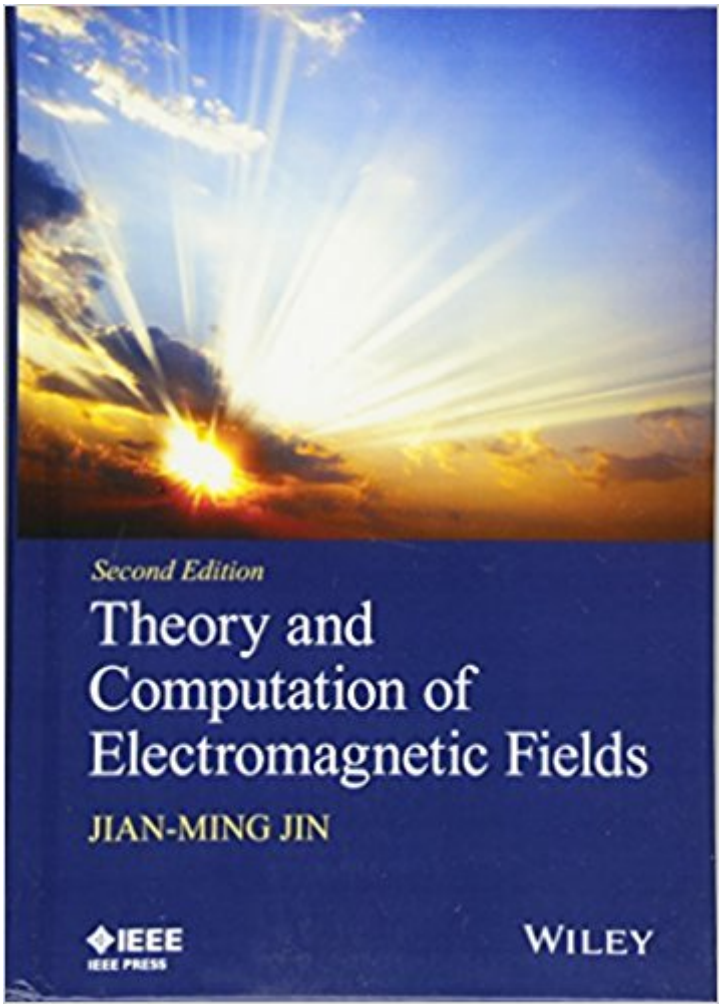
Theory And Computation Of Electromagnetic Fields (Wiley - IEEE)



Synopsis

Reviews the fundamental concepts behind the theory and computation of electromagnetic fields The book is divided in two parts. The first part covers both fundamental theories (such as vector analysis, MaxwellÃ¢â ¬â„¢s equations, boundary condition, and transmission line theory) and advanced topics (such as wave transformation, addition theorems, and fields in layered media) in order to benefit students at all levels. The second part of the book covers the major computational methods for numerical analysis of electromagnetic fields for engineering applications. These methods include the three fundamental approaches for numerical analysis of electromagnetic fields: the finite difference method (the finite difference time-domain method in particular), the finite element method, and the integral equation-based moment method. The second part also examines fast algorithms for solving integral equations and hybrid techniques that combine different numerical methods to seek more efficient solutions of complicated electromagnetic problems. Theory and Computation of Electromagnetic Fields, Second Edition:Ã Â Provides the foundation necessary for graduate students to learn and understand more advanced topics Discusses electromagnetic analysis in rectangular, cylindrical and spherical coordinates Covers computational electromagnetics in both frequency and time domains Includes new and updated homework problems and examples Theory and Computation of Electromagnetic Fields, Second Edition is written for advanced undergraduate and graduate level electrical engineering students. This book can also be used as a reference for professional engineers interested in learning about analysis and computation skills.

Book Information

Series: Wiley - IEEE
Hardcover: 744 pages
Publisher: Wiley-IEEE Press; 2 edition (September 15, 2015)
Language: English
ISBN-10: 1119108047
ISBN-13: 978-1119108047
Product Dimensions: 7.2 x 1.4 x 10.2 inches
Shipping Weight: 3.8 pounds (View shipping rates and policies)
Average Customer Review: 5.0 out of 5 stars 3 customer reviews
Best Sellers Rank: #171,089 in Books (See Top 100 in Books) #32 inÃ Â Books > Science & Math > Physics > Waves & Wave Mechanics #115 inÃ Â Books > Science & Math > Physics >

Electromagnetism #7543 inÃ Â Books > Textbooks > Science & Mathematics

Customer Reviews

Reviews the fundamental concepts behind the theory and computation of electromagnetic fields The book is divided in two parts. The first part covers both fundamental theories (such as vector analysis, MaxwellÃ¢â ¬â„¢s equations, boundary condition, and transmission line theory) and advanced topics (such as wave transformation, addition theorems, and fields in layered media) in order to benefit students at all levels. The second part of the book covers the major computational methods for numerical analysis of electromagnetic fields for engineering applications. These methods include the three fundamental approaches for numerical analysis of electromagnetic fields: the finite difference method (the finite difference time-domain method in particular), the finite element method, and the integral equation-based moment method. The second part also examines fast algorithms for solving integral equations and hybrid techniques that combine different numerical methods to seek more efficient solutions of complicated electromagnetic problems. Theory and Computation of Electromagnetic Fields, Second Edition: Provides the foundation necessary for graduate students to learn and understand more advanced topics Discusses electromagnetic analysis in rectangular, cylindrical and spherical coordinates Covers computational electromagnetics in both frequency and time domains Includes new and updated homework problems and examples Theory and Computation of Electromagnetic Fields, Second Edition is written for advanced undergraduate and graduate level electrical engineering students. This book can also be used as a reference for professional engineers interested in learning about analysis and computation skills. Jian-Ming Jin, PhD, is the Y.T. Lo Chair Professor in Electrical and Computer Engineering and Director of the Electromagnetics Laboratory and Center for Computational Electromagnetics at the University of Illinois at Urbana-Champaign. He authored The Finite Element Method in Electromagnetics (Wiley) and Electromagnetic Analysis and Design in Magnetic Resonance Imaging, and co-authored Computation of Special Functions (Wiley), Finite Element Analysis of Antennas and Arrays (Wiley), and Fast and Efficient Algorithms in Computational Electromagnetics. A Fellow of the IEEE, he is listed by ISI among the worldÃ¢â ¬â„¢s most cited authors.

This was the book I learned electromagnetics and computational electromagnetics from, so I was very excited to hear that a second edition was in the works. I purchased my copy as soon as it became available.The second edition is an incremental improvement over the excellent previous

edition of this book. The first thing you will notice is that the entire book is printed in color on glossy paper. This is a significant improvement over the first edition as the book is much more pleasant to hold and a pleasure to flip through.In terms of content, many worked example problems are now inserted in the electromagnetic theory chapters, which comprises the first half of the book. These include both trivial problems to demonstrate the concept being discussed, as well as more involved problems that demonstrates problem solving techniques to readers who may be learning electromagnetics theory on their own by reading this book. This new additional material makes the book a much more useful independent learning source whereas the first edition was designed more as a textbook that is to be read in conjunction of going to lectures and doing homework problems.The real bonus of this book when compared with other graduate engineering electromagnetic textbooks (Balanis, Harrington, etc) is the second half of the book, which provides an up-to-date and in-depth discussion of computational electromagnetic techniques. The presentation of Finite Difference Time Domain (FDTD) method for computational EM is so simple and clear, that my undergraduate students have been able to produce their own FDTD code based purely on reading this chapter. The author is the world-leading expert on Finite Element Method (FEM) and the chapter on FEM provides a very in-depth discussion of the state-of-the-art of this technique. It is easier to read than the author's monograph on the subject. The chapters on Method of Moments (MoM) and hybrid techniques completes the second half of the book, and prepares the reader to be able to understand and appreciate the latest research papers on computational electromagnetics.This second edition is a good update to a modern classic, and I strongly encourage everyone who wants to familiarize themselves with graduate-level engineering electromagnetics and computational electromagnetics to consider this book as a learning resource.

This book is a recent update of its first edition, which has been used in University of Illinois as the textbook for a series of graduate EM courses in the ECE department. As a student at U of I, I took both courses with the first edition, but bought this second edition at its very first debut. I have to say I'm glad this update comes in. Here are some of my thoughts: spoiler alert, it's a great book.Aside from contents commonly covered in other classic EM textbooks, this book dedicates a significant portion of its content (the second half) to an introductory survey on computational electromagnetics, which includes the most popular CEM methods. The theoretical part starts from the very basics in EM and gradually progress to some of the advanced topics like wave transformation and addition theorem. The coverage of these advanced topics are excentlly chosen in a sense that: a) they are useful and rather basic ideas for the CEM part of the book; b) they provide a decent foundation from

which the readers can progress to more advanced EM monographs.For this second edition, the most significant change is the addition of Examples. These examples are either basic ones that show you the problem solving process in graduate level EM, or are rather complicated ones that extend and deepen the topics covered in the first edition. In short, I believe working out these examples is a great exercise if you want to excel at your course, or are simply interested in EM.Last but not least, the paper is of great quality and the figures are nice and beautiful. A well printed, well bound book.

The 2nd edition of Theory and Computation of Electromagnetic fields is the most useful textbook I have ever seen. It systematically discusses the fundamentals as well as some advanced topics in both electromagnetic theory and numerical methods in electromagnetics. In the theory part, it starts from the overview of Maxwell's equation and review of vector analysis, and then discusses the specific topics in detail such as electromagnetic theorems and principles, wave radiation, scattering, and propagation in free space and three coordinate systems. Compared with electromagnetic knowledge covered by electrodynamics books, this book not only helps you build up a solid fundamental in electromagnetic theory, but also leads you to solve very practical problems using the theory. In the numerical method part, it introduces three most popular numerical methods (FDTD, FEM, and MoM), the hybrid methods, and fast algorithms. It covers all the classic methods a beginner should know in computational electromagnetics. All the derivations are very clear and detailed!This book is also a very beautiful book. The whole book is made of high-quality papers with color pictures. The feel of reading this book is like reading a high-quality magazine! It is very enjoyable to hold this book on hands and read all the materials.

(Basic Life Sciences) Electromagnetic Fields Handbook of Biological Effects of Electromagnetic Fields CRC Handbook of Biological Effects of Electromagnetic Fields Advances in Electromagnetic Fields in Living Systems Crystals: The Ultimate Guide To: Energy Fields, Auras, Chakras and Emotional Healing (Aura, Healing Stones, Crystal Energy, Crystal Healing, Energy Fields, Emotional Healing, Gemstone) Mrs. Fields Cookie Book: 100 Recipes from the Kitchen of Mrs. Fields Fields Virology (Knipe, Fields Virology)-2 Volume Set Inverse Acoustic and Electromagnetic Scattering Theory (Applied Mathematical Sciences) Principles of Optics: Electromagnetic Theory of Propagation, Interference and Diffraction of Light Electromagnetic Theory: Volume 2 Foundations of Electromagnetic Theory (4th Edition) Electromagnetic Field Theory Fundamentals