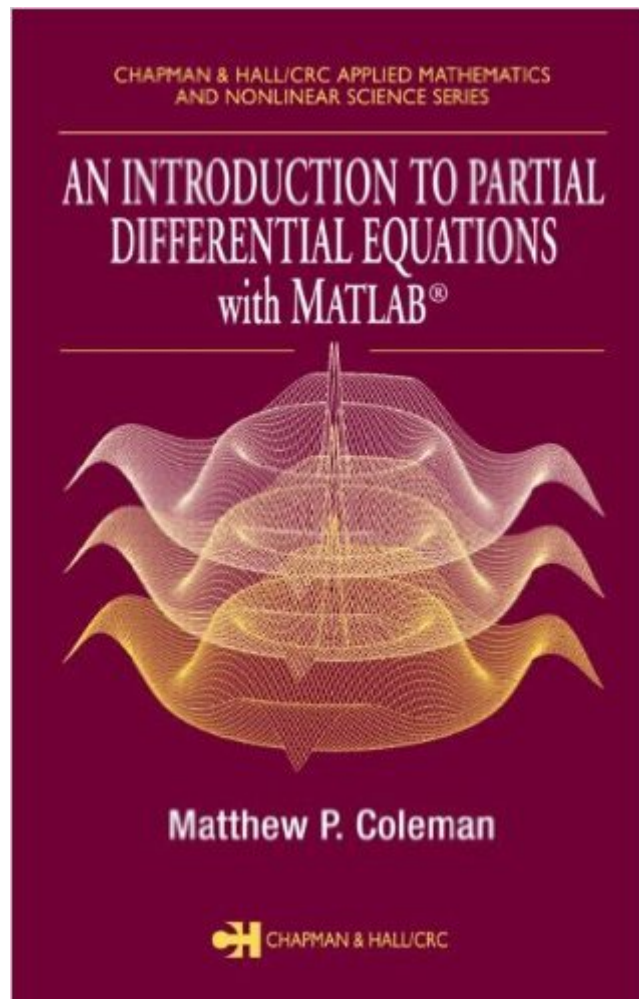


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An Introduction To Partial Differential Equations With MATLAB (Chapman & Hall/CRC Applied Mathematics & Nonlinear Science)



Synopsis

An Introduction to Partial Differential Equations with MATLAB exposes the basic ideas critical to the study of PDEs-- characteristics, integral transforms, Green'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 MATLAB® 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 "Big Three" PDEs-- the heat, wave, and Laplace equations, and is followed by 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 functions, including the orthogonal polynomials. Other topics include Sturm-Liouville problems, adjoint and self-adjoint problems, the application of Green'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

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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...

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