

Microwave Engineering 16 Marks

A practical microwave correlation radiometer was built and tested. Feedback was used to ensure stability and make it unnecessary to match receiver channels. The rms temperature deviation was derived and found to be square root of 2 times that of a total power radiometer. Two separate systems to provide an ac multiplier output were built and evaluated. In one, the receiver channels were tuned to a slightly different frequency while in the other, phase reversal in one channel at an ac rate provided the modulation. The latter method proved easier to instrument. (Author).

Highlighting the challenges RF and microwave circuit designers face in their day-to-day tasks, RF and Microwave Circuits, Measurements, and Modeling explores RF and microwave circuit designs in terms of performance and critical design specifications. The book discusses transmitters and receivers first in terms of functional circuit block and then examines each block individually. Separate articles consider fundamental amplifier issues, low noise amplifiers, power amplifiers for handset applications and high power, power amplifiers. Additional chapters cover other circuit functions including oscillators, mixers, modulators, phase locked loops, filters and multiplexers. New chapters discuss high-power

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PAs, bit error rate testing, and nonlinear modeling of heterojunction bipolar transistors, while other chapters feature new and updated material that reflects recent progress in such areas as high-volume testing, transmitters and receivers, and CAD tools. The unique behavior and requirements associated with RF and microwave systems establishes a need for unique and complex models and simulation tools. The required toolset for a microwave circuit designer includes unique device models, both 2D and 3D electromagnetic simulators, as well as frequency domain based small signal and large signal circuit and system simulators. This unique suite of tools requires a design procedure that is also distinctive. This book examines not only the distinct design tools of the microwave circuit designer, but also the design procedures that must be followed to use them effectively.

Systems. Microwave transmission, control, detection, and generation. Microwave measurements. Microwave subsystems.

Sample Text

Detailing the active and passive aspects of microwaves, *Microwave Engineering: Concepts and Fundamentals* covers everything from wave propagation to reflection and refraction, guided waves, and transmission lines, providing a comprehensive understanding of the underlying principles at the core of

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microwave engineering. This encyclopedic text not only presents the basic principles, characteristics and applications of commonly used microwave devices used in the design of microwave systems. The book begins with a brief overview of the field of microwave engineering and then provides a thorough review of two prerequisite topics in electromagnetics, that is, electromagnetic field theory and transmission lines, so essential to know before analysing and designing microwave systems. The book presents the full spectrum of both passive and active microwave components. Hollow pipe waveguides are thoroughly analysed with respect to their field components and other important characteristics such as bandwidth, dispersive nature, various impedances, and attenuation parameters. The basic principles of various types of microwave junctions used for power division, addition, and in measurement systems, such as tees, directional-couplers, circulators, gyrators, etc. are explained, along with their scattering parameters required for the analysis of microwave circuits. The text also presents a comprehensive analytical treatment of microwave tubes in common use, such as klystrons, magnetrons, TWTs, and solid state sources such as Gunn diodes, IMPATT diodes, funnel diodes and PiN diodes, etc. Finally, the book describes the laboratory procedures for measurements of various parameters of circuits working at microwave

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frequencies. The book contains an instructional framework at the end of each chapter composed of questions, problems, and objective type questions to enable students to gain skills in applying the principles and techniques learned in the text. The book is appropriate for a course in Microwave Engineering at the level of both undergraduate and postgraduate students of Electronics and Communication Engineering.

This authoritative resource provides you with comprehensive and detailed coverage of the wave approach to microwave network characterization, analysis, and design using scattering parameters. For the first time in any book, all aspects and approaches to wave variables and the scattering matrix are explored. The book compares and contrasts voltage waves, travelling waves, pseudo waves, and power waves, and explains the differences between real scattering parameters, pseudo scattering parameters, and power scattering parameters. You find important discussions on standard scattering matrices and wave quantities, mixed mode wave variables, and noise wave variables with noise wave correlation matrices. Moreover, the book presents clear methods for standard single ended multiport network design and noise analysis. This in-depth reference is packed with over 1,100 equations and numerous illustrations. Authored by two of the leading authorities in the field, this guide offers readers

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the knowledge and skills needed to achieve proficiency with embedded software. Handbook of Agricultural and Farm Machinery, Third Edition, is the essential reference for understanding the food industry, from farm machinery, to dairy processing, food storage facilities and the machinery that processes and packages foods. Effective and efficient food delivery systems are built around processes that maximize efforts while minimizing cost and time. This comprehensive reference is for engineers who design and build machinery and processing equipment, shipping containers, and packaging and storage equipment. It includes coverage of microwave vacuum applications in grain processing, cacao processing, fruit and vegetable processing, ohmic heating of meat, facility design, closures for glass containers, double seaming, and more. The book's chapters include an excellent overview of food engineering, but also regulation and safety information, machinery design for the various stages of food production, from tillage, to processing and packaging. Each chapter includes the state-of-the art in technology for each subject and numerous illustrations, tables and references to guide the reader through key concepts. Describes the latest breakthroughs in food production machinery Features new chapters on engineering properties of food materials, UAS applications, and microwave processing of foods Provides efficient access to fundamental information and presents real-world applications Includes design of machinery and facilities as well as theoretical bases for determining and predicting behavior of foods as they are handled and processed

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The leading text and reference on radar cross section (RCS) theory and applications, this work presents a comparison of two radar signal strengths. One is the strength of the radar beam sweeping over a target, the other is the strength of the reflected echo sensed by the receiver. This book shows how the RCS "gauge" can be predicted for theoretical objects.

Discusses the fundamental principles of the design and development of microwave satellite switches utilized in military, commercial, space, and terrestrial communication. This book deals with important RF/microwave components such as switches and phase shifters, which are relevant to many RF/microwave applications. It provides the reader with fundamental principles of the operation of some basic ferrite control devices and explains their system uses. This in-depth exploration begins by reviewing traditional nonreciprocal components, such as circulators, and then proceeds to discuss the most recent advances. This sequential approach connects theoretical and scientific characteristics of the devices listed in the title with practical understanding and implementation in the real world. Microwave Polarizers, Power Dividers, Phase Shifters, Circulators and Switches covers the full scope of the subject matter and serves as both an educational text and resource for practitioners. Among the many topics discussed are microwave switching, circular polarization, planar wye and equilateral triangle resonators, and many others. Translates concepts and ideas fundamental to scientific knowledge into a more visual description. Describes a wide array of devices including

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waveguides, shifters, and circulators Covers the use of finite element algorithms in design Microwave Polarizers, Power Dividers, Phase Shifters, Circulators and Switches is an ideal reference for all practitioners and graduate students involved in this niche field.

With this self-contained, introductory text, readers will easily understand the fundamentals of microwave and radar image generation. Written with the complete novice in mind, and including an easy-to-follow introduction to electromagnetic scattering theory, it covers key topics such as forward models of scattering for interpreting S-parameter and time-dependent voltage data, S-parameters and their analytical sensitivity formulae, basic methods for real-time image reconstruction using frequency-sweep and pulsed-radar signals, and metrics for evaluating system performance. Numerous application examples and practical tutorial exercises provided throughout allow quick understanding of key concepts, and sample MATLAB codes implementing key reconstruction algorithms accompany the book online. This one-stop resource is ideal for graduate students taking introductory courses in microwave imaging, as well as researchers and industry professionals wanting to learn the fundamentals of the field.

This chapter presents high-efficiency power amplifiers (PAs) for wireless infrastructure. It starts by stating the importance of high efficiency and the historical evolution in base station PA concepts. It then introduces the current solution, the Doherty PA. After

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explaining the fundamentals of the Doherty PA, a novel implementation achieving more than 35% drain efficiency across a 6dB power back-off range and up to 20W peak power between 1.7 and 2.3GHz is given. Afterwards, a future PA concept, switch-mode outphasing PA, is introduced. Theory and implementation details of a class-E outphasing PA achieving more than 60% drain efficiency across a 6dB power back-off range and up to 19W peak power between 1800 and 2050MHz is explained. By the end of the chapter, an essential part of switch-mode PAs, high voltage (up to 10V) and high frequency (up to 4GHz) drivers are presented.

Planar Microwave Engineering A Practical Guide to Theory, Measurement, and Circuits
Cambridge University Press

The IET has organised training courses on microwave measurements since 1983, at which experts have lectured on modern developments. Their lecture notes were first published in book form in 1985 and then again in 1989, and they have proved popular for many years with a readership beyond those who attended the courses. The purpose of this third edition of the lecture notes is to bring the latest techniques in microwave measurements to this wider audience. The book begins with a survey of the theory of current microwave circuits and continues with a description of the techniques for the measurement of power, spectrum, attenuation, circuit parameters, and noise. Various other areas like measurements of antenna characteristics, free fields, modulation and dielectric parameters are also included. The emphasis throughout is on good

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measurement practice. All the essential theory is given and a previous knowledge of the subject is not assumed.

Designed as a textbook for the B.E./B.Tech. students of Electronics and Communication Engineering, Computer Science and Engineering, Biomedical Engineering and Information Technology, this book provides the fundamental concepts and applications of probability and random processes. Beginning with a discussion on probability theory, the text analyses various types of random processes. Besides, the text discusses in detail the random variables, standard distributions, correlation and spectral densities, and linear systems. The topics are dealt with in a well-organised sequence with proper explanations along with simple mathematical formulations. **KEY FEATURES :** Gives concise and clear presentation of the concepts. Provides a large number of illustrative examples with step-by-step solutions to help students comprehend the concepts with ease. Includes questions asked in university examinations for the last several years to help students in preparing for examinations. Provides hints and answers to unsolved problems. Incorporates chapter-end exercises to drill the students in self-study.

Fundamentals of Materials Science and Engineering takes an integrated approach to the sequence of topics – one specific structure, characteristic, or property type is covered in turn for all three basic material types: metals, ceramics, and polymeric materials. This presentation permits the early introduction of non-metals and supports

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the engineer's role in choosing materials based upon their characteristics. Using clear, concise terminology that is familiar to students, Fundamentals presents material at an appropriate level for both student comprehension and instructors who may not have a materials background.

Learn the fundamentals of integrated communication microsystems Advanced communication microsystems—the latest technology to emerge in the semiconductor sector after microprocessors—require integration of diverse signal processing blocks in a power-efficient and cost-effective manner. Typically, these systems include data acquisition, data processing, telemetry, and power management. The overall development is a synergy among system, circuit, and component-level designs with a strong emphasis on integration. This book is targeted at students, researchers, and industry practitioners in the semiconductor area who require a thorough understanding of integrated communication microsystems from a developer's perspective. The book thoroughly and carefully explores: Fundamental requirements of communication microsystems System design and considerations for wired and wireless communication microsystems Advanced block-level design techniques for communication microsystems Integration of communication systems in a hybrid environment Packaging considerations Power and form factor trade-offs in building integrated microsystems Advanced Integrated Communication Microsystems is an ideal textbook for advanced undergraduate and graduate courses. It also serves as a valuable reference for

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researchers and practitioners in circuit design for telecommunications and related fields.

Modern wireless communications hardware is underpinned by RF and microwave design techniques. This insightful book contains a wealth of circuit layouts, design tips, and practical measurement techniques for building and testing practical gigahertz systems. The book covers everything you need to know to design, build, and test a high-frequency circuit. Microstrip components are discussed, including tricks for extracting good performance from cheap materials. Connectors and cables are also described, as are discrete passive components, antennas, low-noise amplifiers, oscillators, and frequency synthesizers. Practical measurement techniques are presented in detail, including the use of network analyzers, sampling oscilloscopes, spectrum analyzers, and noise figure meters. Throughout the focus is practical, and many worked examples and design projects are included. There is also a CD-ROM that contains a variety of design and analysis programs. The book is packed with indispensable information for students taking courses on RF or microwave circuits and for practising engineers. CD-ROM contains: PUFF 2.1 for construction and evaluation of circuits.

Microwave systems are key components of every modern wireless communication system. The main objective of this book was to collect as many different state-of-the-art studies as possible in order to cover in a single volume the main aspects of microwave systems and applications. This book contains 17 chapters written by acknowledged

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experts, researchers, academics, and microwave engineers, providing comprehensive information and covering a wide range of topics on all aspects of microwave systems and applications. This book is divided into four parts. The first part is devoted to microwave components. The second part deals with microwave ICs and innovative techniques for on-chip antenna design. The third part presents antenna design cases for microwave systems. Finally, the last part covers different applications of microwave systems.

Introduction to Antenna Placement and Installation introduces the characteristics of antennas and their integration on aircraft. The book covers antenna siting and placement, computational antenna modelling on structures, measurement on sub-scale models of the airframe, full-scale ground measurements and in-flight measurements. The author addresses the different stages in the process of developing an entire antenna layout, as well as covering individual retrofits on existing platforms. She explains the physics of antenna placement qualitatively, thus obviating the requirement to understand complex mathematical equations. Provides a reference book & guide written primarily for Antenna and Integration Engineers but which will also be of interest to Systems Engineers and Project Managers Includes chapters on aircraft systems using antennas, restrictions & trade-offs, frequency & spatial coverage considerations, effect of other antennas & obstacles, RF interoperability issues associated with radiated emissions, computer modelling software, scaled model & full-scale measurements,

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comparison between measurements & modelling, as well as ground tests and in-flight measurements Describes techniques that can be applied equally to antennas on other structures such as land or sea vehicles and spacecraft Illustrated throughout with figures & diagrams as well as a full colour plates

By 1990 the wireless revolution had begun. In late 2000, Mike Golio gave the world a significant tool to use in this revolution: The RF and Microwave Handbook. Since then, wireless technology spread across the globe with unprecedented speed, fueled by 3G and 4G mobile technology and the proliferation of wireless LANs. Updated to reflect this tremendous growth, the second edition of this widely embraced, bestselling handbook divides its coverage conveniently into a set of three books, each focused on a particular aspect of the technology. Six new chapters cover WiMAX, broadband cable, bit error ratio (BER) testing, high-power PAs (power amplifiers), heterojunction bipolar transistors (HBTs), as well as an overview of microwave engineering. Over 100 contributors, with diverse backgrounds in academic, industrial, government, manufacturing, design, and research reflect the breadth and depth of the field. This eclectic mix of contributors ensures that the coverage balances fundamental technical issues with the important business and marketing constraints that define commercial RF and microwave engineering. Focused chapters filled with formulas, charts, graphs, diagrams, and tables make the information easy to locate and apply to practical cases. The new format, three tightly focused volumes, provides not only increased information

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but also ease of use. You can find the information you need quickly, without wading through material you don't immediately need, giving you access to the caliber of data you have come to expect in a much more user-friendly format.

Building on the success of the previous three editions, *Foundations for Microstrip Circuit Design* offers extensive new, updated and revised material based upon the latest research. Strongly design-oriented, this fourth edition provides the reader with a fundamental understanding of this fast expanding field making it a definitive source for professional engineers and researchers and an indispensable reference for senior students in electronic engineering. Topics new to this edition: microwave substrates, multilayer transmission line structures, modern EM tools and techniques, microstrip and planar transmission line design, transmission line theory, substrates for planar transmission lines, Vias, wirebonds, 3D integrated interposer structures, computer-aided design, microstrip and power-dependent effects, circuit models, microwave network analysis, microstrip passive elements, and slotline design fundamentals. Gain fast access to design information required for any RF communication project using high-frequency circuits and systems with this bestseller. It contains measurement methods, system calculations, statistical procedures, and actual circuit and measurement examples that help you shorten design cycles, improve quality, and reduce design risks. Augmented with 400 equations and 210 figures, the book is an ideal reference for product designers and consultants in the RF and wireless

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communications industry and an outstanding learning tool for classroom use. The must-have specifications writing reference—and essential study aid for the Certified Construction Specifier (CCS) Exam The CSI Practice Guides are a library of comprehensive references specifically and carefully designed for the construction professional. Each book examines important concepts and best practices integral to a particular aspect of the building process. The CSI Construction Specifications Practice Guide is focused on the roles and responsibilities of the specifications professional in meeting the challenges of the changing world of construction. In this volume, guidelines on topics like writing quality construction specifications and product selection are meshed with best practices for managing project information, working with Building Information Modeling (BIM) and Integrated Project Delivery, and writing sustainable design specifications. Other material covered in this guide includes: The Construction Specifications Institute's collected best practices for authoring specifications Specialized guidance on presentation and management of project information in the context of Building Information Modeling and sustainable design Includes access to a password-protected web site with bonus content, including a PDF of the printed book and copies of CSI format documents, such as UniFormat and SectionFormat/PageFormat An authoritative resource for effective written communication of design intent, The CSI Construction Specifications Practice Guide presents construction professionals and students studying for the Certified Construction

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Specifier (CCS) Exam with a solid foundation for improving their methods of collecting and delivering important specifications data. Serves as an authoritative resource for effective writing of design intent Includes CSI's best practices for authoring specifications Offers specialized guidance on project information in the context of BIM and sustainable design

This book presents a comprehensive and substantial overview of the emerging field of food safety engineering, bringing together in one volume the four essential components of food safety: the fundamentals of microbial growth food safety detection techniques microbial inactivation techniques food safety management systems Written by a team of highly active international experts with both academic and professional credentials, the book is divided into five parts. Part I details the principles of food safety including microbial growth and modelling. Part II addresses novel and rapid food safety detection methods. Parts III and IV look at various traditional and novel thermal and non-thermal processing techniques for microbial inactivation. Part V concludes the book with an overview of the major international food safety management systems such as GMP, SSOP, HACCP and ISO22000.

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 advanced topics necessary for a complete understanding of inverse synthetic aperture

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radar (ISAR) imaging and its concepts. Distinguished author and academician, Caner Özdemir, describes the practical aspects of ISAR imaging and presents 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 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 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 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 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 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 Algorithms also belongs on the bookshelves of practicing

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researchers in the related areas looking for a useful resource to assist them in their day-to-day professional work.

This classic text provides a thorough coverage of RF and microwave engineering concepts based on fundamental principles of electrical engineering and applied to microwave circuits and devices of practical importance. Coverage includes microwave network analysis, impedance matching, directional couplers and hybrids, microwave filters, ferrite devices, noise, nonlinear effects, and the design of microwave oscillators, amplifiers, and mixers. A large number of examples and end-of-chapter problems test the reader's understanding of the material.

- Electromagnetic Theory
- Transmission Line Theory
- Transmission Lines and Waveguides
- Microwave Network Analysis
- Impedance Matching and Tuning
- Microwave Resonators
- Power Dividers and Directional Couplers
- Microwave Filters
- Theory and Design of Ferrimagnetic Components
- Noise and Active RF Components
- Microwave Amplifier Design
- Oscillators and Mixers

Introduction to Microwave Systems

Microengineering Aerospace Systems is a textbook tutorial encompassing MEMS (micro-electromechanical systems), nanoelectronics, packaging, processing, and materials characterization for developing miniaturized smart instruments for aerospace systems (i.e., ASIM application-specific integrated microinstrument), satellites, and satellite subsystems. Third in a series of Aerospace Press publications covering this rapidly advancing technology, this work presents fundamental aspects of the

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technology and specific aerospace systems applications through worked examples. Based on the popular Artech House title Microwave Network Design Using the Scattering Matrix, this authoritative resource provides comprehensive coverage of the wave approach to microwave network characterization, analysis, and design using scattering parameters. New topics include signal and noise analysis of differential microwave networks based on mixed mode wave variables, generalized mixed mode scattering, and generalized mixed mode noise wave scattering matrix. This one of a kind resource presents all aspects and topics related to the scattering matrix which have been developed and applied in microwave theory and practice. The book is an excellent source of theoretical information on the wave variables and scattering matrix and their application to microwave network characterization, modeling, analysis and design. This book demonstrates the approach of noise and signal analysis and how it is applicable to two port networks and their cascades, multi-ports and multi-element multiport networks with standard single-ended ports with differential ports and simultaneously with single-ended and differential ports. It is suitable for beginners, and students as well as experienced engineers and researchers working in the field of microwaves.

The first book to cover all engineering aspects of microwave communication path design for the digital age Fixed point-to-point microwave systems provide moderate-capacity digital transmission between well-defined locations. Most popular in situations

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where fiber optics or satellite communication is impractical, it is commonly used for cellular or PCS site interconnectivity where digital connectivity is needed but not economically available from other sources, and in private networks where reliability is most important. Until now, no book has adequately treated all engineering aspects of microwave communications in the digital age. This important new work provides readers with the depth of knowledge necessary for all the system engineering details associated with fixed point-to-point microwave radio path design: the why, what, and how of microwave transmission; design objectives; engineering methodologies; and design philosophy (in the bid, design, and acceptance phase of the project). Written in an easily accessible format, Digital Microwave Communication features an appendix of specialized engineering details and formulas, and offers up chapter coverage of: A Brief History of Microwave Radio Microwave Radio Overview System Components Hypothetical Reference Circuits Multipath Fading Rain Fading Reflections and Obstructions Network Reliability Calculations Regulation of Microwave Radio Networks Radio Network Performance Objectives Designing and Operating Microwave Systems Antennas Radio Diversity Ducting and Obstruction Fading Digital Receiver Interference Path Performance Calculations Digital Microwave Communication: Engineering Point-to-Point Microwave Systems will be of great interest to engineers and managers who specify, design, or evaluate fixed point-to-point microwave systems associated with communications systems and equipment manufacturers, independent and university

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research organizations, government agencies, telecommunications services, and other users.

Microwave Devices, Circuits and Subsystems for Communications Engineering provides a detailed treatment of the common microwave elements found in modern microwave communications systems. The treatment is thorough without being unnecessarily mathematical. The emphasis is on acquiring a conceptual understanding of the techniques and technologies discussed and the practical design criteria required to apply these in real engineering situations. Key topics addressed include: Microwave diode and transistor equivalent circuits Microwave transmission line technologies and microstrip design Network methods and s-parameter measurements Smith chart and related design techniques Broadband and low-noise amplifier design Mixer theory and design Microwave filter design Oscillators, synthesizers and phase locked loops Each chapter is written by specialists in their field and the whole is edited by experience authors whose expertise spans the fields of communications systems engineering and microwave circuit design. Microwave Devices, Circuits and Subsystems for Communications Engineering is suitable for senior electrical, electronic or telecommunications engineering undergraduate students, first year postgraduate students and experienced engineers seeking a conversion or refresher text.

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Includes a companion website featuring: Solutions to selected problems

Electronic versions of the figures Sample chapter

Annotation This practical "how to" book is an ideal introduction to electromagnetic field-solvers. Where most books in this area are strictly theoretical, this unique resource provides engineers with helpful advice on selecting the right tools for their RF (radio frequency) and high-speed digital circuit design work

The book is primarily designed to cater to the needs of undergraduate and postgraduate students of Electronics and Communication Engineering and allied branches. The book has been written keeping average students in mind. This well-organised and lucidly written text gives a comprehensive view of microwave concepts covering its vast spectrum, transmission line, network analysis, microwave tubes, microwave solid-state devices, microwave measurement techniques, microwave antenna theories, radars and satellite communication.

KEY FEATURES

- A fairly large number of well-labelled diagrams provides practical understanding of the concepts.
- Solved numerical problems aptly crafted and placed right after conceptual discussion provide better comprehension of the subject matter.
- Chapter summary highlights important points for quick recap and revision before examination.
- About 200 MCQs with answers help students to prepare for competitive examinations.
- Appropriate

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number of unsolved numerical problems with answers improves problem solving skill of students. • Simplified complex mathematical derivations by synthesising them in smaller parts for easy grasping. Audience Undergraduate and Postgraduate students of Electronics and Communication Engineering and allied branches

The ultimate handbook on microwave circuit design with CAD. Full of tips and insights from seasoned industry veterans, Microwave Circuit Design offers practical, proven advice on improving the design quality of microwave passive and active circuits-while cutting costs and time. Covering all levels of microwave circuit design from the elementary to the very advanced, the book systematically presents computer-aided methods for linear and nonlinear designs used in the design and manufacture of microwave amplifiers, oscillators, and mixers. Using the newest CAD tools, the book shows how to design transistor and diode circuits, and also details CAD's usefulness in microwave integrated circuit (MIC) and monolithic microwave integrated circuit (MMIC) technology. Applications of nonlinear SPICE programs, now available for microwave CAD, are described. State-of-the-art coverage includes microwave transistors (HEMTs, MODFETs, MESFETs, HBTs, and more), high-power amplifier design, oscillator design including feedback topologies, phase noise and examples, and more. The

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techniques presented are illustrated with several MMIC designs, including a wideband amplifier, a low-noise amplifier, and an MMIC mixer. This unique, one-stop handbook also features a major case study of an actual anticollision radar transceiver, which is compared in detail against CAD predictions; examples of actual circuit designs with photographs of completed circuits; and tables of design formulae.

Technological advances have created a need for the merger and rethinking of past testing approaches for wireless equipment. This first-of-its-kind resource offers professionals an in-depth overview of cutting-edge RF (radio frequency) and SOC (system on a chip) product testing for wireless communications.

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