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Electromagnetic Waves in Chiral and Bi-isotropic Media Analysis of electromagnetic problems involving chiral, bi-isotropic, and uniaxial bianisotropic media Analytical solutions of some electromagnetic problems involving chiral, bi-isotropic, and uniaxial media Theory and Phenomena of Metamaterials Electromagnetic Waveguides and Transmission Lines Electromagnetic Theory for Microwaves and Optoelectronics Double-Grid Finite-Difference Frequency-Domain (DG-FDFD) Method for Scattering from Chiral Objects Scientific and Technical Aerospace Reports Advances in Complex Electromagnetic Materials Behaviour of Electromagnetic Waves in Different Media and Structures Modern EMC Analysis Techniques Volume II Solutions and Applications of Scattering, Propagation, Radiation and Emission of Electromagnetic Waves Advances in Electromagnetics of Complex Media and Metamaterials Wave Propagation, Scattering And Emission In Complex Media Theory and Computation of Electromagnetic Fields Functional Metamaterials and Metadevices Electromagnetic Nanomaterials Adventures in Contemporary Electromagnetic Theory Scattering, Two-Volume Set Functional Fractional Calculus Comprehensive Dictionary of Electrical Engineering World Scientific Handbook Of Metamaterials And Plasmonics (In 4 Volumes) Electromagnetic Waves Introduction To Modern Planar Transmission Lines Programmable Matter Metamaterial Polarization Optics in Telecommunications Radio Science FDTD Modeling of Metamaterials: Theory and Applications Electromagnetic Mixing Formulas and Applications Scattering and Biomedical Engineering Comprehensive Dictionary of Electrical Engineering Theory of Reflection Microwaves & RF. Novel Insights into Orbital Angular Momentum Beams: From Fundamentals, Devices to Applications Journal of Communications Technology & Electronics Electromagnetic Waves in Complex Systems Physical Review Proceedings of Bianisotropics '97 Chiral Nanophotonics

Electromagnetic Waves in Chiral and Bi-isotropic Media

1994

learn how chiral and bi media affect electromagnetic fields and wave propagation and how to apply the theory to basic problems in waveguide antenna and scattering analysis with this book it provides you with effective methods of measurement and solutions to electromagnetic problems involving interaction between complex materials and microwave applications

Analysis of electromagnetic problems involving chiral, bi-isotropic, and uniaxial bianisotropic media

1994

theory and phenomena of metamaterials offers an in depth look at the theoretical background and basic properties of electromagnetic artificial materials often called metamaterials a volume in the metamaterials handbook this book provides a comprehensive guide to working with metamaterials using topics presented in a concise review format along with numerous references with contributions from leading researchers this text covers all areas where artificial materials have been developed each chapter in the text features a concluding summary as well as various cross references to address a wide range of disciplines in a single volume

Analytical solutions of some electromagnetic problems involving chiral, bi-isotropic, and uniaxial media

1991

this monograph deals with the theoretical aspects of the circuit modelling of high frequency electromagnetic structures using the lorentz reciprocity theorem this is the first book to cover the generalization from closed structures to open boundary waveguides and circuit structures the author has developed a new way to represent a general waveguide by transmission lines and was awarded the microwave prize of the ieee for this work the first part of the book discusses the construction of transmission line models for waveguide structures then the incidence of external electromagnetic waves on high frequency structures is studied and finally the concepts derived in the earlier parts of the book are generalized to reciprocal and non reciprocal anisotropic bi isotropic and bianisotropic materials

Theory and Phenomena of Metamaterials

2017-12-19

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

Electromagnetic Waveguides and Transmission Lines

1999-05-27

this book presents the application of the overlapping grids approach to solve chiral material problems using the fdtd method due to the two grids being used in the technique we will name this method as double grid finite difference frequency domain dg fdtd method as a result of this new approach the electric and magnetic field components are defined at every node in the computation space thus there is no need to perform averaging during the calculations as in the aforementioned fdtd technique 16 we formulate general 3d frequency domain numerical methods based on double grid dg fdtd approach for general bianisotropic materials the validity of the derived formulations for different scattering problems has been shown by comparing the obtained results to exact and other solutions obtained using different numerical methods table of contents introduction chiral media basics of the finite difference frequency domain fdtd method the double grid finite difference frequency domain dg fdtd method for bianisotropic medium scattering from three dimensional chiral structures improving time and memory efficiencies of fdtd methods conclusions appendix a notations appendix b near to far field transformation

Electromagnetic Theory for Microwaves and Optoelectronics

2008

recent advances in our understanding of complex composite media especially chiral media for microwave applications suggest the feasibility of creating novel materials with unusual properties and the possibility of constructing new microwave devices using such materials the emphasis of the book is on bi anisotropic materials whose most interesting feature is the magnetoelectric interaction of the fields the materials are expected to supply useful applications in radar technology aerospace microwave engineering manufacturing technology etc such as absorbers for low reflectivity shields reciprocal phase shifters polarization transformers the first experiments with artificial bi anisotropic media have been successfully carried out

Double-Grid Finite-Difference Frequency-Domain (DG-FDFD) Method for Scattering from Chiral Objects

2022-05-31

this comprehensive volume thoroughly covers wave propagation behaviors and computational techniques for electromagnetic waves in different complex media the chapter authors describe powerful and sophisticated analytic and numerical methods to solve their specific electromagnetic problems for complex media and geometries as well this book will be of interest to electromagnetics and microwave engineers physicists and scientists

Scientific and Technical Aerospace Reports

1995

the objective of this two volume book is the systematic and comprehensive description of the most competitive time domain computational methods for the efficient modeling and accurate solution of

modern real world emc problems intended to be self contained it performs a detailed presentation of all well known algorithms elucidating on their merits or weaknesses and accompanies the theoretical content with a variety of applications outlining the present volume numerical investigations delve into printed circuit boards monolithic microwave integrated circuits radio frequency microelectromechanical systems as well as to the critical issues of electromagnetic interference immunity shielding and signal integrity biomedical problems and emc test facility characterizations are also thoroughly covered by means of diverse time domain models and accurate implementations furthermore the analysis covers the case of large scale applications and electrostatic discharge problems while special attention is drawn to the impact of contemporary materials in the emc world such as double negative metamaterials bi isotropic media and several others table of contents introduction printed circuit boards in emc structures electromagnetic interference immunity shielding and signal integrity bioelectromagnetic problems human exposure to electromagnetic fields time domain characterization of emc test facilities large scale emc and electrostatic discharge problems contemporary material modeling in emc applications

Advances in Complex Electromagnetic Materials

2012-12-06

in this book a wide range of different topics related to analytical as well as numerical solutions of problems related to scattering propagation radiation and emission in different medium are discussed design of several devices and their measurements aspects are introduced topics related to microwave region as well as terahertz and quasi optical region are considered bi isotropic metamaterial in optical region is investigated interesting numerical methods in frequency domain and time domain for scattering radiation forward as well as reverse problems and microwave imaging are summarized therefore the book will satisfy different tastes for engineers interested for example in microwave engineering antennas and numerical methods

Behaviour of Electromagnetic Waves in Different Media and Structures

2011-07-05

the nato advanced research workshop bianisotropics 2002 was held in th marrakesh morocco during 8 11 may 2002 this was the 9 international conference on electromagnetics of complex media belonging to a series of meetings where the focus is on electromagnetics of chiral bianisotropic and other materials that may respond to electric and magnetic field excitations in special manner the first of these meetings was held in espoo finland 1993 and the following venues were gomel belarus 1993 perigueux france 1994 state college pennsylvania usa 1995 the rivers and channels between st petersburg and moscow in russia 1996 glasgow scotland 1997 brunswick germany 1998 and lisbon portugal 2000 the present book contains full articles of several of the presentations that were given in the marrakesh conference in bianisotropics 2002 8 re view lectures 14 invited lectures and 68 contributed talks and posters were presented of these presentations after a double review process 28 contributions have achieved their final form on the pages to follow from the contributions ofthe meeting also another publication is being planned a special issue of the journal electromagnetics will be devoted to complex materials guest editors for this issue are keith w whites and said zouhdi the chairmen of bianisotropics 2002conference were said zouhdi pierre et marie curie university paris and mohamed arsalane cad i ayyad university marrakesh who were assisted by scientists from moroccan universities and the international

bianisotropics conference committee

Modern EMC Analysis Techniques Volume II

2022-06-01

this book contains review papers presented at the international workshop on wave propagation scattering and emission on theory experiment simulation and inversion wps the papers are of high quality covering broad areas a new mechanism of interaction of electromagnetic waves with complex media remote sensing information computational electromagnetics etc this book summarizes the most significant progress in wave propagation encompassing theory experiment simulation and inversion it will also serve as a good reference for scientists in future research list of foreign invited speakers henry berton brooklyn polytechnic university lawrence carin duke u al chang nasa goddard margaret cheney renselaer polytech institute weng chew u of illinois at urbana champaign shane cloude ael consultants uk adrian fung u of texas at arlington al gasiewski environmental tech lab noaa martti hallikainen helsinki u of technology akira ishmaru u of washington magdy iskander u of hawaii j a kong mit roger lang george washington u alex maradudin u of california at irvine eric michielssen u of illinois at urbana champaign eni njoku caltech jet propulsion lab carey rappaport northeastern u marc saillard institut fresnel kamal sarabandi u of michigan david r smith u of california at san diego mitsuo tateiba kyushu university george uslenghi u of illinois at chicago and werner wiesbeck karlsruhe u

Solutions and Applications of Scattering, Propagation, Radiation and Emission of Electromagnetic Waves

2012-11-14

reviews the fundamental concepts behind the theory and computation of electromagnetic fields the book is divided in two parts the first part covers both fundamental theories such as vector analysis maxwell s equations boundary condition and transmission line theory and advanced topics such as wave transformation addition theorems and fields in layered media in order to benefit students at all levels the second part of the book covers the major computational methods for numerical analysis of electromagnetic fields for engineering applications these methods include the three fundamental approaches for numerical analysis of electromagnetic fields the finite difference method the finite difference time domain method in particular the finite element method and the integral equation based moment method the second part also examines fast algorithms for solving integral equations and hybrid techniques that combine different numerical methods to seek more efficient solutions of complicated electromagnetic problems theory and computation of electromagnetic fields second edition provides the foundation necessary for graduate students to learn and understand more advanced topics discusses electromagnetic analysis in rectangular cylindrical and spherical coordinates covers computational electromagnetics in both frequency and time domains includes new and updated homework problems and examples theory and computation of electromagnetic fields second edition is written for advanced undergraduate and graduate level electrical engineering students this book can also be used as a reference for professional engineers interested in learning about analysis and computation skills

Advances in Electromagnetics of Complex Media and Metamaterials

2012-12-06

to meet the demands of students scientists and engineers for a systematic reference source this book introduces comprehensively and in a single voice research and development progress in emerging metamaterials and derived functional metadevices coverage includes electromagnetic optical acoustic thermal and mechanical metamaterials and related metadevices metamaterials are artificially engineered composites with designed properties beyond those attainable in nature and with applications in all aspects of materials science from spatially tailored dielectrics to tunable dynamic materials properties and unique nonlinear behavior metamaterial systems have demonstrated tremendous flexibility and functionality in electromagnetic optical acoustic thermal and mechanical engineering furthermore the field of metamaterials has been extended from the mere pursuit of various exotic properties towards the realization of practical devices leading to the concepts of dynamically reconfigurable metadevices and functional metasurfaces the book explores the fundamental physics design and engineering aspects as well as the full array of state of the art applications to electronics telecommunications antennas and energy harvesting future challenges and potential in regard to design modeling and fabrication are also addressed

Wave Propagation, Scattering And Emission In Complex Media

2005-01-26

electromagnetic metamaterials the book presents an overview of metamaterials current state of development in several domains of application such as electromagnetics electrical engineering classical optics microwave and antenna engineering solid state physics materials sciences and optoelectronics metamaterials have become a hot topic in the scientific community in recent years due to their remarkable electromagnetic properties metamaterials have the ability to alter electromagnetic and acoustic waves in ways that bulk materials cannot electromagnetic metamaterials properties and applications discusses a wide range of components to make metamaterial engineered devices it gives an overview of metamaterials current stage of development in a variety of fields such as remote aerospace applications medical appliances sensor detectors and monitoring devices of infrastructure crowd handling smart solar panels radomes high gain antennas lens high frequency communication on the battlefield ultrasonic detectors and structures to shield from earthquakes audience researchers and engineers in electromagnetic and electrical engineering classical optics microwave and antenna engineering solid state physics materials sciences and optoelectronics

Theory and Computation of Electromagnetic Fields

2015-08-26

this book describes the most recent advances in electromagnetic theory motivated and partly informed by developments in engineering science and nanotechnology the collection of chapters provided in this edited book authored by leading experts in the field offers a bird s eye view of recent progress in electromagnetic theory spanning a wide range of topics of current interest ranging from fundamental issues to applications

Functional Metamaterials and Metadevices

2017-09-14

part 1 scattering of waves by macroscopic target interdisciplinary aspects of wave scattering acoustic scattering approximate methods electromagnetic wave scattering theory electromagnetic wave scattering approximate and numerical methods electromagnetic wave scattering applications elastodynamic wave scattering theory elastodynamic wave scattering applications scattering in oceans part 2 scattering in microscopic physics and chemical physics introduction to direct potential scattering introduction to inverse potential scattering visible and near visible light scattering practical aspects of visible and near visible light scattering nonlinear light scattering atomic and molecular scattering introduction to scattering in chemical x ray scattering neutron scattering electron diffraction and scattering part 3 scattering in nuclear physics nuclear physics part 4 particle scattering state of the art of perturbative methods scattering through electro weak interactions the fermi scale scattering through strong interactions the hadronic or qcd scale part 5 scattering at extreme physical scales scattering at extreme physical scales part 6 scattering in mathematics and non physical sciences relations with other mathematical theories inverse scattering transform and non linear partial differential equations scattering of mathematical objects

Electromagnetic Nanomaterials

2023-09-20

when a new extraordinary and outstanding theory is stated it has to face criticism and skepticism because it is beyond the usual concept the fractional calculus though not new was not discussed or developed for a long time particularly for lack of its application to real life problems it is extraordinary because it does not deal with ordinary differential calculus it is outstanding because it can now be applied to situations where existing theories fail to give satisfactory results in this book not only mathematical abstractions are discussed in a lucid manner with physical mathematical and geometrical explanations but also several practical applications are given particularly for system identification description and then efficient controls the normal physical laws like transport theory electrodynamics equation of motions elasticity viscosity and several others of are based on ordinary calculus in this book these physical laws are generalized in fractional calculus contexts taking heterogeneity effect in transport background the space having traps or islands irregular distribution of charges non ideal spring with mass connected to a pointless mass ball material behaving with viscous as well as elastic properties system relaxation with and without memory physics of random delay in computer network and several others mapping the reality of nature closely the concept of fractional and complex order differentiation and integration are elaborated mathematically physically and geometrically with examples the practical utility of local fractional differentiation for enhancing the character of singularity at phase transition or characterizing the irregularity measure of response function is deliberated practical results of viscoelastic experiments fractional order controls experiments design of fractional controller and practical circuit synthesis for fractional order elements are elaborated in this book the book also maps theory of classical integer order differential equations to fractional calculus contexts and deals in details with conflicting and demanding initialization issues required in classical techniques the book presents a modern approach to solve the solvable system of fractional and other differential equations linear non linear without perturbation or transformations but by applying physical principle of action and opposite reaction giving approximately exact series solutions historically sir isaac newton and gottfried wihelm leibniz independently discovered

calculus in the middle of the 17th century in recognition to this remarkable discovery j von neumann remarked the calculus was the first achievement of modern mathematics and it is difficult to overestimate its importance i think it defines more equivocally than anything else the inception of modern mathematical analysis which is logical development still constitute the greatest technical advance in exact thinking this xxi century has thus started to think exactly for advancement in science technology by growing application of fractional calculus and this century has started speaking the language which nature understands the best

Adventures in Contemporary Electromagnetic Theory

2023-07-31

complete coverage of all fields of electrical engineering the book provides workable definitions for practicing engineers while serving as a reference and research tool for students and offering practical information for scientists and engineers in other disciplines areas examined include applied electrical microwave control power and digital systems engineering plus device electronics

Scattering, Two-Volume Set

2002

metamaterials represent a new emerging innovative field of research which has shown rapid acceleration over the last couple of years in this handbook we present the richness of the field of metamaterials in its widest sense describing artificial media with sub wavelength structure for control over wave propagation in four volumes volume 1 focuses on the fundamentals of electromagnetic metamaterials in all their richness including metasurfaces and hyperbolic metamaterials volume 2 widens the picture to include elastic acoustic and seismic systems whereas volume 3 presents nonlinear and active photonic metamaterials finally volume 4 includes recent progress in the field of nanoplasmonics used extensively for the tailoring of the unit cell response of photonic metamaterials in its totality we hope that this handbook will be useful for a wide spectrum of readers from students to active researchers in industry as well as teachers of advanced courses on wave propagation contents volume 1 electromagnetic metamaterials ekaterina shamonina prefaceelectromagnetic metamaterials homogenization and effective properties of mixtures ari sihvola effective medium theory of electromagnetic and quantum metamaterials mário g silveirinha hyperbolic metamaterials igor i smolyaninov circuit and analytical modelling of extraordinary transmission metamaterials francisco medina francisco mesa raul rodríguez berral and carlos molero electromagnetic metasurfaces synthesis realizations and discussions karim achouri and christophe caloz metasurfaces for general control of reflection and transmission sergei tretyakov viktar asadchy and ana d íaz rubio scattering at the extreme with metamaterials and plasmonics francesco monticone and andrea alù all dielectric nanophotonics fundamentals fabrication and applications alexander krasnok roman savelev denis baranov and pavel belov tunable metamaterials ilya v shadrivov and dragomir n neshev spatial solitonic and nonlinear plasmonic aspects of metamaterials allan d boardman alesandro alberucci gaetano assanto yu g rapoport vladimir v grimalsky vasyly m ivchenko and eugen n tkachenko metamaterial catheter receivers for internal magnetic resonance imaging richard r a syms ian r young and laszlo solymar microwave sensors based on symmetry properties and metamaterial concepts jordi naqui ali k horestani christophe fumeaux and ferran martín volume 2 elastic acoustic and seismic metamaterials richard craster and sébastien guenneau preface dynamic homogenization of acoustic and elastic metamaterials and phononic crystals

richard craster tryfon antonakakis and sébastien guenneau acoustic metamaterial nicholas fang jun xu navid nemati nicolas viard and denis lafarge flat lens focusing of flexural waves in thin plates patrick sebbah and marc dubois space time cloaking martin w mcall and paul kinsler soda cans metamaterial homogenization and beyond fabrice lemoult geoffroy lerosey nadège kaïna and mathias fink new trends toward locally resonant metamaterials at the mesoscopic scale philippe roux matthieu rupin fabrice lemoult geoffroy lerosey andrea colombi richard craster sébastien guenneau william a kuperman and earl g williams seismic metamaterials controlling surface rayleigh waves using analogies with electromagnetic metamaterials stéphane brûlé stefan enoch sébastien guenneau and

Functional Fractional Calculus

2011-06-01

this volume is based on the contributions of several authors in electromagnetic waves propagations several issues are considered the contents of most of the chapters are highlighting non classic presentation of wave propagation and interaction with matters this volume bridges the gap between physics and engineering in these issues each chapter keeps the author notation that the reader should be aware of as he reads from chapter to the other

Comprehensive Dictionary of Electrical Engineering

1999-01-01

provides a comprehensive discussion of planar transmission lines and their applications focusing on physical understanding analytical approach and circuit models planar transmission lines form the core of the modern high frequency communication computer and other related technology this advanced text gives a complete overview of the technology and acts as a comprehensive tool for radio frequency rf engineers that reflects a linear discussion of the subject from fundamentals to more complex arguments introduction to modern planar transmission lines physical analytical and circuit models approach begins with a discussion of waves on transmission lines and waves in material medium including a large number of illustrative examples from published results after explaining the electrical properties of dielectric media the book moves on to the details of various transmission lines including waveguide microstrip line co planar waveguide strip line slot line and coupled transmission lines a number of special and advanced topics are discussed in later chapters such as fabrication of planar transmission lines static variational methods for planar transmission lines multilayer planar transmission lines spectral domain analysis resonators periodic lines and surfaces and metamaterial realization and circuit models emphasizes modeling using physical concepts circuit models closed form expressions and full derivation of a large number of expressions explains advanced mathematical treatment such as the variation method conformal mapping method and sda connects each section of the text with forward and backward cross referencing to aid in personalized self study introduction to modern planar transmission lines is an ideal book for senior undergraduate and graduate students of the subject it will also appeal to new researchers with the inter disciplinary background as well as to engineers and professionals in industries utilizing rf microwave technologies

World Scientific Handbook Of Metamaterials And Plasmonics

(In 4 Volumes)

2011-06-14

what is programmable matter programmable matter is matter which has the ability to change its physical properties in a programmable fashion based upon user input or autonomous sensing programmable matter is thus linked to the concept of a material which inherently has the ability to perform information processing how you will benefit i insights and validations about the following topics chapter 1 programmable matter chapter 2 metamaterial chapter 3 electropermanent magnet chapter 4 self reconfiguring modular robot chapter 5 claytronics chapter 6 cellular automaton chapter 7 quantum well chapter 8 synthetic biology ii answering the public top questions about programmable matter iii real world examples for the usage of programmable matter in many fields iv 17 appendices to explain briefly 266 emerging technologies in each industry to have 360 degree full understanding of programmable matter technologies who this book is for professionals undergraduate and graduate students enthusiasts hobbyists and those who want to go beyond basic knowledge or information for any kind of programmable matter

Electromagnetic Waves

2011-07-05

what is metamaterial a metamaterial is any material engineered to have a property that is not found in naturally occurring materials they are made from assemblies of multiple elements fashioned from composite materials such as metals and plastics the materials are usually arranged in repeating patterns at scales that are smaller than the wavelengths of the phenomena they influence metamaterials derive their properties not from the properties of the base materials but from their newly designed structures their precise shape geometry size orientation and arrangement gives them their smart properties capable of manipulating electromagnetic waves by blocking absorbing enhancing or bending waves to achieve benefits that go beyond what is possible with conventional materials how you will benefit i insights and validations about the following topics chapter 1 metamaterial chapter 2 history of metamaterials chapter 3 negative index metamaterial chapter 4 negative refraction chapter 5 photonic crystal chapter 6 electronic band structure chapter 7 oscillation ii answering the public top questions about metamaterial iii real world examples for the usage of metamaterial in many fields iv 17 appendices to explain briefly 266 emerging technologies in each industry to have 360 degree full understanding of metamaterial technologies who this book is for professionals undergraduate and graduate students enthusiasts hobbyists and those who want to go beyond basic knowledge or information for any kind of metamaterial

Introduction To Modern Planar Transmission Lines

2021-06-16

i have written this book to ll a void between theory and practice a void that i perceived while conducting my own research and development of components and instruments over the last ve years in the chapters that follow i have pulled materials from the technical and patent literature that are relevant to the understanding and practice of polarization optics in telecommuni tions material that is often known by the respective experts in industry and academia but is rarely if ever found in one place

by bringing this material into a monograph and by applying a single formalism throughout in order to create a base level upon which future research and development can grow polarization optics in telecommunications is an ever evolving field each year significant advancements are made punctuated by important discoveries the references upon which this book is based are only a snapshot in time areas that remain unresolved at the time of publication may very well be identified in the years to come moreover the focus of the field changes in time for instance there have been few passive nonreciprocal component advancements reported in the last few years but pmd and pdl advancement continues with only modest abatement

Programmable Matter

2022-01-16

master powerful new modeling tools that let you quantify and represent metamaterial properties with never before accuracy this first of its kind book brings you up to speed on breakthrough finite difference time domain techniques for modeling metamaterial characteristics and behaviors in electromagnetic systems this practical resource comes complete with sample ftd scripts to help you pave the way to new metamaterial applications and advances in antenna microwave and optics engineering you get in depth coverage of state of the art ftd modeling techniques and applications for electromagnetic bandgap ebg structures left handed metamaterials lhms wire medium metamaterials for optics and other practical metamaterials you find steps for computing dispersion diagrams dealing with material dispersion properties and verifying the left handedness moreover this comprehensive volume offers guidance for handling the unique properties possessed by metamaterials including how to define material parameters characterize the interface of metamaterial slabs and quantify their spatial as well as frequency dispersion characteristics the book also presents conformal and dispersive ftd modeling of electromagnetic cloaks perfect lens and plasmonic waveguides as well as other novel antenna microwave and optical applications over 190 illustrations support key topics throughout the book

Metamaterial

2022-01-16

this book covers the homogenization principles and mixing rules for determining the macroscopic dielectric and magnetic properties of different types of media sihvola electromagnetics helsinki u of technology finland discusses subjects such as the characteristic differences between a mixture and its parts and ways that mixing results are applied to different materials in geophysics and biology distributed by inspec annotation copyrighted by book news inc portland or

Polarization Optics in Telecommunications

2005-08-25

this volume deals with scattering theory applied mathematics modeling and biomedical engineering most of the papers describe mathematical methods numerical solutions and models for well known problems in those areas the proceedings have been selected for coverage in oco index to scientific technical proceedings istp cdrom version isi proceedings

Radio Science

2007-11

succinct yet comprehensive coverage of the most important terms acronyms and definitions made the first edition of the comprehensive dictionary of electrical engineering a bestseller recent advances in many disciplines of this rapidly growing field have made necessary a new edition of this must have reference this authoritative lexicon includes more than 1500 additional terms now supplying more than 11 000 total terms gathered by a stellar international panel of the world s leading experts compiled from crc s immensely popular and highly respected handbooks and accompanied by more than 120 tables and illustrations new areas to this edition include process control and instrumentation embedded sensors and systems biomedical engineering hybrid vehicles mechatronics data storage gis includes new terms reflecting the rapid growth in computer electronics image processing nanotechnology fuel cells phillip laplante has again succeeded in producing an invaluable up to date reference for the entire field of electrical engineering covering device electronics and applied electrical microwave control power and digital systems engineering in addition to the new areas listed above whether you are a practicing or student electrical engineer or a professional from another field in need of complete and updated information you need look no further than the comprehensive dictionary of electrical engineering second edition

FDTD Modeling of Metamaterials: Theory and Applications

2008-10-01

this book deals with the reflection of electromagnetic and particle waves by interfaces the interfaces can be sharp or diffuse the topics of the book contain absorption inverse problems anisotropy pulses and finite beams rough surfaces matrix methods numerical methods reflection of particle waves and neutron reflection exact general results are presented followed by long wave reflection variational theory reflection amplitude equations of the riccati type and reflection of short waves the second edition of the theory of reflection is an updated and much enlarged revision of the 1987 monograph there are new chapters on periodically stratified media ellipsometry chiral media neutron reflection and reflection of acoustic waves the chapter on anisotropy is much extended with a complete treatment of the reflection and transmission properties of arbitrarily oriented uniaxial crystals the book gives a systematic and unified treatment reflection and transmission of electromagnetic and particle waves at interfaces it is intended for physicists chemists applied mathematicians and engineers and is written in a simple direct style with all necessary mathematics explained in the text

Electromagnetic Mixing Formulas and Applications

1999

it is well known by now that the angular momentum carried by elementary particles can be categorized as spin angular momentum sam and orbital angular momentum oam in the early 1900s poynting recognized that a particle such as a photon can carry sam which has only two possible states i e clockwise and anticlockwise circular polarization states however only fairly recently in 1992 allen et al discovered that photons with helical phase fronts can carry oam which has infinite orthogonal states in the past two decades the oam carrying beam due to its unique features has gained increasing interest

from many different research communities including physics chemistry and engineering its twisted phase front and intensity distribution have enabled a variety of applications such as micromanipulation laser beam machining nonlinear matter interactions imaging sensing quantum cryptography and classical communications this book aims to explore novel insights of oam beams it focuses on state of the art advances in fundamental theories devices and applications as well as future perspectives of oam beams

Scattering and Biomedical Engineering

2002

this book gives guidance to solve problems in electromagnetics providing both examples of solving serious research problems as well as the original results to encourage further investigations the book contains seven chapters on various aspects of resonant wave scattering each solving one original problem all of them are unified by the authors desire to show advantages of rigorous approaches at all stages from the formulation of a problem and the selection of a method to the interpretation of results the book reveals a range of problems associated with wave propagation and scattering in natural and artificial environments or with the design of antennas elements the authors invoke both theoretical analytical and numerical and experimental techniques for handling the problems attention is given to mathematical simulations computational efficiency and physical interpretation of the experimental results the book is written for students graduate students and young researchers

Comprehensive Dictionary of Electrical Engineering

2018-10-03

publishes papers that report results of research in statistical physics plasmas fluids and related interdisciplinary topics there are sections on 1 methods of statistical physics 2 classical fluids 3 liquid crystals 4 diffusion limited aggregation and dendritic growth 5 biological physics 6 plasma physics 7 physics of beams 8 classical physics including nonlinear media and 9 computational physics

Theory of Reflection

2016-01-13

this book describes the physics behind the optical properties of plasmonic nanostructures focusing on chiral aspects it explains in detail how the geometry determines chiral near fields and how to tailor their shape and strength electromagnetic fields with strong optical chirality interact strongly with chiral molecules and therefore can be used for enhancing the sensitivity of chiroptical spectroscopy techniques besides a short review of the latest results in the field of plasmonically enhanced enantiomer discrimination this book introduces the concept of chiral plasmonic near field sources for enhanced chiroptical spectroscopy the discussion of the fundamental properties of these light sources provides the theoretical basis for further optimizations and is of interest for researchers at the intersection of nano optics plasmonics and stereochemistry

Microwaves & RF.

1995

Novel Insights into Orbital Angular Momentum Beams: From Fundamentals, Devices to Applications

2019-09-03

Journal of Communications Technology & Electronics

1998

Electromagnetic Waves in Complex Systems

2016-05-24

Physical Review

1995-06

Proceedings of Bianisotropics '97

1997

Chiral Nanophotonics

2016-11-11

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