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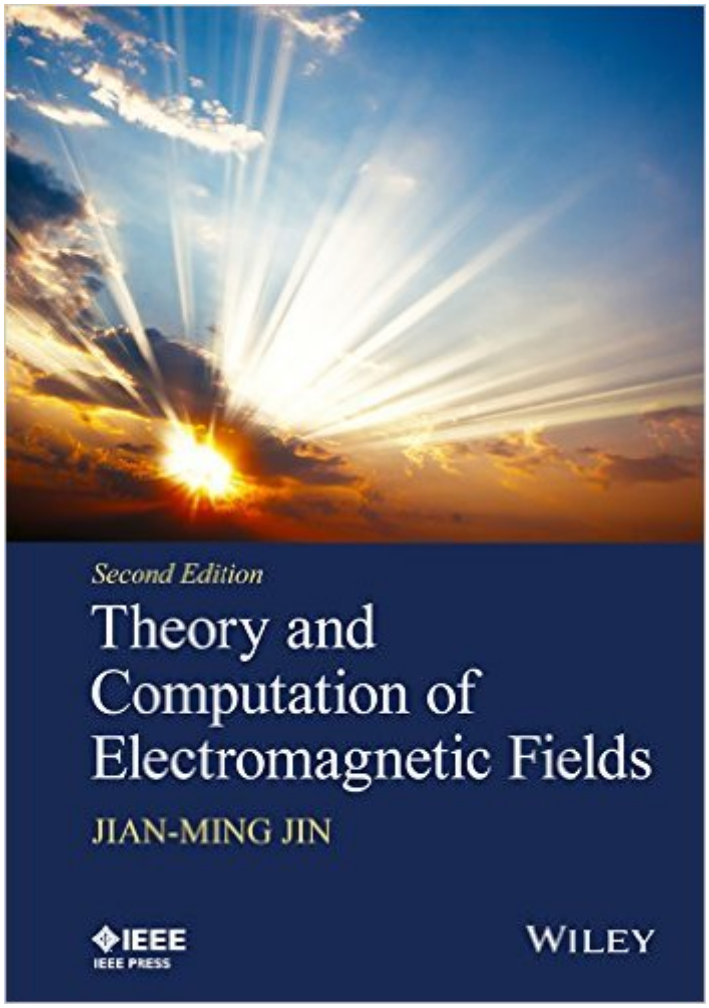
Theory And Computation Of Electromagnetic Fields



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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, Maxwellâ ™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: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.

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Customer Reviews

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.

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