

## Fields And Waves In Communication Electronics Solutions Manual

Adapted from a successful and thoroughly field-tested Italian text, the first edition of Electromagnetic Waves was very well received. Its broad, integrated coverage of electromagnetic waves and their applications forms the cornerstone on which the author based this second edition. Working from Maxwell's equations to applications in optical communications and photonics, Electromagnetic Waves, Second Edition forges a link between basic physics and real-life problems in wave propagation and radiation. Accomplished researcher and educator Carlo G. Somenzi uses a modern approach to the subject. Unlike other books in the field, it surveys all major areas of electromagnetic waves in a single treatment. The book begins with a detailed treatment of the mathematics of Maxwell's equations. It follows with a discussion of polarization, delves into propagation in various media, devotes four chapters to guided propagation, links the concepts to practical applications, and concludes with radiation, diffraction, coherence, and radiation statistics. This edition features many new and reworked problems, updated references and suggestions for further reading, a completely revised appendix on Bessel functions, and new definitions such as antenna effective height. Illustrating the concepts with examples in every chapter, Electromagnetic Waves, Second Edition is an ideal introduction for those new to the field as well as a convenient reference for seasoned professionals.

Only 30% Of This Book Deals With Theory, The Rest Of It Is Application Of This Theory To Various Situations Of Different Levels Of Complexity. In Each Case The Reason For The Choice Of The Method Is Explained, And Various Doubts Which Assail The Minds Of Most Students Have Been Tackled. The Solved Examples In The Book Do Not Deal With Mere Substitution Of Numerical Values Of Formulae. They Are Aimed At Establishing A Strong Foundation Of Knowledge All The Required Mathematics Has Been Explained In The First Chapter To Avoid The Need To Refer Frequently To Other Books In Mathematics. At The End Of Each Chapter A Summary Of The Achievements Is Given Along With Comments On The Nature Of Difficulties Encountered, And The Reader Is Thereafter Prepared For The Objectives To Be Attained In The Following Chapter. The Emphasis Throughout The Book Is On A Physical Understanding Of Fields And Waves And Their Characteristics, Rather Than Getting Lost In A Maze Of Mathematical Manipulations. This Is An Introductory Textbook Intended To Give The Reader A Solid Grounding In The Subject And To Prepare Him To Deal With More Advanced Texts. The Material Has Been Tested In One-Semester Courses Given By The Author In Various Colleges In Pune. This book is designed to serve as a textbook for UG and PG students of Electronics and Communication, Electronics & Instrumentation and Telecommunication Engineering branches. It provides a thorough understanding of the electromagnetic theory and their properties, application and also the modern trends in Electromagnetism in detail. Book also describes transmission lines, wave guides, as well as the effects of EM/EMC, including impedance matching and antennas. Written in an easy-to-understand manner, the book includes several illustrative examples, objective-type questions and exercise Questions to reinforce the theoretical understanding of subject. Appendices provide information and expressions as well as design data for references.

Invisible Fields  
MicroWave and mmWave Engineering with Generalized Macroscopic Electrodynamics  
Understanding of Electrodynamics, Radio Wave Propagation and Antennas  
Understanding Electromagnetic Waves  
Fundamentals and Applications

*This systematic and well-written book provides an in-depth analysis of all the major areas of the subject such as fields, waves and lines. It is written in a simple and an easy-to-understand language. Beginning with a discussion on vector calculus, the book elaborately explains electrostatics, including the concepts of electric force and field intensity, electric displacement, Gauss law, conductors, dielectrics and capacitors. This is followed by a detailed study of magnetostatics, covering Biot-Savart law, Lorentz's force law and Ampere's circuital law. Then, it discusses Maxwell's equations that describe the time-varying fields and the wave theory which is the basis of radiation and wireless communications. Finally, the book gives a fair treatment to transmission line theory, which is a foundation course in mechanical engineering. The text is well-supported by a large number of solved and unsolved problems to enhance the analytical skill of the students. The problems are framed to test the conceptual understanding of the students. It also includes plenty of objective type questions with answers. It is intended as a textbook for the undergraduate students of Electrical and*

*Electronics Engineering and Electronics and Communication Engineering for their course on Electromagnetic Waves and Transmission Lines.*

*From sound waves to gravitational waves, and from waves of light to crashing rollers on the ocean, Mike Goldsmith explores the fundamental features shared by all waves in the natural world, and considers the range of phenomena resulting from wave motion, including reflection, diffraction, and polarization in light, and beats and echoes in sound.*

*Everyone, whether they like it or not, is exposed to electromagnetic fields, most of the time, at very low levels. In this case, they are inconsequential, but they can cause adverse health effects when they become intense enough. This topic is complex and sensitive. Covering frequencies from 0 Hz to 300 GHz, Human Exposure to Electromagnetic Fields provides an overview of this vast topic. After a reminder of the concepts of electromagnetic fields, the author presents some examples of sources of radiation in daily life and in the industrial or medical sectors. The biophysical and biological effects of these fields on the human body are detailed and the exposure limits are recalled. The exposure assessment and the implementation of the appropriate regulation within companies are also covered. Technically and practically, this book is aimed at people with a scientific background, risk prevention actors, health physicians, especially occupational doctors, and equipment designers.*

Teaching Electromagnetics

Electromagnetic Waves in Stratified Media

Advanced Electromagnetic Wave Propagation Methods

Analysis and Design

Electromagnetic Fields & Waves

Written by a leading expert in the field, this practical new resource presents the fundamentals of electromagnetics and antenna technology. This book covers the design, electromagnetic simulation, fabrication, and measurements for various types of antennas, including impedance matching techniques and beamforming for ultrawideband dipoles, monopoles, loops, vector sensors for direction finding, HF curtain arrays, 3D printed nonplanar patch antenna arrays, waveguides for portable radar, reflector antennas, and other antennas. It explores the essentials of phased array antennas and includes detailed derivations of important field equations, and a detailed formulation of the method of moments. This resource exhibits essential derivations of equations, providing readers with a strong foundation of the underpinnings of electromagnetics and antennas. It includes a complete chapter on the details of antenna and electromagnetic test and measurement. This book explores details on 3D printed non-planar circular patch array antenna technology and the design and analysis of a planar array-fed axisymmetric gregorian reflector. The lumped-element impedance matched antennas are examined and include a look at an analytic impedance matching solution with a parallel LC network. This book provides key insight into many aspects of antenna technology that have broad applications in radar and communications.

One of us (FAB) published a book Problems in Electronics with Solutions in 1957 which became well established and ran to five editions, the last revised and enlarged edition appearing in 1976. When the first edition was written it covered almost the complete undergraduate electronics courses in engineering at universities. One book, at a price students can afford, can no longer cover an undergraduate course in electronics. It has therefore been decided to produce a book covering one important section of such a course using the experience gained and a few problems from previous editions of Problems in Electronics with Solutions. The book is based largely on problems collected by us over many years and given to undergraduate electronic and electrical engineers. Its purpose is to present the problems, together with a large number of their solutions, in the hope that it will prove valuable to undergraduates and other teachers. It should also be useful for Master's degree students in electronic and electrical engineering and physics, research workers, engineers and scientists in industry and as a reference source.

A text on electromagnetic fields and waves. It is useful reference for researchers and engineers in the areas of microwaves and optoelectronics. It discusses the field analysis of electromagnetic waves confined in material boundaries, or so-called guided waves, and electromagnetic waves in the dispersive media and anisotropic media.

Fields and Waves in Communication Electronics

Electromagnetics, Microwave Circuit and Antenna Design for Communications Engineering

International Series of Monographs in Electromagnetic Waves

A Very Short Introduction

Innovative Approaches and Pedagogical Strategies

Wireless communications allow high-speed mobile access to a global Internet based on ultra-wideband backbone intercontinental and terrestrial networks. Both of these environments support the carrying of information via electromagnetic waves that are wireless (in free air) or guided through optical fibers. Wireless and Guided Wave Electromagnetics: Fundamentals and Applications explores the fundamental aspects of electromagnetic waves in wireless media and wired guided media. This is an essential subject for engineers and physicists working with communication technologies, mobile networks, and optical communications. This comprehensive book Builds from the basics to modern topics in electromagnetics for wireless and optical fiber communication. Examines wireless radiation and the guiding of optical waves, which are crucial for carrying high-speed information in long-reach optical networking scenarios Explains the physical phenomena and practical aspects of guiding optical waves that may not require detailed electromagnetic solutions Explores applications of electromagnetic waves in optical communication systems and networks based on frequency domain transfer functions in the linear regions, which simplifies the physical complexity of the waves but still allows them to be examined from a system engineering perspective Uses MATLAB® and Simulink® models to simulate and illustrate the electromagnetic fields Includes worked examples, laboratory exercises, and problem sets to test understanding The book's modular structure makes it suitable for a variety of courses, for self-study, or as a resource for research and development. Throughout, the author emphasizes issues commonly faced by engineers. Going a step beyond traditional electromagnetics textbooks, this book highlights specific uses of electromagnetic waves with a focus on the wireless and optical technologies that are increasingly important for high-speed transmission over very long distances.

Clear, coherent work for graduate-level study discusses the Maxwell field equations, radiation from wire antennas, wave aspects of radio-astronomical antenna theory, the Doppler effect, and more.

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.

Electromagnetics and Antenna Technology

Tour of the Electromagnetic Spectrum

Fundamentals of Electromagnetics with MATLAB

Field and Wave Electromagnetics

Radio-Frequency and Microwave Communication Circuits

If you're looking for a clear, comprehensive overview of basic electromagnetics principles and applications to antenna and microwave circuit design for communications, this authoritative book is your best choice. Including concise explanations of all required mathematical concepts needed to fully comprehend the material, the book is your complete resource for understanding electromagnetics in current, emerging and future broadband communication systems, as well as high-speed analogue and digital electronic circuits and systems.

An introduction to RF propagation that spans all wireless applications This book provides readers with a solid understanding of theconcepts involved in the propagation of electromagnetic waves andof the commonly used modeling techniques. While many books cover RFpropagation, most are geared to cellular telephone systems and,therefore, are limited in scope. This title is comprehensive-ittreats the growing number of wireless applications that range wellbeyond the mobile telecommunications industry, including radar andsatellite communications. The author's straightforward, clear style makes it easy for readersto gain the necessary background in electromagnetics, communicationtheory, and probability, so they can advance to propagation modelisfor near-earth, indoor, and earth-space propagation. Criticaltopics that readers would otherwise have to search a number ofresources to find are included: \* RF safety chapter provides a concise presentation of FCCrecommendations, including application examples, and preparesreaders to work with real-world propagating systems \* Antenna chapter provides an introduction to a wide variety ofantennas and techniques for antenn analysis, including a detailedtreatment of antenna polarization and axial ratio; the chaptercontains a set of curves that permit readers to estimatopolarization loss due to axial ratio mismatch between transmitting and receiving antennas without performing detailedcalculations \* Atmospheric effects chapter provides curves of typicalatmospheric loss, so that expected loss can be determinedeasily \* Rain attenuation chapter features a summary of how to apply theITU and Crane rain models \* Satellite communication chapter provides the details ofearth-space propagation analysis including rain attenuation, atmospheric absorption, path length determination and noise/temperature determination Examples of widely used models provide all the details andinformation needed to allow readers to apply the models withoutconfide. References, provided throughout the book, enablereaders to explore particular topics in greater depth.Additionally, an accompanying Wiley ftp site provides supportingMathCad files for select figures in the book. With its emphasis on fundamentals, detailed examples, andcomprehensive coverage of models and applications, this is anexcellent text for upper-level undergraduate or graduate students, or for the practicing engineer who needs to develop anunderstanding of propagation phenomena.

Spanning static fields to terahertz waves, this volume explores the range of consequences electromagnetic fields have on the human body. Topics discussed include essential interactions and field coupling phenomena: electric field interactions in cells, focusing on ultrasound, pulsed high-intensity fields; dosimetry or coupling of ELF fields into biological systems; and the historical developments and recent trends in numerical dosimetry. It also discusses mobile communication devices and the dosimetry of RF radiation into the human body, exposure and dosimetry associated with MRI and spectroscopy, and available data on the interaction of terahertz radiation with biological tissues, cells, organelles, and molecules.

Electromagnetic Theory for Microwaves and Optoelectronics

Plane-Wave Theory of Time-Domain Fields

Introduction to RF Propagation

Solutions Manual to Accompany Fields and Waves in Communication Electronics

Waves

This revised text covers electromagnetic waves and fields in great detail. It begins with a review of static electric and magnetic fields, providing results useful for static fields and time-dependent field problems in which the size of the device is small compared with the wavelength.

Fields and Waves in Communication ElectronicsJohn Wiley & SonsFields and Waves in Communication ElectronicsFields and Waves in Communication Electronics

Teaching Electromagnetics: Innovative Approaches and Pedagogical Strategies is a guide for educators addressing course content and pedagogical methods primarily at the undergraduate level in electromagnetic theory and its applications. Topics include teaching methods, lab experiences and hands-on learning, and course structures that help teachers respond effectively to trends in learning styles and evolving engineering curricula. The book grapples with issues related to the recent worldwide shift to remote teaching. Each chapter begins with a high-level consideration of the topic, reviews previous work and publications, and gives the reader a broad picture of the topic before delving into details. Chapters include specific guidance for those who want to implement the methods and assessment results and evaluation of the effectiveness of the methods. Respecting the limited time available to the average teacher to try new methods, the chapters focus on why an instructor should adopt the methods proposed in it. Topics include virtual laboratories, computer-assisted learning, and MATLAB® tools. The authors also review flipped classrooms and online teaching methods that support remote teaching and learning. The end result should be an impact on the reader represented by improvements to his or her practical teaching methods and curricular approach to electromagnetics education. The book is intended for electrical engineering professors, students, lab instructors, and practicing engineers with an interest in teaching and learning. In summary, this book: Surveys methods and tools for teaching the foundations of wireless communications and electromagnetic theory Presents practical experience and best practices for topical coverage, course sequencing, and content Covers virtual laboratories, computer-assisted learning, and MATLAB tools Reviews flipped classroom and online teaching methods that support remote teaching and learning Helps instructors in RF systems, field theory, and wireless communications bring their teaching practice up to date Dr. Krishnasamy T. Selvan is Professor in the Department of Electronics & Communication Engineering, SSN College of Engineering, since June 2012. Dr. Karl F. Warnick is Professor in the Department of Electrical and Computer Engineering at BYU.

Electromagnetic Fields and Waves

From Extremely Low Frequency (ELF) to Radiofrequency

Electromagnetic Waves

ELECTROMAGNETIC WAVES AND TRANSMISSION LINES

Fields and Waves in Modern Radio

The development of efficient techniques for the rigorous modelling of electromagnetic phenomena is a key factor in determining the progress in many technical area from microwave engineering to X-Ray technology. This book presents a class of numerical techniques for the analysis of discrete spectra of electrodynamic operators, highlights their advantages and drawbacks, and discusses their potential for solving practical problems. Examples of the application of some of the methods to solve both field theory and engineering problems are included.

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.

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.

Revised Edition Including Supplemented Material

ELECTROMAGNETIC WAVES AND RADIATING SYSTEMS

Near-Field Scanning Applications

Fields, Waves and Transmission Lines

\* This invaluable book provides a comprehensive framework for the formulation and solution of numerous problems involving the radiation, reception, propagation, and scattering of electromagnetic and acoustic waves. Filled with original derivations and theorems, it includes the first rigorous development of plane-wave expansions for time-domain electromagnetic and acoustic fields. For the past 30 years, near-field measurement techniques have been confined to the frequency domain. Now, with the publication of this book, probe-corrected near-field measurement techniques have been extended to ultra-wide-band, short-pulse transmitting and receiving antennas and transducers. By combining unencumbered straightforward derivations with in-depth expositions of prerequisite material, the authors have created an invaluable resource for research scientists and engineers in electromagnetics and acoustics, and a definitive reference on plane-wave expansions and near-field measurements. Featured topics include: \* An introduction to the basic electromagnetic and acoustic field equations \* A rigorous development of time-domain and frequency-domain plane-wave representations \* The formulation of time-domain, frequency-domain, and static planar near-field measurement techniques with and without probe-correction \* Sampling theorems and computation schemes for time-domain and frequency-domain fields \* Analytic-signal formulas that simplify the formulation and analysis of transient fields \* Wave phenomena, such as "electromagnetic missiles" encountered only in the time domain \* Definitive force and power relations for electromagnetic and acoustic fields and sources. \* Sponsored by IEEE Antennas and Propagation Society.

The products that drive the wireless communication industry, such as cell phones and pagers, employ circuits that operate at radio and microwave frequencies. Following on from a highly successful first edition, the second edition provides readers with a detailed introduction to RF and microwave circuits. Throughout, examples from real-world devices and engineering problems are used to great effect to illustrate circuit concepts. \* Takes a top-down approach, describing circuits in the overall context of communication systems. \* Presents expanded coverage of waveguides and FT mixers. \* Discusses new areas such as oscillators design and digital communication. \*An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Why yet another book on antennas? The aim of the authors was to offer a didactic text appropriate for advanced graduate students, as well as a practical work for practicing engineers; to combine a solid theoretical treatment with a practical development which should allow the serious reader to undertake antenna design from first principles. To accomplish these goals, the authors bring together their contributions from both industry and the academic environment. The developments of the various topics start at a level which is accessible to a novice in the speciality, but give a treatment which culminates at an advanced level. Another important feature of the book is its use of practical examples illustrating real engineering problems and designs. In most cases, the explanation is sufficient to grasp the principles of operation of the related equipment, and, where appropriate, the reader is referred to a relevant bibliography for more complete and hence more sophisticated methodologies of design. Of particular note are the chapters on specialist subjects such as antennas and signal theory, and signal processing antennas, showing how the antenna may be combined with signal processing techniques in imaging applications, in angular superresolution, and in adaptive arrays to suppress interference and jamming. Another example is the chapter on the use of polarimetry to enhance the wealth of information which may be extracted, for example, from radar signals.

Electromagnetic Fields in Biological Systems

Fields and Waves in Communication Electronics

Guided Electromagnetic Waves

Properties and Analysis

Geographies of Radio Waves

ING\_17 Flap copy

*In the offered book the fundamentals of electromagnetic fields and waves are discussed based on the great Maxwell equations. The book is conceived as a textbook for serious technical and classical universities in the considered themes. Nevertheless, it can be used, of course, as the reference book for wide group of engineers, researchers and practical experts. Material of this book is divided into four main parts connected between them. The first part (Fundamental of Electrodynamics) is devoted to explanation of Maxwell equations and methods of its solutions. Besides classical interpretation the generalized equations are discussed, which take into consideration the scalar magnetic fields. New approaches allow description of so-called longitudinal electromagnetic waves, which have the absolutely non-standard propagation properties, and permit to explain various electrodynamics paradoxes, which cannot be explained in another way. The main characteristics of wave processes in the free space and in transmission lines (feeders) are described. The second part (Radio Wave Propagation) investigates the obvious patterns of diffraction and interference phenomena at radio wave propagation for the obstacle presence in the propagation track, which is typical for all practical situations. Radio wave propagation of various frequency ranges is fulfilled separately taking into consideration the specific features of reflections from the atmosphere parts, attenuation in different media, types of propagating waves, multipath effects, diffraction and non-standard conditions of obstacle overcoming including non-usual ways of atmosphere ducts. The third part is devoted to description of various types and antennas, beginning from simplest (vibrators) and ending by complicate adaptive antenna arrays. Description is fulfilled on the reviewing level with many obvious figures, not to rely on strict mathematical methods, but rather on the concept level. Fourth part includes description of UHF devices, which are the elements' base of UHF devices including surface and bulk integrated UHF circuits. These results have in many aspects the pioneer character and they are not widely known to experts. Distinctive feature of the offered book is sufficiently simplifies description of the very complicated electrodynamics problems available for the modern students and for young engineers. Of course, it is impossible to deal without mathematics in theses areas but required mathematics can be replaced by the many patterns, which give the chance to understand problems and to determine the complex questions. Sample Chapter(s) Chapter 1: GENERAL DEFINITIONS AND RELATIONS OF ELECTRODYNAMICS (498 KB)Contents:FRONT MATTERCHAPTER 1. GENERAL DEFINITIONS AND RELATIONS OF ELECTRODYNAMICSCHAPTER 2. ELECTROMAGNETIC FIELDS AND WAVESCHAPTER 3. MAIN PHYSICAL PHENOMENA AT RADIO WAVES PROPAGATIONCHAPTER 4. PROPAGATION OF RADIO WAVES OF DIFFERENT RANGES AND ITS APPLICATION AREASCHAPTER 5. PRINCIPAL CHARACTERISTICS OF ANTENNASCHAPTER 6. ANTENNAS OF DECIMILLIMETER, MILLIMETER AND CENTIMETER WAVESCHAPTER 7. ANTENNAS OD DECIMETER, METER AND DECAMETER WAVESCHAPTER 8. ANTENNAS OF HECTOMETER, KILOMETER MYRIAMETER WAVESCHAPTER 9. ANTENNAS FOR TV, RADIO RELAY AND SPACE COMMUNICATION LINESCHAPTER 10. ELECTROMAGNETIC COMPATIBILITY OF RADIO ENGINEERING SYSTEMS. ANTENNAS AND THE PROBLEM OF ITS MINIATURIZATIONCHAPTER 11. MAIN COMPONENTS OF THE ELEMENT BASE OF ANTENNA-FEDDER ENGINEERINGCHAPTER 12. BASE ELEMENTS AND FUNCTIONAL UNITS OF ANTENNA- FEEDER ENGINEERINGBACK MATTERReadership: The book is conceived as a textbook for serious technical and classical universities in the considered themes. Nevertheless, it can be used, of course, as the reference book for wide group of engineers, researchers and practical experts.*

*Terrestrial Propagation of Long Electromagnetic Waves deals with the propagation of long electromagnetic waves confined principally to the shell between the earth and the ionosphere, known as the terrestrial waveguide. The discussion is limited to steady-state solutions in a waveguide that is uniform in the direction of propagation. Wave propagation is characterized almost exclusively by mode theory. The mathematics are developed only for sources at the ground surface or within the waveguide, including artificial sources as well as lightning discharges. This volume is comprised of nine chapters and begins with an introduction to the fundamental concepts of wave propagation in a planar and curved isotropic waveguide. A number of examples are presented to illustrate the effects of an anisotropic ionosphere. The basic equations are summarized and plane-wave reflection from a dielectric interface is considered, along with the superposition of two obliquely incident plane waves. The properties of waveguide boundaries are implicitly represented by Fresnel reflection coefficients. Subsequent chapters focus on boundaries of the terrestrial guide; lightning discharges as a natural source of extremely-low-frequency and very-low-frequency radiation; and the mode theory for waves in an isotropic spherical shell. This book will be a useful resource for students and practitioners of physics.*

Human Exposure to Electromagnetic Fields

Theory of Electromagnetic Wave Propagation

Wireless and Guided Wave Electromagnetics

Modern Antennas

Terrestrial Propagation of Long Electromagnetic Waves

This textbook provides a solid foundation into many approaches that are used in the analysis of advanced electromagnetic wave propagation problems. The techniques discussed are essential to obtain closed-form solutions or asymptotic solutions and meet an existing need for instructors and students in electromagnetic theory. The book covers various advanced mathematical methods used in the evaluation of the electromagnetic fields in rectangular, cylindrical and spherical geometries. The mathematics of special functions (i.e., Bessel, Hankel, Airy, Legendre, Error, etc.) are covered in depth, including appropriate Appendices. The author takes particular care to provide detailed explanations of auxiliary potentials, Hertz's vectors, Debye potentials, as well as the use of Green functions, the Watson transformation and the method of steepest descent in the solution of electromagnetic problems. Overall, Advanced Electromagnetic Wave Propagation Methods is a good source for the many skills required in obtaining closed form and asymptotic solution, which in many instances cannot be obtained using computer codes of Maxwell's equations. Thus, it provides an excellent training for preparing graduate students in their research work. This book is intended for a graduate course in electromagnetic theory for students in electrical engineering. Students in physics and professionals will also find it appropriate and useful.

This textbook is intended for a course in electromagnetism for upper undergraduate and graduate students. The main concepts and laws of classical macroscopic electrodynamics and initial information about generalized laws of modern electromagnetics are discussed, explaining some paradoxes of the modern theory. The reader then gets acquainted with electrodynamics methods of field analysis on the basis of wave equation solution. Emission physics are considered using an example of the Huygens-Fresnel-Kirchhoff canonic principle. The representation about strict electrodynamics task statement on the base of Maxwell equations, boundary conditions, emission conditions and the condition on the edge is given. Different classes of approximate boundary conditions are presented, which essentially simplify understanding of process physics. The canonic Fresnel functions are given and their generalization on the case of anisotropic impedance. The free waves in closed waveguides and in strip-slotted and edge-dielectric transmission lines are described. A large number of Mathcad programs for illustration of field patterns and its properties in different guiding structures are provided. The material is organized for self-study as well as classroom use.

International Series of Monographs in Electromagnetic Waves, Volume 3: Electromagnetic Waves in Stratified Media provides information pertinent to the electromagnetic waves in media whose properties differ in one particular direction. This book discusses the important feature of the waves that enables communications at global distances. Organized into 13 chapters, this volume begins with an overview of the general analysis for the electromagnetic response of a plane stratified medium comprising of any number of parallel homogeneous layers. This text then explains the reflection of electromagnetic waves from planar stratified media. Other chapters consider the oblique reflection of plane electromagnetic waves from a continuously stratified medium. This book discusses as well the fundamental theory of wave propagation around a sphere. The final chapter deals with the theory of propagation in a spherically stratified medium. This book is a valuable resource for electrical engineers, scientists, and research workers.