

Microwave Engineering Schaum Series

Schaum's Outline of Electromagnetics is the perfect study aid—loaded with solved problems and thorough descriptions of electromagnetics concepts, in plain English. Used along with your textbook, it helps you prepare for classroom exams, broadens your level of comprehension, and develops your intuitive problem-solving ability. Featuring hundreds of completely solved problems—worked out step by step—this popular Schaum's Outline shows you how to solve the kinds of problems you will find on your tests. So complete it can be used alone as an independent study course, it's also compatible with any course text. For better grades in courses covering electromagnetics—you can't do better than this Schaum's Outline!

A rigorous and straightforward treatment of analog, digital and optical transmission lines, which avoids using complex mathematics.

As the number of electrical devices in use continues to grow, so do the challenges of ensuring the electromagnetic compatibility (EMC) of products and systems. Fortunately, engineers have at their disposal an array of approximations, models, and rules-of-thumb to help them meet those challenges. Unfortunately, the number of these tools and guidelines is overwhelming, and worse still is the thought of investigating their origins and confirming their results. The Electromagnetic Compatibility Handbook is an unprecedented compilation of the many approximations, guidelines, models, and rules-of-thumb used in EMC analyses, complete with their sources and their limitations. The book presents these in an efficient question-and-answer format and incorporates an extremely comprehensive set of tables and figures. The author has either derived from basic principles or obtained and verified from their original sources all of the expressions in the tables. Mathcad was used to generate most of the plots and solve many of the equations, and the author includes the Mathcad programs for many of these so users can clearly see the variable assignments, assumptions, and equations. Designed to be of long-lasting value to engineers, researchers, and students, the Electromagnetic Compatibility Handbook is ideal both for quick reference and as a textbook for upper-level and graduate electrical engineering courses.

The first book to focus on the electromagnetic basis of signal integrity The Foundations of Signal Integrity is the first of its kind—a reference that examines the physical foundation of system integrity based on electromagnetic theory derived from Maxwell's Equations. Drawing upon the cutting-edge research of Professor Paul Huray's team of industrial engineers and graduate students, it develops the physical theory of wave propagation using methods of solid state and high-energy physics, mathematics, chemistry, and electrical engineering before addressing its application to modern high-speed

systems. Coverage includes: All the necessary electromagnetic theory needed for a complete understanding of signal integrity Techniques for obtaining analytic solutions to Maxwell's Equations for ideal materials and boundary conditions Plane electromagnetic waves Plane waves in compound media Transmission lines and waveguides Ideal models vs. real-world systems Complex permittivity of propagating media Surface roughness Advanced signal integrity Signal integrity simulations Problem sets for each chapter With its thorough coverage of this relatively new discipline, the book serves as an ideal textbook for senior undergraduate and junior graduate students, as well as a resource for practicing engineers in this burgeoning field. At the end of each section, it typically stimulates the reader with open-ended questions that might lead to future theses or dissertation research.

An authoritative view of Maxwell's Equations that takes theory to practice Maxwell's Equations is a practical guide to one of the most remarkable sets of equations ever devised. Professor Paul Huray presents techniques that show the reader how to obtain analytic solutions for Maxwell's equations for ideal materials and boundary conditions. These solutions are then used as a benchmark for solving real-world problems. Coverage includes: An historical overview of electromagnetic concepts before Maxwell and how we define fundamental units and universal constants today A review of vector analysis and vector operations of scalar, vector, and tensor products Electrostatic fields and the interaction of those fields with dielectric materials and good conductors A method for solving electrostatic problems through the use of Poisson's and Laplace's equations and Green's function Electrical resistance and power dissipation; superconductivity from an experimental perspective; and the equation of continuity An introduction to magnetism from the experimental inverse square of the Biot-Savart law so that Maxwell's magnetic flux equations can be deduced Maxwell's Equations serves as an ideal textbook for undergraduate students in junior/senior electromagnetics courses and graduate students, as well as a resource for electrical engineers.

Includes Part 1, Number 2: Books and Pamphlets, Including Serials and Contributions to Periodicals July - December) This final year/postgraduate text for courses in digital filters or digital signal processing deals with the construction of algorithms that filter data into useful information. It starts with the basics and goes on to cover advanced topics such as recursive and non-recursive filters (including optimization techniques), wave digital filters and DFTs. A new chapter on the application of digital signal processing offers up-to-date techniques and there are new problems and examples throughout. A solutions manual is available (0-07-002122-8).

If you want top grades and thorough understanding of electronic communications in less study time, this powerful study tool is the best tutor you can have! It takes you step-by-step through the subject and gives you accompanying problems with fully worked solutionsÑplus hundreds of additional problems with answers at the end of chapters, so you can measure your own progress. You

also get the benefit of clear, detailed illustrations. Famous for their clarity, wealth of illustrations and examples—and lack of tedious detail—Schaum's Outlines have sold more than 30 million copies worldwide. This guide will show you why!

In chapters culled from the popular and critically acclaimed Electromagnetic Compatibility Handbook, Transmission Lines, Matching, and Crosstalk provides a tightly focused, convenient, and affordable reference for those interested primarily in this subset of topics. Author Kenneth L. Kaiser demystifies transmission lines, matching, and crosstalk and explains the source and limitations of the approximations, guidelines, models, and rules-of-thumb used in this field. The material is presented in a unique question-and-answer format that gets straight to the heart of each topic. The book includes numerous examples and uses Mathcad to generate all of the figures and many solutions to equations. In many cases, the entire Mathcad program is provided.

Schaum's Outline of Electromagnetics McGraw-Hill

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

Balanis' second edition of Advanced Engineering Electromagnetics – a global best-seller for over 20 years – covers the advanced knowledge engineers involved in electromagnetic need to know, particularly as the topic relates to the fast-moving, continually evolving, and rapidly expanding field of wireless communications. The immense interest in wireless communications and the expected increase in wireless communications systems projects (antenna, microwave and wireless communication) points to an increase in the number of engineers needed to specialize in this field. In addition, the Instructor Book Companion Site contains a rich collection of multimedia resources for use with this text. Resources include: Ready-made lecture notes in Power Point format for all the chapters. Forty-nine MATLAB® programs to compute, plot and animate some of the wave phenomena Nearly 600 end-of-chapter problems, that's an average of 40 problems per chapter (200 new problems; 50% more than in the first edition) A thoroughly updated Solutions Manual 2500 slides for Instructors are included.

This book presents a systematic, comprehensive treatment of analog and discrete signal analysis and synthesis and an introduction to analog communication theory. This evolved from my 40 years of teaching at Oklahoma State University (OSU). It is based on three courses, Signal Analysis (a second semester junior level course), Active Filters (a first semester senior level course), and Digital signal processing (a second semester senior level course). I have taught these courses a number of times using this material along with existing texts. The references for the books and journals (over

160 references) are listed in the bibliography section. At the undergraduate level, most signal analysis courses do not require probability theory. Only, a very small portion of this topic is included here. I emphasized the basics in the book with simple mathematics and the sophistication is minimal. Theorem-proof type of material is not emphasized. The book uses the following model: 1. Learn basics 2. Check the work using bench marks 3. Use software to see if the results are accurate The book provides detailed examples (over 400) with applications. A three-number system is used consisting of chapter number – section number – example or problem number, thus allowing the student to quickly identify the related material in the appropriate section of the book. The book includes well over 400 homework problems. Problem numbers are identified using the above three-number system.

Time domain electrometry (TDE) is a general term which includes time domain reflectometry and time domain transmissiometry. It is a commercially-viable technique for leak detection, contaminant monitoring, and moisture content determination in contaminant transport modelling. Under demographic pressure, contaminated sites are increasingly being re-developed for domestic and industrial use; and this presents an urgent need for reliable, non-intrusive and integrated methods of subsurface characterization, detection and monitoring of organic and inorganic pollutants, soil moisture content and salinity. This book provides an overview of the potential application of TDE in geoenvironmental engineering and describes the geophysical methods used.

In chapters culled from popular and critically acclaimed Electromagnetic Compatibility Handbook, Electromagnetic Shielding provides a tightly focused, convenient, and affordable reference for those interested primarily in this subset of topics. Author Kenneth L. Kaiser demystifies shielding and explains the source and limitations of the approximations, guidelines, models, and rules-of-thumb used in this field. The material is presented in a unique question-and-answer format that gets straight to the heart of each topic. The book includes numerous examples and uses Mathcad to generate all of the figures and many solutions to equations. In many cases, the entire Mathcad program is provided.

This self-contained book provides techniques for use in determining electromagnetic fields in layered dielectric media. You'll find useful problem sets and practical examples with solutions, as well as a simplified model for approaching problems.

treated in more detail. They are just specimen of larger classes of schemes. Essentially, we have to distinguish between semi-analytical methods, discretization methods, and lumped circuit models. The semi-analytical methods and the discretization methods start directly from Maxwell's equations. Semi-analytical methods are concentrated on the analytical level: They use a computer only to evaluate expressions and to solve resulting linear algebraic problems. The best known semi-analytical methods are the mode matching method, which is described in subsection 2. 1, the method of

integral equations, and the method of moments. In the method of integral equations, the given boundary value problem is transformed into an integral equation with the aid of a suitable Green's function. In the method of moments, which includes the mode matching method as a special case, the solution function is represented by a linear combination of appropriately weighted basis functions. The treatment of complex geometrical structures is very difficult for these methods or only possible after geometric simplifications: In the method of integral equations, the Green's function has to satisfy the boundary conditions. In the mode matching method, it must be possible to decompose the domain into subdomains in which the problem can be solved analytically, thus allowing to find the basis functions. Nevertheless, there are some applications for which the semi-analytic methods are the best suited solution methods. For example, an application from accelerator physics used the mode matching technique (see subsection 5.4).

This book is designed to serve as a textbook for UG and PG students of Electronics and Communication, Electronics and Electrical, Electronics & Instrumentation and Telecommunication Engineering branches. It provides a thorough understanding of the electromagnetic theory and their properties, application and also the modern trends in Electromagnetism in detail. Book also describes transmission lines, wave guides, as well as the effects of EMI/EMC, including impedance matching and antennas. Written in an easy-to-understand manner, the book includes several illustrative examples, objective-type questions and exercise Questions to reinforce the theoretical understanding of subject. Appendices provide information and expressions as well as design data for references.

This is a new book on food process engineering which treats the principles of processing in a scientifically rigorous yet concise manner, and which can be used as a lead in to more specialized texts for higher study. It is equally relevant to those in the food industry who desire a greater understanding of the principles of the food processes with which they work. This text is written from a quantitative and mathematical perspective and is not simply a descriptive treatment of food processing. The aim is to give readers the confidence to use mathematical and quantitative analyses of food processes and most importantly there are a large number of worked examples and problems with solutions. The mathematics necessary to read this book is limited to elementary differential and integral calculus and the simplest kind of differential equation.

Comprehensive coverage of superconductivity from the Wiley Encyclopedia of Electrical and Electronics Engineering Engineering Superconductivity features fifty articles selected from the Wiley Encyclopedia of Electrical and Electronics Engineering, the one truly indispensable reference for electrical engineers. Superconductor technology has made highly advanced experiments possible in chemistry, biochemistry, particle physics, and health sciences, and introduced new applications currently in use in fields from medicine to cellular communications. Taken together, these articles-written by

acknowledged experts in the field-provide the most complete and in-depth accounting of superconductivity in existence. The book brings together a wealth of information that would not be available to those who do not have access to the full 24-volume encyclopedia. The entire encyclopedia is available online-visit www.interscience.wiley.com/EEEE for more information. This thorough survey looks at the application of superconductors from an engineer's practical perspective rather than a theoretical approach. Engineering Superconductivity provides full coverage of the fundamentals of superconducting behavior and explains the properties and fabrication methods of commercially produced superconductors. Up-to-date material on superconductor applications as well as competing technologies is included. The fifty articles presented here are divided into three sections: * Superconductivity and magnetism * Superconductors * Applications and related technology Engineering Superconductivity is a complete and up-to-date reference for engineers, physicists, chemists, materials scientists, and anyone working with superconductors.

This book introduces the fundamentals of probability theory and random processes by demonstrating its application to real-world engineering problems. It connects theory and practice through an emphasis on mathematical modeling and promotes a hands-on approach to the subject. At every step of theoretical development, the student is invited to challenge the theory by asking "what-if" questions. Specially written Matlab programs, which are available at the text's Web site, encourage real data experimentation and facilitate the visual modeling of difficult probabilistic concepts. The modeling tools are clearly identified in every chapter and are accompanied by discussions of the applicability, power, and limitations of each tool. It is ideally suited for advanced undergraduates and graduate students in electrical and computer engineering.

With the increased use of mobile phones and computer wireless techniques, a need has developed for a book which provides students and industry with expertise in radio and microwave engineering. This important text has been written with these aims in mind. *Provides a comprehensive course in radio and microwave engineering *Includes CD-ROM, containing the CAD package PUFF 2.1 for construction and evaluation of circuits; and a comprehensive section on practical aspects of design *Written by an experienced author, in a clear and easy-to-follow style *Contains a variety of examples and self-test questions with model answers The material covers transmission lines, scattering parameters, couplers, amplifiers, oscillators and phase-locked loops in a novel way by introducing examples from daily life prior to the introduction of the theory. Microwave tools such as Smith charts, scattering parameters and signal flow diagrams are dealt with thoroughly and are fully integrated in the numerous examples throughout the text and with PUFF. High Frequency and Microwave Engineering is intended as an advanced undergraduate text for students of electrical and communication engineering, and is also eminently suitable for self-study and as a manual for those in the industry

wishing to update their engineering skills. Provides a comprehensive course in radio and microwave engineering

Contains many examples and self-test questions with model answers

There have been many new developments in the ten years since the first edition of Radar and Laser Cross Section Engineering was published. Stealth technology is now an important consideration in the design of all types of platforms. The second edition includes a more extensive introduction that covers the important aspects of stealth technology and the unique tradeoffs involved in stealth design. Prediction, reduction, and measurement of electromagnetic scattering from complex three-dimensional targets remains the primary emphasis of this text, developed by the author from courses taught at the Naval Postgraduate School. New topics on computational methods like the finite element method and the finite integration technique are covered, as well as new areas in the application of radar absorbing material and artificial metamaterials. Matlab [registered] software, homework problems, and a solution manual (available to instructors) supplement the text. Written as an instructional text, this book is recommended for upper-level undergraduate and graduate students. introduction to the physics and mathematics of radar cross section in order to better understand the interdisciplinary aspects of stealth. Matlab is a registered trademark of The MathWorks, Inc.

An elective course in the final-year BEng programme in electronic engineering in the City Polytechnic of Hong Kong was generated in response to the growing need of local industry for graduate engineers capable of designing circuits and performing measurements at high frequencies up to a few gigahertz. This book has grown out from the lecture and tutorial materials written specifically for this course. This course should, in the opinion of the author, best be conducted if students can take a final-year design project in the same area. Examples of projects in areas related to the subject matter of this book which have been completed successfully in the last two years that the course has been run include: low-noise amplifiers, dielectric resonator-loaded oscillators and down converters in the 12 GHz as well as the 1 GHz bands; mixers; varactor-tuned and non-varactor-tuned VCOs; low-noise and power amplifiers; and filters and duplexers in the 1 GHz, 800 MHz and 500 MHz bands. The book is intended for use in a course of forty lecture hours plus twenty tutorial hours and the prerequisite expected of the readers is a general knowledge of analogue electronic circuits and basic field theory. Readers with no prior knowledge in high-frequency circuits are recommended to read the book in the order that it is arranged. ~ _____ In_t_ro_d_u_c_t_l_·o_n _____ ~1 ~ 1.

This book is intended to provide a step-by-step guide to all design aspects and tradeoffs from theory to application for fiber-optics transceiver electronics. Presenting a compendium of information in a structured way, this book enables the engineer to develop a methodical design approach, a deep understanding of specifications parameters and the reasons behind them, as well as their effects and consequences on system performance, which are essential for proper

component design. Further, a fundamental understanding of RF, digital circuit design, and linear and nonlinear phenomena is important in order to achieve the desired performance levels. Becoming familiar with solid-state devices and passives used to build optical receivers and transmitters is also important so one can effectively overcome design limitations. The book is organized into six main sections covering the following subjects: a top level overview; optics, semiconductors, and passives; RF concepts; an introduction to CATV modems and transmitters; digital transceivers' performance, evaluation, and concepts; and integration and testing. Copublished with Wiley Interscience.

Emphasizes electromagnetic and microwave problems and the fundamental algorithms which can be used as the basis for computer programs that produce useful numerical results. Includes relevant computer project descriptions in related chapters. A requirement for any student doing work in electromagnetics.

Today, any well-designed electrical engineering curriculum must train engineers to account for noise and random signals in systems. The best approach is to emphasize fundamental principles since systems can vary greatly. Professor Peebles's book specifically has this emphasis, offering clear and concise coverage of the theories of probability, random variables, and random signals, including the response of linear networks to random waveforms. By careful organization, the book allows learning to flow naturally from the most elementary to the most advanced subjects. Time domain descriptions of the concepts are first introduced, followed by a thorough description of random signals using frequency domain. Practical applications are not forgotten, and the book includes discussions of practical noises (noise figures and noise temperatures) and an entire special chapter on applications of the theory. Another chapter is devoted to optimum networks when noise is present (matched filters and Wiener filters). This third edition differs from earlier editions mainly in making the book more useful for classroom use. Beside the addition of new topics (Poisson random processes, measurement of power spectra, and computer generation of random variables), the main change involves adding many new end-of-chapter exercises (180 were added for a total of over 800 exercises). The new exercises are all clearly identified for instructors who have used the previous edition.

Publisher Description

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