**Electromagnetic Foundations of Electrical Engineering**

A. Brandão Faria 2008-09-15 The applications of electromagnetic phenomena within electrical engineering have been evolving and progressing at a fast pace. In contrast, the underlying principles have been stable for a long time and are not expected to undergo any changes. It is these electromagnetic field fundamentals that are the subject of discussion in this book with an emphasis on basic principles, concepts and governing laws that apply across the electrical engineering discipline.

Electromagnetic Foundations of Electrical Engineering begins with an explanation of Maxwell’s equations, from which the fundamental laws and principles governing the static and time-varying electric and magnetic fields are derived. Results for both slowly- and rapidly-varying electromagnetic field problems are discussed in detail. Key aspects: Offers a project portfolio, with detailed solutions included on the companion website, which draws together aspects from various chapters so as to ensure comprehensive understanding of the fundamentals. Provides end-of-chapter homework problems with a focus on engineering applications. Progresses chapter by chapter to increasingly more challenging topics, allowing the reader to grasp the more simple phenomena and build upon these foundations. Enables the reader to attain a level of competence to subsequently progress to more advanced topics such as electrical machines, power system analysis, electromagnetic compatibility, microwaves and radiation. This book is aimed at electrical engineering students and faculty staff in sub-disciplines as diverse as power and energy systems, circuit theory and telecommunications. It will also appeal to existing electrical engineering professionals with a need for a refresher course in electromagnetic foundations.

**Electromagnetics**

Branišlav M. Notaroš 2011 "Electromagnetics is a thorough text that enables readers to readily grasp EM fundamentals, develop true problem-solving skills, and really understand and like the material. It is meant as an “ultimate resource” for undergraduate electromagnetics.”

**Analysis and Design of Transmittarray Antennas**

Ahmed H. Abdelrahman 2017-01-18 In recent years, transmittarray antennas have attracted growing interest with many antenna researchers. Transmittarrays combine both optical and antenna array theory, leading to a low profile design with high gain, high radiation efficiency, and versatile radiation performance for many wireless communication systems. In this book, comprehensive analysis, new methodologies, and novel designs of transmittarray antennas are presented. Detailed analysis for the design of planar space-fed array antennas is presented. The basics of aperture field distribution and the analysis of the array elements are described. The radiation performances (directivity and gain) are discussed using array theory approach, and the impacts of element phase errors are demonstrated. The performance of transmittarray design using multilayer frequency selective surfaces (M-FSS) approach is carefully studied, and the transmission phase limit which are generally independent from the selection of a specific element shape is revealed. The maximum transmission phase range is determined based on the number of layers, substrate permittivity, and the separations between layers. In order to reduce the transmitarray design complexity and cost, three different methods have been investigated. As a result, one design is performed using quad-layer cross-slot elements with no dielectric material and another using triple-layer spiral dipole elements. Both designs were fabricated and tested at X-Band for deep space communications. Furthermore, the radiation pattern characteristics were studied under different feed polarization conditions and oblique angles of incident field from the feed. New design methodologies are proposed to improve the bandwidth of transmittarray antennas through the control of the transmission phase range of the elements. These design techniques are validated through the fabrication and testing of two quad-layer transmittarray antennas at Ku-band. A single-feed quad-beam transmittarray antenna with 50 degrees elevation separation between the beams is investigated, designed, fabricated, and tested at Ku-band. In summary, various challenges in the analysis and design of transmittarray antennas are addressed in this book. New methodologies to improve the bandwidth of transmittarray antennas have been demonstrated. Several prototypes have been fabricated and tested, demonstrating the desirable features and potential new applications of transmittarray antennas.

**Electromagnetic Field Theories for Engineering**

Md. Abbas Salam 2014-04-03 A four-year Electrical and Electronic engineering curriculum normally contains two modules of electromagnetic field theories during the first two years. However, some curricula do not have enough slots to accommodate the two modules. This book, Electromagnetic Field Theories, is designed for Electrical and Electronic engineering undergraduate students to provide fundamental knowledge of electromagnetic fields and waves in a structured manner. A comprehensive fundamental knowledge of electric and magnetic fields is required to understand the working principles of generators, motors and transformers. This knowledge is also necessary to analyze transmission lines, substations, insulator flashover mechanism, transient phenomena, etc. Recently, academics and researchers are working for sending electrical power to a remote area by designing a suitable antenna. In this case, the knowledge of electromagnetic fields is considered as important tool.

**Wavelet Applications in Engineering Electromagnetics**

Tapas K. Sarkar 2002 V; List of Figures ix; List of Tables xv; PREFACE xix; ACKNOWLEDGMENTS xx; 1 ROAD MAP OF THE BOOK 1; 1.1 INTRODUCTION 1; 1.2 WHY USE WAVELETS? 1; 1.3 WHAT ARE WAVELETS? 2; 1.4 WHAT IS THE WAVELET TRANSFORM? 3; 1.3 USE OF WAVELETS IN THE NUMERICAL SOLUTION OF ELECTROMAGNETIC FIELD PROBLEMS 4; 1.6 WAVELET METHODOLOGIES COMPLEMENT FOURIER TECHNIQUES 7; 1.7 OVERVIEW OF THE CHAPTERS 10; REFERENCES 11; 2 WAVELETS FROM AN ELECTRICAL ENGINEERING PERSPECTIVE 15; 2.1 INTRODUCTION 15; 2.2 DEVELOPMENT OF THE DISCRETE WAVELET METHODOLOGY FROM FILTER THEORY CONCEPTS 16.

**Electromagnetism for Engineers**

P. Hammond 2013-10-22 Electromagnetism for Engineers: An Introductory Course, Third Edition covers the principles of electromagnetism. The book discusses electric charges at rest; steady electric currents; and the magnetic field of steady electric currents. The text also describes electromagnetic induction; the magnetic effects of iron; and electromagnetic radiation. Mechanical and other kinds of engineers and engineering students who need knowledge on electromagnetism will find the book invaluable.

**Electromagnetic Fields and Waves: Fundamentals of Engineering**

Sedki M. Riad 2019-12-27 Publisher’s Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. Understand electromagnetic field principles, engineering techniques, and applications This core introductory-level undergraduate textbook offers a solid coverage of the fundamentals of electromagnetic fields and waves. Written by two electrical engineering experts and experienced educators, the book is designed to accommodate both one and two semester curricula. Electromagnetic Fields and Waves: Fundamentals of Engineering presents detailed explanations of the topic of EM fields in a holistic fashion that integrates the math and the physics of the material with students’ realistic
preparation in mind. You will learn about static and time-varying fields, wave propagation and polarization, transmission lines and waveguides, and more. Coverage includes: • An introduction to electromagnetic fields and waves • Transmission lines and wave equations • Transition to electrostatics • Electrostatic fields, electric flux, and Gauss’ law • Electric force, field, energy, and potential • Materials: conductors and dielectrics • Poisson’s and Laplace’s equations • Uniqueness theorem and graphical and numerical solutions • Magnetic fields and flux • Magnetic materials, magnetic circuits, and inductance • Time-varying fields and Faraday’s law • Wave propagation: plane waves • Wave polarization and propagation in multiple layers • Waveguides and cavity resonators • Historical review of EM scientists

**Engineering Electromagnetics and Waves, Global Edition** - Aziz Inan 2015-07-31 For courses in Electromagnetic Fields & Waves. Electromagnetic Waves continues the applied approach used in the authors’ successful Engineering Electromagnetics. The second book is appropriate for a second course in Electromagnetics that covers the topic of waves and the application of Maxwell’s equations to electromagnetic events.

**Engineering Electromagnetism** - Percy Hammond 1994 The aim of the book and its associated computer disk is to explain the physical nature of electric and magnetic fields encountered in electrical engineering. Field problems are inherently difficult because fields are distributed in space and can exist in what is usually regarded as empty space devoid of matter. The customary approach to fields problems is through algebraic methods and the solution of equations. The book emphasizes instead a method based on geometry which enables the student to visualize the fields. Backed by a computer program (available to download at the bottom of this page) giving visual displays, the method enables the student to attempt real problems and to use design methods. A comprehensive survey of numerical and analytical methods is provided and examples of engineering applications are discussed.

**Electromagnetic Fields in Electrical Engineering** - Professor Department of Electrical Engineering A Savini 1989-02-01

**Human Interaction with Electromagnetic Fields** - Dragan Poljak 2019-06-07 Human Interaction with Electromagnetic Fields: Computational Models in Dosimetry presents some highly rigorous and sophisticated integral equation techniques from computational electromagnetics (CEM), along with practical techniques for the calculation and measurement of internal dosimetry. Theory is accompanied by numerical modeling algorithms and illustrative computational examples that range from academic to full real-world scenarios. Covers both deterministic and stochastic modeling. Presents implementations of integral equation approaches, overcoming the limitations of the FDTD approach. Presents various biomedical applications.

**Advanced Engineering Electromagnetics** - Constantine A. Balanis 2012-01-24 Balanis’ second edition of Advanced Engineering Electromagnetics - a global best-seller for over 20 years - covers the advanced knowledge engineers involved in electromagnetic know-how to know, particularly as the topic relates to the fast-moving, continually evolving, and rapidly expanding field of wireless communications. The immense interest in wireless communications and the expected increase in wireless communications systems projects (antenna, microwave and wireless communication) points to an increase in the number of engineers needed to specialize in this field. In addition, the Instructor Book Companion Site contains a rich collection of multimedia resources for use with this text. Resources include: Ready-made lecture notes in Power Point format for all the chapters. Forty-nine MATLAB® programs to compute, plot and animate some of the wave phenomena. Nearly 600 end-of-chapter problems, that’s an average of 40 problems per chapter (200 new problems; 50% more than in the first edition). A thoroughly updated Solutions Manual 2500 slides for Instructors are included.

**Fundamentals of Electromagnetics for Electrical and Computer Engineering** - Nannapaneni Narayana Rao 2011-11-21 This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Fundamentals of Electromagnetics for Electrical and Computer Engineering, First Edition is appropriate for all beginning courses in electromagnetics, in both electrical engineering and computer engineering programs. This is ideal for anyone interested in learning more about electromagnetics. Dr. N. Narayana Rao has designed this compact, one-semester textbook in electromagnetics to fully reflect the evolution of technologies in both electrical and computer engineering. This book’s unique approach begins with Maxwell’s equations for time-varying fields (first in integral and then in differential form), and also introduces waves at the outset. Building on these core concepts, Dr. Rao treats each category of fields as solutions to Maxwell’s equations, highlighting the frequency behavior of physical structures. Next, he systematically introduces the topics of transmission lines, waveguides, and antennas. To keep the subject’s geometry as simple as possible, while ensuring that students master the physical concepts and mathematical tools they will need, Rao makes extensive use of the Cartesian coordinate system. Topics covered in this book include: uniform plane wave propagation; material media and their interaction with uniform plane wave fields; essentials of transmission-line analysis (both frequency- and time-domain); metallic waveguides; and Hertzian dipole field solutions. Material on cylindrical and spherical coordinate systems is presented in appendices, where it can be studied whenever relevant or convenient. Worked examples are presented throughout to illuminate (and in some cases extend) key concepts; each chapter also contains a summary and review questions. (Note: this book provides a one-semester alternative to Dr. Rao’s classic textbook for two-semester courses, Elements of Engineering Electromagnetics, now in its Sixth Edition.)

**Approximate Boundary Conditions in Electromagnetics** - Thomas B. A. Senior 1995 Commonplace use of non-metallic materials and composites in vehicles and other environments has led to a need to compute scattering and other electromagnetic phenomena in their presence. This book provides the first comprehensive treatment of a variety of approximate boundary conditions in electromagnetics. The genesis and properties of impedance, resistive sheet, conductive sheet, generalized and absorbing boundary conditions are discussed. Applications to diffraction by numerous canonical geometries and impedance structures are presented. Accuracy and uniqueness issues are addressed and high frequency techniques such as physical and geometrical theory of diffraction are introduced. Many of the results presented are previously unpublished.

**MATLAB-Based Electromagnetics** - Branislav Notaros 2013-05-09 This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. This title can be used to either complement another electromagnetics text, or as an independent resource. Designed primarily for undergraduate electromagnetics, it can also be used in follow-up courses on antennas, propagation, microwaves, advanced electromagnetic theory, computational electromagnetics, electrical machines, signal integrity, etc. This title also provides practical content to current and aspiring industry professionals. MATLAB-Based Electromagnetics provides engineering and physics students and other users with an operational knowledge and firm grasp of electromagnetic fundamentals aimed toward practical engineering applications, by teaching them “hands on” electromagnetics through a unique and comprehensive collection of MATLAB computer exercises and projects. Essentially, the book unifies two themes: it presents and explains electromagnetics using MATLAB on one side, and develops and discusses MATLAB for electromagnetics on the other. MATLAB codes described (and listed) in TUTORIALS or proposed in other exercises provide prolonged benefits of learning. By running codes, generating results, figures, and diagrams; playing movies and animations; and solving a large variety of problems in MATLAB, in class, with peers in study groups, or individually, readers gain a deep understanding of electromagnetics.

**Human Interaction with Electromagnetic Fields** - Dragan Poljak 2019-08-15 Human Interaction with Electromagnetic Fields: Computational Models in Dosimetry presents some highly rigorous and sophisticated integral equation techniques from computational electromagnetics (CEM), along with practical techniques for the calculation and measurement of internal dosimetry. Theory is accompanied by numerical modeling algorithms and illustrative computational examples that range from academic to full real-world scenarios. Covers both deterministic and stochastic modeling. Presents implementations of integral equation approaches, overcoming the limitations of the FDTD approach. Presents various biomedical applications.

**MATLAB-Based Electromagnetics** - Branislav M. Notaros 2013-05-13 This title can be used to either
Mathematical and numerical modelling of engineering problems in medicine is aimed at unveiling and understanding the theoretical concepts and problem-solving techniques and skills in electromagnetics. The text provides operational knowledge and firm grasp of electromagnetic fundamentals aimed toward practical engineering applications by teaching them “hands-on” electromagnetics through a unique and comprehensive collection of MATLAB computer exercises and projects. Essentially, the book unifies two themes: it presents and explains electromagnetics using MATLAB on one side, and develops and discusses MATLAB for electromagnetics on the other. MATLAB codes described (and listed) in TUTORIALS or proposed in other exercises provide prolonged benefits of learning. By running codes; generating results, figures, and diagrams; playing movies and animations; and solving a large variety of problems in MATLAB, in class, with peers in study groups, or individually, readers gain a deep understanding of electromagnetics.

Electrical Engineering - Volume II - Kit Po Wong 2009-11-30 Electricity is an integral part of life in modern society. It is one form of energy and can be transported and converted into other forms. Throughout the world electricity is used to light homes and streets, cook meals, power computers and run industrial plants. Electricity is so integrated with our way of living that electricity consumption per person is used to measure the levels of economic development of countries. Any disruptions to electricity supply or blackouts will lead to huge financial loss and threats to lives well-being in the community. Electrical engineering is the profession and study of generating, transmitting, controlling and using electrical energy. It offers a wide range of exciting opportunities to those looking for a fulfilling, challenging and professional career. Electrical engineers are the designers of modern electrical machinery, power systems, transportation and communication systems. They work in various sectors, including the building industry, telecommunication industry, consultancy services, technology development, education services as well as government. In these volumes, the essential aspects and fundamentals of electrical engineering are presented. In depth knowledge of various areas of electrical engineering are disseminated by learned scholars in their fields. It is hoped that readers will find all the writings comprehensive, informative and interesting. It is further hoped that these fundamentals will assist the readers to study advanced topics in electrical engineering. If the reviews of these topics is electrical engineers themselves, it is hoped that the articles will broaden their horizon in electrical engineering and provide them with the necessary knowledge to further their profession as electrical engineers.

Conceptual Electromagnetics - Branislav M. Notaros 2017-07-06 This is a textbook on electromagnetic fields and waves completely based on conceptual understanding of electromagnetics. The text provides operational knowledge and firm grasp of electromagnetic fundamentals aimed toward practical engineering applications by combining fundamental theory and a unique and comprehensive collection of as many as 888 conceptual questions and problems in electromagnetics. Conceptual questions are designed to strongly enforce and enhance both the theoretical concepts and understanding and problem-solving techniques and skills in electromagnetics.

Computational Modeling in Biomedical Engineering and Medical Physics - Alexandru Morega 2020-09-15 Mathematical and numerical modelling of engineering problems in medicine is aimed at unveiling and understanding multidisciplinary interactions and processes and providing insights useful to clinical care and technology advances for better medical equipment and systems. When modelling medical problems, the engineer is confronted with the cross-disciplinary problems of electromagnetism, bioengineering and biomechanics with, possibly, different time and space scales, which may raise concerns in formulating consistent, solvable mathematical models. Computational Medical Engineering presents a number of engineering for medicine problems that may be encountered in medical physics, procedures, diagnosis and monitoring techniques, including electrical activity of the heart, hemodynamic activity monitoring, magnetic drug targeting, bioheat models and thermography, RF and microwave hyperthermia, ablation, EMF dosimetry, and bioimpedance methods. The authors discuss the core approach methodology to pose and solve different problems of medical engineering, including essentials of mathematical modelling (e.g., criteria for well-posed problems); physics scaling (homogenization techniques); Constructal Law criteria in morphing shape and structure of systems with internal flows; computational domain construction (CAD and, or reconstruction techniques based on medical images); numerical modelling issues, and validation techniques used to ascertain numerical simulation results. In addition, new ideas and venues to investigate and understand finer scale models and merge them into continuous media mathematical physics are provided as case studies. Presents the fundamentals of medical and numerical modeling of engineering problems in medicine Discusses many of the most common modeling scenarios for Biomedical Engineering, including, electrical activity of the heart hemodynamic activity monitoring, magnetic drug targeting, bioheat models and thermography, RF and microwave hyperthermia, ablation, EMF dosimetry, and bioimpedance methods Includes discussion of the core approach methodology to pose and solve different problems of medical engineering, including essentials of mathematical modelling, physics scaling, Constructal Law criteria in morphing shape and structure of systems with internal flows, computational domain construction, numerical modelling issues, and validation techniques used to ascertain numerical simulation results.

Primary Theory of Electromagnetics - Hyo J. Eom 2013-08-31 This is a textbook on electromagnetics for undergraduate students in electrical engineering, information, and communications. The book contents are very compact and brief compared to other commonly known electromagnetics books for undergraduate students and emphasizes mathematical aspects of basic electromagnetic theory. The book presents basic electromagnetic theory starting from static fields to time-varying fields. Topics are divided into static electric fields, static magnetic fields, time-varying fields, and electromagnetic waves. The goal of this textbook is to lead students away from memorization, but towards a deeper understanding of formulas that are used in electromagnetic theory. Many formulas commonly used for electromagnetic analysis are mathematically derived from a few empirical laws. Physical interpretations of formulas are de-emphasized. Each important formula is framed to indicate its significance. Primary Theory of Electromagnetics shows a clear and rigorous account of formulas in a consistent manner, thus letting students understand how electromagnetic formulas are related to each other.

Subsurface Sensing with Acoustic and Electromagnetic Waves Using a Nonlinear Inversion Algorithm - A. Abubakar 2001

Electromagnetic Modeling and Simulation - Levent Sevgi 2014-03-13 This book presents practical, easy-to-use, but effective short codes as well as virtual tools that can be used by electrical, electronic, communication, and computer engineers in a broad range of electrical engineering problems Electromagnetic modeling is essential to the design and modeling of antenna, radar, satellite, medical imaging, and other applications. In this book, author Levent Sevgi explains techniques for solving real-time complex physical problems using MATLAB-based short scripts and comprehensive virtual tools. Unique in coverage and tutorial approach, Electromagnetic Modeling and Simulation covers fundamental analytical and numerical methods that are widely used in teaching, research, and engineering designs—including mode and ray summation approaches with the canonical 2D nonpenetrable parallel plate waveguide as well as FDTD, MoM, and SSPE scripts. The book also establishes an intelligent balance among the essentials of EMMODSIM: The Problem (the physics), The Theory and Models(mathematical background and analytical solutions), and TheSimulations (code developing plus validation) tested in graduate classroom. Features include online videos and “short courses” that are easily integrated to the design and modeling of antenna, radar, satellite, medical imaging, and other applications. Includes sample scenarios and video clips recorded during characteristic simulations that visually impact learning—available on wiley.com Provides readers with their first steps in EM MODSIM as well as astros for medium and high-level code developers and users Electrical Modelling and Simulation thoroughly cover the physics, mathematical background, analytical solutions, and code development of electromagnetic modeling, making it an ideal resource for electrical engineers and researchers.

Explicit Symmetry Breaking in Electrodynamic Systems and Electromagnetic Radiation - Dhiraj Sinha 2016-04-01 This book is an introduction to the concept of symmetries in electromagnetism and explicit symmetry breaking to pose and solve engineering problems on symmetry breaking occurring in fields such as architecture, mathematics and physics. Despite the extensive developments of symmetry in these fields, it has yet to be applied to the concept of classical electromagnetism and related engineering applications. This book unravels the beauty and excitement of this area to scientists and engineers.
Electromagnetic Foundations of Electrical Engineering - A. Brandao Faria 2008-08-22 The applications of electromagnetic phenomena within electrical engineering have been evolving and progressing at a fast pace. In contrast, the underlying principles have been stable for a long time and are not expected to undergo any changes. It is these electromagnetic field fundamentals that are the subject of discussion in this book with an emphasis on basic principles, concepts and governing laws that apply across the electrical engineering discipline.

Electromagnetic Foundations of Electrical Engineering begins with an explanation of Maxwell’s equations, from which the fundamental laws and principles governing the static and time-varying electric and magnetic fields are derived. Results for both slowly- and rapidly-varying electromagnetic field problems are discussed in detail. Key aspects: Offers a project portfolio, with detailed solutions included on the companion website, which draws together aspects from various chapters so as to ensure comprehensive understanding of the fundamentals. Provides end-of-chapter homework problems with a focus on engineering applications. Progresses chapter by chapter to increasingly more challenging topics, allowing the reader to grasp the more simple phenomena and build upon these foundations. Enables the reader to attain a level of competence to subsequently progress to more advanced topics such as electrical machines, power system analysis, electromagnetic compatibility, microwaves and radiation. This book is aimed at electrical engineering students and faculty staff in sub-disciplines as diverse as power and energy systems, circuit theory and telecommunications. It will also appeal to existing electrical engineering professionals with a need for a refresher course in electromagnetic foundations.

Fundamentals of Electromagnetics with MATLAB - Karl E. Longren 2007 Virtually every four-year electrical and computer engineering program requires a course in electromagnetic fields and waves encompassing Maxwell’s equations. Understanding and appreciating the laws of Nature that govern the speed of even the smallest computer chip or largest power line is fundamental for every electrical and computer engineer.

Fundamentals of Electromagnetics with MATLAB, 2nd Edition is much more than a mere textbook. The book itself offers a structural framework of principles, key equations, and problems. With that crucial supporting structure, each instructor, student or reader can turn to the supplemental files provided with this book or available online to customize and decorate each topic room. This second edition is the result of extensive user feedback and includes a 100% standalone Transmission Line chapter for flexible course placement; expanded problem sets matched to text sections and checked for clarity; and separate chapters for Electrostatics and Magneto-statics. Supplementary materials for professors and/or students are available upon request via email to books@theiet.org.

Principles of Electromagnetic Waves and Materials - Dikhutulo K. Kalliari 2017-11-14 This book focuses primarily on senior undergraduates and graduates in Electromagnetics Waves and Materials courses. The book takes an integrative approach to the subject of electromagnetics by supplementing quintessential “old school” information and methods with instruction in the use of new commercial software such as MATLAB. Homework problems, PowerPoint slides, an instructor’s manual, a solutions manual, MATLAB downloads, quizzes, and suggested examination problems are included. Revised throughout, this new edition includes two key new chapters on artificial electromagnetic materials and electromagnetics of moving media.

Electromagnetic Compatibility for Space Systems Design - Nikopolouvs, Christos D. 2018-03-02 In the aerospace industry, avoiding operating issues, especially in regard to space missions and satellite structures, is crucial. The vast majority of these issues can be traced to disturbances in the electromagnetic fields used. Electromagnetic Compatibility for Space Systems Design is a critical scholarly resource that examines the applications of electromagnetic compatibility and electromagnetic interference in the space industry. Featuring coverage on a wide range of topics, such as magnetometers, electromagnetic environmental effects, and electric fields, this book is geared toward managers, engineers, and researchers seeking current research on the applications of electromagnetic technologies in the aerospace field.


Elements of Electromagnetics - Matthew N. O. Sadiku 2007 Elements of Electromagnetics, Fourth Edition, uses a vectors-first approach to explain electrostatics, magnetostatics, fields, waves, and applications like transmission lines, waveguides, and antennas. It also provides a balanced presentation of time-varying and static fields, preparing students for employment in today’s industrial and manufacturing sectors. Streamlined to facilitate student understanding, this edition features worked examples in every chapter that help to explain the theory presented in the text to solve different kinds of problems. Numerical methods, including MATLAB and vector analysis, are also included to help students analyze situations that they are likely to encounter in industry practice. Elements of Electromagnetics, Fourth Edition, is designed for introductory undergraduate courses in electromagnetics. An Instructor’s Solutions Manual (co-authored by Sudarshan Rao Nelatury of Penn State Erie, The Behrend College) and PowerPoint slides of all figures in the text are available to adopters.

Modeling and Application of Electromagnetic and Thermal Field in Electrical Engineering - Zhiguang Cheng 2019-12-03 Co-authored by an international research group with a long-standing cooperation, this book focuses on engineering-oriented electromagnetic and thermal field modeling and application. It presents important contributions, including advanced and efficient finite element analysis used in the solution of electromagnetic and thermal field problems for large and multi-scale engineering applications involving application script development; magnetic measurement of both magnetic materials and components under various, even extreme conditions, based on well-established (standard and non-standard) experimental systems; and multi-level validation based on both industrial test systems and extended TEAM P21 benchmarking platform. Although these are challenging topics, they are useful for readers from both academia and industry.

Introduction to Electromagnetic Compatibility - Clayton R. Paul 2006-01-03 A Landmark text thoroughly updated, including a new CD As digital devices continue to be produced at increasingly lower costs and with higher speeds, the need for effective electromagnetic compatibility (EMC) design practices has become more critical. The designer must avoid unnecessary costs in bringing products into compliance with governmental regulations. The Second Edition of this landmark text has been thoroughly updated and reorganized to reflect these major developments that affect both academia and the electronics industry. Readers familiar with the First Edition will find much new material, including: * Latest U.S. and international regulatory requirements * PSpice used throughout the textbook to simulate EMC analysis and design * Methods of designing for Signal Integrity * Fortran programs for the simulation of Crosstalk supplied on a CD * OrCAD(r) PSpice(r) Release 10.0 and Version 8 Demo Edition software supplied on a CD * The final chapter on System Design for EMC completely rewritten * The chapter on Crosstalk rewritten to simplify the mathematics Detailed, worked-out examples are now included throughout the text. In addition, review exercises are now included following the discussion of each important topic to help readers assess their grasp of the material. Several appendices are new to this edition including Phasor Analysis of Electric Circuits, The ElectromagneticField Equations and Waves, Computer Codes for Calculating thePer-Unit-Length Parameters and Crosstalk of MulticonductorTransmission Lines, and a SPICE (PSPICE) tutorial. Now thoroughly updated, the Second Edition of Introduction to Electromagnetic Compatibility remains the textbook of choice for universities and EMC courses as well as a reference for EMC design engineers. An Instructor’s Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Introduction to Engineering Electromagnetic Fields - Korada Umashankar 1989 This is a textbook designed to provide analytical background material in the area of Engineering Electromagnetic Fields for the senior level undergraduate and preparatory level graduate electrical engineering students. It is also an excellent reference book for researchers in the field of computational electromagnetic fields. The textbook covers: Static Electric and Magnetic Fields: The basic laws governing the Electromagnetics, Magnetostatics with engineering examples are presented which are enough to understand the fields and the electric current and charge sources. Dynamic Electromagnetic Fields: The Maxwell’s equations in Time-Domain and solutions, the Maxwell’s equations in Frequency-Domain and solutions. Extensive approaches are presented to solve partial differential equations.
satisfying electromagnetic boundary value problems. Foundation to electromagnetic field radiation, guided wave propagation is discussed to expose at the undergraduate level application of the Maxwell's equations to practical engineering problems.

Explicit Symmetry Breaking in Electrodynamic Systems and Electromagnetic Radiation-Dhiraj Sinha
2016-04 This book is an introduction to the concept of symmetries in electromagnetism and explicit symmetry breaking. It begins with a brief background on the origin of the concept of symmetry and its meaning in fields such as architecture, mathematics and physics. Despite the extensive developments of symmetry in these fields, it has yet to be applied to the context of classical electromagnetism and related engineering applications. This book unravels the beauty and excitement of this area to scientists and engineers.

Electromagnetics-Arlon T. Adams 2015-09-11 “Electromagnetics is by no means an easy subject to grasp. Teaching materials in the discipline must be carefully prepared and organized to help guide students to success. Not only should such materials offer comprehensive mathematics and strong physical insights, they should also present alternative ways of viewing and formulating problems. “Electromagnetics” is wonderfully unique in its approach. With thorough examples, summary tables, figures, alternative formulations, and homework problems, this volume takes the electromagnetics student step-by-step through the intricacies of the subject, and builds up comprehension and application gradually. Examples are used to delineate a basic approach and to guide students from start to solution through complex problems. Special cases are considered to draw analogies, and to offer physical insights and interpretations. Finally, the book’s large problem set enables instructors to teach the course for several years without repeating problem assignments. During their many years of teaching electromagnetics, Adams and Lee became interested in the discipline’s historical aspects and found it useful to incorporate stories of the basic discoveries into the classroom. This book explores such rarely covered aspects of the subject. Included is a fascinating account of what Michael Faraday did when unexpected events occurred. With its lively description, this book helps students to imagine themselves taking the same steps as Faraday. Jay Kyoon Lee (Ph.D., Massachusetts Institute of Technology) is a Professor of Electrical Engineering and Computer Science at Syracuse University, where he teaches Electromagnetics, among other courses. His current research interests are electromagnetic theory, microwave remote sensing, waves in anisotropic media, antennas and propagation. He was a Research Fellow at Naval Air Development Center, Rome Air Development Center and Naval Research Laboratory and was an Invited Visiting Professor at Seoul National University in Seoul, Korea. He has received the Eta Kappa Nu Outstanding Undergraduate Teacher Award (1999), the IEEE Third Millennium Medal (2000), and the College Educator of the Year Award from the Technology Alliance of Central New York (2002). Arlon T. Adams (Ph.D., University of Michigan) was a professor emeritus in the Department of Electrical and Computer Engineering at Syracuse University, where he taught and conducted research in electromagnetics for many years, focusing on antennas and microwaves. He served as electronics officer in the U. S. Navy and worked as an engineer for the Sperry Gyroscope Company. He was a Life Fellow of the IEEE from which institution he received eight prize paper and achievement awards. He was a Fulbright Scientist in Yugoslavia, a visiting scholar at Berkeley, and was general chairman of the 1988 IEEE Antennas and Propagation Society /URSI International Symposium at Syracuse, New York.”

Engineering Electromagnetics-William H. Hayt, Jr

Electromagnetic Compatibility - an Introduction to the Theory of Interference and Shielding-Adrianus T. de Hoop 1987

Transient Electromagnetic Fields Interference Through Circular Apertures in a Plane Screen-D. Quak 2000

Electromagnetics for Electrical Machines-Saurabh Kumar Mukerji 2018-10-08 Electromagnetics for Electrical Machines offers a comprehensive yet accessible treatment of the linear theory of electromagnetics and its application to the design of electrical machines. Leveraging valuable classroom insight gained by the authors during their impressive and ongoing teaching careers, this text emphasizes concepts rather than numerical methods, providing presentation/project problems at the end of each chapter to enhance subject knowledge. Highlighting the essence of electromagnetic field (EMF) theory and its correlation with electrical machines, this book: Reviews Maxwell’s equations and scalar and vector potentials Describes the special cases leading to the Laplace, Poisson’s, eddy current, and wave equations Explores the utility of the uniqueness, generalized Poynting, Helmholtz, and approximation theorems Discusses the Schwarz–Christoffel transformation, as well as the determination of airgap permeance Addresses the skin effects in circular conductors and eddy currents in solid and laminated iron cores Contains examples relating to the slot leakage inductance of rotating electrical machines, transformer leakage inductance, and theory of hysteresis machines Presents analyses of EMFs in laminated-rotor induction machines, three-dimensional field analyses for three-phase solid rotor induction machines, and more Electromagnetics for Electrical Machines makes an ideal text for postgraduate-level students of electrical engineering, as well as of physics and electronics and communication engineering. It is also a useful reference for research scholars concerned with problems involving electromagnetics.