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Electromagnetics
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Notaros*

2022-01-20

NATHAN JAYCE

Electromagnetic Waves

Courier Corporation

A timely and authoritative

guide to the state of the
art of wavescattering
Scattering of
Electromagnetic Waves
offers in three volumes

a complete and up-to-date treatment of wave scattering by random discrete scatterers and rough surfaces. Written by leading scientists who have made important contributions to wave scattering over three decades, this new work explains the principles, methods, and applications of this rapidly expanding, interdisciplinary field. It covers both introductory and advanced material and provides students and researchers in remote sensing as well

as imaging, optics, and electromagnetic theory with a one-stop reference to a wealth of current research results. Plus, Scattering of Electromagnetic Waves contains detailed discussions of both analytical and numerical methods, including cutting-edge techniques for the recovery of earth/land parametric information. The three volumes are entitled respectively Theories and Applications, Numerical Simulation, and Advanced Topics. In

the first volume, Theories and Applications, Leung Tsang (University of Washington), Jin Au Kong (MIT), and Kung-Hau Ding (Air Force Research Lab) cover: * Basic theory of electromagnetic scattering * Fundamentals of random scattering * Characteristics of discrete scatterers and rough surfaces * Scattering and emission by layered media * Single scattering and applications * Radiative transfer theory and solution techniques * One-dimensional random rough surface scattering

Electromagnetic Engineering and Waves

Springer

When I was a student, in the early fifties, the properties of gratings were generally explained according to the scalar theory of optics. The grating formula (which predicts the diffraction angles for a given angle of incidence) was established, experimentally verified, and intensively used as a source for textbook problems. Indeed those grating properties, we can call optical properties,

were taught in a satisfactory manner and the students were able to clearly understand the diffraction and dispersion of light by gratings. On the other hand, little was said about the "energy properties", i. e. , about the prediction of efficiencies. Of course, the existence of the blaze effect was pointed out, but very frequently nothing else was taught about the efficiency curves. At most a good student had to know that, for an echellette grating, the efficiency in a given

order can approach unity insofar as the diffracted wave vector can be deduced from the incident one by a specular reflexion on the large facet. Actually this rule of thumb was generally sufficient to make good use of the optical gratings available about thirty years ago. Thanks to the spectacular improvements in grating manufacture after the end of the second world war, it became possible to obtain very good gratings with more and more lines per mm. Nowadays, in

gratings used in the visible region, a spacing smaller than half a micron is common. A Handbook for Wireless/RF, EMC, and High-Speed Electronics CRC Press

Advanced topics of research in field computation are explored in this publication. Contributions have been sourced from international experts, ensuring a comprehensive specialist perspective. A unity of style has been achieved by the editor, who has specifically inserted appropriate cross-

references throughout the volume, plus a single collected set of references at the end. The book provides a multi-faceted overview of the power and effectiveness of computation techniques in engineering electromagnetics. In addition to examining recent and current developments, it is hoped that it will stimulate further research in the field.

Electromagnetic Waves and Lasers Springer
Nature

In the past few decades,

Magnetic Resonance Imaging (MRI) has become an indispensable tool in modern medicine, with MRI systems now available at every major hospital in the developed world. But for all its utility and prevalence, it is much less commonly understood and less readily explained than other common medical imaging techniques. Unlike optical, ultrasonic, X-ray (including CT), and nuclear medicine-based imaging, MRI does not rely primarily on simple transmission and/or

reflection of energy, and the highest achievable resolution in MRI is orders of magnitude smaller than the smallest wavelength involved. In this book, MRI will be explained with emphasis on the magnetic fields required, their generation, their concomitant electric fields, the various interactions of all these fields with the subject being imaged, and the implications of these interactions to image quality and patient safety. Classical electromagnetics will be used to describe

aspects from the fundamental phenomenon of nuclear precession through signal detection and MRI safety. Simple explanations and illustrations combined with pertinent equations are designed to help the reader rapidly gain a fundamental understanding and an appreciation of this technology as it is used today, as well as ongoing advances that will increase its value in the future. Numerous references are included to facilitate further study

with an emphasis on areas most directly related to electromagnetics.

Electromagnetic solution of canonical problems

Grand Central Publishing

This self-contained book gives fundamental knowledge about scattering and diffraction of electromagnetic waves and fills the gap between general electromagnetic theory courses and collections of engineering formulas. The book is a tutorial for advanced students learning the

mathematics and physics of electromagnetic scattering and curious to know how engineering concepts and techniques relate to the foundations of electromagnetics

Scattering of Electromagnetic Waves

Electromagnetic Fields and Waves

Newly corrected, this edition of a highly acclaimed text is suitable for advanced physics courses. Its accessible macroscopic view of classical electromagnetics emphasizes integrating electromagnetic theory

with physical optics. 1994 edition.

Electromagnetic Field Theory Courier

Corporation

Newly corrected, this highly acclaimed text is suitable for advanced physics courses. The authors present a very accessible macroscopic view of classical electromagnetics that emphasizes integrating electromagnetic theory with physical optics. The survey follows the historical development of physics, culminating in

the use of four-vector relativity to fully integrate electricity with magnetism. Corrected and emended reprint of the Brooks/Cole Thomson Learning, 1994, third edition.

Lightning

Electromagnetics John

Wiley & Sons

Electromagnetic Fields

and Waves Courier

Corporation

A Problem Solving

Approach Elsevier

This book is a rigorous but concise macroscopic description of the interaction between

electromagnetic radiation and structures containing graphene sheets (two-dimensional structures). It presents canonical problems with translational invariant geometries, in which the solution of the original vectorial problem can be reduced to the treatment of two scalar problems, corresponding to two basic polarization modes. The book includes computational problems and makes use of the Python programming language to make numerical calculations

accessible to any science student. Many figures within are accompanied by Python scripts. Physical Principles, Related Applications, and Ongoing Developments Tata McGraw-Hill Education
This short monograph presents the theory of electromagnetic pulses in a simple and physical way. All pulses discussed are exact solutions of the Maxwell equations, and have finite energy, momentum and angular momentum. There are five chapters: on

Fundamentals, Solutions of the Wave Equation, Electromagnetic Pulses, Angular Momentum, and Lorentz Transformations. Nine Appendices cover mathematical or associated aspects, such as chiral measures of electromagnetic fields. The subject matter is restricted to free-space classical electrodynamics, but contact is made with quantum theory in proofs that causal pulses are equivalent to superpositions of photons. *Theory of Electromagnetic Wave Propagation* Courier

Corporation

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.

Electromagnetic Fields (Theory and Problems)

Springer Science & Business Media

Electromagnetic (EM) waves carry energy through propagation in space. This radiation associates with entangled electric and magnetic

fields which must exist simultaneously. Although all EM waves travel at the speed of light in vacuum, they cover a wide range of frequencies called the EM spectrum. The various portions of the EM spectrum are referred to by various names based on their different attributes in the emission, transmission, and absorption of the corresponding waves and also based on their different practical applications. There are no certain boundaries separating these various

portions, and the ranges tend to overlap. Overall, the EM spectrum, from the lowest to the highest frequency (longest to shortest wavelength) contains the following waves: radio frequency (RF), microwaves, millimeter waves, terahertz, infrared, visible light, ultraviolet, X-rays, and gamma rays. This Special Issue consists of sixteen papers covering a broad range of topics related to the applications of EM waves, from the design of filters and antennas for wireless

communications to biomedical imaging and sensing and beyond.

Applications of Electromagnetic Waves
Routledge

Direct approach covers electrostatics of point charges, distributions of charge, conductors and dielectrics, currents and circuits, Lorentz force and magnetic field, magnetic media, Maxwell equations, more. 228 illustrations. 1963 edition.

Electromagnetics Made Easy John Wiley & Sons
Discussed is the electromagnetic field

theory and its mathematical methods. Maxwell's equations are presented and explained. It follows a detailed discussion of electrostatics, flux, magnetostatics, quasi stationary fields and electromagnetic fields. The author presents how to apply numerical methods like finite differences, finite elements, boundary elements, image charge methods, and Monte-Carlo methods to field theory problems. He offers an outlook on fundamental

issues in physics including quantum mechanics. Some of these issues are still unanswered questions. A chapter dedicated to the theory of special relativity, which allows to simplify a number of field theory problems, complements this book. A book whose usefulness is not limited to engineering students, but can be very helpful for physicists and other branches of science.
What You Should Know About Electromagnetic Fields, Electromagnetic Radiation & Your Health S.

Chand Publishing
 The book Electromagnetic Field Theory caters to the students of BE/BTech Electronics and Communication Engineering, Electrical and Electronics Engineering, and Electronic Instrumentation Engineering, as electromagnetics is an integral part of their curricula. It covers a wide range of topics that deal with various physical and mathematical concepts, including vector functions, coordinate systems, integration and

differentiation, complex numbers, and phasors. The book helps in understanding the electric and magnetic fields on different charge and current distributions, such as line, surface, and volume. It also explains the electromagnetic behaviour of waves, fields in transmission lines, and radiation in antennas. A number of electromagnetic applications are also included to develop the interest of students.
SALIENT FEATURES • Simple and easy-to-follow

text • Complete coverage of the subject as per the syllabi of most universities • Lucid, well-explained concepts with clear examples • Relevant illustrations for better understanding and retention • Some of the illustrations provide three-dimensional view for in-depth knowledge • Numerous mathematical examples for full clarity of concepts • Chapter objectives at the beginning of each chapter for its overview • Chapter-end summary and exercises for quick review

and to test your knowledge

Theory of Electromagnetic Pulses Springer Science & Business Media

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 ultrashort, 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.

EMF Book Vikas Publishing House
Nonlinear Electromagnetics is a

collection of research papers from different areas of study related to the nonlinear phenomena in electromagnetism. The book, after giving a short introduction to some mathematical techniques for nonlinear problems, covers related topics such as the history of particle physics; a physical description of the spectral transform; solitons in randomly inhomogeneous media; and localized wave fields in nonlinear dispersive media. Also covered in this book are topics such as non-linear

plasma-wave interaction; Lagrangian methods; electromagnetic problems in composite materials in linear and nonlinear regimes; and stationary regimes in passive nonlinear methods. The text is recommended for physicists and engineers interested in the development and applications of nonlinear electromagnetic and the mathematical expressions behind it.

**Nonlinear
Electromagnetics**

Morgan & Claypool
Publishers

Foundations of Geophysical Electromagnetic Theory and Methods, Second Edition, builds on the strength of the first edition to offer a systematic exposition of geophysical electromagnetic theory and methods. This new edition highlights progress made over the last decade, with a special focus on recent advances in marine and airborne electromagnetic methods. Also included are recent case histories on practical applications in tectonic

studies, mineral exploration, environmental studies and off-shore hydrocarbon exploration. The book is ideal for geoscientists working in all areas of geophysics, including exploration geophysics and applied physics, as well as graduate students and researchers working in the field of electromagnetic theory and methods. Presents theoretical and methodological foundations of geophysical field theory
Synthesizes fundamental

theory and the most recent achievements of electromagnetic (EM) geophysical methods in the framework of a unified systematic exposition Offers a unique breadth and completeness in providing a general picture of the current state-of-the-art in EM geophysical technology Discusses practical aspects of EM exploration for mineral and energy resources
Graphene Optics Elsevier
 "Engineering Electromagnetics and Waves" is designed for

upper-division college and university engineering students, for those who wish to learn the subject through self-study, and for practicing engineers who need an up-to-date reference text. The student using this text is assumed to have completed typical lower-division courses in physics and mathematics as well as a first course on electrical engineering circuits." "This book provides engineering students with a solid grasp of electromagnetic fundamentals and

electromagnetic waves by emphasizing physical understanding and practical applications. The topical organization of the text starts with an initial exposure to transmission lines and transients on high-speed distributed circuits, naturally bridging electrical circuits and electromagnetics. Teaching and Learning Experience This program will provide a better teaching and learning experience-for you and your students. It provides: Modern Chapter Organization Emphasis on

Physical Understanding Detailed Examples, Selected Application Examples, and Abundant Illustrations Numerous End-of-chapter Problems, Emphasizing Selected Practical Applications Historical Notes on the Great Scientific Pioneers Emphasis on Clarity without Sacrificing Rigor and Completeness Hundreds of Footnotes Providing Physical Insight, Leads for Further Reading, and Discussion of Subtle and

Interesting Concepts and Applications"
Pergamon Unified Engineering Series
 Morgan & Claypool Publishers
 Based on familiar circuit theory and basic physics, this book serves as an invaluable reference for both analog and digital engineers alike. For those who work with analog RF, this book is a must-have resource. With computers and networking equipment of the 21st century running at such high frequencies, it is now crucial for digital

designers to understand electromagnetic fields, radiation and transmission lines. This knowledge is necessary for maintaining signal integrity and achieving EMC compliance. Since many digital designers are lacking in analog design skills, let alone electromagnetics, an easy-to-read but informative book on electromagnetic topics should be considered a welcome addition to their professional libraries. Covers topics using conceptual explanations

and over 150 lucid figures, in place of complex mathematics Demystifies antennas,

waveguides, and transmission line phenomena Provides the foundation necessary to

thoroughly understand signal integrity issues associated with high-speed digital design