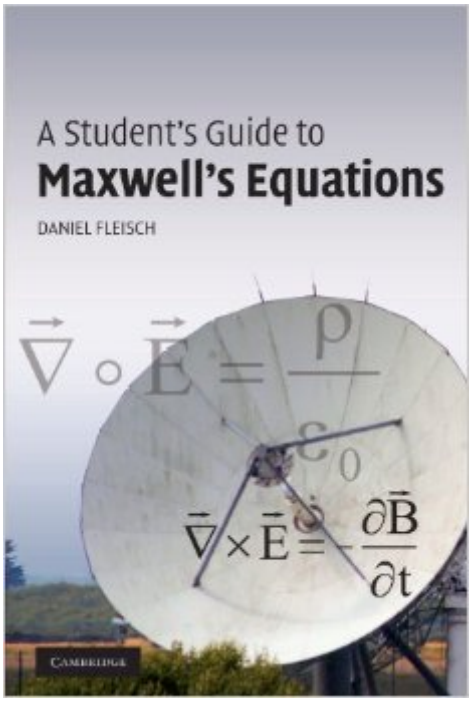
A Student's Guide To Maxwell's Equations



Synopsis

Gauss's law for electric fields, Gauss's law for magnetic fields, Faraday's law, and the Ampere-Maxwell law are four of the most influential equations in science. In this guide for students, each equation is the subject of an entire chapter, with detailed, plain-language explanations of the physical meaning of each symbol in the equation, for both the integral and differential forms. The final chapter shows how Maxwell's equations may be combined to produce the wave equation, the basis for the electromagnetic theory of light. This book is a wonderful resource for undergraduate and graduate courses in electromagnetism and electromagnetics. A website hosted by the author at www.cambridge.org/9780521701471 contains interactive solutions to every problem in the text as well as audio podcasts to walk students through each chapter.

Book Information

Paperback: 134 pages

Publisher: Cambridge University Press; 1 edition (January 28, 2008)

Language: English

ISBN-10: 0521701473

ISBN-13: 978-0521701471

Product Dimensions: 6 x 0.3 x 9 inches

Shipping Weight: 9.6 ounces (View shipping rates and policies)

Average Customer Review: 4.8 out of 5 stars 181 customer reviews

Best Sellers Rank: #52,421 in Books (See Top 100 in Books) #19 inÂ Books > Science & Math > Physics > Mathematical Physics #28 inÂ Books > Science & Math > Physics > Electromagnetism #31 inÂ Books > Science & Math > Mathematics > Applied > Differential Equations

Customer Reviews

'Professor Fleisch is a great scientific communicator.' electronicdesign.com'... good examples and problems are given so the student can practice the skills being taught.' IEEE Microwave Magazine'... its virtue ... is to address, through judicious selection of material and masterful repetition of important facts, the needs of a student who finds lectures and textbooks hard to understand, too complex, and besides the point of doing the assigned problems. ... Students who are struggling with the material will love the Guide. The Guide is a well-written, concise, honest tool that delivers just what it promises.' American Journal of Physics

Maxwell's equations are four of the most influential equations in science. In this book, each equation

is the subject of an entire chapter, making it a wonderful resource for undergraduate and graduate courses in electromagnetism and electromagnetics. Audio podcasts and solutions to the problems are available at www.cambridge.org/9780521701471.

Anyone who has a major that requires a class in electromagnetics has to study Maxwell’s equations in depth. In textbooks, at least the one I used, the point behind the various equations are buried in so much detail that being able to really figure out what they are saying and what they show is difficult to grasp. This book breaks down both the differential and integral forms of the equations in a step by step, clear manner. You need enough background in math to really understand the book well (and calculus based physics does not hurt either), but as long as you have the knowledge you would have attained up to the point where you are taking an electric and magnetic field class this book is much easier than the presentation you will get in the textbook.I would suggest comparing the material in this book to the table of contents in your textbook. Before you get to the topics, read this book first and try the problems at the end. Then read the textbook and work whatever homework problems you are assigned from that, and then if you have time read through this again. Obviously you will get more detail in the textbook that you need to know to do well, but it will make much more sense after reading through this first, and if you really understand the material in this book, even as small as it is, you should be able to do well in any undergrad EM class.

Concise, clear, and thorough, this little book illuminates all the meanings and proper interpretation of Maxwell’s equations. It covers all the details as well- from what exactly all the notation is trying to say, to curl, to ’which path’ is meant in the line integrals in circulation definitions, to subtle points on flux and all the geometry and vector operator math that goes into it. It describes everything in "plain english" and provides you with a final and comprehensive intuitive understanding of the physics behind these equations. I have read dozens and dozens of electromagnetics books, and NONE have ever delivered as well as this book has when it comes to explaining what the heck these equations are really trying to say and showing you all the slight ’catches’ and pitfalls involved in trying to interpret them. I recommend you buy a copy and keep it alongside your favorite fields and waves texts, at any level.

This book is just what I needed although it may or may not be helpful for others. For me, I am trying to re-learn the physics I learned some decades ago. The author’s clear explanations and viewing the forest instead of the trees was just what I needed. I wish there there more books like this. This

book is a good starter for studies in electromagnetism. After this book you can progress to one of the other recommended texts given in the back of the book. This book assumes that you are prepared with basic calculus and some knowledge of vector calculus is helpful even though even this is explained as well. The problems are not too hard which was OK with me as I just wanted the problems to solidify the teaching concepts which they did. The solutions are on the web site. One area where I was not successful is downloading the podcasts through iTunes. It would only download one podcast in the module and not all of them. It could have been my error but I didn't solve that issue. Based on this book I will go ahead and order Daniel Fleisch's book on Vectors and Tensors with high expectations.

This is a must-have book for your Electric fields and Magnetic fields (E&M) class. You need this book! Get it! Stop reading this, and get it! If you're still reading this, here's some more aspects that will make you want this book. If you've already gone through an E&M class, but you want better understanding or just a review for whatever reason, get this book! If you've never taken an E&M class, but you have taken at least calc 1 and know about vectors, and you want to learn about E&M, get this book! It is BY FAR the best resource for getting started in E&M. It walks you through all of Maxwell's equations so expertly you'll have a sound foundation from which to build to even harder problems. I guarantee this book is the best investment you'll make. It's like reading an illustrated transcript of a lecture from a professor who makes no mistakes, is exceptionally clear on his explanations, and who will guide you several times through the "boring" stuff to make sure you understand it from the context of each of Maxwell's equations. It's a short, small book, too. So, it won't be heavy to carry or take up too much space. It pulls together all of the relevant topics to understanding each of Maxwell's equations, fully, that you'd have to thumb through many, many pages of a giant textbook to see. It will open your eyes to the true meaning of each of Maxwell's equations and how to use them. So, stop thinking about it, and GET THIS BOOK, NOW!!!

This book it is an excellent refresher course for the seasoned engineers that need a fast refresher course in advanced calculus and how it applies to everyday design challenges. This is not the book for the beginner mathematics or electromagnetism student but this it is a book that puts the together concepts for the everyday professional that has to understand clearly electromagnetic concepts. The same electromagnetics that are the fundamental foundation to the microwave understanding required to design high-speed systems that including gigabit speed PCB channels, EMI, etc. Thank you to the author on behave those that long time left college but need to brush up on fundamental

concepts essential to resolve nowadays technical challenges.

A Student's Guide to Maxwell's Equations King and Maxwell (King & Maxwell) King and Maxwell (King & Maxwell Series) Student Solutions Manual to accompany Boyce Elementary Differential Equations 10e & Elementary Differential Equations with Boundary Value Problems 10e Student's Solutions Manual for Fundamentals of Differential Equations 8e and Fundamentals of Differential Equations and Boundary Value Problems 6e Maxwell's Equations Without the Calculus Differential Equations and Boundary Value Problems: Computing and Modeling (5th Edition) (Edwards/Penney/Calvis Differential Equations) Fundamentals of Differential Equations (8th Edition) (Featured Titles for Differential Equations) Differential Equations: Computing and Modeling (5th Edition) (Edwards/Penney/Calvis Differential Equations) Applied Partial Differential Equations with Fourier Series and Boundary Value Problems (5th Edition) (Featured Titles for Partial Differential Equations) [Differential Equations, Dynamical Systems, and an Introduction to Chaos [DIFFERENTIAL EQUATIONS, DYNAMICAL SYSTEMS, AND AN INTRODUCTION TO CHAOS BY Hirsch, Morris W. (Author) Mar-26-2012] By Hirsch, Morris W. (Author) [2012) [Paperback] Numerical Partial Differential Equations: Conservation Laws and Elliptic Equations (Texts in Applied Mathematics) (v. 33) Algebra Essentials Practice Workbook with Answers: Linear & Quadratic Equations, Cross Multiplying, and Systems of Equations: Improve Your Math Fluency Series Algebra Essentials Practice Workbook with Answers: Linear & Quadratic Equations, Cross Multiplying, and Systems of Equations (Improve Your Math Fluency Series 12) Transformations Of Coordinates, Vectors, Matrices And Tensors Part I: LAGRANGEâ ™S EQUATIONS, HAMILTONâ ™S EQUATIONS, SPECIAL THEORY OF RELATIVITY AND CALCULUS ... Mathematics From 0 And 1 Book 16) How Einstein gives Dirac, Klein-Gordon and SchrÃ¶dinger: Deriving the SchrÃ¶dinger, Dirac and Klein-Gordon Equations from the Einstein-Field-Equations via an Intelligent Zero Partial Differential Equations of Mathematical Physics and Integral Equations (Dover Books on Mathematics) Student Solutions Manual: Elementary Differential Equations & Boundary Value Problems Differential Equations: Theory, Technique, and Practice (Walter Rudin Student Series in Advanced Mathematics) The Ultimate Chemical Equations Handbook Student Edition

Privacy

FAQ & Help