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Fundamentals Of Electromagnetics With Matlab

Virtually every four-year
electrical and computer

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engineering program requires a course in electromagnetic fields and waves encompassing Maxwell's equations.

Understanding and appreciating the laws of Nature that govern the speed of even the smallest

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computer chip or largest power line is fundamental for every electrical and computer engineer. Fundamentals of Electromagnetics with MATLAB, 2nd Edition is much more than a mere textbook. The book itself

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offers a structural framework of principles, key equations, and problems. With that crucial supporting structure, each instructor, student or reader can turn to the supplemental files provided with this book or

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available online to customize and decorate each topic room. This second edition is the result of extensive user feedback and includes a 100% standalone Transmission Line chapter for flexible course placement;

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expanded problem sets matched to text sections and checked for clarity; and separate chapters for Electrostatics and Magnetostatics. Supplementary materials for professors and/or students are available upon

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request via email to
books@theiet.org.

This book is the first complete and comprehensive description of the modern Physical Theory of Diffraction (PTD) based on the concept of elementary edge

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waves (EEWs). The theory is demonstrated with the example of the diffraction of acoustic and electromagnetic waves at perfectly reflecting objects. The derived analytic expressions clearly explain the physical

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structure of the scattered field and describe in detail all of the reflected and diffracted rays and beams, as well as the fields in the vicinity of caustics and foci. Shadow radiation, a new fundamental component of the

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field, is introduced and proven to contain half of the total scattered power.

An electric machine is a device that converts mechanical energy into electrical energy or vice versa. It can take the form of an

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electric generator, electric motor, or transformer. Electric generators produce virtually all electric power we use all over the world. Electric machine blends the three major areas of electrical engineering: power,

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control and power electronics. This book presents the relation of power quantities for the machine as the current, voltage power flow, power losses, and efficiency. This book will provide a good understanding of the

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behavior and its drive, beginning with the study of salient features of electrical dc and ac machines.

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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

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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

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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

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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

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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,

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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 electromagnetics concepts,

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including antennas, radiation, transmission lines, and microwave circuit components. (Photo courtesy of Marlin H. Mickle.)

Fundamentals and Applications with MATLAB

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Fundamentals and Applications
Inverse Synthetic Aperture
Radar Imaging With MATLAB
Algorithms
Fundamentals of
Electromagnetics with MATLAB
A Gentle Introduction to

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Numerical Simulations with MATLAB/Octave

"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

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meant as an ""ultimate resource" for undergraduate electromagnetics."

Fundamentals of Electromagnetics with MATLAB®(R) Second Edition equips you for your journey into learning the theory and the application of electromagnetic fields and waves.

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Build your knowledge of SAR/ISAR imaging with this comprehensive and insightful resource The newly revised Second Edition of Inverse Synthetic Aperture Radar Imaging with MATLAB Algorithms covers in greater detail the fundamental and

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advanced topics necessary for a complete understanding of inverse synthetic aperture radar (ISAR) imaging and its concepts.

Distinguished author and academician, Caner Özdemir, describes the practical aspects of ISAR imaging and presents

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illustrative examples of the radar signal processing algorithms used for ISAR imaging. The topics in each chapter are supplemented with MATLAB codes to assist readers in better understanding each of the principles discussed within the book. This new edition includes

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discussions of the most up-to-date topics to arise in the field of ISAR imaging and ISAR hardware design. The book provides a comprehensive analysis of advanced techniques like Fourier-based radar imaging algorithms, and motion compensation

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techniques along with radar fundamentals for readers new to the subject. The author covers a wide variety of topics, including: Radar fundamentals, including concepts like radar cross section, maximum detectable range, frequency modulated

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continuous wave, and doppler frequency and pulsed radar The theoretical and practical aspects of signal processing algorithms used in ISAR imaging The numeric implementation of all necessary algorithms in MATLAB ISAR

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hardware, emerging topics on SAR/ISAR focusing algorithms such as bistatic ISAR imaging, polarimetric ISAR imaging, and near-field ISAR imaging, Applications of SAR/ISAR imaging techniques to other radar imaging problems such as thru-the-wall

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radar imaging and ground-penetrating radar imaging Perfect for graduate students in the fields of electrical and electronics engineering, electromagnetism, imaging radar, and physics, Inverse Synthetic Aperture Radar Imaging With MATLAB

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Algorithms also belongs on the bookshelves of practicing researchers in the related areas looking for a useful resource to assist them in their day-to-day professional work.

"[Contains] more lengthy mathematical derivations than most {comparable

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books] ... for arrays, provides for a unique, stand-alone mathematical description that can be adopted by anyone trying to communicate the theoretical foundation for their array design...has insights from a practitioner that are unique. The MATLAB®

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scripts alone are worth the price."

—Daniel C. Ross, Ph. D, Northrop
Grumman Corporation Electronically
Scanned Arrays: MATLAB®

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the first book to provide
comprehensive modeling/simulation

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programs used to design and analyze Electronically Scanned Arrays (ESA), a key technology internationally in the scientific and engineering communities. Several books have been written about ESAs, but most cover only fundamental theory. Few, if any,

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provide the insightful, easy-to-use simulation tools found in this book. Obviously, MATLAB® is one of the greatest tools available for exploring and understanding science and engineering concepts, and we use MATLAB functions to easily and

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instantly calculate ESA patterns.

However, to achieve a truly insightful and in-depth analysis of subarray architectures, conformal arrays, etc., it is imperative that users first develop a firm grasp of ESA fundamentals.

Covers largely unexplored topics, such

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as reliability aspects and the application of ESAs in space This volume helps readers build that elemental understanding of how ESAs work. It also provides code to run as an aid, so that readers don't have to start from scratch. The book expands on

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ESA principles and provides a modeling framework, using MATLAB to model applications of ESAs (i.e. pattern optimization, space-based applications, and reliability analysis). Presented code serves as an excellent vehicle to help readers master the

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analysis and simulation of ESAs.

Exploring how difficult problems can be simplified with short, elegant solutions, this is an invaluable resource for students and others new to ESAs, as well as experienced practicing engineers who model ESAs at the

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systems level.

Fundamentals of the Physical Theory
of Diffraction

Magnetics, Dielectrics, and Wave

Propagation with MATLAB® Codes

A Practical Guide to EMC Engineering

Early Transmission Lines Approach

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Early Transmission Lines

A comprehensive text, combining all important concepts and topics of Electrical Machines and featuring exhaustive simulation models based on

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MATLAB/Simulink Electrical Machine Fundamentals with Numerical Simulation using MATLAB/Simulink provides readers with a basic understanding of all key concepts related to electrical

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machines (including working principles, equivalent circuit, and analysis). It elaborates the fundamentals and offers numerical problems for students to work through. Uniquely, this text includes

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simulation models of every type of machine described in the book, enabling students to design and analyse machines on their own. Unlike other books on the subject, this book meets all the needs of

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students in electrical machine courses. It balances analytical treatment, physical explanation, and hands-on examples and models with a range of difficulty levels. The authors present complex

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ideas in simple, easy-to-understand language, allowing students in all engineering disciplines to build a solid foundation in the principles of electrical machines. This book: Includes clear

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elaboration of fundamental concepts in the area of electrical machines, using simple language for optimal and enhanced learning
Provides wide coverage of topics, aligning with the

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electrical machines syllabi of most international universities Contains extensive numerical problems and offers MATLAB/Simulink simulation models for the covered machine types

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Describes MATLAB/Simulink modelling procedure and introduces the modelling environment to novices
Covers magnetic circuits, transformers, rotating machines, DC machines,

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electric vehicle motors,
multiphase machine concept,
winding design and details,
finite element analysis, and
more Electrical Machine
Fundamentals with Numerical
Simulation using

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MATLAB/Simulink is a well-balanced textbook perfect for undergraduate students in all engineering majors.

Additionally, its comprehensive treatment of electrical machines makes it

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suitable as a reference for researchers in the field. Provides a detailed and systematic description of the Method of Moments (Boundary Element Method) for electromagnetic modeling

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at low frequencies and includes hands-on, application-based MATLAB® modules with user-friendly and intuitive GUI and a highly visualized interactive output. Includes a full-body

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computational human phantom with over 120 triangular surface meshes extracted from the Visible Human Project® Female dataset of the National library of Medicine and fully compatible

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with MATLAB and major commercial FEM/BEM electromagnetic software simulators. This book covers the basic concepts of computational low-frequency electromagnetics in an

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application-based format and hones the knowledge of these concepts with hands-on MATLAB® modules. The book is divided into five parts. Part 1 discusses low-frequency electromagnetics,

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basic theory of triangular surface mesh generation, and computational human phantoms. Part 2 covers electrostatics of conductors and dielectrics, and direct current flow. Linear

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magnetostatics is analyzed in Part 3. Part 4 examines theory and applications of eddy currents. Finally, Part 5 evaluates nonlinear electrostatics. Application examples included in this

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book cover all major subjects of low-frequency electromagnetic theory. In addition, this book includes complete or summarized analytical solutions to a large number of quasi-static

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electromagnetic problems. Each Chapter concludes with a summary of the corresponding MATLAB® modules. Combines fundamental electromagnetic theory and application-

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oriented computation algorithms in the form of stand alone MATLAB® modules Makes use of the three-dimensional Method of Moments (MoM) for static and quasistatic

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electromagnetic problems
Contains a detailed full-body
computational human phantom
from the Visible Human
Project® Female, embedded
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researchers, engineers, and medical doctors working on low-frequency modeling and bioelectromagnetic applications. Sergey N. Makarov is a Professor in the Department of Electrical and

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Computer Engineering at Worcester Polytechnic Institute (WPI). Gregory M. Noetscher is a Senior Research Electrical Engineer at the U.S. Army Natick Soldier Research,

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Development and Engineering Center (NSRDEC) in Natick, MA. Ara Nazarian is an Assistant Professor of Orthopaedic Surgery, Harvard Medical School, Center for Advanced Orthopaedic

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Studies, Beth Israel
Deaconess Medical Center
(BIDMC).

This edition has been update
to give students a better
understanding of the core
principles and their real-

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world usefulness with particular focus on early transmission lines. The transmission line material has been split into two parts. The first part focuses on the fundamental aspects of

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transmission lines. The second part includes Smith charts and transmission line applications to provide a smooth transition from transmission line to a specific type of transmission line load

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- the antenna, which is covered in later chapters. This book and its accompanying CD-ROM offer a complete treatment from background theory and models to implementation and

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verification techniques for simulations and linear analysis of frequently studied machine systems. Every chapter of Dynamic Simulation of Electric Machinery includes exercises

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and projects that can be explored using the accompanying software. A full chapter is devoted to the use of MATLAB and SIMULINK, and an appendix provides a convenient overview of key

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numerical methods used.

Dynamic Simulation of Electric Machinery provides professional engineers and students with a complete toolkit for modeling and analyzing power systems on

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their desktop computers.
Optics for Engineers

Wireless and Guided Wave
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THEORY, Second Edition

Applied Electromagnetics

The Method of Lines (MOL) is a versatile approach to obtaining numerical solutions to partial differential equations (PDEs) as they appear in dynamic and static

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problems. This method, popular in science and engineering, essentially reduces PDEs to a set of ordinary differential equations that can be integrated using standard numerical integration methods. Its significant advantage is that the analysis

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algorithms follow the physical wave propagation and are therefore efficient. This is because the fields on the discretisation lines are described by generalised transmission line (GTL) equations. With this formulation we have a connection to

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the well known transmission line theory and resulting in an easy understanding. The method of lines is a very accurate and powerful way to analyze electromagnetic waves, enabling a full-wave solution without the computational burden of pure

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finite element or finite difference methods. With Analysis of Electromagnetic Fields and Waves, Reinhold Pregla describes an important and powerful method for analyzing electromagnetic waves. This book: Describes the general analysis

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principles for electromagnetic fields. Includes applications in microwave, millimetre wave and optical frequency regions. Unifies the analysis by introducing generalised transmission line (GTL) equations for all orthogonal coordinate systems and

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with materials of arbitrary anisotropy as a common start point.

Demonstrates a unique analysis principle with the numerical stable impedance/admittance transformation and a physical adapted field transformation concept that is also

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useful for other modelling algorithms. Includes chapters on Eigenmode calculations for various waveguides, concatenations and junctions of arbitrary number of different waveguide sections in complex devices, periodic structures (e.g.

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Bragg gratings, meander lines, clystron resonators, photonic crystals), antennas (e.g. circular and conformal). Enables the reader to solve partial differential equations in other physical areas by using the described principles. Features an

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accompanying website with program codes in Matlab© for special problems. Analysis of Electromagnetic Fields and Waves will appeal to electromagnetic field practitioners in primary and applied research as well as postgraduate students in the areas

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of photonics, micro- and millimetre waves, general electromagnetics, e.g. microwave integrated circuits, antennas, integrated and fibre optics, optoelectronics, nanophotonics, microstructures, artificial materials. This second edition comes from your

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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 exciting new resource presents a comprehensive introduction to the

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fundamentals of diffraction of two-dimensional canonical structures, including wedge, strip, and triangular cylinder with different boundary conditions. Maxwell equations are discussed, along with wave equation and scattered, diffracted and fringe

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fields. Geometric optics, as well as the geometric theory of diffraction are explained. With MATLAB scripts included for several well-known electromagnetic diffraction problems, this book discusses diffraction fundamentals of two-dimensional

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structures with different boundary conditions and analytical numerical methods that are used to show diffraction. The book introduces fundamental concepts of electromagnetic problems, identities, and definitions for diffraction

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modeling. Basic coordinate systems, boundary conditions, wave equation, and Green's function problem are given. The scattered fields, diffracted fields, and fringe fields, radar cross section for diffraction modeling are presented. Behaviors of

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electromagnetic waves around the two dimensional canonical wedge and canonical strip are also explored. Diffraction of trilateral cylinders and wedges with rounded edges is investigated as well as double tip diffraction using Finite Difference

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Time Domain and Method of Moments. A MATLAB based virtual tool, developed with graphical user interface (GUI), for the visualization of both fringe currents and fringe waves is included, using numerical FDTD and MoM algorithm and High-

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Frequency Asymptotics approaches. Quickly Engages in Applying Algorithmic Techniques to Solve Practical Signal Processing Problems With its active, hands-on learning approach, this text enables readers to master the underlying principles of

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digital signal processing and its many applications in industries such as digital television, mobile and broadband communications, and medical/scientific devices. Carefully developed MATLAB® examples throughout the text illustrate the

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mathematical concepts and use of digital signal processing algorithms. Readers will develop a deeper understanding of how to apply the algorithms by manipulating the codes in the examples to see their effect. Moreover, plenty of exercises help to

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put knowledge into practice solving real-world signal processing challenges. Following an introductory chapter, the text explores: Sampled signals and digital processing
Random signals Representing signals and systems
Temporal and spatial

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signal processing Frequency analysis of signals Discrete-time filters and recursive filters Each chapter begins with chapter objectives and an introduction. A summary at the end of each chapter ensures that one has mastered all the key concepts and

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techniques before progressing in the text. Lastly, appendices listing selected web resources, research papers, and related textbooks enable the investigation of individual topics in greater depth. Upon completion of this text, readers will understand how to

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apply key algorithmic techniques to address practical signal processing problems as well as develop their own signal processing algorithms.

Moreover, the text provides a solid foundation for evaluating and applying new digital processing signal

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techniques as they are developed.
Fundamentals Of Electromagnetics
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Numerical Methods for Engineering
MATLAB-based Finite Element
Programming in Electromagnetic
Modeling

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Numerical Techniques in Electromagnetics, Second Edition
An Introduction Using MATLAB® and Computational Electromagnetics Examples

The revised and updated second edition of this textbook teaches

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students to create computer codes used to engineer antennas, microwave circuits, and other critical technologies for wireless communications and other applications of electromagnetic fields and waves. Worked code

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examples are provided for MATLAB technical computing software.

This comprehensive resource provides readers with the tools necessary to perform analysis of various waveforms for use in

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radar systems. It provides information about how to produce synthetic aperture (SAR) images by giving a tomographic formulation and implementation for SAR imaging. Tracking filter fundamentals, and each

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parameter associated with the filter and how each affects tracking performance are also presented. Various radar cross section measurement techniques are covered, along with waveform selection analysis through the

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study of the ambiguity function for each particular waveform from simple linear frequency modulation (LFM) waveforms to more complicated coded waveforms. The text includes the Python tool suite, which allows the

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reader to analyze and predict radar performance for various scenarios and applications. Also provided are MATLAB® scripts corresponding to the Python tools. The software includes a user-friendly graphical user interface

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(GUI) that provides visualizations of the concepts being covered. Users have full access to both the Python and MATLAB source code to modify for their application. With examples using the tool suite are given at the end of each

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chapter, this text gives readers a clear understanding of how important target scattering is in areas of target detection, target tracking, pulse integration, and target discrimination.

This book is a self-contained,

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programming-oriented and learner-centered book on finite element method (FEM), with special emphasis given to developing MATLAB® programs for numerical modeling of electromagnetic boundary value

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problems. It provides a deep understanding and intuition of FEM programming by means of step-by-step MATLAB® programs with detailed descriptions, and eventually enabling the readers to modify,

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adapt and apply the provided programs and formulations to develop FEM codes for similar problems through various exercises. It starts with simple one-dimensional static and time-harmonic problems and extends

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the developed theory to more complex two- or three-dimensional problems. It supplies sufficient theoretical background on the topic, and it thoroughly covers all phases (pre-processing, main body and post-

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processing) in FEM. FEM formulations are obtained for boundary value problems governed by a partial differential equation that is expressed in terms of a generic unknown function, and then, these

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formulations are specialized to various electromagnetic applications together with a post-processing phase. Since the method is mostly described in a general context, readers from other disciplines can also use this

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book and easily adapt the provided codes to their engineering problems. After forming a solid background on the fundamentals of FEM by means of canonical problems, readers are guided to more advanced

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applications of FEM in electromagnetics through a survey chapter at the end of the book. Offers a self-contained and easy-to-understand introduction to the theory and programming of finite element method. Covers

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various applications in the field of static and time-harmonic electromagnetics. Includes one-, two- and three-dimensional finite element codes in MATLAB®. Enables readers to develop finite element programming skills

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through various MATLAB® codes and exercises. Promotes self-directed learning skills and provides an effective instruction tool.

This practical new resource explores the fundamentals of

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EMC engineering and examines the concepts and underpinnings of electromagnetics. This book highlights the procedures from design to market for both technical and non-technical issues, including market control,

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accreditation, calibration, EMC tests and measurement, and EMC protection. Basic electrical engineering theories, Maxwell equations, EM scattering, diffraction and propagation in the electromagnetic model are

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presented. The circuit model, including lumped parameter circuit elements, two-port circuit definitions, grounding, common and differential model currents, and microstripline circuits are explored. This book also covers

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antennas and antenna calibration, including communication antennas, normalized site attenuation (NSA), loop antennas, and loop antenna calibration (LAC). Noise and frequency analysis on fundamental

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electromagnetic signals, noise, and transforms is explained. Readers find insight into EMC test and measurement environments and devices. Time-saving MATLAB code is included in this resource to help engineers with

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their projects in the field.

Electronically Scanned Arrays

MATLAB® Modeling and

Simulation

Low-Frequency Electromagnetic

Modeling for Electrical and

Biological Systems Using

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MATLAB

Fundamentals of Electric
Machines: A Primer with
MATLAB

The Method of Lines

Electrical Machine Fundamentals
with Numerical Simulation using

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MATLAB / SIMULINK

The field of optics has become central to major developments in medical imaging, remote sensing, communication, micro- and nanofabrication, and consumer technology, among other areas.

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Applications of optics are now found in products such as laser printers, bar-code scanners, and even mobile phones.

There is a growing need for engineers to understand

Wireless communications allow high-speed mobile access to a global Internet

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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

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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

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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

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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

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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

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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-

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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

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the wireless and optical technologies that are increasingly important for high-speed transmission over very long distances.

This monograph provides a framework for students and practitioners who are working on the solution of

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electromagnetic imaging in geophysics. Bridging the gap between theory and practical applied material (for example, inverse and forward problems), it provides a simple explanation of finite volume discretization, basic concepts in solving inverse problems through

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optimization, a summary of applied electromagnetics methods, and MATLAB?÷code for efficient computation.

Because future microwave, magnetic resonance, and wave propagation systems will involve miniature devices,

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nanosize structures, multifunctional applications, and composites of various types of materials, their development requires distinctly multidisciplinary collaborations. That means specialized approaches will not be sufficient to satisfy requirements. Anticipating that

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many students lack specialized training in magnetism and magnetics, Magnetics, Dielectrics, and Wave Propagation with MATLAB® Codes avoids application-specific descriptions. Instead, it connects phenomenological approaches with

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comprehensive microscopic formulations to provide a new and sufficiently broad physical perspective on modern trends in microwave technology. Reducing complex calculation approaches to their simplest form, this book's strength is in its step-

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by-step explanation of the procedure for unifying Maxwell's equations with the free energy via the equation of motion. With clear and simple coverage of everything from first principles to calculation tools, it revisits the fundamentals that govern the

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phenomenon of magnetic resonance and wave propagation in magneto-dielectric materials. Introduces constitutive equations via the free energy, paving the way to consider wave propagation in any media This text helps students develop an essential

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understanding of the origin of magnetic parameters from first principles, as well as how these parameters are to be included in the large-scale free energy. More importantly, it facilitates successful calculation of said parameters, which is required as the

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dimensionality of materials is reduced toward the microscopic scale. The author presents a systematic way of deriving the permeability tensor of the most practical magnetic materials, cubic and hexagonal crystal structures. Using this simple and very general

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approach, he effectively bridges the gap between microscopic and macroscopic principles as applied to wave propagation.

Radio Wave Propagation and Parabolic Equation Modeling
Computational Methods in Geophysical

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Electromagnetics

Introduction to Radar Using Python and
MATLAB

Computational Electromagnetics for
RF and Microwave Engineering
Dynamic Simulation of Electric
Machinery

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Principles and Technologies for Electromagnetic Energy Based Therapies covers the theoretical foundations of electromagnetic-energy based therapies, principles for design of practical devices and systems, techniques for in vitro and

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in vivo testing of devices, and clinical application examples of contemporary therapies employing non-ionizing electromagnetic energy. The book provides in-depth coverage of: pulsed electric fields, radiofrequency heating systems,

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tumor treating fields, and microwave heating technology. Devices and systems for electrical stimulation of neural and cardiac tissue are covered as well. Lastly, the book describes and discusses issues that are relevant to

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engineers who develop and translate these technologies to clinical applications. Readers can access information on incorporation of preclinical testing, clinical studies and IP protection in this book, along with in-depth

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technical background for engineers on electromagnetic phenomena within the human body and selected therapies. It covers both engineering and biological/medical materials and gives a full perspective on electromagnetics

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therapies. Unique features include content on tumor treating fields and the development and translation of biomedical devices. Provides in-depth technical background on electromagnetic energy-based therapies, along with

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real world examples on how to design devices and systems for delivering electromagnetic energy-based therapies Includes guidance on issues that are relevant for translating the technology to the market, such as intellectual

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property, regulatory issues, and preclinical testing Companion site includes COMSOL models, MATLAB code, and lab protocols This fourth edition of the text reflects the continuing increase in awareness and use of

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computational electromagnetics and incorporates advances and refinements made in recent years. Most notable among these are the improvements made to the standard algorithm for the finite-difference time-domain (FDTD)

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method and treatment of absorbing boundary conditions in FDTD, finite element, and transmission-line-matrix methods. It teaches the readers how to pose, numerically analyze, and solve EM problems, to give them the ability to expand

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their problem-solving skills using a variety of methods, and to prepare them for research in electromagnetism. Includes new homework problems in each chapter. Each chapter is updated with the current trends in CEM.

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Adds a new appendix on CEM codes, which covers commercial and free codes. Provides updated MATLAB code.

This book presents computer programming as a key method for solving mathematical problems.

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There are two versions of the book, one for MATLAB and one for Python. The book was inspired by the Springer book TCSE 6: A Primer on Scientific Programming with Python (by Langtangen), but the style is more accessible and

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concise, in keeping with the needs of engineering students. The book outlines the shortest possible path from no previous experience with programming to a set of skills that allows the students to write simple programs for solving common

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mathematical problems with numerical methods in engineering and science courses. The emphasis is on generic algorithms, clean design of programs, use of functions, and automatic tests for verification.

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A comprehensive presentation of the theory and simulation of optical waveguides and wave propagations in a guided environment, Guided Wave Photonics: Fundamentals and Applications with MATLAB

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supplies fundamental and advanced understanding of integrated optical devices that are currently employed in modern optical fiber communications systems and p

Using MATLAB/SIMULINK

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MATLAB/Octave

A Primer with MATLAB

Fundamentals of electromagnetics
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Analysis of Electromagnetic Fields
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Introduces CEM methods, applying the codes that implement them to real-world engineering problems.

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text, or as an independent resource. Designed primarily for undergraduate electromagnetics, it can also be used in follow-up courses on antennas,

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propagation, microwaves, advanced electromagnetic theory, computational electromagnetics, electrical machines, signal integrity, etc. This title also provides

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with an operational knowledge and firm grasp of electromagnetic fundamentals aimed toward practical engineering applications, by teaching them "hands on"

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electromagnetics through a unique and comprehensive collection of MATLAB computer exercises and projects. Essentially, the book unifies two themes: it presents and explains

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electromagnetics using MATLAB on one side, and develops and discusses MATLAB for electromagnetics on the other. MATLAB codes described (and listed) in

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TUTORIALS or proposed in other exercises provide prolonged benefits of learning. By running codes; generating results, figures, and diagrams; playing movies and

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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.

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*with the concise,
successful ESSENTIALS OF
MATLAB PROGRAMMING, 3E.
Author Stephen Chapman
emphasizes problem-solving
skills throughout the book
as he teaches MATLAB as a*

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technical programming language. Readers learn how to write clean, efficient, and well-documented programs, while the book simultaneously presents the many

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practical functions of MATLAB. The first seven chapters introduce programming and problem solving. The last two chapters address more advanced topics of

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additional data types and plot types, cell arrays, structures, and new MATLAB handle graphics to ensure readers have the skills they need. Important Notice: Media content

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Electromagnetics

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

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electromagnetic theory, computational electromagnetics, electrical machines, signal integrity, etc. This title also provides practical content to current and aspiring industry professionals. MATLAB-Based Electromagnetics provides engineering and physics students and other users with an operational knowledge

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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

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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

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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. As the availability of powerful computer resources has grown over the last three decades, the art of computation of

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electromagnetic (EM) problems has also grown - exponentially. Despite this dramatic growth, however, the EM community lacked a comprehensive text on the computational techniques used to solve EM problems. The first edition of Numerical Techniques in Electromagnetics filled that gap and

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became the reference of choice for thousands of engineers, researchers, and students. The Second Edition of this bestselling text reflects the continuing increase in awareness and use of numerical techniques and incorporates advances and refinements made in recent years. Most notable among these are the

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improvements made to the standard algorithm for the finite difference time domain (FDTD) method and treatment of absorbing boundary conditions in FDTD, finite element, and transmission-line-matrix methods. The author also added a chapter on the method of lines.

Numerical Techniques in

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Electromagnetics continues to teach readers how to pose, numerically analyze, and solve EM problems, give them the ability to expand their problem-solving skills using a variety of methods, and prepare them for research in electromagnetism. Now the Second Edition goes even further toward

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providing a comprehensive resource that addresses all of the most useful computation methods for EM problems. 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

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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

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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.

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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.

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The Second Edition of this book, while retaining the contents and style of the first edition, continues to fulfil the require-ments of the course curriculum in Electromagnetic Theory for the undergraduate students of electrical engineering, electronics and telecommunication engineering, and

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electro-nics 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

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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*

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numerical problems asked in various universities' examinations

*Essentials of MATLAB Programming
Computational Electromagnetics with
MATLAB, Fourth Edition*

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Electromagnetic Energy Based Therapies Fundamentals of electromagnetics with engineering applications

The goal of this book is to discuss fundamentals of electromagnetic wave propagation, especially

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radiowave propagation,
groundwave propagation,
surface wave propagation,
maritime communication,
radar applications in
terms of parabolic
equation modeling and

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simulation approaches This is the first book on the guided wave propagation model in nearly two decades. This book will cover several new applications. The book

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also introduces several simple and sophisticated MATLAB scripts as well as virtual electromagnetic tools for several well-known electromagnetic propagation problems.