5,800-page encyclopedia surveys 100 generations of great thinkers, offering more than 2,000 detailed biographies of scientists, engineers, explorers and inventors who left their mark on the history of science and technology. This six-volume masterwork also includes 380 articles summarizing the time-line of ideas in the leading fields of science, technology, mathematics and philosophy.

Approach your problems from the right It isn't that they can't see the solution. end and begin with the answers. Then It is

that they can't see the problem. one day, perhaps you will find the final question. G.K. Chesterton. The Scandal of Father Brown 'The Point of a Pin'. 'The Hermit Clad in Crane Feathers' in R.van Gulik's The Chinese Maze Murders. Growing specialization and diversification have brought a host of monographs and textbooks on increasingly specialized topics. However, the "tree" of knowledge of mathematics and related fields does not grow only by putting forth new branches. It also happens, quite often in fact, that branches which were thought to be completely disparate are suddenly seen to be related. Further, the kind and level of sophistication of mathematics applied in various sciences has changed drastically in recent years: measure theory is used (non-trivially) in - gional and theoretical economics; algebraic geometry interacts with physics; the Minkowsky lemma, coding theory and the structure of water meet one another in pack ing and covering theory; quantum fields, crystal defects and mathematical programming profit from homotopy theory; Lie algebras are relevant to filtering; and prediction and electrical engineering can use Stein spaces. And in addition to this there are such new emerging subdisciplines as "completely integrable systems", "chaos, synergetics and large-scale order", which are almost impossible to fit into the existing classification schemes. They draw upon widely different sections of mathematics. Takes the student with a background in the undergraduate courses in physics and mathematics towards the skills needed for graduate work in theoretical physics. The author uses Green's functions to explore the physics of potentials, diffusion and waves. Case histories illustrate the interplay between physical insight and mathematical formalism.

Symplectic geometry and the theory of Fourier integral operators are modern manifestations of themes that have occupied a central position in mathematical thought for the past three hundred years - the relations between the wave and the corpuscular theories of light. The purpose of this book is to develop these themes, and present some of the recent advances, using the language of differential geometry as a unifying influence.

A thorough account of the roots and development of probability theory, published in 1865 by a distinguished Cambridge mathematician.