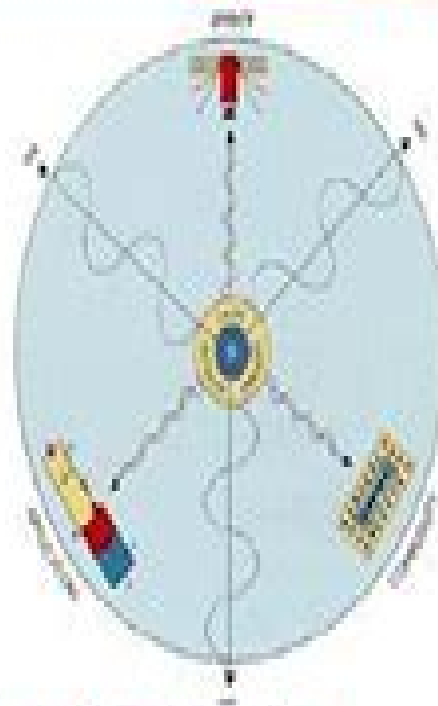


# Radio Frequency

AND

# MICROWAVE ELECTRONICS

ILLUSTRATED



Matthew M. Radmanesh

# Radio Frequency And Microwave Electronics Illustrated

**Ian Robertson, Nutapong  
Somjit, Mitchai Chongcheawchamnan**



## **Radio Frequency And Microwave Electronics Illustrated:**

Radio Frequency and Microwave Electronics Illustrated Matthew M. Radmanesh, 2001 Foreword by Dr Asad Madni C Eng Fellow IEEE Fellow IEE Learn the fundamentals of RF and microwave electronics visually using many thoroughly tested practical examples RF and microwave technology are essential throughout industry and to a world of new applications in wireless communications in Direct Broadcast TV in Global Positioning System GPS in healthcare medical and many other sciences Whether you're seeking to strengthen your skills or enter the field for the first time Radio Frequency and Microwave Electronics Illustrated is the fastest way to master every key measurement electronic and design principle you need to be effective Dr Matthew Radmanesh uses easy mathematics and a highly graphical approach with scores of examples to bring about a total comprehension of the subject Along the way he clearly introduces everything from wave propagation to impedance matching in transmission line circuits microwave linear amplifiers to hard core nonlinear active circuit design in Microwave Integrated Circuits MICs Coverage includes A scientific framework for learning RF and microwaves easily and effectively Fundamental RF and microwave concepts and their applications The characterization of two port networks at RF and microwaves using S parameters Use of the Smith Chart to simplify analysis of complex design problems Key design considerations for microwave amplifiers stability gain and noise Workable considerations in the design of practical active circuits amplifiers oscillators frequency converters control circuits RF and Microwave Integrated Circuits MICs Novel use of live math in circuit analysis and design Dr Radmanesh has drawn upon his many years of practical experience in the microwave industry and educational arena to introduce an exceptionally wide range of practical concepts and design methodology and techniques in the most comprehensible fashion Applications include small signal narrow band low noise broadband and multistage transistor amplifiers large signal high power amplifiers microwave transistor oscillators negative resistance circuits microwave mixers rectifiers and detectors switches phase shifters and attenuators The book is intended to provide a workable knowledge and intuitive understanding of RF and microwave electronic circuit design Radio Frequency and Microwave Electronics Illustrated includes a comprehensive glossary plus appendices covering key symbols physical constants mathematical identities formulas classical laws of electricity and magnetism Computer Aided Design CAD examples and more About the Web Site The accompanying web site has an E Book containing actual design examples and methodology from the text in Microsoft Excel environment where files can easily be manipulated with fresh data for a new design

**Advanced RF & Microwave Circuit Design** Matthew M. Radmanesh Ph. D., Matthew M. Radmanesh, 2009 RF and Microwaves is currently in the forefront as a fundamental technology in numerous industrial and commercial applications As applications of RF and microwaves continue to evolve and as this technology becomes a common factor in the scientific and engineering communities it is imperative that university students and practicing scientists and engineers become thoroughly familiar with the measurement principles electronics and design fundamentals underlying this technology RF and

Microwaves is currently in the forefront as a fundamental technology in numerous industrial and commercial applications. As applications of RF and microwaves continue to evolve and as this technology becomes a common factor in the scientific and engineering communities, it is imperative that university students and practicing scientists and engineers become thoroughly familiar with the measurement principles, electronics, and design fundamentals underlying this technology.

**Advanced RF Microwave Circuit Design** is the quickest way to master this powerful subject, and information contained within the pages of this book will make every key electronic measurement and design principle you need a simple task. The book introduces concepts on a wide range of materials and has several advantages over existing texts, including:

1. The presentation of a series of scientific postulates and axioms which lays the foundation for any of the engineering sciences and is unique to this book, compared with similar RF and Microwave texts.

*RF & Microwave Design Essentials* Matthew M. Radmanesh, 2007

**RF Microwave Design Essentials** This book is an indispensable tool for the RF Microwave engineer as well as the scientist in the field working on the high frequency circuit applications. You will discover:

- Electricity Fundamentals
- Wave propagation
- Amplifier Design
- Gain Equations
- CAD Examples
- S Parameters
- Circuit Noise
- RF Design
- Circuit Stability
- Transmission Lines
- RF Microwave Bands
- Matching Circuit Design
- Smith Chart Applications
- BJT and FET Circuit Design
- Advanced RF Microwave Concepts

The most realistic and inspiring book with invaluable practical insights. Dr. S. K. Ramesh, Dean of Engineering, California State University Northridge.

A completely unique book that unlocks the mysteries of our microwave world. Paul Luong, Senior Microwave Engineer, ATK Mission Systems Inc.

The CD-ROM provides design worksheets and menus as well as actual design examples in a Microsoft Excel Environment where the student can design or analyze RF Microwave circuits easily and efficiently.

**Advanced RF & Microwave Circuit Design** Matthew M. Radmanesh, 2008-11-10

**RF and Microwaves** is currently in the forefront as a fundamental technology in numerous industrial and commercial applications. As applications of RF and microwaves continue to evolve and as this technology becomes a common factor in the scientific and engineering communities, it is imperative that university students and practicing scientists and engineers become thoroughly familiar with the measurement principles, electronics, and design fundamentals underlying this technology.

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**Advanced RF Microwave Circuit Design** is the quickest way to master this powerful subject, and information contained within the pages of this book will make every key electronic measurement and design principle you need a simple task. The book introduces concepts on a wide range of materials and has several advantages over existing texts, including:

1. The presentation of a series of scientific postulates and axioms which lays the foundation for any of the engineering sciences and is unique to this book.

compared with similar RF and Microwave texts 2 The presentation of classical laws and principles of electricity and magnetism all inter related conceptually and graphically 3 There is a shift of emphasis from rigorous mathematical solutions of Maxwells equations and instead has been aptly placed on simple yet fundamental concepts that underlie these equations This shift of emphasis will promote a deeper understanding of the electronics particularly at RF Microwave frequencies 4 Fundamentals of electronics have been amply treated which makes an easy transition to RF Microwave principles and prevents a gap of knowledge in the readers mind

Microwave Integrated Circuit Components Design through MATLAB® S Raghavan, 2019-11-11 MICROWAVE INTEGRATED CIRCUIT COMPONENTS DESIGN THROUGH MATLAB This book teaches the student community microwave integrated circuit component design through MATLAB helping the reader to become conversant in using codes and thereafter commercial software for verification purposes only Microwave circuit theory and its comparisons transmission line networks S parameters ABCD parameters basic design parameters of planar transmission lines striplines microstrips slot lines coplanar waveguides finlines filter theory Smith chart inverted Smith chart stability circles noise figure circles and microwave components are thoroughly explained in the book The chapters are planned in such a way that readers get a thorough understanding to ensure expertise in design Aimed at senior undergraduates graduates and researchers in electrical engineering electromagnetics microwave circuit design and communications engineering this book Explains basic tools for design and analysis of microwave circuits such as the Smith chart and network parameters Gives the advantage of realizing the output without wiring the circuit by simulating through MATLAB code Compares distributed theory with network theory Includes microwave components filters and amplifiers S Raghavan was a Senior Professor HAG in the Department of Electronics and Communication Engineering National Institute of Technology NIT Trichy India and has 39 years of teaching and research experience at the Institute His interests include microwave integrated circuits RF MEMS Bio MEMS metamaterial frequency selective surfaces FSS substrate integrated waveguides SIW biomedical engineering and microwave engineering He has established state of the art MICs and microwave research laboratories at NIT Trichy with funding from the Indian government He is a Fellow Senior Member in more than 24 professional societies including IEEE MTT EMBS APS IETE IEI CSI TSI ISSS ILA and ISOI He is twice a recipient of the Best Teacher Award and has received the Life Time Achievement Award Distinguished Professor of Microwave Integrated Circuit Award and Best Researcher Award

**Software VNA and Microwave Network Design and Characterisation** Zhipeng Wu, 2007-09-27 Advances in computer technology and in the development of modern microwave test instruments over the past decade have given electrical engineers researchers and university students a number of new approaches to study microwave components devices and circuits Vector network analyser VNA is a valuable tool for providing fast and accurate characterisation of microwave components and devices for other circuits working at high frequencies This book together with associated software serves as an introduction to microwave network analysis microwave components and devices and

microwave circuit design Software VNA and Microwave Network Design and Characterisation also provides both device and circuit simulators powered by the analytical formulae presented in the book The book consists of chapters on network analysis theory and network parameters installation and functions of the software built in device models circuit design and operation principles and design examples The Software VNA provided with the book includes a trainer for users to gain experience of how a VNA would operate in practice Capability of accessing to the data on a commercial VNA test instrument device simulator equipped with 35 device builders from which an unlimited number of devices can be defined and studied circuit simulator that can be used to build circuits and study their properties Software VNA and Microwave Network Design and Characterisation is a practical guide for senior undergraduate and MSc students as well as practising engineers and researchers in the field of microwave engineering

**Introduction to Microsystem Packaging Technology** Yufeng Jin,Zhiping Wang,Jing Chen,2017-12-19 The multi billion dollar microsystem packaging business continues to play an increasingly important technical role in today s information industry The packaging process including design and manufacturing technologies is the technical foundation upon which function chips are updated for use in application systems and it is an important guarantee of the continued growth of technical content and value of information systems Introduction to Microsystem Packaging Technology details the latest advances in this vital area which involves microelectronics optoelectronics RF and wireless MEMS and related packaging and assembling technologies It is purposefully written so that each chapter is relatively independent and the book systematically presents the widest possible overview of packaging knowledge Elucidates the evolving world of packaging technologies for manufacturing The authors begin by introducing the fundamentals history and technical challenges of microsystems Addressing an array of design techniques for packaging and integration they cover substrate and interconnection technologies examples of device and system level packaging and various MEMS packaging techniques The book also discusses module assembly and optoelectronic packaging reliability methodologies and analysis and prospects for the evolution and future applications of microsystems packaging and associated environmental protection With its research examples and targeted reference questions and answers to reinforce understanding this text is ideal for researchers engineers and students involved in microelectronics and MEMS It is also useful to those who are not directly engaged in packaging but require a solid understanding of the field and its associated technologies

**Fundamentals of EM Design of Radar Absorbing Structures (RAS)** Hema Singh,Ebison Duraisingh Daniel J,Harish Singh Rawat,Reshma George,2017-10-25 This book presents a detailed analytical formulation and step by step design procedure for the electromagnetic EM design of radar absorbing structures RAS It discusses both the equivalent circuit model and Smith chart approach with illustrations to provide a clear understanding of the steps involved in designing multilayered RAS according to the desired specifications This book is a valuable resource for beginners academicians and R D engineers working in the field of RAS design and development

**Cracking the Code of Our Physical Universe**

Matthew M. Radmanesh, 2006-05-30 What sets this book apart is the fact that it is not just another science book describing scientific facts and phenomena. It would surely be redundant since that task has been done many times over with much more elegant prose and brighter narrators. In this book for the first time we have undertaken the task of breaking the code of any piece of matter or natural phenomena, whether it is an atom, a quantum occurrence, a planet, a galaxy, or any other perceivable thing. It covers any natural phenomena ever discovered or one that will be unravelled by the future pioneers in their respective fields. This book provides the trail map of any and all things that man has discovered and shows how their codes were cracked. The list of discoveries is endless, but prominent amongst them are the discovery of fire, electricity, magnetism, laws of motion, the solar system and planets, so on and so forth. This book goes beyond just pure science since it fuses philosophy with science. It actually makes science a subset of philosophy or more precisely applied philosophy. Just like the light phenomenon which was made to be a subset of the field of electricity by James Clerk Maxwell, revolutionizing our technical world, so does this book by bringing a new era of incredible developments for mankind. *Microwave and Millimetre-Wave Design for Wireless Communications* Ian Robertson, Nutapong Somjit, Mitchai

Chongcheawchamnan, 2016-06-20 This book describes a full range of contemporary techniques for the design of transmitters and receivers for communications systems operating in the range from 1 through to 300 GHz. In this frequency range, there is a wide range of technologies that need to be employed with silicon ICs at the core, but compared with other electronics systems, a much greater use of more specialist devices and components for high performance, for example, high Q factor, low loss, and good power efficiency. Many text books do, of course, cover these topics, but what makes this book timely is the rapid adoption of millimetre wave frequencies from 30 to 300 GHz for a wide range of consumer applications such as wireless high definition TV, 5G Gigabit mobile internet systems, and automotive radars. It has taken many years to develop low cost technologies for suitable transmitters and receivers, so previously these frequencies have been employed only in expensive military and space applications. The book will cover these modern technologies with the following topics covered: transmitters and receivers, lumped element filters, transmission lines, and S parameters, RF MEMS, RFICs and MMICs, and many others. In addition, the book includes extensive line diagrams to illustrate circuit diagrams and block diagrams of systems, including diagrams and photographs showing how circuits are implemented practically. Furthermore, case studies are also included to explain the salient features of a range of important wireless communications systems. The book is accompanied with suitable design examples and exercises based on the Advanced Design System, the industry leading CAD tool for wireless design. More importantly, the authors have been working with Keysight Technologies on a learning teaching initiative which is designed to promote access to industry standard EDA tools such as ADS. Through its University Educational Support Program, Keysight offers students the opportunity to request a student license backed up with extensive classroom materials and support resources. This culminates with students having the chance to demonstrate their RF/MW design and measurement expertise.

through the Keysight RF Microwave Industry Ready Student Certification Program [www.keysight.com](http://www.keysight.com) find eesof university  
[www.keysight.com](http://www.keysight.com) find eesof student certification      The Ultimate Keys to Success in Business and Science Matthew M. Radmanesh, 2008-10-14 Everyone in today's society is struggling with this mysterious thing called the business world and strives toward a higher understanding of its inner workings and yet most books present the basic concepts with so much complexity and filled with so many arbitrary factors that the general public has given up on the subject and perforce has decided to retire to the sideline to be a spectator In other words his hope has been dashed aside and his dream of a higher understanding has not been fulfilled in any of the books The present work is the culmination of many years of study observation and pondering on the dilemmas and enigmas of the business world Within the confines of this book one is given a chance to take an in depth look and inspect first hand the combination of what makes a successful business The basics are laid in simple terms and clear explanations express the powerful principles lucidly and dynamically providing an unforgettable impression in the reader's mind By avoiding undue complexities the reader will achieve simplicity of thought and will be actually traveling in the direction of the actual why and thus be able to understand how to set up and manage any business It is an interestingly uncommon book written primarily for the technical as well as the non technical man It is intended to serve several classes of our society The office workers and managers The Business minded individuals The business owners The professional managers This book will surely serve also an important class of our society the technical inventors who is looking for inspirations and new ideas to imbue him with enough understanding to finalize and materialize his thoughts into reality The broad importance of this work could be summed up as laying the foundation for the business world on a scientific basis where arbitrary factors are removed and technical superiority is substituted      *The Gateway to Understanding* Matthew Radmanesh, 2005-05 MEET BENJAMIN FRANKLIN FRIDDLE The hero of this narrative is a precocious schoolboy who was given a dictionary by his parents when he was very young In spite of learning the meaning of many new words he and Jamie conspired to speak like the young man they idolized who spoke with very bad grammar This gradually became harder but they both tried very hard not to sound like a girl Frankie is persuaded to adopt a different imperative through his teacher who had more understanding of the boys than they could have supposed In 1987 the book was written to amuse my mother who seemed to enjoy hearing each episode as it developed The narrative was rejected by several publishers so I recorded it on an audio tape which I gave to my grandchildren And I made a hard copy which stayed on a shelf until after I received word from 1stBooks The interest of my grandchildren interested me Several parts were extremely funny when read aloud to them Although it is fiction it might be useful in persuading readers that the uses of good grammar might be necessary for success in modern society Recent gaps in SAT scores could easily be society's heritage from an erroneous assumption No language is likely to equal proper English in the American job market This book may help readers to realize that bad grammar could limit the perception of academic perfectionists who happen to hear job applicants



speak Please let me know whether I should develop another thing I regard as fact true wisdom is often overlooked in persons who differ from ourselves      The Essentials of Lifelong Investing: The Ultimate Guide for Ascent to Higher Realms Matthew Radmanesh,2020-01-12 This book lays the foundation for any lifelong investor who desires to make a difference in the world and the life of others and intends to ascend to higher realms of existence which are zones of operations lying well beyond mere survival This book provides the road map for a lifelong investor to make a series of correct decisions much needed to guarantee a higher survival potential and a super bright future This becomes possible if and only if one masters the fundamental truths succinctly laid out in this book and applies the derived principles with great skill and commanding presence      *Ad Hoc Wireless Networks* C. Siva Ram Murthy,B. S. Manoj,2004-05-24 Practical design and performance solutions for every ad hoc wireless network Ad Hoc Wireless Networks comprise mobile devices that use wireless transmission for communication They can be set up anywhere and any time because they eliminate the complexities of infrastructure setup and central administration and they have enormous commercial and military potential Now there s a book that addresses every major issue related to their design and performance Ad Hoc Wireless Networks Architectures and Protocols presents state of the art techniques and solutions and supports them with easy to understand examples The book starts off with the fundamentals of wireless networking wireless PANs LANs MANs WANs and wireless Internet and goes on to address such current topics as Wi Fi networks optical wireless networks and hybrid wireless architectures Coverage includes Medium access control routing multicasting and transport protocols QoS provisioning energy management security multihop pricing and much more In depth discussion of wireless sensor networks and ultra wideband technology More than 200 examples and end of chapter problems Ad Hoc Wireless Networks is an invaluable resource for every network engineer technical manager and researcher designing or building ad hoc wireless networks      *Advanced Principles of Success & Prosperity* Matthew M. Radmanesh,2012-08-14 You will discover The Business World in a Nutshell Who Do You Have to Be to Succeed Scientific Fundamentals of Business The Relativity of Business Knowledge Timeless Principles of Business Advanced Business Principles Understanding Time Wasters Economics As a Subset of Life The Seven Levers of Leverage Principles of Lifelong Selling Unlimited Income Strategies Creating Streams of Income The Five Echelons to Climb The Fifty Genius Traits Selling as a Way of Life The Essence of Money      *The Modern Philosophy & Science of Investment* Matthew M. Radmanesh Ph.D.,2017-01-18 Reference Business Management Philosophy Science The Modern Philosophy Science of Investment An indispensable tool for the average investor desiring to climb to a higher plateau of affluence and abundance This book is one s ultimate weapon in the modern world to become a superior investor with an unusually high investment IQ to confront and conquer all of the doom and gloom of the economic and political upheavals in our society with relative ease Dr Matthew M Radmanesh From The Modern Philosophy Science of Investment You will discover The Pyramid of life The Scientific Methodology in Investment The General Certainty Principle The Entropy Principle Unification of Life and Business

The New Unified Theory Reward to Risk Ratio The PE Index The Postulates and Axioms of Investment The Pyramid of Knowledge in Investment The F7 Investment System The Golden Goose Principle The Growth Share Matrix Cash Cow Figures of Merit The Logarithmic Investor The Margin of Safety This book is the road map leading to the recovery of great mental abilities and the discovery of physical treasures that would guarantee enormous success in life or business Dr Matthew M Radmanesh From The Modern Philosophy Science of Investment Other Books by Dr Matthew M Radmanesh The Gateway to Prosperity System 2015 751 Pages Advanced Principles of Success Prosperity 2012 622 Pages The Ultimate Keys to Success in Business and Science 2008 464 Pages Cracking the Code of Our Physical Universe 2006 416 Pages The Gateway to Understanding Electrons to Waves and Beyond 2005 678 Pages Matthew M Radmanesh Ph D is currently a faculty member in the Electrical and Computer Engineering ECE department at California State University Northridge CA Dr Radmanesh is a member of Tau Beta Pi and Eta Kappa Nu Honor societies and holds two patents for his pioneering works in Microwaves and Millimeter waves WWW KRCbooks com

*The Gateway to Understanding: Electrons to Waves and Beyond Workbook* Matthew M. Radmanesh, 2005-05-24 324 Pages Learning the subject of electricity and electronics through the study of this workbook is tremendously more beneficial than simply purchasing and reading the book on your own The workbook provides many advantages including a A step by step approach presenting a series of lessons which are bite sized pieces of information taken from the book b The lessons act like a trail or a road to knowledge with a definite beginning and a finite end This prevents possible frustration of the reader from aimlessly reading the book or getting overwhelmed by the enormity of the subject c Solutions to many of the end of chapter quizzes provide an excellent check out to the readers comprehension of the material d A streamlined approach to learning electricity electronics which takes irrelevant materials off the direct path of achieving the final goal of total comprehension e Authors numerous comments exercises and summary adds clarity and understanding and brings simplification to a very complicated subject

**The Gateway to Prosperity System** Matthew M. Radmanesh Ph.D., 2015-11-04 Unlike most business guides The Gateway to Prosperity System From Mediocrity to Power and Beyond the new book by Dr Matthew M Radmanesh has undertaken the task of breaking the code of any business using proven fundamental principles that can improve any business viability and longevity dramatically Much like Dr Radmanesh s Gateway to Understanding Electrons to Waves and Beyond which sets the foundation for understanding our physical universe The Gateway to Prosperity sets out to explore the ultimate governing principles of the entire business world with a top down approach utilizing essential and powerful keys and principles that can unlock the vault and open many hidden doors of opportunity This work goes beyond the traditional business concepts and explores the more broad based principles of life and existence in conjunction with the discovered scientific and philosophical laws that lie beneath technical aspects of any business activity Moreover these powerful principles and laws can be used by any business entity from Internet based companies to school systems to small businesses to multi billion dollar corporations and even to state and

federal governments This book begins with the main driving force behind any business the viewpoint who powers up the entire operation and by conceiving the right ideas for the business breathes life into it Each Chapter leads the reader to the next step in the process of developing and evolving a viable and expanding business that can withstand and survive the devastating forces of any market condition By explaining and employing sound scientific fundamentals such as the use of absolutes the relativity of knowledge and the use of the scientific methodology The Gateway to Prosperity offers a revolutionary new business guide fusing business fundamentals philosophy and science as well as a step by step approach for anyone to make it big in the business world

**The Gateway to Understanding** Matthew M. Radmanesh, 2005 The subject of waves particularly electronic waves has been piecemealed to a point where every text covers only a small part of the subject and leaves the rest to someone else to develop At the present moment there is no coherent and one stop approach that covers this material from A to Z and presents it in such a way that an average person can wrap his wits around it There has been a need for such a book for quite some time Over the last hundred years the field of electronic waves initially placed on a firm ground by James Clerk Maxwell has grown and blossomed magnificently primarily in the area of applications to match up with the mathematical sophistication with which Maxwell's equations were presented Today almost anyone in our highly technological society strives toward a higher understanding of the inner workings of electronic equipment and desires to know the major principles behind this fascinating form of energy called electricity and electronic waves and yet most electrical books present the basic concepts with so much complexity and filled with so many mathematical equations that the average individual has given up on the subject and perforce has decided to retire to the sideline to be a spectator on the subject In other words their hope has been dashed aside and their dream of a higher understanding has not been fulfilled in any of the modern texts on electricity The present work is the culmination of many years of study observation and pondering on the dilemmas and enigmas of the physical universe in which we live with particular attention to electronic waves In this work the origin of electronic waves and the resultant understandings that have been extracted from years of study of this sophisticated and at times incomprehensible subject is presented with many lucid examples and applications Within the confines of this book one is given a chance for the first time to take an in depth look and inspect first hand one of the most dynamic fields of study that has ever been developed in the history of mankind on this planet The basics are laid in simple terms and clear explanations express the powerful principles lucidly and dynamically providing an unforgettable impression in the reader's mind Rather than looking into the complicated mathematical equations for solutions Man's long search for answers to the riddles of the technical world will finally be amply rewarded through the pages of this book By avoiding undue complexities the reader will achieve Occam's razor doctrine and will be actually traveling in the direction of the actual why and thus be able to put his thoughts on the right track for all the future problems forthcoming It is an interestingly uncommon book intended to lift the aura of black magic surrounding the world of sciences particularly electricity to

enlighten and demystify the subject of sciences in the minds of ordinary individuals It is written primarily for the technical as well as the non technical man and intends to serve several classes of our society a The professional engineers b The technical inventors c The technically versed individuals d The college professors e The college senior and graduate students f The interested but non technical individuals and g The business and industrial leaders The scientist armed with the tools solidly laid out in this book will be well equipped to understand scientific journals and handle the problems of work a day world of sciences particularly testing analysis and design of devices circuits and systems dealing with electric magnetic or electronic wave phenomena The increased depth of knowledge will allow one to achieve one s objectives with a much higher probability of success in this rapidly advancing subject

**Fundamentals of WiMAX** Jeffrey G. Andrews, Arunabha Ghosh, Rias Muhamed, 2007-02-27

The Definitive Guide to WiMAX Technology WiMAX is the most promising new technology for broadband wireless access to IP services It can serve an extraordinary range of applications and environments data voice and multimedia fixed and mobile licensed and unlicensed However until now wireless professionals have had little reliable information to guide them Fundamentals of WiMAX is the first comprehensive guide to WiMAX its technical foundations features and performance Three leading wireless experts systematically cut through the hype surrounding WiMAX and illuminate the realities They combine complete information for wireless professionals and basic accessible knowledge for non experts Professionals will especially appreciate their detailed discussion of the performance of WiMAX based on comprehensive link and system level simulations Whether you re a wireless engineer network architect manager or system designer this book delivers essential information for succeeding with WiMAX from planning through deployment Topics include Applications history spectrum options technical and business challenges and competitive technologies of WiMAX 802.16 standards physical and MAC layers channel access scheduling services mobility advanced antenna features hybrid ARQ and more Broadband wireless channels pathloss shadowing cellular systems sectoring and fading including modeling and mitigation OFDM from basic multicarrier concepts to synchronization PAR reduction and clipping MIMO Multiple antennas spatial diversity beamforming and a cutting edge treatment of the use of MIMO in WiMAX OFDMA multiple access multiuser diversity adaptive modulation and resource allocation Networking and services aspects architecture and protocols for IP QoS session management security and mobility management Predicting performance using link level and system level simulations WiMAX network architecture design principles reference models authentication QoS and mobility management

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