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Unified Field Theory and Occam's Razor: Simple Solutions to Deep Questions - András Kovács, Giorgio Vassallo, Paul O'Hara, Francesco Celani and Antonino Oscar Di Tommaso

Foundations of Electromagnetic Theory - John R. Reitz 2009-09

Problems and Solutions on Electromagnetism - Yung-kuo Lim 1993
Electrostatics - Magnetostatic field and quasi-stationary electromagnetic fields - Circuit analysis - Electromagnetic waves - Relativity, particle-field interactions.
Electromagnetic Theory: Problems and Solutions - Keith Foster 1970

Physics of Classical Electromagnetism - Minoru Fujimoto 2007-09-06
This book is unique because unlike others on the subject that focus on mathematical arguments, this volume emphasizes the original field concept, aiming at objectives in modern information technology. Written primarily for undergraduate students of physics and engineering, this book serves as a useful reference for graduate students and researchers too. With concise introductory arguments for the physics of electromagnetism, this book covers basic topics including the nature of space-time-dependent radiations in modern applications.
Force-Free Magnetic Fields: Solutions, Topology and Applications - G E Marsh 1996-01-31
After an introductory chapter concerned with

the history of force-free magnetic fields, and the relation of such fields to hydrodynamics and astrophysics, the book examines the limits imposed by the virial theorem for finite force-free configurations. Various techniques are then used to find solutions to the field equations. The fact that the field lines corresponding to these solutions have the common feature of being "twisted", and may be knotted, motivates a discussion of field line topology and the concept of helicity. The topics of field topology, helicity, and magnetic energy in multiply connected domains make the book of interest to a rather wide audience. Applications to solar prominence models, type-II superconductors, and force-reduced magnets are also discussed. The book contains many figures and a wealth of material not readily available elsewhere.

Contents: Introduction The Virial Theorem Solutions to the Force-Free Field Equations Field Topology Magnetic Energy in Multiply Connected Domains Applications Force-Free Fields and Electromagnetic Waves Proof of the Jacobi Polynomial Identities Separation of the Wave Equation, Cyclides, and Boundary Conditions Readership: Students and researchers working in physics, astrophysics, hydrodynamics, plasma physics and energy research. keywords: Force-Free; Magnetic Field Topology; Helicity (Twist, Kink, Link); Magnetic Energy in Multiply-Connected Domains; Magnetic Knots

Electromagnetic Field Theory Fundamentals - Bhag Singh Guru 2009-07-23
Guru and Hiziroglu have produced an accessible and user-friendly text on electromagnetics that

will appeal to both students and professors teaching this course. This lively book includes many worked examples and problems in every chapter, as well as chapter summaries and background revision material where appropriate. The book introduces undergraduate students to the basic concepts of electrostatic and magnetostatic fields, before moving on to cover Maxwell's equations, propagation, transmission and radiation. Chapters on the Finite Element and Finite Difference method, and a detailed appendix on the Smith chart are additional enhancements. MathCad code for many examples in the book and a comprehensive solutions set are available at www.cambridge.org/9780521830164.

Modern Electrodynamics - Andrew Zangwill 2013

An engaging writing style and a strong focus on the physics make this graduate-level textbook a must-have for electromagnetism students.

Catalogue for the Academic Year - Naval Postgraduate School (U.S.) 1970

Electromagnetic Field Theory - Markus Zahn 2003-01-01

Mathematical Problems of Classical Nonlinear Electromagnetic Theory - Frederick Bloom 2020-11-29

A survey of some problems of current interest in the realm of classical nonlinear electromagnetic theory.

Foundations of Electromagnetic Theory - John R. Reitz 2009

This revision is an update of a classic text that has been the standard electricity and magnetism text for close to 40 years. The fourth edition contains more worked examples, a new design and new problems. Vector Analysis, Electrostatics, Solution of Electrostatic Problems, The Electrostatic Field in Dielectric Media, Microscopic Theory of Dielectrics, Electrostatic Energy, Electric Current, The Magnetic Field of Steady Currents, Magnetic Properties of Matter, Microscopic Theory of Magnetism, Electromagnetic Induction, Magnetic Energy, Slowly Varying Currents, Physics of Plasmas, Electromagnetic Properties of Superconductors, Maxwell's Equations, Propagation of Monochromatic, Monochromatic

Waves in Bounded Regions, Dispersion and Oscillating Fields in Dispersive Media, The Emission of Radiation, Electrodynamics, The Special Theory of Relativity. Intended for those interested in learning the basics of standard electricity and magnetism.

The Classical Theory of Fields - Carl S. Helrich 2012-01-13

The study of classical electromagnetic fields is an adventure. The theory is complete mathematically and we are able to present it as an example of classical Newtonian experimental and mathematical philosophy. There is a set of foundational experiments, on which most of the theory is constructed. And then there is the bold theoretical proposal of a field-field interaction from James Clerk Maxwell. This textbook presents the theory of classical fields as a mathematical structure based solidly on laboratory experiments. Here the student is introduced to the beauty of classical field theory as a gem of theoretical physics. To keep the discussion fluid, the history is placed in a beginning chapter and some of the mathematical proofs in the appendices. Chapters on Green's Functions and Laplace's Equation and a discussion of Faraday's Experiment further deepen the understanding. The chapter on Einstein's relativity is an integral necessity to the text. Finally, chapters on particle motion and waves in a dispersive medium complete the picture. High quality diagrams and detailed end-of-chapter questions enhance the learning experience.

Electromagnetic Fields and Waves - Paul Lorrain 1972

Foundations of Electromagnetic Theory - John R. Reitz 1979

Classical Electromagnetic Radiation, Third Edition Mark A. Heald 2013-04-22

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.

Electrodynamics and Classical Theory of Fields and Particles - A. O. Barut 2012-04-30
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.

Classical Electromagnetic Radiation - Mark A. Heald 2012-12-19

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.

Behaviour of Electromagnetic Waves in Different Media and Structures - Ali Akdagli 2011-07-05

This comprehensive volume thoroughly covers wave propagation behaviors and computational techniques for electromagnetic waves in different complex media. The chapter authors describe powerful and sophisticated analytic and numerical methods to solve their specific electromagnetic problems for complex media and geometries as well. This book will be of interest to electromagnetics and microwave engineers, physicists and scientists.

Physics of Light and Optics (Black & White) - Michael Ware 2020

LSC Fundamentals of Optics - Francis Jenkins 2001-12-03

Foundations of electromagnetic theory - John R. Reitz 1974

Mathematical Problems of Classical Nonlinear Electromagnetic Theory - Frederick Bloom 1993-02-08

A survey of some problems of current interest in the realm of classical nonlinear electromagnetic theory.

Foundations of Electrodynamics - Parry Hiram Moon 2013-07-17

Electrodynamics involves the study of electric

charges and their interaction with magnetic and electric fields. This advanced undergraduate text presupposes some knowledge of electricity and magnetism, making substantial use of vector analysis. The authors define their goal as "a serious attempt to develop electrodynamics on a postulational basis and to define each concept in the most general way." 1960 edition.

Handbook of Surface Plasmon Resonance - Richard B. M. Schasfoort 2017-05-30

Surface plasmon resonance (SPR) plays a dominant role in real-time interaction sensing of biomolecular binding events, this book provides a total system description including optics, fluidics and sensor surfaces for a wide researcher audience.

Solved Problems in Classical Electromagnetism - J. Pierrus 2018-08-02

Classical electromagnetism - one of the fundamental pillars of physics - is an important topic for all types of physicists from the theoretical to the applied. The subject is widely recognized to be one of the most challenging areas of the physics curriculum, both for students to learn and for lecturers to teach. Although textbooks on electromagnetism are plentiful, hardly any are written in the question-and-answer style format adopted in this book. It contains nearly 300 worked questions and solutions in classical electromagnetism, and is based on material usually encountered during the course of a standard university physics degree. Topics covered include some of the background mathematical techniques, electrostatics, magnetostatics, elementary circuit theory, electrodynamics, electromagnetic waves and electromagnetic radiation. For the most part the book deals with the microscopic theory, although we also introduce the important subject of macroscopic electromagnetism as well. Nearly all questions end with a series of comments whose purpose is to stimulate inductive reasoning and reach various important conclusions arising from the problem. Occasionally, points of historical interest are also mentioned. Both analytical and numerical techniques are used in obtaining and analyzing solutions. All computer calculations are performed with Mathematica® and the relevant code is provided in a notebook; either in the solution or the comments.

Electromagnetic Fields and Energy - Hermann A. Haus 1989-01

Electromagnetic Fields - Roald K. Wangsness 2000

Geometrical Methods of Mathematical Physics - Bernard F. Schutz 1980-01-28

In recent years the methods of modern differential geometry have become of considerable importance in theoretical physics and have found application in relativity and cosmology, high-energy physics and field theory, thermodynamics, fluid dynamics and mechanics. This textbook provides an introduction to these methods - in particular Lie derivatives, Lie groups and differential forms - and covers their extensive applications to theoretical physics. The reader is assumed to have some familiarity with advanced calculus, linear algebra and a little elementary operator theory. The advanced physics undergraduate should therefore find the presentation quite accessible. This account will prove valuable for those with backgrounds in physics and applied mathematics who desire an introduction to the subject. Having studied the book, the reader will be able to comprehend research papers that use this mathematics and follow more advanced pure-mathematical expositions.

Introduction to Electrodynamics - David J. Griffiths 2017-06-29

This is a re-issued and affordable printing of the widely used undergraduate electrodynamics textbook.

Circuit Oriented Electromagnetic Modeling Using the PEEC Techniques - Albert Ruehli 2017-06-19

Bridges the gap between electromagnetics and circuits by addressing electrometric modeling (EM) using the Partial Element Equivalent Circuit (PEEC) method This book provides intuitive solutions to electromagnetic problems by using the Partial Element Equivalent Circuit (PEEC) method. This book begins with an introduction to circuit analysis techniques, laws, and frequency and time domain analyses. The authors also treat Maxwell's equations, capacitance computations, and inductance computations through the lens of the PEEC method. Next, readers learn to build PEEC

models in various forms: equivalent circuit models, non-orthogonal PEEC models, skin-effect models, PEEC models for dielectrics, incident and radiate field models, and scattering PEEC models. The book concludes by considering issues like stability and passivity, and includes five appendices some with formulas for partial elements. Leads readers to the solution of a multitude of practical problems in the areas of signal and power integrity and electromagnetic interference Contains fundamentals, applications, and examples of the PEEC method Includes detailed mathematical derivations Circuit Oriented Electromagnetic Modeling Using the PEEC Techniques is a reference for students, researchers, and developers who work on the physical layer modeling of IC interconnects and Packaging, PCBs, and high speed links.

Design Sensitivity Analysis and Optimization of Electromagnetic Systems - Il Han Park 2018-08-27

This book presents a comprehensive introduction to design sensitivity analysis theory as applied to electromagnetic systems. It treats the subject in a unified manner, providing numerical methods and design examples. The specific focus is on continuum design sensitivity analysis, which offers significant advantages over discrete design sensitivity methods. Continuum design sensitivity formulas are derived from the material derivative in continuum mechanics and the variational form of the governing equation. Continuum sensitivity analysis is applied to Maxwell equations of electrostatic, magnetostatic and eddy-current systems, and then the sensitivity formulas for each system are derived in a closed form; an integration along the design interface. The book also introduces the recent breakthrough of the topology optimization method, which is accomplished by coupling the level set method and continuum design sensitivity. This topology optimization method enhances the possibility of the global minimum with minimised computational time, and in addition the evolving shapes during the iterative design process are easily captured in the level set equation. Moreover, since the optimization algorithm is transformed into a well-known transient analysis algorithm for differential equations, its

numerical implementation becomes very simple and convenient. Despite the complex derivation processes and mathematical expressions, the obtained sensitivity formulas are very straightforward for numerical implementation. This book provides detailed explanation of the background theory and the derivation process, which will help readers understand the design method and will set the foundation for advanced research in the future.

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Vector Analysis and Cartesian Tensors, S.E. Bourne 2014-05-10

Vector Analysis and Cartesian Tensors, Second Edition focuses on the processes, methodologies, and approaches involved in vector analysis and Cartesian tensors, including volume integrals, coordinates, curves, and vector functions. The publication first elaborates on rectangular Cartesian coordinates and rotation of axes, scalar and vector algebra, and differential geometry of curves. Discussions focus on differentiation rules, vector functions and their geometrical representation, scalar and vector products, multiplication of a vector by a scalar, and angles between lines through the origin. The text then elaborates on scalar and vector fields and line, surface, and volume integrals, including surface, volume, and repeated integrals, general orthogonal curvilinear coordinates, and vector components in orthogonal curvilinear coordinates. The manuscript ponders on representation theorems for isotropic tensor functions, Cartesian tensors, applications in potential theory, and integral theorems. Topics include geometrical and physical significance of divergence and curl, Poisson's equation in vector form, isotropic scalar functions of symmetrical second order tensors, and diagonalization of second-order symmetrical tensors. The publication is a valuable reference for mathematicians and researchers interested in vector analysis and Cartesian tensors.

Electromagnetic Field Solutions for the Natural Modes of a Cylindrical Cavity Loaded with Lossy Materials - Edward Benjamin Manring 1992

Intermediate Electromagnetic Theory -

Joseph V. Stewart 2001

This invaluable text has been developed to provide students with more background on the applications of electricity and magnetism, particularly with those topics which relate to current research. For example, waveguides (both metal and dielectric) are discussed more thoroughly than in most texts because they are an important laboratory tool and important components of modern communications. In a sense, this book modernizes the topics covered in the typical course on electricity and magnetism. It provides not only solid background for the student who chooses a field which uses techniques requiring knowledge of electricity and magnetism, but also general background for the physics major.

Classical Electromagnetic Theory - Jack Vanderlinde 2006-01-17

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 elect- magnetic 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 Griffith's 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.

Electromagnetic Signals - Henning F. Harmuth 2012-12-06

Electromagnetic Signals deals with the practical applications of nonsinusoidal electromagnetic waves or carrier free radars, ultrawideband technology and large relative bandwidth technology. The book is unique since it deals with a number of current conventional radar problems along with proposed solutions.

Electricity and Magnetism Edward M. Purcell
2013-01-21

For 50 years, Edward M. Purcell's classic textbook has introduced students to the world of electricity and magnetism. The third edition has been brought up to date and is now in SI units. It features hundreds of new examples, problems, and figures, and contains discussions of real-life applications. The textbook covers all the standard introductory topics, such as electrostatics, magnetism, circuits, electromagnetic waves, and electric and magnetic fields in matter. Taking a nontraditional approach, magnetism is derived as a relativistic effect. Mathematical concepts are introduced in parallel with the physics topics at hand, making the motivations clear. Macroscopic phenomena are derived rigorously

from the underlying microscopic physics. With worked examples, hundreds of illustrations, and nearly 600 end-of-chapter problems and exercises, this textbook is ideal for electricity and magnetism courses. Solutions to the exercises are available for instructors at www.cambridge.org/Purcell-Morin.

Propagation of Electromagnetic Signals -
Henning F. Harmuth 1994

Maxwell's equations have been the basis of electromagnetic theory for a century. They were very successful in providing solutions with sinusoidal time variation, but these solutions are outside the causality law and the conservation law for energy. Signal solutions, which satisfy these two laws, generally do not exist, but can be obtained by adding a term for magnetic dipole currents to Maxwell's equations. Such currents are caused by the rotation of magnetic dipoles, ranging from the hydrogen atom to the magnetic compass needle. Many computer plots of the time variation of electric and magnetic field strengths excited by signals are given in this useful book.