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Electromagnetic Engineering and Waves
Biological and Medical Aspects of Electromagnetic Fields
Financial Services, 10th Edition
New Developments in Sensing Technology for Structural Health Monitoring
Microwave NDTElectromagnetic Surface Waves
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FUNDAMENTALS OF ELECTROMAGNETIC THEORY, Second Edition
Principles of Digital Communication
Radio Frequency Identification
Fundamentals and Applications
CRC Handbook of Biological Effects of Electromagnetic Fields
Engineering Electromagnetic Fields and Waves
Expanded and updated, this practical guide is a one-stop design reference containing all an engineer needs when designing antennas. Integrates state-of-the-art technologies with a special section for step-by-step antenna design. Features up-to-date bio-safety and electromagnetic compatibility regulation compliance and latest standards. Newly updated with MIMO antenna design, measurements and requirements. Accessible to readers of many levels, from introductory to specialist. Written by a practicing expert who has hired and trained numerous engineers. When in the future improved and more flexible heating equipment becomes available, and when hyperthermia is applied more routinely, computerized simulations of treatments will...
become commonplace, as they are in radiation therapy. For hyperthermia, however, such simulations will be used not only for the traditional role of planning patient treatment, but also for three other applications not needed in radiation therapy - the comparative evaluation of equipment, feedback control during treatment, and the post-treatment evaluation of therapy. The present simulations of hyperthermia are crude and simple when compared with what is required for these future applications, a fact which indicates the need for considerable research and development in this area. Indeed, this research is proceeding rapidly within the hyperthermia community, where three-dimensional power deposition and temperature calculations have just become available for realistic patient anatomies. Of equal significance are the even more rapid development in diagnostic imaging for the determination and display of patient anatomy and blood flow rates - information required for the planning of realistic hyperthermia treatment. These simulations will be very valuable tools which can be used to great advantage when combined with data obtained from treatments of patients.

This book, entitled Radio Frequency Identification Fundamentals and Applications, Bringing Research to Practice, bridges the gap between theory and practice and brings together a variety of research results and practical solutions in the field of RFID. The book is a rich collection of articles written by people from all over the world: teachers, researchers, engineers, and technical people with strong background in the RFID area. Developed as a source of information on RFID technology, the book addresses a wide audience including designers for RFID systems, researchers, students and anyone who would like to learn about this field. At this point I would like to express my thanks to all scientists who were kind enough to contribute to the success of this project by presenting numerous technical studies and research results. However, we couldn’t have published this book without the effort of InTech team. I wish to extend my most sincere gratitude to InTech publishing house for continuing to publish new, interesting and valuable books for all of us.

Articles, testimonies, and stories about Jewish people and their relationship with God, Israel, and the Messiah. Includes the effective tract, "The Most Famous Jew of All." Russian version also available.

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 researches 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. Presents comprehensive coverage of the fundamentals of electromagnetic theory and applications. Basic laws and physical phenomena are illustrated by numerous examples. Can the electric and magnetic fields (EMF) to which people are routinely exposed cause health effects? This volume assesses the data and draws conclusions about the consequences of human exposure to EMF. The committee examines what is known about three kinds of health effects associated with EMF: cancer, primarily childhood leukemia; reproduction and development; and neurobiological effects. This book provides a detailed discussion of hazard identification, dose-response assessment, exposure assessment, and risk characterization for each. Possible Health Effects of Exposure to Residential Electric and Magnetic Fields also discusses the tools available to measure exposure, common types of exposures, and what is known about the effects of exposure. The committee looks at correlations between EMF exposure and carcinogenesis, mutagenesis, neurobehavioral effects, reproductive and developmental effects, effects on melatonin and other neurochemicals, and effects on bone healing and stimulated cell growth. This book reviews basic electromagnetic (EM) wave theory and applies it specifically to lasers in order to give the reader not only tangible examples of how the theory is manifested in real life, but also practical knowledge about lasers, and their operation and usage. The latter can be useful for those involved with using lasers. As a short treatise on this subject matter, this book is not intended to dwell deeply into the details of EM waves nor lasers. A bibliography is provided for those who wish to explore in more depth the topics covered in this book. Rather the aim of this book is to offer a quick overview, which will allow the reader to gain a competent general understanding of EM waves and lasers. The title of this book, Plasmonics: Principles and Applications, encompasses theory, technical issues, and practical applications which are of interest for diverse classes of the plasmonics. The book is a collection of the contemporary researches and developments in the area of plasmonics technology. It consists of 21 chapters that focus on interesting topics of modeling and computational methods, plasmonic structures for light transmission, focusing, and guiding, emerging concepts, and applications. Respected for its accuracy, its smooth and logical flow of ideas, and its clear presentation, 'Field
and Wave Electromagnetics’ has become an established textbook in the field of electromagnetics. This book builds the electromagnetic model using an axiomatic approach in steps: first for static electric fields, then for static magnetic fields, and finally for time-varying fields leading to Maxwell's equations. Underground Sensing: Monitoring and Hazard Detection for Environment and Infrastructure brings the target audience the technical and practical knowledge of existing technologies of subsurface sensing and monitoring based on a classification of their functionality. In addition, the book introduces emerging technologies and applications of sensing for environmental and geo-hazards in subsurface - focusing on sensing platforms that can enable fully distributed global measurements. Finally, users will find a comprehensive exploration of the future of underground sensing that can meet demands for preemptive and sustainable response to underground hazards. New concepts and paradigms based on passively powered and/or on-demand activated, embeddable sensor platforms are presented to bridge the gap between real-time monitoring and global measurements. Presents a one-stop-shop reference for underground sensing and monitoring needs that saves valuable research time. Provides application cases for all technologies that are covered and described in detail. Includes full, four color images of equipment and applications. Designed to cover a wide variety of underground sensors, from agriculture to geohazards. For decades, the surface-plasmon-polariton wave guided by the interface of simple isotropic materials dominated the scene. However, in recent times research on electromagnetic surface waves guided by planar interfaces has expanded into new and exciting areas. In the 1990's research focused on advancing knowledge of the newly discovered Dyakonov wave. More recently, much of the surface wave research is motivated by the proliferation of nanotechnology and the growing number of materials available with novel properties. This book leads the reader from the relatively simple surface-plasmon-polariton wave with isotropic materials to the latest research on various types of electromagnetic surface waves guided by the interfaces of complex materials enabled by recent developments in nanotechnology. This includes: Dyakonov waves guided by interfaces formed with columnar thin films, Dyakonov-Tamm waves guided by interfaces formed with sculptured thin films, and multiple modes of surface-plasmon-polariton waves guided by the interface of a metal and a periodically varying dielectric material. Gathers research from the past 5 years in a single comprehensive view of electromagnetic surface waves. Written by the foremost experts and researchers in the field. Layered presentation explains topics with an introductory overview level up to a highly technical level. The objective of this book is to
present in a concise manner what is actually known at the present time about biological effects of time invariant, low frequency and radio frequency (including microwave) electric and magnetic fields. In reviewing the vast amount of experimental data which have been obtained in recent years, the authors tried to select those results that are, in their opinion, of major importance and of lasting value. In discussing mechanisms of interaction of electromagnetic fields with living matter they have tried to differentiate between what is clearly established, what is suggested by available evidence without being convincingly proven, and what is conjecture at the present time.

The book has focussed on the different aspects of sensing technology, i.e. high reliability, adaptability, recalibration, information processing, data fusion, validation and integration of novel and high performance sensors specifically aims to use to inspect mechanical health of structure and similar applications. This book is dedicated to Sensing systems for Structural Health Monitoring offers to variety of users, namely, Master and PhD degree students, researchers, practitioners, especially Civil and Construction engineers. The book will provide an opportunity of a dedicated and a deep approach in order to improve their knowledge in this specific field.

Annotation
This practical "how to" book is an ideal introduction to electromagnetic field-solvers. Where most books in this area are strictly theoretical, this unique resource provides engineers with helpful advice on selecting the right tools for their RF (radio frequency) and high-speed digital circuit design work. An accessible introduction to all important aspects of electric machines, covering dc, induction, and synchronous machines. Also addresses modern techniques of control, power electronics, and applications. Exposition builds from first principles, making this book accessible to a wide audience. Contains a large number of problems and worked examples.

The aim of this text is to provide physical insight & thorough understanding of the complex-frequency domain & its application of circuits. 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.A world list of books in the English language. There is hardly a field of science or engineering that does not have some interest in light scattering by small particles. For example, this subject is important to climatology because the energy budget for the Earth's atmosphere is strongly affected by scattering of solar radiation by cloud and aerosol particles, and the whole discipline of remote sensing relies largely on analyzing the parameters of radiation scattered by aerosols, clouds, and precipitation. The scattering of light by spherical particles can be easily computed using the conventional Mie theory. However, most small solid particles encountered in natural and laboratory conditions have nonspherical shapes. Examples are soot and mineral aerosols, cirrus cloud particles, snow and frost crystals, ocean hydrosols, interplanetary and cometary dust grains, and microorganisms. It is now well known that scattering properties of nonspherical particles can differ dramatically from those of "equivalent" (e.g., equal-volume or equal-surface-area) spheres. Therefore, the ability to accurately compute or measure light scattering by nonspherical particles in order to clearly understand the effects of particle nonsphericity on light scattering is very important. The rapid improvement of computers and experimental techniques over the past 20 years and the development of efficient numerical approaches have resulted in major advances in this field which have not been systematically summarized. Because of the universal importance of electromagnetic scattering by nonspherical particles, papers on different aspects of this subject are scattered over dozens of diverse research and engineering journals. Often experts in one discipline (e.g., biology) are unaware of potentially useful results obtained in another discipline (e.g., antennas and propagation). This leads to an inefficient use of the accumulated knowledge and unnecessary redundancy in research activities. This book offers the first systematic and unified discussion of light scattering by nonspherical
particles and its practical applications and represents the state-of-the-art of this important research field. Individual chapters are written by leading experts in respective areas and cover three major disciplines: theoretical and numerical techniques, laboratory measurements, and practical applications. An overview chapter provides a concise general introduction to the subject of nonspherical scattering and should be especially useful to beginners and those interested in fast practical applications. The audience for this book will include graduate students, scientists, and engineers working on specific aspects of electromagnetic scattering by small particles and its applications in remote sensing, geophysics, astrophysics, biomedical optics, and optical engineering. The first systematic and comprehensive treatment of electromagnetic scattering by nonspherical particles and its applications Individual chapters are written by leading experts in respective areas includes a survey of all the relevant literature scattered over dozens of basic and applied research journals Consistent use of unified definitions and notation makes the book a coherent volume An overview chapter provides a concise general introduction to the subject of light scattering by nonspherical particles Theoretical chapters describe specific easy-to-use computer codes publicly available on the World Wide Web Extensively illustrated with over 200 figures, 4 in color Fundamentals of Semiconductor Devices provides a realistic and practical treatment of modern semiconductor devices. A solid understanding of the physical processes responsible for the electronic properties of semiconductor materials and devices is emphasized. With this emphasis, the reader will appreciate the underlying physics behind the equations derived and their range of applicability. The author’s clear writing style, comprehensive coverage of the core material, and attention to current topics are key strengths of this book. This textbook on signals and systems provides a complete array of MATLAB tools specifically designed for the course, compatible with MATLAB 3.5 or 4.0. This software tool is used in the context of a presentation of systems concepts and analysis techniques. Use of MATLAB helps students to understand what the mathematical abstractions represent, which helps them to understand the behavior of a variety of systems. In response to a wide range of signal inputs. The software provides students with instantaneous feedback which encourages them to explore problems further. Topics covered in the text include signals, systems, convolution, Fourier series and transforms, Laplace transforms, analog filters, sampling, the discrete-time Fourier transform (DTFT), FFT, z-transforms and digital filters. All basic concepts are illustrated by worked examples. End-of-chapter problems include simple drills as well as more challenging exercises that develop or extend the concepts covered.
A unique (but optional) feature of this text is the software supplied on disk which contains ready-to-run demonstrations, interactive programs and full-fledged general purpose programs. The software runs under MATLAB and includes routines developed for plotting functions, generating random signals, regular and periodic convolution, analytical and numerical solution of differential and difference equations, Fourier analysis, frequency response, asymptotic Bode plots, closed form expressions for Laplace and z-transforms and inverse transforms, classical analog filter design, sampling, quantization, interpolation, FIR and IIR filter design using various methods, and more. So as not to affect the continuity and logical flow of the text material, the programs are described and used only in the accompanying documentation on disk. A MATLAB appendix to each chapter lists the appropriate programs, and each section that can be tied to the software is marked.

Balanis’ second edition of Advanced Engineering Electromagnetics – a global best-seller for over 20 years – covers the advanced knowledge engineers involved in electromagnetic need 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.

Although classical electromagnetic (EM) field theory is typically embedded in vector calculus and differential equations, many of the basic concepts and characteristics can be understood with precursory mathematical knowledge. Completely revised and updated, Basic Introduction to Bioelectromagnetics, Second Edition facilitates the process of interd"Engineering Electromagnetics and Waves" is designed for upper-division college and university engineering students, for those who wish to learn the subject through self-study, and for practicing engineers who need an up-to-date reference text. The student using this text is assumed to have completed typical lower-division courses in physics and mathematics as well as a first course on electrical engineering circuits. "This book provides engineering students with a solid grasp of electromagnetic fundamentals and electromagnetic waves by
emphasizing physical understanding and practical applications. The topical organization of the text starts with an initial exposure to transmission lines and transients on high-speed distributed circuits, naturally bridging electrical circuits and electromagnetics. Teaching and Learning Experience This program will provide a better teaching and learning experience for you and your students. It provides: Modern Chapter Organization Emphasis on Physical Understanding Detailed Examples, Selected Application Examples, and Abundant Illustrations Numerous End-of-chapter Problems, Emphasizing Selected Practical Applications Historical Notes on the Great Scientific Pioneers Emphasis on Clarity without Sacrificing Rigor and Completeness Hundreds of Footnotes Providing Physical Insight, Leads for Further Reading, and Discussion of Subtle and Interesting Concepts and Applications "Covers vectors, stationary electric charges, direct currents, dielectrics, magnetic fields, alternating currents, and electromagnetic waves Microwave can be effectively used in the processing of industrial materials under a wide range of conditions. However, microwave processing is complex and multidisciplinary in nature, and a high degree of technical knowledge is needed to determine how, when, and where the technology can be most profitably utilized. This book assesses the potential of microwave technology for industrial applications, reviews the latest equipment and processing methods, and identifies both the gaps in understanding of microwave processing technology and the promising development opportunities that take advantage of this new technology's unique performance characteristics. Biological and Medical Aspects of Electromagnetic Fields examines potential health hazards, exposure standards, and medical applications of electromagnetic (EM) fields. The second volume in the bestselling and newly revised Handbook of Biological Effects of Electromagnetic Fields, Third Edition, this book draws from the latest studies on the effects of exposure to electric and magnetic fields. In addition to extensive reviews of physiological effects, the book contains now separate reviews of behavioral and cognitive responses to various exposures. The book also describes an approach to setting standards for exposure limits and explores a few of the beneficial uses of EM fields in medical applications, both diagnostics and in treatment. Biological and Medical Aspects of Electromagnetic Fields provides a practical overview of the experiments and methods used to observe ELF and RF fields and the possible useful and hazardous implications of these observations. Microwave testing has been paid only scant attention in the literature as a method for nondestructive testing of materials, yet it offers some attractive features, especially for the testing of composite and other non-metallic materials. Microwave techniques have been used in a large
number of applications that can be classified as nondestructive testing applications, ranging from large scale remote sensing to detection of tumors in the body. This volume describes a unified approach to microwave nondestructive testing by presenting the three essential components of testing: theory, practice, and modelling. While recognizing that each of these subjects is wide enough to justify a volume of its own, the presentation of the three topics together shows that these are interrelated and should be practiced together. While few will argue against a good theoretical background, modelling and simulation of the testing environment is seldom part of the NDT training in any method, but particularly so in microwave testing. The text is divided in four parts. The first part presents the field theory background necessary for understanding the microwave domain. The second part treats microwave measurements as well as devices and sources and the third part discusses practical tests applicable to a variety of materials and geometries. The fourth part discusses modelling of microwave testing. Each chapter contains a bibliography intended to expand on the material given and, in particular, to point to subjects which could not be covered either as not appropriate or for lack of space. For engineers, applied physicists, material scientists. This volume outlines the fundamentals and applications of light scattering, absorption and polarization processes involving ice crystals. 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. The Second Edition of this book, while retaining the contents and style of the first
edition, continues to fulfil the requirements of the course curriculum in Electromagnetic Theory for the undergraduate students of electrical engineering, electronics and telecommunication engineering, and electronics and communication engineering. The text covers the modules of the syllabus corresponding to vectors and fields, Maxwell’s equations in integral form and differential form, wave propagation in free space and material media, transmission line analysis and waveguide principles. It explains physical and mathematical aspects of the highly complicated electromagnetic theory in a very simple and lucid manner. This new edition includes:

- Two separate chapters on Transmission Line and Waveguide
- A thoroughly revised chapter on Plane Wave Propagation
- Several new solved and unsolved numerical problems asked in various universities’ examinations

Now in its Tenth Edition, Financial Services continues to be the leading textbook, aimed at reflecting the current regulatory and policy developments in the financial sector in India. The text has been substantially revised to include all the significant updates—notable policy and operational developments—till end-March 2019.

It provides a judicious mixture of theory and business practices, both from the non-banking financial intermediaries/companies (which provide the financial services) and their users viewpoint, of the contemporary Indian Financial Sector. Designed primarily for teachers and advanced students of finance, management, commerce and accounting, this book will also be useful for practicing professionals. Salient Features:

- Comprehensive coverage of legal, procedural, tax, accounting and regulatory aspects.
- A text focused on Financial Services alone, with in-depth analysis of the subject matter.
- Mini Cases in the text and Comprehensive Cases on the website help readers to synthesize and apply the related concepts, theories, techniques and procedures.

This revised edition provides patient guidance in its clear and organized presentation of problems. It is rich in variety, large in number and provides very careful treatment of relativity. One outstanding feature is the inclusion of simple, standard examples demonstrated in different methods that will allow students to enhance and understand their calculating abilities. There are over 145 worked examples; virtually all of the standard problems are included. The M.I.T. Introductory Physics Series is the result of a program of careful study, planning, and development that began in 1960. The Education Research Center at the Massachusetts Institute of Technology (formerly the Science Teaching Center) was established to study the process of instruction, aids thereto, and the learning process itself, with special reference to science teaching at the
university level. Generous support from a number of foundations provided the means for assembling and maintaining an experienced staff to co-operate with members of the Institute's Physics Department in the examination, improvement, and development of physics curriculum materials for students planning careers in the sciences. After careful analysis of objectives and the problems involved, preliminary versions of textbooks were prepared, tested through classroom use at M.I.T. and other institutions, re-evaluated, rewritten, and tried again. Only then were the final manuscripts undertaken.

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