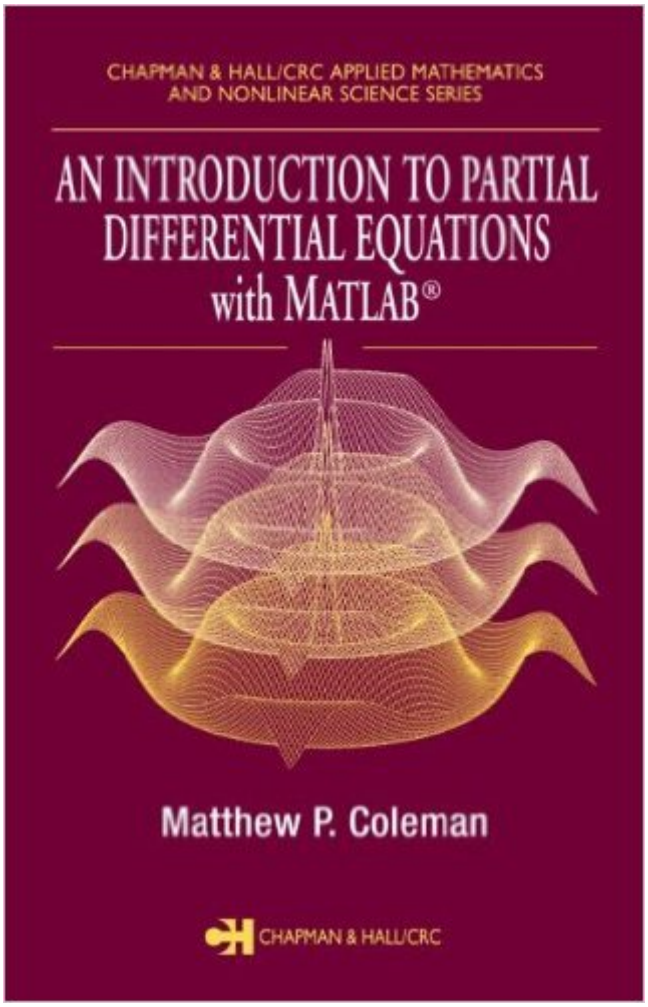
An Introduction To Partial Differential Equations With MATLAB (Chapman & Hall/CRC Applied Mathematics & Nonlinear Science)



Synopsis

An Introduction to Partial Differential Equations with MATLAB exposes the basic ideas critical to the study of PDEs-- characteristics, integral transforms, Greenâ ™s functions, and, most importantly, Fourier series and related topics. The author approaches the subject from a motivational perspective, detailing equations only after a need for them has been established. He uses MATLABÂ® software to solve exercises and to generate tables and figures. This volume includes examples of many important PDEs and their applications. The first chapter introduces PDEs and makes analogies to familiar ODE concepts, then strengthens the connection by exploring the method of separation of variables. Chapter 2 examines the â œBig Threeâ • PDEs-- the heat, wave, and Laplace equations, and is followed byÂ chapters explaining how these and other PDEs on finite intervals can be solved using the Fourier series for arbitrary initial and boundary conditions. Chapter 5 investigates characteristics for both first- and second-order linear PDEs, the latter revealing how the Big Three equations are important far beyond their original application to physical problems. The book extends the Fourier method to functions on unbounded domains, gives a brief introduction to distributions, then applies separation of variables to PDEs in higher dimensions, leading to the special funtions, including the orthogonal polynomials. Other topics include Sturm-Liouville problems, adjoint and self-adjoint problems, the application of Greenâ ™s functions to solving nonhomogeneous PDEs, and an examination of practical numerical methods used by engineers, including the finite difference, finite element, and spectral methods.

Book Information

Series: Chapman & Hall/CRC Applied Mathematics & Nonlinear Science (Book 4)
Hardcover: 688 pages
Publisher: Chapman and Hall/CRC; 1 edition (September 29, 2004)
Language: English
ISBN-10: 1584883731
ISBN-13: 978-1584883739
Product Dimensions: 9.4 x 6.4 x 1.6 inches
Shipping Weight: 2.4 pounds (View shipping rates and policies)
Average Customer Review: 4.2 out of 5 starsÂ Â See all reviewsÂ (8 customer reviews)
Best Sellers Rank: #1,404,149 in Books (See Top 100 in Books) #194 inÂ Books > Science & Math > Mathematics > Number Systems #456 inÂ Books > Science & Math > Mathematics > Pure Mathematics > Discrete Mathematics #707 inÂ Books > Science & Math > Mathematics > Applied

> Differential Equations

Customer Reviews

Matthew Coleman’s book gives a clear and concise exposition on PDE’s....Almost similar to C.Henry Edward’s textbook on ODE’s (6th ed.).....The organization of the material is also a major strength as it correlates to mathematical development and structure....Here’s the issue: Coleman has made a strident effort to "conceal" the solutions manual from students by only making it available to professors who use this textbook as part of the course’s curriculum.....That’s problematic, because there’s no feedback system from which the reader could check his or her work.....you’re given short answers to a few select problems (mostly odd problems)...some of the answers to those selected odd problems aren’t even listed towards the end....So, out of all the problems listed in the textbook, you’re only given roughly 35 to 40% of the answers....Which prob. wouldn’t be an issue, if someone were enrolled in a PDE course....however, it would be a major issue if anyone were to use this for self-study.....This policy should be changed...the objective of any textbook is to inform and instruct, NOT conceal information as an effort to help Universities’ profit.....OTHER CRITICISMS:1. There aren’t many graphs and illustrations used in this textbook...So, if you’re looking for visual clarity as it pertains to geometric interpretations of the material, then you’re out of luck with this textbook....which is strange, because its primary software tool involves the use of MATLAB.....2. Although Coleman uses thorough and explicit examples in his textbook, the problems listed at the end of each chapter tend to deviate from the initial examples listed...

Differential Equations and Their Applications, No. 76) Numerical Partial Differential Equations: Finite Difference Methods (Texts in Applied Mathematics) Finite Difference Methods for Ordinary and Partial Differential Equations: Steady-State and Time-Dependent Problems (Classics in Applied Mathematics) Coding Theory and Cryptography: The Essentials, Second Edition (Chapman & Hall/CRC Pure and Applied Mathematics) Binary Polynomial Transforms and Non-Linear Digital Filters (Chapman & Hall/CRC Pure and Applied Mathematics) Introduction to Partial Differential Equations (Undergraduate Texts in Mathematics) Applied Partial Differential Equations: With Fourier Series and Boundary Value Problems, 4th Edition Partial Differential Equations (Applied Mathematical Sciences) (v. 1) The Garbage Collection Handbook: The Art of Automatic Memory Management (Chapman & Hall/CRC Applied Algorithms and Data Structures series) Introduction to Network Security (Chapman & Hall/CRC Computer and Information Science Series) Introduction to Probability (Chapman & Hall/CRC Texts in Statistical Science) Stochastic Processes: An Introduction, Second Edition (Chapman & Hall/CRC Texts in Statistical Science) Differential Equations and Boundary Value Problems: Computing and Modeling (5th Edition) (Edwards/Penney/Calvis Differential Equations)