Fundamentals Of Applied Electromagnetics Document

A translation of the highly acclaimed text by Roberto Tenenbaum (originally published in Portuguese). Tenenbaum's book covers the full range of topics included in a complete basic course designed for undergraduate students in engineering. Requiring no more than a basic course in calculus, the text employs an intuitive approach, from the point of view of Newtonian mechanics, that avoids the complications of Hamiltonian and Lagrangian formalism. The balance between analysis and practical examples also avoids the tendency of other engineering- oriented texts to assume an antipathy towards abstract thinking among engineers. The analytical approach, presented in a simple but rigorous way, gives the required tools for modeling novel practical situations.
The Finite-Difference Time-domain (FDTD) method allows you to compute electromagnetic interaction for complex problem geometries with ease. The simplicity of the approach coupled with its far-reaching usefulness, create the powerful, popular method presented in The Finite Difference Time Domain Method for Electromagnetics. This volume offers timeless applications and formulations you can use to treat virtually any material type and geometry. The Finite Difference Time Domain Method for Electromagnetics explores the

mathematical foundations of FDTD, including stability, outer radiation boundary conditions, and different coordinate systems. It covers derivations of FDTD for use with PEC, metal, lossy dielectrics, gyrotropic materials, and anisotropic materials. A number of applications are completely worked out with numerous figures to illustrate the results. It also includes a printed FORTRAN 77 version of the code that implements the technique in three dimensions for lossy dielectric materials. There are many methods for analyzing electromagnetic interactions for problem geometries. With The Finite Difference Time Domain Method for Electromagnetics, you will learn the simplest, most useful of these methods, from the basics through to the practical applications.

This text discusses electromagnetics from the view of operator theory, in a manner more commonly seen in textbooks of quantum mechanics. It includes a self-contained introduction to operator theory, presenting definitions and theorems, plus proofs of the theorems when these are simple or enlightening. Society is approaching and advancing nano- and microtechnology from various angles of science and engineering. The need for further fundamental, applied, and experimental research is matched by the demand for quality references that capture the multidisciplinary and multifaceted nature of the science. Presenting cutting-edge information that is applicable to many fields, Nano- and Micro-

Electromechanical Systems: Fundamentals of Nano and Microengineering, Second Edition builds the theoretical foundation for understanding, modeling, controlling, simulating, and designing nano- and microsystems. The book focuses on the fundamentals of nano- and microengineering and nano- and microtechnology. It emphasizes the multidisciplinary principles of NEMS and MEMS and practical applications of the basic theory in engineering practice and technology development. Significantly revised to reflect both fundamental and technological aspects, this second edition introduces the concepts, methods, techniques, and technologies needed to solve a wide variety of problems related to high-performance nano- and microsystems. The book is written in a textbook style and now includes homework problems, examples, and reference lists in every chapter, as well as a separate solutions manual. It is designed to satisfy the growing demands of undergraduate and graduate students, researchers, and professionals in the fields of nano- and microengineering, and to enable them to contribute to the nanotechnology revolution.

This text applies engineering science and technology to biological cells and tissues that are electrically conducting and excitable. It describes the theory and a wide range of applications in both electric and magnetic fields.

Mathematics of Computing -- Numerical Analysis.

In this book, experts from academia and industry present the latest advances in scientific theory relating to applied electromagnetics and examine current and emerging applications particularly within the fields of electronics, communications, and computer technology. The book is based on presentations delivered at APPEIC 2015, the 2nd Applied Electromagnetic International Conference, held in Krabi, Thailand in December 2015. The conference provided an ideal platform for researchers and specialists to deliver both theoretically and practically oriented contributions on a wide range of topics relevant to the theme of nurturing applied electromagnetics for human technology. Many novel aspects were addressed, and the contributions selected for this book highlight the relevance of advances in applied electromagnetics to a variety of industrial engineering problems and identify exciting futu re directions for research. This one-semester textbook teaches students Electromagnetic Waves, via an early introduction to Maxwell's Equations in the first chapter. Mathematics fundamentals are used as needed, but rigor is de-emphasized in preference to understanding the basic ideas and principles of EM waves. Each chapter includes extensive, step-by-step, solved examples, as well as abundant exercises. Designed for a one-semester course in electromagnetic waves; Introduces Maxwell's equations in the first chapter; De-emphasizes mathematical rigor in order to make key ideas and principles easy to

understand; Makes material accessible to readers of varying backgrounds, with extensive use of solved examples; Includes abundant exercises for each chapter. This book serves as a tool for any engineer who wants tolearn about circuits, electrical machines and drives, powerelectronics, and power systems basics From time to time, engineers find they need to brush up oncertain fundamentals within electrical engineering. This clear andconcise book is the ideal learning tool for them to quickly learnthe basics or develop an understanding of newer topics. Fundamentals of Electric Power Engineering: FromElectromagnetics to Power Systems helps nonelectrical engineersamass power system information quickly by imparting tools and tradetricks for remembering basic concepts and grasping newdevelopments. Created to provide more in-depth knowledge offundamentals—rather than a broad range of applicationsonly—this comprehensive and up-to-date book: Covers topics such as circuits, electrical machines and drives,power electronics, and power system basics as well as newgeneration technologies Allows nonelectrical engineers to build their electricalknowledge quickly Includes exercises with worked solutions to assist readers ingrasping concepts found in the book Contains "in-depth" side bars throughout whichpique the reader's curiosity Fundamentals of Electric Power Engineering is an idealrefresher course for those involved in this interdisciplinarybranch. For supplementary files for this book, please visit ahref="http://booksupport.wiley.com/"http://booksupport.wiley.com/a Considered a major field of photonics, plasmonics offers the potential to confine and

guide light below the diffraction limit and promises a new generation of highly miniaturized photonic devices. This book combines a comprehensive introduction with an extensive overview of the current state of the art. Coverage includes plasmon waveguides, cavities for field-enhancement, nonlinear processes and the emerging field of active plasmonics studying interactions of surface plasmons with active media. This book provides students with a thorough theoretical understanding of electromagnetic field equations and it also treats a large number of applications. The text is a comprehensive two-semester textbook. The work treats most topics in two steps – a short, introductory chapter followed by a second chapter with in-depth extensive treatment; between 10 to 30 applications per topic; examples and exercises throughout the book; experiments, problems and summaries. The new edition includes: modifications to about 30-40% of the end of chapter problems; a new introduction to electromagnetics based on behavior of charges; a new section on units; MATLAB tools for solution of problems and demonstration of subjects; most chapters include a summary. The book is an undergraduate textbook at the Junior level, intended for required classes in electromagnetics. It is written in simple terms with all details of derivations included and all steps in solutions listed. It requires little beyond basic calculus and can be used for self-study. The wealth of examples and alternative explanations makes it very approachable by students. More than 400 examples and exercises, exercising every topic in the book Includes 600 end-of-chapter problems,

many of them applications or simplified applications Discusses the finite element, finite difference and method of moments in a dedicated chapter

In the tradition of the previous three conferences, the proceedings of the 4th Ultra-Wideband Short-Pulse Electromagnetics Conference explores topics including pulse generation and detection; broadband electronic systems; antennas - theory, design, experiments and systems; pulse propagation; scattering theory; signal processing; and buried targets - detection and identification.

Covering both statics and dynamics, this book uses many tools to facilitate understanding of EM concepts and to demonstrate their relevance to modern technology. It also provides overviews of fundamental and sophisticated technologies. It is useful for courses in Electromagnetics offered in Electrical Engineering departments and Applied Physics.

The first book to focus on the electromagnetic basis of signal integrity The Foundations of Signal Integrity is the first of its kind—a reference that examines the physical foundation of system integrity based on electromagnetic theory derived from Maxwell's Equations. Drawing upon the cutting-edge research of Professor Paul Huray's team of industrial engineers and graduate students, it develops the physical theory of wave propagation using methods of solid state and high-energy physics, mathematics, chemistry, and electrical engineering before addressing its application to modern high-speed systems. Coverage includes: All the necessary electromagnetic theory needed

for a complete understanding of signal integrity Techniques for obtaining analytic solutions to Maxwell's Equations for ideal materials and boundary conditions Plane electromagnetic waves Plane waves in compound media Transmission lines and waveguides Ideal models vs. real-world systems Complex permittivity of propagating media Surface roughness Advanced signal integrity Signal integrity simulations Problem sets for each chapter With its thorough coverage of this relatively new discipline, the book serves as an ideal textbook for senior undergraduate and junior graduate students, as well as a resource for practicing engineers in this burgeoning field. At the end of each section, it typically stimulates the reader with open-ended questions that might lead to future theses or dissertation research.

RFID Design Fundamentals and ApplicationsCRC Press

Explains the fundamental concepts of Newtonian mechanics, special relativity, waves, fluids, thermodynamics, and statistical mechanics. Provides an introduction for college-level students of physics, chemistry, and engineering, for AP Physics students, and for general readers interested in advances in the sciences. In volume II, Shankar explains essential concepts, including electromagnetism, optics, and quantum mechanics. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics.

This well-known undergraduate electrodynamics textbook is now available in a more affordable printing from Cambridge University Press. The Fourth Edition provides a rigorous, yet clear and accessible treatment of the fundamentals of electromagnetic theory and offers a sound

platform for explorations of related applications (AC circuits, antennas, transmission lines, plasmas, optics and more). Written keeping in mind the conceptual hurdles typically faced by undergraduate students, this textbook illustrates the theoretical steps with well-chosen examples and careful illustrations. It balances text and equations, allowing the physics to shine through without compromising the rigour of the math, and includes numerous problems, varying from straightforward to elaborate, so that students can be assigned some problems to build their confidence and others to stretch their minds. A Solutions Manual is available to instructors teaching from the book; access can be requested from the resources section at www.cambridge.org/electrodynamics.

Applied Electromagnetics and Electromagnetic Compatibility deals with Radio Frequency Interference (RFI), which is the reception of undesired radio signals originating from digital electronics and electronic equipment. With today's rapid development of radio communication, these undesired signals as well as signals due to natural phenomena such as lightning, sparking, and others are becoming increasingly important in the general area of Electro Magnetic Compatibility (EMC). EMC can be defined as the capability of some electronic equipment or system to be operated at desired levels of performance in a given electromagnetic environment without generating EM emissions unacceptable to other systems operating in the vicinity.

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 Electromagentics 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.

Written by an antenna engineer turned professor who has worked at Apple, Nokia and Amphenol, Antenna Design for Mobile Devicesis a comprehensive guide for fresh and intermediate engineers involved in antenna design. The book instructs readers through all aspects of real world antenna designs, which includes how to make a stable antenna fixture, designing various types of antennas, designing an antenna with good manufacturability, using various matching technique to improve antenna performance, setting up production measurement for mass manufacturing, and making antenna SAR and HAC compliant. Most popular antenna categories, such as internal PIFA, integral IFA, internal folded monopole, ceramic antennas, stubby antennas and whip stubby antennas, are introduced in the book. The book focuses on the basic principle of each kind of antenna and emphasizes on key parameters of antenna optimization. Complimentary matching software, which accompanies

the book, is provided so readers can practice various antenna matching technique and design matching circuits for real projects. A one-stop design reference containing all an engineer needs when designing antennas Accessible to readers of many levels, from introductory to specialist Presents shortcuts for engineers who lack antenna knowledge but need no-hassle techniques for designing simple antennas Contains hands-on knowledge not available in other books Written by a practicing expert who has hired and trained numerous engineers Incorporates the various techniques used by pure-play antenna firms, established mobile device brands, and new entrants to the mobile space Comes with antenna matching software written by the author, which can be used for practice and real-world projects Presentation slides with lecture notes available for instructor use This book is targeted at practicing antenna engineers, particularly those focusing on mobile devices, as well as researchers and academics looking to keep up with this quick-changing field. Engineering managers will find it to be a helpful guide for teaching new hires, while new hires, by using the book themselves, will be able to quickly gain expert-level proficiencies. The book is also suitable for wireless network equipment engineers, who desire a stronger sense of antenna principles, as well as electronic engineering students studying electromagnetics. Readers should possess a basic undergraduate-level understanding of electromagnetic theory. Companion website for the book: http://www.wiley.com/go/zhangantenna

STUDENT COMPANION SITE Every new copy of Stuart Wentworth's Applied Electromagnetics comes with a registration code which allows access to the Student's Book Companion Site. On the BCS the student will find: * Detailed Solutions to Odd-Numbered Problems in the text * Detailed Solutions to all Drill Problems from the text * MATLAB code for

all the MATLAB examples in the text * Additional MATLAB demonstrations with code. This includes a Transmission Lines simulator created by the author. * Weblinks to a vast array of resources for the engineering student. Go to www.wiley.com/college/wentworth to link to Applied Electromagnetics and the Student Companion Site. ABOUT THE PHOTO Passive RFID systems, consisting of readers and tags, are expected to replace bar codes as the primary means of identification, inventory and billing of everyday items. The tags typically consist of an RFID chip placed on a flexible film containing a planar antenna. The antenna captures radiation from the reader's signal to power the tag electronics, which then responds to the reader's query. The PENI Tag (Product Emitting Numbering Identification Tag) shown, developed by the University of Pittsburgh in a team led by Professor Marlin H. Mickle, integrates the antenna with the rest of the tag electronics. RFID systems involve many electomagnetics concepts, including antennas, radiation, transmission lines, and microwave circuit components. (Photo courtesy of Marlin H. Mickle.)

With the rapid growth of wireless technologies, more and more people are trying to gain a better understanding of electromagnetics. After all, electromagnetic fields have a direct impact on reception in all wireless applications. This text explores electromagnetics, presenting practical applications for wireless systems, transmission lines, waveguides, antennas, electromagnetic interference, and microwave engineering. It is designed for use in a one- or two-semester electromagnetics sequence for electrical engineering students at the junior and

senior level. The first book on the subject to tackle the impact of electromagnetics on wireless applications: Includes numerous worked-out example problems that provide you with hands-on experience in solving electromagnetic problems. Describes a number of practical applications that show how electromagnetic theory is put into practice. Offers a concise summary at the end of each chapter that reinforces the key points. Detailed MATLAB examples are integrated throughout the book to enhance the material.

Author Ned Mohan has been a leader in EES education and research for decades. His three-book series on Power Electronics focuses on three essential topics in the power sequence based on applications relevant to this age of sustainable energy such as wind turbines and hybrid electric vehicles. The three topics include power electronics, power systems and electric machines. Key features in the first Edition build on Mohan's successful MNPERE texts; his systems approach which puts dry technical detail in the context of applications; and substantial pedagogical support including PPT's, video clips, animations, clicker questions and a lab manual. It follows a top-down systems-level approach to power electronics to highlight interrelationships between these sub-fields. It's intended to cover fundamental and practical design. This book also follows a building-block approach to power electronics that allows an in-depth discussion

of several important topics that are usually left. Topics are carefully sequenced to maintain continuity and interest.

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. FEATURES: 371 outstanding worked examples, with very detailed and instructive solutions, tightly coupled to the theory650 outstanding homework problems, fully supported by solved examples (a demo example for every problem)New pedagogy and clear, rigorous, complete, and logical presentation of material with no missing stepsGreat flexibility for different options in coverage, including the transmission-lines-first approach500 unique multiple-choice conceptual questions, for active teaching/learning and assessment, available on-line400 MATLAB computer exercises and projects, many with tutorials and m files, available on-line www.pearsonhighered.com/notaros Branislav M. Notaros is Associate Professor of Electrical and Computer Engineering at Colorado State University, where he conducts research in computational electromagnetics, antennas, and microwaves. He received the Ph.D. degree from the University of Belgrade, Yugoslavia, where he then served as Assistant Professor. He also was Assistant and Associate Professor at the

University of Massachusetts Dartmouth. He has published three workbooks and 80 papers. Prof. Notaros was the recipient of the 2005 IEEE MTT-S Microwave Prize, 1999 IEE Marconi Premium, 1999 URSI Young Scientist Award, 2005 UMass Dartmouth Scholar of the Year Award, 2004 UMD COE Dean's Recognition Award, and 2009 CSU Excellence in Teaching Award.

This book presents an in-depth treatment of various mathematical aspects of electromagnetism and Maxwell's equations: from modeling issues to well-posedness results and the coupled models of plasma physics (Vlasov-Maxwell and Vlasov-Poisson systems) and magnetohydrodynamics (MHD). These equations and boundary conditions are discussed, including a brief review of absorbing boundary conditions. The focus then moves to well?posedness results. The relevant function spaces are introduced, with an emphasis on boundary and topological conditions. General variational frameworks are defined for static and quasi-static problems, time-harmonic problems (including fixed frequency or Helmholtz-like problems and unknown frequency or eigenvalue problems), and time-dependent problems, with or without constraints. They are then applied to prove the well-posedness of Maxwell's equations and their simplified models, in the various settings described above. The book is completed with a discussion of dimensionally reduced models in prismatic and axisymmetric geometries, and a

survey of existence and uniqueness results for the Vlasov-Poisson, Vlasov-Maxwell and MHD equations. The book addresses mainly researchers in applied mathematics who work on Maxwell's equations. However, it can be used for master or doctorate-level courses on mathematical electromagnetism as it requires only a bachelor-level knowledge of analysis.

This second edition comes from your suggestions for a more lively format, self-learning aids for students, and the need for applications and projects without being distracted from EM Principles. Flexibility Choose the order, depth, and method of reinforcing EM Principles—the PDF files on CD provide Optional Topics, Applications, and Projects.Affordability Not only is this text priced below competing texts, but also the topics on CD (and downloadable to registered users) provide material sufficient for a second term of study with no additional book for students to buy.MATLAB This book takes full advantage of MATLAB's power to motivate and reinforce EM Principles. No other EM books is better integrated with MATLAB. The second edition is even richer and easier to incorporate into course use with the new, self-paced MATLAB tutorials on the CD and available to registered users.

Electromagnetics is too important in too many fields for knowledge to be gathered on the fly. A deep understanding gained through structured

presentation of concepts and practical problem solving is the best way to approach this important subject. Fundamentals of Engineering Electromagnetics provides such an understanding, distilling the most important theoretical aspects and applying this knowledge to the formulation and solution of real engineering problems. Comprising chapters drawn from the critically acclaimed Handbook of Engineering Electromagnetics, this book supplies a focused treatment that is ideal for specialists in areas such as medicine, communications, and remote sensing who have a need to understand and apply electromagnetic principles, but who are unfamiliar with the field. Here is what the critics have to say about the original work "...accompanied with practical engineering applications and useful illustrations, as well as a good selection of references ... those chapters that are devoted to areas that I am less familiar with, but currently have a need to address, have certainly been valuable to me. This book will therefore provide a useful resource for many engineers working in applied electromagnetics, particularly those in the early stages of their careers." -Alastair R. Ruddle, The IEE Online "...a tour of practical electromagnetics written by industry experts ... provides an excellent tour of the practical side of electromagnetics ... a useful reference for a wide range of electromagnetics problems ... a very useful and well-written compendium..." -Alfy Riddle, IEEE Microwave Magazine Fundamentals of

Engineering Electromagnetics lays the theoretical foundation for solving new and complex engineering problems involving electromagnetics.

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.

One of the most methodical treatments of electromagnetic wave propagation, radiation, and scattering—including new applications and ideas Presented in two parts, this book takes an analytical approach on the subject and emphasizes new ideas and applications used today. Part one covers fundamentals of electromagnetic wave propagation, radiation, and scattering. It provides ample end-of-chapter problems and offers a 90-page solution manual to help readers check and comprehend their work.

The second part of the book explores up-to-date applications of electromagnetic waves—including radiometry, geophysical remote sensing and imaging, and biomedical and signal processing applications. Written by a world renowned authority in the field of electromagnetic research, this new edition of Electromagnetic Wave Propagation, Radiation, and Scattering: From Fundamentals to Applications presents detailed applications with useful appendices, including mathematical formulas, Airy function, Abel's equation, Hilbert transform, and Riemann surfaces. The book also features newly revised material that focuses on the following topics: Statistical wave theories—which have been extensively applied to topics such as geophysical remote sensing, bio-electromagnetics, bio-optics, and bio-ultrasound imaging Integration of several distinct yet related disciplines, such as statistical wave theories, communications, signal processing, and time reversal imaging New phenomena of multiple scattering, such as coherent scattering and memory effects Multiphysics applications that combine theories for different physical phenomena, such as seismic coda waves, stochastic wave theory, heat diffusion, and temperature rise in biological and other media Metamaterials and solitons in optical fibers, nonlinear phenomena, and porous media Primarily a textbook for graduate courses in electrical engineering, Electromagnetic Wave Propagation, Radiation, and Scattering is also ideal for graduate students in bioengineering, geophysics, ocean engineering, and geophysical remote sensing. The book is also a useful reference for engineers and scientists working in

fields such as geophysical remote sensing, bio–medical engineering in optics and ultrasound, and new materials and integration with signal processing.

RFID is an increasingly pervasive tool that is now used in a wide range of fields. It is employed to substantiate adherence to food preservation and safety standards, combat the circulation of counterfeit pharmaceuticals, and verify authenticity and history of critical parts used in aircraft and other machinery—and these are just a few of its uses. Goes beyond deployment, focusing on exactly how RFID actually works RFID Design Fundamentals and Applications systematically explores the fundamental principles involved in the design and characterization of RFID technologies. The RFID market is exploding. With new and enhanced applications becoming increasingly integral to government and industrial chain supply and logistics around the globe, professionals must be proficient in the evaluation and deployment of these systems. Although manufacturers provide complete and extensive documentation of each individual RFID component, it can be difficult to synthesize and apply this complex information—and users often must consult and integrate data from several producers for different components. This book covers topics including: Types of antennas used in transponders Components of the transponder, memory structure and logic circuits Antennae for RFID interrogators Types of modulation Organization and characteristics of commercial transponders Communication links Modes of operation for transponders operating at different frequencies Principles of arbitration and anti-collision Commands

used by transponders This powerful reference helps to resolve this dilemma by compiling a systematic overview of the different parts that make up the whole RFID system, helping the reader develop a clear and understanding of its mechanisms and how the technology actually works. Most books on RFID focus on commercial use and deployment of the technology, but this volume takes a different and extremely useful approach. Directed toward both professionals and students in electronics, telecommunications, and new technologies, it fills the informational void left by other books, illustrating specific examples of available semiconductors and integrated circuits to clearly explain how RFID systems are configured, how they work, and how different system components interact with each other.

This text should serve as an introduction to the application of electromagnetics EM, following an initial course in basic EM theory. A particular feature of the book is that it examines time domain rather than frequency domain methods in depth.; This book is intended for advanced undergraduate and graduates in electrical and electronic engineering. Research and practitioners in electromagnetics in electrical and electronic engineering and physics.

In the past few decades, Magnetic Resonance Imaging (MRI) has become an indispensable tool in modern medicine, with MRI systems now available at every major hospital in the developed world. But for all its utility and prevalence, it is much less commonly understood and less readily explained than other common medical imaging

techniques. Unlike optical, ultrasonic, X-ray (including CT), and nuclear medicine-based imaging, MRI does not rely primarily on simple transmission and/or reflection of energy, and the highest achievable resolution in MRI is orders of magnitude smaller that the smallest wavelength involved. In this book, MRI will be explained with emphasis on the magnetic fields required, their generation, their concomitant electric fields, the various interactions of all these fields with the subject being imaged, and the implications of these interactions to image quality and patient safety. Classical electromagnetics will be used to describe aspects from the fundamental phenomenon of nuclear precession through signal detection and MRI safety. Simple explanations and Illustrations combined with pertinent equations are designed to help the reader rapidly gain a fundamental understanding and an appreciation of this technology as it is used today, as well as ongoing advances that will increase its value in the future. Numerous references are included to facilitate further study with an emphasis on areas most directly related to electromagnetics.

Fully revised and in its second edition, this standard reference on nano-optics is ideal for graduate students and researchers alike.

CD-ROM contains: Demonstration exercises -- Complete solutions -- Problem statements.

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