

Classical Theory Of Electric And Magnetic Fields

Classical Theory of Electricity and Magnetism
 The Classical Theory of Fields
 Classical Electromagnetic Radiation
 Classical Theory of Electric and Magnetic Fields
 Classical Electromagnetic Radiation, Third Edition
 The Classical Electromagnetic Field
 The Classical Theory of Electricity and Magnetism, Rev. by Richard Becker
 Foundations of Classical Electrodynamics
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 Classical Electricity and Magnetism
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 The Classical Theory of Electricity and Magnetism
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Classical Theory of Electricity and Magnetism Elsevier

Classical Theory of Electric and Magnetic Fields is a textbook on the principles of electricity and magnetism. This book discusses mathematical techniques, calculations, with examples of physical reasoning, that are generally applied in theoretical physics. This text reviews the classical theory of electric and magnetic fields, Maxwell's Equations, Lorentz Force, and Faraday's Law of Induction. The book also focuses on electrostatics and the general methods for solving electrostatic problems concerning images, inversion, complex variable, or separation of variables. The text also explains magnetostatics and compares the calculation methods of electrostatics with those of magnetostatics. The book also discusses electromagnetic wave phenomena concerning wave equations with a source term and the Maxwell equations which are linear and homogenous. The book also explains Einstein's the Special Theory of Relativity which is applicable' only to inertial coordinate systems. The text also discusses the particle aspects of electromagnetic field equations such as those concerning wave equations for particles with spin. This textbook is intended for graduate or advanced students and academicians in the field of physics.

The Classical Theory of Fields Courier Corporation

Classical Electromagnetism is built for readers who want to learn about the theory of electricity and magnetism. The text starts in historical order, moving through Coulomb's law and the magnetic law of Biot-Savart to Maxwell's unification of physics. Author Jerrold Franklin carefully develops each stage of the theory without oversimplifying. Throughout, he demonstrates how key principles can be defined on a more fundamental basis to enhance reader understanding. The mathematics and physics are unified so that readers learn the material in the context of real physics applications. Foundations of Electrostatics, Further Development of Electrostatics, Methods of Solution in Electrostatics, Spherical and Cylindrical Coordinates, Green's Functions, Electrostatics in Matter, Magnetostatics, Magnetization and Ferromagnetism, Time Varying Fields, Maxwell's Equations, Electromagnetic Plane Waves, Wave Guides and Cavities, Electromagnetic Radiation and Scattering, Special Relativity, The Electrodynamics of Moving Bodies For all readers interested in learning about the theory of electricity and magnetism.

Classical Electromagnetic Radiation Courier Dover Publications

Newly corrected, this highly acclaimed text is suitable for advanced physics courses. The authors present a very accessible macroscopic view of classical electromagnetics that emphasizes integrating electromagnetic theory with physical optics. The survey follows the historical development of physics, culminating in the use of four-vector relativity to fully integrate electricity with magnetism. Corrected and emended reprint of the Brooks/Cole Thomson Learning, 1994, third edition.

Classical Theory of Electric and Magnetic Fields L. Carrier, Mercury Press

Accessible treatment offers highly detailed accounts concerning development of ideas and theories about the nature of electricity and space (aether), focusing on period from Descartes to Lorentz, Einstein, and Minkowski. 1960 edition.

Classical Electromagnetic Radiation, Third Edition BrownWalker Press

This excellent text covers a year's course. Topics include vectors D and H inside matter, conservation laws for energy, momentum, invariance, form invariance, covariance in special relativity, and more.

The Classical Electromagnetic Field CRC Press

This book contains 157 problems in classical electromagnetism, most of them new and original compared to those found in other textbooks. Each problem is presented with a title in order to highlight its inspiration in different areas of physics or technology, so that the book is also a survey of historical discoveries and applications of classical electromagnetism. The solutions are complete and include detailed discussions, which take into account typical questions and mistakes by the students. Without unnecessary mathematical complexity, the problems and related discussions introduce the student to advanced concepts such as unipolar and homopolar motors, magnetic monopoles, radiation pressure, angular momentum of light, bulk and surface plasmons, radiation friction, as well as to tricky concepts and ostensible ambiguities or paradoxes related to the classical theory of the electromagnetic field. With this approach the book is both a teaching tool for undergraduates in physics, mathematics and electric engineering, and a reference for students wishing to work in optics, material science, electronics, plasma physics.

The Classical Theory of Electricity and Magnetism, Rev. by Richard Becker Springer Nature

Comprehensive graduate-level text by a distinguished theoretical physicist reveals the classical underpinnings of modern quantum field theory.

Topics include space-time, Lorentz transformations, conservation laws, equations of motion, Green's functions, and more. 1964 edition.

Foundations of Classical Electrodynamics Butterworth-Heinemann

The fourth edition contains seven new sections with chapters on General Relativity, Gravitational Waves and Relativistic Cosmology. The text has been thoroughly revised and additional problems inserted. The Complete course of Theoretical Physics by Landau and Lifshitz, recognized as two of the world's outstanding physicists, is published in full by Butterworth-Heinemann. It comprises nine volumes, covering all branches of the subject; translations from the Russian are by leading scientists.

The Classical Theory of Electricity and Magnetism Springer Science & Business Media

Translated from the 6th Russian edition, this latest edition contains seven new sections with chapters on General Relativity, Gravitational Waves and Relativistic Cosmology, where Professor Lifshitz's interests lay. The text of the 3rd English edition has been thoroughly revised and additional problems inserted

Remarks on The Classical Theory of Fields Princeton University Press

New Edition: Classical Theory of Electromagnetism (3rd Edition)The topics treated in this book are essentially those that a graduate student of physics or electrical engineering should be familiar with in classical electromagnetism. Each topic is analyzed in detail, and each new concept is explained with examples. The text is self-contained and oriented toward the student. It is concise and yet very detailed in mathematical calculations; the equations are explicitly derived, which is of great help to students and allows them to concentrate more on the physics concepts, rather than spending too much time on mathematical derivations. The introduction of the theory of special relativity is always a challenge in teaching electromagnetism, and this topic is considered with particular care. The value of the book is increased by the inclusion of a large number of exercises.

Classical Electricity and Magnetism Springer Science & Business Media

Based on a highly regarded lecture course at Moscow State University, this is a clear and systematic introduction to gauge field theory. It is unique in providing the means to master gauge field theory prior to the advanced study of quantum mechanics. Though gauge field theory is typically included in courses on quantum field theory, many of its ideas and results can be understood at the classical or semi-classical level. Accordingly, this book is organized so that its early chapters require no special knowledge of quantum mechanics. Aspects of gauge field theory relying on quantum mechanics are introduced only later and in a graduated fashion--making the text ideal for students studying gauge field theory and quantum mechanics simultaneously. The book begins with the basic concepts on which gauge field theory is built. It introduces gauge-invariant Lagrangians and describes the spectra of linear perturbations, including perturbations above nontrivial ground states. The second part focuses on the construction and interpretation of classical solutions that exist entirely due to the nonlinearity of field equations: solitons, bounces, instantons, and sphalerons. The third section considers some of the interesting effects that appear due to interactions of fermions with topological scalar and gauge fields. Mathematical digressions and numerous problems are included throughout. An appendix sketches the role of instantons as saddle points of Euclidean functional integral and related topics. Perfectly suited as an advanced undergraduate or beginning graduate text, this book is an excellent starting point for anyone seeking to understand gauge fields.

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Neoclassical Theory of Electromagnetic Interactions Elsevier

This volume is intended as a systematic introduction to gauge field theory for advanced undergraduate and graduate students in high energy physics. The discussion is restricted to the classical (non-quantum) theory in Minkowski spacetime. Particular attention has been given to conceptual aspects of field theory, accurate definitions of basic physical notions, and thorough analysis of exact solutions to the equations of motion for interacting systems.

The Classical Theory of Electricity and Magnetism Courier Corporation

This book examines the topics of magnetohydrodynamics and plasma oscillations, in addition to the standard topics discussed to cover courses in electromagnetism, electrodynamics, and fundamentals of physics, to name a few. This textbook on electricity and magnetism is primarily targeted at graduate students of physics. The undergraduate students of physics also find the treatment of the subject useful. The treatment of the special theory of relativity clearly emphasises the Lorentz covariance of Maxwell's equations. The rather abstruse topic of radiation reaction is covered at an elementary level, and the Wheeler-Feynman absorber theory has been dwelt upon briefly in the book.

Classical Theory Of Electromagnetism (Third Edition) Springer

This newly corrected, highly acclaimed text offers intermediate-level juniors and first-year graduate students of physics a rigorous treatment of classical electromagnetics. The authors present a very accessible macroscopic view of classical electromagnetics that emphasizes integrating electromagnetic theory with physical optics. The survey follows the historical development of physics, culminating in the use of four-vector relativity to fully integrate electricity with magnetism. Starting with a brief review of static electricity and magnetism, the treatment advances to examinations of multipole fields, the equations of Laplace and Poisson, dynamic electromagnetism, electromagnetic waves, reflection and refraction, and waveguides. Subsequent chapters explore retarded potentials and fields and radiation by charged particles; antennas; classical electron theory; interference and coherence; scalar diffraction theory and the Fraunhofer limit; Fresnel diffraction and the transition to geometrical optics; and relativistic electrodynamics. A basic knowledge of vector calculus and Fourier analysis is assumed, and several helpful appendices supplement the text. An extensive Solutions Manual is also available.

Electromagnetic Field Interaction with Transmission Lines Springer

The aim of this book is to interpret all the laws of classical electromagnetism in a modern coherent way. In a typical undergraduate course using vector analysis, the students finally end up with Maxwell's equations, when they are often exhausted after a very long course, in which full discussions are properly given of the full range of applications of individual laws, each of which is important in its own right. As a result, many students do not appreciate how limited is the experimental evidence on the basis of which Maxwell's equations are normally developed and they do not always appreciate the underlying unity of classical electromagnetism, before they go on to graduate courses in which Maxwell's equations are taken as axiomatic. This book is designed to be used between such an undergraduate course and graduate courses. It is written by an experimental physicist and is intended to be used by physicists, electrical engineers and applied mathematicians.

Introduction to the Classical Theory of Particles and Fields Academic Press

Introduction to Electrodynamics and Radiation introduces the reader to electrodynamics and radiation, with emphasis on the microscopic theory of electricity and magnetism. Nonrelativistic quantum electrodynamics (QED) is presented as a logical outgrowth of the classical theory, both relativistic and nonrelativistic. The advanced mathematical and diagrammatic techniques of the relativistic quantum field theory are also described in a simple and easily understood manner. Comprised of 16 chapters, this book opens with an overview of the special theory of relativity and some of its consequences. The following chapters deal with classical relativistic electrodynamics, touching on topics such as tensor analysis and Riemannian spaces; radiation from charged particles; radiation scattering from electrons; and the classical theory of charged particles. The second part of the book is entirely quantum mechanical in outlook, beginning with the quantization of the Hamiltonian formulation of classical electrodynamics. The many-body formalism leading to Fock-space techniques is also considered, along with self-energies and renormalization. The final chapter is devoted to the covariant formulation of QED as well as the validity of QED. This monograph is written primarily for graduate students in elementary classical and quantum mechanics, electricity and magnetism, and modern physics courses.

A History of the Theories of Aether and Electricity Courier Corporation

Electronic Conduction: Classical and Quantum Theory to Nanoelectronic Devices provides a concise, complete introduction to the fundamental principles of electronic conduction in microelectronic and nanoelectronic devices, with an emphasis on integrating the quantum aspects of conduction. The chapter coverage begins by presenting the classical theory of conduction, including introductory chapters on quantum mechanics and the solid state, then moving to a complete presentation of essential theory for understanding modern electronic devices. The author's unique approach is applicable to microscale and nanoscale device simulation, which is particularly timely given the explosion in the nanoelectronics field. Features Self-contained Gives a complete account of classical and quantum aspects of conduction in nanometer scale devices Emphasises core principles, the book can be useful to electrical engineers and material scientists, and no prior course in semiconductors is necessary Highlights the bridge to modern electronics, first presenting the physics, and then the engineering complications related to quantum behaviour Includes many clear, illustrative diagrams and chapter problem sets Gives an account of post-Silicon devices such as the GaAs MOSFET, the CNT-FET and the vacuum transistor Showcases why quantum mechanics is necessary with modern devices due to their size and corresponding electron transport properties Discusses all the issues that will enable readers to conduct their own research

Classical Electromagnetic Theory World Scientific Publishing Company Incorporated

The evaluation of electromagnetic field coupling to transmission lines is an important problem in electromagnetic compatibility. Traditionally, use is made of the TL approximation which applies to uniform transmission lines with electrically small cross-sectional dimensions, where the dominant mode of propagation is TEM. Antenna-mode currents and higher-order modes appearing at higher frequencies are neglected in TL theory. The use of the TL approximation has permitted to solve a large range of problems (e.g. lightning and EMP interaction with power lines). However, the continual increase in operating frequency of products and higher frequency sources of disturbances (such as UWB systems) makes that the TL basic assumptions are no longer acceptable for a certain number of applications. In the last decade or so, the generalization of classical TL theory to take into account high frequency effects has emerged as an important topic of study in electromagnetic compatibility. This effort resulted in the elaboration of the so-called 'generalized' or 'full-wave' TL theory, which incorporates high frequency radiation effects, while keeping the relative simplicity of TL equations. This book is organized in two main parts. Part I presents consolidated knowledge of classical transmission line theory and different field-to-transmission line coupling models. Part II presents different approaches developed to generalize TL Theory.

Electromagnetics Springer Science & Business Media

In this book we display the fundamental structure underlying classical electro dynamics, i. e. , the phenomenological theory of electric and magnetic effects. The book can be used as a textbook for an advanced course in theoretical electrodynamics for physics and mathematics students and, perhaps, for some highly motivated electrical engineering students. We expect from our readers that they know elementary electrodynamics in the conventional (1 + 3)-dimensional form including Maxwell's equations. More over, they should be familiar with linear algebra and elementary analysis, including vector analysis. Some knowledge of differential geometry would help. Our approach rests on the metric-free integral formulation of the conservation laws of electrodynamics in the tradition of F. Kottler (1922), E. Cartan (1923), and D. van Dantzig (1934), and we stress, in particular, the

axiomatic point of view. In this manner we are led to an understanding of why the Maxwell equations have their specific form. We hope that our book can be seen in the classical tradition of the book by E. J. Post (1962) on the Formal Structure of Electromagnetics and of the chapter "Charge and Magnetic Flux" of the encyclopedia article on classical field theories by C. Truesdell and R. A. Toupin (1960), including R. A. Toupin's Bressanone lectures (1965); for the exact references see the end of the introduction on page 11. .

[Problems in Classical Electromagnetism](#) World Scientific

In questions of science, the authority of a thousand is not worth the humble reasoning of a single individual. Galileo Galilei, physicist and astronomer (1564-1642) This book is a second edition of "Classical Electromagnetic Theory" which derived from a set of lecture notes compiled over a number of

years of teaching electromagnetic theory to fourth year physics and electrical engineering students. These students had a previous exposure to electricity and magnetism, and the material from the first four and a half chapters was presented as a review. I believe that the book makes a reasonable transition between the many excellent elementary books such as Griffiths' Introduction to Electrodynamics and the obviously graduate level books such as Jackson's Classical Electrodynamics or Landau and Lifshitz' Electrodynamics of Continuous Media. If the students have had a previous exposure to Electromagnetic theory, all the material can be reasonably covered in two semesters. Neophytes should probably spend a semester on the first four or five chapters as well as, depending on their mathematical background, the Appendices B to F. For a shorter or more elementary course, the material on spherical waves, waveguides, and waves in anisotropic media may be omitted without loss of continuity.

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