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# Jordan Balmain Electromagnetic Waves

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### **Electromagnetic Theory and Applications in Beam-wave**

**Electronics** CUP Archive  
Handbook of Microwave Technology  
*Electromagnetic Waves And Radiating Systems 2Nd Ed.* Oxford Higher Education

This book begins by introducing magnetism and discusses magnetic properties of materials, magnetic moments of atoms and ions, and the elements important to magnetism. It covers magnetic susceptibilities and electromagnetic waves in anisotropic dispersive media among other topics. There are problems at the end of each chapter, many of which serve to expand or explain the material in the text. The bibliographies for each chapter give an entry to the research literature.

**Microstrip Antennas** Academic Press  
This edition of an established textbook presents aspects of electromagnetic theory of direct relevance to the transmission of information by electromagnetic waves. In revising the

first edition the authors have taken the opportunity to extend the coverage significantly by adding new material on optical transmission. Throughout, the theory is applied to the working of practical systems, and the constraints imposed by fundamental properties are emphasised.

[ELECTROMAGNETIC WAVES AND RADIATING SYSTEMS](#) John Wiley & Sons  
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. [The Physics and Mathematics of Electromagnetic Wave Propagation in Cellular Wireless Communication](#) John Wiley & Sons

This book is a sequel to *Electromagnetism: Theory (Volume I)*. It has been updated to cover some additional aspects of theory and nearly all modern applications. The semi-historical approach is unchanged, but further historical comments have been

introduced at various places in the book to give a better insight into the development of the subject as well as to make the study more interesting and palatable to the students.

- Emphasis on practical aspects of wave guidance and radiation
- Sections on analysis of cylindrical dielectric waveguide (e.g. of optical fibres) in Chapters 18 and 22
- Tensor formulation of Maxwell's Stresses
- Extension of Principle of Duality to time varying field problems as well as to non electrical systems
- Extrapolation of the method of images from partially embedded conduction current elements to discontinuous current elements with displacement currents in antennae problems
- Explanation of the physical basis of the mechanism of electromagnetic radiation
- Analysis of wave polarization including complete and partial polarization
- Effects of finite geometrical dimensions of the conducting media on the skin-effect phenomenon
- Types of apertures in receiving antennae

The book is designed to serve as a core text for students of electrical engineering. Besides, it will be useful to postgraduate physics students as well as research engineers and design and development engineers in industries.

Complex Electromagnetic Problems and Numerical Simulation Approaches

Cambridge University Press  
 Electromagnetic Field Theory and Transmission Lines is ideal for a single semester, first course on Electromagnetic Field Theory (EMFT) at the undergraduate level. This book uses diagrammatic representations and real life examples to explain the fu  
The Physics and Mathematics of Electromagnetic Wave Propagation in Cellular Wireless Communication John Wiley & Sons

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.

*High-frequency Electrodynamics* Pearson Education India

Balanis' Advanced Engineering Electromagnetics The latest edition of the foundational guide to advanced electromagnetics Balanis' third edition of Advanced Engineering Electromagnetics - a global best-seller for over 30 years - covers the advanced knowledge engineers involved in electromagnetics need to know, particularly as the topic relates to the fast-moving, continuously evolving, and rapidly expanding field of wireless communications. The immense interest in wireless communications and the expected increase in wireless

communications systems projects (antennas, microwaves and wireless communications) points to an increase in the number of engineers needed to specialize in this field. Highlights of the 3rd Edition include: A new chapter, on Artificial Impedance Surfaces (AIS), contains material on current and advanced EM technologies, including the exciting and fascinating topic of metasurfaces for: Control and broadband RCS reduction using checkerboard designs. Optimization of antenna fundamental parameters, such as: input impedance, directivity, realized gain, amplitude radiation pattern. Leaky-wave antennas using 1-D and 2-D polarization diverse-holographic high impedance metasurfaces for antenna radiation control and optimization. Associated MATLAB programs for the design of checkerboard metasurfaces for RCS reduction, and metasurface printed antennas and holographic LWA for radiation control and optimization. Throughout the book, there are: Additional examples, numerous end-of-chapter problems, and PPT notes. Fifty three MATLAB computer programs for computations, graphical visualizations and animations. Nearly 4,500 multicolor PowerPoint slides are available for self-study or lecture use.

*An Introduction to Classical Electromagnetic Radiation* Springer Science & Business Media

Providing an ideal transition from introductory to advanced concepts, this book builds a foundation that allows electrical engineers to confidently proceed with the development of advanced EM studies, research, and applications. New topics include quasistatics, vector spherical wave functions, and wave matrices. Several application-oriented sections covering

guided waves and transmission lines, particle dynamics, shielding, electromagnetic material characterization, and antennas have also been added. Mathematical appendices present helpful background information in the areas of Fourier transforms, dyadics, and boundary value problems. *Applied Electromagnetics and Electromagnetic Compatibility* CRC Press

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

**Electromagnetic Modeling and Simulation** John Wiley & Sons

Extensive revision of the best-selling text on satellite communications — includes new chapters on cubesats, NGSO satellite systems, and Internet access by satellite There have been many changes in the thirty three years since the first edition of Satellite Communications was published. There has been a complete

transition from analog to digital communication systems, with analog techniques replaced by digital modulation and digital signal processing. While distribution of television programming remains the largest sector of commercial satellite communications, low earth orbit constellations of satellites for Internet access are set to challenge that dominance. In the third edition, chapters one through three cover topics that are specific to satellites, including orbits, launchers, and spacecraft. Chapters four through seven cover the principles of digital communication systems, radio frequency communications, digital modulation and multiple access techniques, and propagation in the earth's atmosphere, topics that are common to all radio communication systems. Chapters eight through twelve cover applications that include non-geostationary satellite systems, low throughput systems, direct broadcast satellite television, Internet access by satellite, and global navigation satellite systems. The chapter on Internet access by satellite is new to the third edition, and each of the chapters has been extensively revised to include the many changes in the field since the publication of the second edition in 2003. Two appendices have been added that cover digital transmission of analog signals, and antennas. An invaluable resource for students and professionals alike, this book:

- Focuses on the fundamental theory of satellite communications
- Explains the underlying principles and essential mathematics required to understand the physics and engineering of satellite communications
- Discusses the expansion of satellite communication systems in areas such as direct-broadcast satellite TV, GPS, and internet access
- Introduces the rapidly

advancing field of small satellites, referred to as SmallSats or CubeSats

- Provides relevant practice problems based on real-world satellite systems
- Satellite Communications is required reading for undergraduate and postgraduate students in satellite communications courses and an authoritative reference for engineers working in communications, systems and networks, and satellite operations and management.

#### ELECTROMAGNETISM Volume 2

—Applications CRC Press

"This anthology combines 15 years of microstrip antenna technology research into one significant volume and includes a special introductory tutorial by the co-editors. Covering theory, design and modeling techniques and methods, this source book is an excellent reference tool for engineers who want to become more familiar with microstrip antennas and microwave systems. Proven antenna designs, novel solutions to practical design problems and relevant papers describing the theory of operation and analysis of microstrip antennas are contained within this convenient reference."

*Theory of Magnetostatic Waves* World Scientific

An important resource that examines the physical aspects of wireless communications based on mathematical and physical evidence

*The Physics and Mathematics of Electromagnetic Wave Propagation in Cellular Wireless Communication* describes the electromagnetic principles for designing a cellular wireless system and includes the subtle electromagnetic principles that are often overlooked in designing such a system. This important text explores both the physics and mathematical concepts used in

deploying antennas for transmission and reception of electromagnetic signals and examines how to select the proper methodology from a wide range of scenarios. In this much-needed guide, the authors—noted experts in the field—explore the principle of electromagnetics as developed through the Maxwellian principles and describe the properties of an antenna in the frequency domain. The text also includes a review of the characterization of propagation path loss in a cellular wireless environment and examines ultrawideband antennas and the mechanisms of broadband transmission of both power and information. This important resource: Includes a discussion of the shortcomings of a MIMO system from both theoretical and practical aspects Demonstrates how to deploy base station antennas with better efficiency Validates the principle and the theoretical analysis of electromagnetic propagation in cellular wireless communication Contains results of experiments that are solidly grounded in mathematics and physics Written for engineers, researchers, and educators who are or plan to work in the field, *The Physics and Mathematics of Electromagnetic Wave Propagation in Cellular Wireless Communication* offers an essential resource for understanding the principles underpinning wireless communications.

**Principles Of Electromagnetics, 4Th Edition, International Version** John Wiley & Sons

This first book to develop the theoretical basics from the concept of guided wave optics is all set to become a standard in fundamental concepts of electromagnetic waves within the field of telecommunications. Maxwell equations Plane waves Closed waveguides Closed

Resonators Open Lines Backgrounds of Antenna Theory Diffraction on Metallic and Dielectric Objects Complementary References With its chapters on high frequency waveguides this book is aimed at both scientists and professionals in electrical engineering and telecommunications.

**Electromagnetic Waves and Radiating Systems [by] Edward C. Jordan [and] Keith G. Balmain**

Springer Science & Business Media

Antennas and Wave Propagation is

written for the first course on the same.

The book begins with an introduction

that discusses the fundamental

concepts, notations, representation and

principles that govern the field of

antennas. A separate chapter on

mathematical preliminaries is discussed

followed by chapters on every aspect of

antennas from Maxwell's equations to

antenna array analysis, antenna array

synthesis, antenna measurements and

wave propagation.

*FUNDAMENTALS OF ELECTROMAGNETIC THEORY, Second Edition* Springer

Science & Business Media

Aimed at a single-semester course on

antennas at the undergraduate level,

*Antennas and Wave Propagation*

provides a lucid explanation of the

fundamentals of antennas and

propagation. This student-friendly text

also includes simple design procedures

along with a large number of examples

and exercises.

*Electromagnetic Radiation, Scattering, and Diffraction* PHI Learning Pvt. Ltd.

Today, engineering problems are very

complex, requiring powerful computer

simulations to power them. For

engineers, observable-based

parameterization as well as numerically

computable forms with rapid

convergent properties if in a

series are essential. Complex Electromagnetic Problems and Numerical Simulation Approaches, along with its companion FTP site, will show you how to take on complex electromagnetic problems and solve them in an accurate and efficient manner. Organized into two distinct parts, this comprehensive resource first introduces you to the concepts, approaches, and numerical simulation techniques that will be used throughout the book and then, in Part II, offers step-by-step guidance as to their practical, real-world applications. Self-contained chapters will enable you to find specific solutions to numerous problems. Filled with in-depth insight and expert advice, Complex Electromagnetic Problems and Numerical Simulation Approaches: Describes ground wave propagation Examines antenna systems Deals with radar cross section (RCS) modeling Explores microstrip network design with FDTD and TLM techniques Discusses electromagnetic compatibility (EMC) and bio-electromagnetics (BEM) modeling Presents radar simulation Whether you're a professional electromagnetic engineer requiring a consolidated overview of the subject or an academic/student who wishes to use powerful simulators as a learning tool, Complex Electromagnetic Problems and Numerical Simulation Approaches - with its focus on model development, model justification, and range of validity - is the right book for you.

**Handbook of Microwave Technology**

John Wiley & Sons

Electromagnetic Radiation, Scattering, and Diffraction Discover a graduate-level text for students specializing in electromagnetic wave radiation, scattering, and diffraction for engineering applications In

Electromagnetic Radiation, Scattering and Diffraction, distinguished authors Drs. Prabhakar H. Pathak and Robert J. Burkholder deliver a thorough exploration of the behavior of electromagnetic fields in radiation, scattering, and guided wave environments. The book tackles its subject from first principles and includes coverage of low and high frequencies. It stresses physical interpretations of the electromagnetic wave phenomena along with their underlying mathematics. The authors emphasize fundamental principles and provide numerous examples to illustrate the concepts contained within. Students with a limited undergraduate electromagnetic background will rapidly and systematically advance their understanding of electromagnetic wave theory until they can complete useful and important graduate-level work on electromagnetic wave problems. Electromagnetic Radiation, Scattering and Diffraction also serves as a practical companion for students trying to simulate problems with commercial EM software and trying to better interpret their results. Readers will also benefit from the breadth and depth of topics, such as: Basic equations governing all electromagnetic (EM) phenomena at macroscopic scales are presented systematically. Stationary and relativistic moving boundary conditions are developed. Waves in planar multilayered isotropic and anisotropic media are analyzed. EM theorems are introduced and applied to a variety of useful antenna problems. Modal techniques are presented for analyzing guided wave and periodic structures. Potential theory and Green's function methods are developed to treat interior and exterior EM problems. Asymptotic High

Frequency methods are developed for evaluating radiation Integrals to extract ray fields. Edge and surface diffracted ray fields, as well as surface, leaky and lateral wave fields are obtained. A collective ray analysis for finite conformal antenna phased arrays is developed. EM beams are introduced and provide useful basis functions. Integral equations and their numerical solutions via the method of moments are developed. The fast multipole method is presented. Low frequency breakdown is studied. Characteristic modes are discussed. Perfect for graduate students studying electromagnetic theory, Electromagnetic Radiation, Scattering, and Diffraction is an invaluable resource for professional electromagnetic engineers and researchers working in this area.

### **ENGINEERING ELECTROMAGNETICS**

BoD – Books on Demand

This book is divided into two parts. The first part deals with basic electromagnetic and the second part with beam-wave electronics related to growing-wave devices including 'slow-wave' travelling-wave tubes and 'fast-wave' gyro-travelling-wave tubes. The first part is a prerequisite for the second part, while the second part covers the applications of the topics discussed in the first part. These two parts put together make the volume a self-contained treatise. In the specific applications considered, time-independent field concepts are exemplified in the problems related to the formation of an electron beam by an electron gun, the confinement of an electron beam by a magnetic focusing

structure, etc. Similarly, time-dependent field concepts are exemplified in problems related to propagation through a slow-wave structure and amplification in growing-wave electron beam devices, such as travelling-wave tubes, double-stream amplifiers, beam-plasma amplifiers and gyro-travelling-wave tubes. All throughout the text, stress is given to provide complete analytical deductions with full mathematical details and present the state-of-the-art concepts.

Behaviour of Electromagnetic Waves in Different Media and Structures Pearson Education India

This book provides a thorough description of classical electromagnetic radiation, starting from Maxwell's equations, and moving on to show how fundamental concepts are applied in a wide variety of examples from areas such as classical optics, antenna analysis, and electromagnetic scattering. Throughout, the author interweaves theoretical and experimental results to help give insight into the physical and historical foundations of the subject. A key feature of the book is that pulsed and time-harmonic signals are presented on an equal footing. Mathematical and physical explanations are enhanced by a wealth of illustrations (over 300), and the book includes more than 140 problems. It can be used as a textbook for advanced undergraduate and graduate courses in electrical engineering and physics, and will also be of interest to scientists and engineers working in applied electromagnetics. A solutions manual is available on request for lecturers adopting the text.