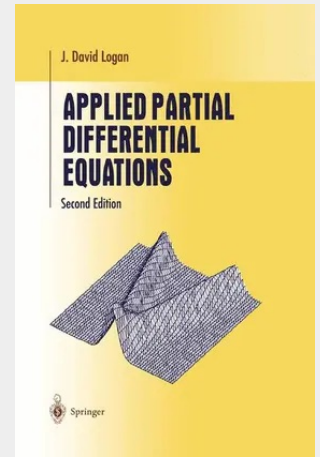


Applied Partial Differential Equations

This text is written for the standard, one-semester, undergraduate course in elementary partial differential equations. The topics include derivations of some of the standard equations of mathematical physics (including the heat equation, the wave equation, and Laplace's equation) and methods for solving those equations on bounded and unbounded domains. Methods include eigenfunction expansions, or separation of variables, and methods based on Fourier and Laplace transforms.

This textbook is for the standard, one-semester, junior-senior course that often goes by the title "Elementary Partial Differential Equations" or "Boundary Value Problems". The audience consists of students in mathematics, engineering, and the physical sciences. The topics include derivations of some of the standard models of mathematical physics (e.g., the heat equation, the wave equation, and Laplace's equation) and methods for solving those equations on unbounded and bounded domains (transform methods and eigenfunction expansions). Prerequisites include multivariable calculus and elementary differential equations. The text differs from other texts in that it is a brief treatment; yet it provides coverage of the main topics usually studied in the standard course as well as an introduction to using computer algebra packages to solve and understand partial differential equations. The many exercises help students sharpen their computational skills by encouraging them to think about concepts and derivations. The student who reads this book carefully and solves most of the problems will have a sound knowledge base for a second-year partial differential equations course where careful proofs are constructed or for upper division courses in science and engineering where detailed applications of partial differential equations are introduced. To give this text an even wider appeal, the second edition has been updated with a new chapter on partial differential equation models in biology, and with various examples from the life sciences that have been added throughout the text. There are more exercises, as well as solutions and hints to some of the problems at the end of the book.



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