

Laplace Heat Equation 2d In Maple

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Student Solutions Manual, Partial Differential Equations & Boundary Value Problems with Maple

- George A. Articolo 2009-07-22

Student Solutions Manual, Partial Differential Equations & Boundary Value Problems with Maple

Introductory Finite Difference Methods for PDEs -

Partial Differential Equations for Computational Science - David Betounes 1998-05-15

This book will have strong appeal to interdisciplinary audiences, particularly in regard to its treatments of fluid mechanics, heat equations, and continuum mechanics. There is also a heavy focus on vector analysis. Maple examples, exercises, and an appendix is also included.

Mathematical Methods for Engineers and Scientists 3 - Kwong-Tin Tang 2007-01-10

Pedagogical insights gained through 30 years of teaching applied mathematics led the author to write this set of student oriented books. Topics such as complex analysis, matrix theory, vector and tensor analysis, Fourier analysis, integral transforms, ordinary and partial differential equations are presented in a discursive style that is readable and easy to follow. Numerous examples, completely worked out, together with carefully selected problem sets with answers are used to enhance students' understanding and manipulative skill. The goal is to make students comfortable in using advanced mathematical tools in junior, senior, and beginning graduate courses.

Elementary Differential Equations - William Trench 2000-03-28

Homework help! Worked-out solutions to select problems in the text.

Differential Equations with Maple - Jon Davis 2012-12-06

Differential equations is a subject of wide applicability, and knowledge of differential equations is a subject of wide applicability, and knowledge of differential equations topics permeates all areas of study in engineering and applied mathematics. Some differential equations are susceptible to analytic means of solution, while others require the generation of numerical solution trajectories to see the behavior of the system under study. For both situations, the software package Maple can be used to advantage. To the student Making effective use of differential equations requires facility in recognizing and solving standard "tractable" problems, as well as having the background in the subject to make use of tools for dealing with situations that are not amenable to simple analytic approaches.

Introduction to Partial Differential Equations - Peter J. Olver 2013-11-08

This textbook is designed for a one year course covering the fundamentals of partial differential equations, geared towards advanced undergraduates and beginning graduate students in mathematics, science, engineering, and elsewhere. The exposition carefully balances solution techniques, mathematical rigor, and significant applications, all illustrated by numerous examples. Extensive exercise sets appear at the end of

almost every subsection, and include straightforward computational problems to develop and reinforce new techniques and results, details on theoretical developments and proofs, challenging projects both computational and conceptual, and supplementary material that motivates the student to delve further into the subject. No previous experience with the subject of partial differential equations or Fourier theory is assumed, the main prerequisites being undergraduate calculus, both one- and multi-variable, ordinary differential equations, and basic linear algebra. While the classical topics of separation of variables, Fourier analysis, boundary value problems, Green's functions, and special functions continue to form the core of an introductory course, the inclusion of nonlinear equations, shock wave dynamics, symmetry and similarity, the Maximum Principle, financial models, dispersion and solutions, Huygens' Principle, quantum mechanical systems, and more make this text well attuned to recent developments and trends in this active field of contemporary research. Numerical approximation schemes are an important component of any introductory course, and the text covers the two most basic approaches: finite differences and finite elements.

Maple Computer Manual for Advanced Engineering Mathematics - Erwin Kreyszig 1994

This supplement is appropriate for use in an advanced engineering mathematics course (including differential equations, numerical analysis, linear algebra, partial differential equations and complex analysis) where the computer algebra system MAPLE is used as a teaching tool.

A Short Course in Mathematical Methods with Maple - Henrik Aratyn 2006

This unique book provides a streamlined, self-contained and modern text for a one-semester mathematical methods course with an emphasis on concepts important from the application point of view. Part I of this book follows the "paper and pencil" presentation of mathematical methods that emphasizes fundamental understanding and geometrical intuition. In addition to a complete list of standard subjects, it introduces important, contemporary topics like nonlinear differential equations, chaos and solitons. Part II employs the Maple software to cover the same topics as in Part I in a computer oriented approach to instruction. Using Maple liberates students from laborious tasks while helping them to concentrate entirely on concepts and on better visualizing the mathematical content. The focus of the text is on key ideas and basic technical and geometric insights presented in a way that closely reflects how physicists and engineers actually think about mathematics.

Applied Partial Differential Equations - J. David Logan 2012-12-06

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 usually consists of students in mathematics, engineering, and the physical sciences. The topics include derivations of some of the standard equations of mathematical physics (including the heat equation, the wave equation, and the 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. Prerequisites include calculus and a post-calculus differential equations course. There are several excellent texts for this course, so one can legitimately ask why one would wish to write another. A survey of the content of the existing titles shows that their scope is broad and the analysis detailed; and they often exceed five hundred pages in length. These books generally have enough material for two,

three, or even four semesters. Yet, many undergraduate courses are one-semester courses. The author has often felt that students become a little uncomfortable when an instructor jumps around in a long volume searching for the right topics, or only partially covers some topics; but they are secure in completely mastering a short, well-defined introduction. This text was written to provide a brief, one-semester introduction to partial differential equations.

Maple By Example - Martha L. L. Abell 2005-04-28

Maple by Example, Third Edition, is a reference/text for beginning and experienced students, professional engineers, and other Maple users. This new edition has been updated to be compatible with the most recent release of the Maple software. Coverage includes built-in Maple commands used in courses and practices that involve calculus, linear algebra, business mathematics, ordinary and partial differential equations, numerical methods, graphics and more. * Updated coverage of Maple features and functions * Backwards compatible for all versions * New applications from a variety of fields, including biology, physics and engineering * Expanded topics with many additional examples

Solving Problems in Scientific Computing Using Maple and MATLAB® - Walter Gander 2004-06-07

Teaches problem-solving using two of the most important mathematical software packages: Maple and MATLAB. This new edition contains five completely new chapters covering new developments.

Advanced Transport Phenomena - P. A. Ramachandran 2014-09-25

Integrated, modern approach to transport phenomena for graduate students, featuring examples and computational solutions to develop practical problem-solving skills.

Partial Differential Equations of Applied Mathematics - Erich Zauderer 2011-10-24

This new edition features the latest tools for modeling, characterizing, and solving partial differential equations. The Third Edition of this classic text offers a comprehensive guide to modeling, characterizing, and solving partial differential equations (PDEs). The author provides all the theory and tools necessary to solve problems via exact, approximate, and numerical methods. The Third Edition retains all the hallmarks of its previous editions, including an emphasis on practical applications, clear writing style and logical organization, and extensive use of real-world examples. Among the new and revised material, the book features: * A new section at the end of each original chapter, exhibiting the use of specially constructed Maple procedures that solve PDEs via many of the methods presented in the chapters. The results can be evaluated numerically or displayed graphically. * Two new chapters that present finite difference and finite element methods for the solution of PDEs. Newly constructed Maple procedures are provided and used to carry out each of these methods. All the numerical results can be displayed graphically. * A related FTP site that includes all the Maple code used in the text. * New exercises in each chapter, and answers to many of the exercises are provided via the FTP site. A supplementary Instructor's Solutions Manual is available. The book begins with a demonstration of how the three basic types of equations—parabolic, hyperbolic, and elliptic—can be derived from random walk models. It then covers an exceptionally broad range of topics, including questions of stability, analysis of singularities, transform methods, Green's functions, and perturbation and asymptotic treatments. Approximation methods for simplifying complicated problems and solutions are described, and linear and nonlinear problems not easily solved by standard methods are examined in depth. Examples from the fields of engineering and physical sciences are used liberally throughout the text to help illustrate how theory and techniques are applied to actual problems. With its extensive use of examples and exercises, this text is recommended for advanced undergraduates and graduate students in engineering, science, and applied mathematics, as well as professionals in any of these fields. It is possible to use the text, as in the past, without use of the new Maple material.

Choice - 2006

Numerical Methods for Laplace Transform Inversion - Alan M. Cohen 2007-06-16

This book gives background material on the theory of Laplace transforms, together with a fairly comprehensive list of methods that are available at the current time. Computer programs are included for those methods that perform consistently well on a wide range of Laplace transforms. Operational methods have been used for over a century to solve problems such as ordinary and partial differential equations.

Differential Equations for Engineers - Wei-Chau Xie 2010-04-26

Xie presents a systematic introduction to ordinary differential equations for engineering students and practitioners. Mathematical concepts and various techniques are presented in a clear, logical, and concise manner. Various visual features are used to highlight focus areas. Complete illustrative diagrams are used to facilitate mathematical modeling of application problems. Readers are motivated by a focus on the relevance of differential equations through their applications in various engineering disciplines. Studies of various types of differential equations are determined by engineering applications. Theory and techniques for solving differential equations are then applied to solve practical engineering problems. A step-by-step analysis is presented to model the engineering problems using differential equations from physical principles and to solve the differential equations using the easiest possible method. This book is suitable for undergraduate students in engineering.

Mathematics Catalog 2005 - Neil Thomson 2004-10

Partial Differential Equations - Victor Henner 2019-11-20

Partial Differential Equations: Analytical Methods and Applications covers all the basic topics of a Partial Differential Equations (PDE) course for undergraduate students or a beginners' course for graduate students. It provides qualitative physical explanation of mathematical results while maintaining the expected level of rigor. This text introduces and promotes practice of necessary problem-solving skills. The presentation is concise and friendly to the reader. The "teaching-by-examples" approach provides numerous carefully chosen examples that guide step-by-step learning of concepts and techniques. Fourier series, Sturm-Liouville problem, Fourier transform, and Laplace transform are included. The book's level of presentation and structure is well suited for use in engineering, physics and applied mathematics courses. Highlights: Offers a complete first course on PDEs. The text's flexible structure promotes varied syllabi for courses. Written with a teach-by-example approach which offers numerous examples and applications. Includes additional topics such as the Sturm-Liouville problem, Fourier and Laplace transforms, and special functions. The text's graphical material makes excellent use of modern software packages. Features numerous examples and applications which are suitable for readers studying the subject remotely or independently.

The Finite Element Method - Darrell W. Pepper 2017-04-11

This self-explanatory guide introduces the basic fundamentals of the Finite Element Method in a clear manner using comprehensive examples. Beginning with the concept of one-dimensional heat transfer, the first chapters include one-dimensional problems that can be solved by inspection. The book progresses through more detailed two-dimensional elements to three-dimensional elements, including discussions on various applications, and ending with introductory chapters on the boundary element and meshless methods, where more input data must be provided to solve problems. Emphasis is placed on the development of the discrete set of algebraic equations. The example problems and exercises in each chapter explain the procedure for defining and organizing the required initial and boundary condition data for a specific problem, and computer code listings in MATLAB and MAPLE are included for setting up the examples within the text, including COMSOL files. Widely used as an introductory Finite Element Method text since 1992 and used in past ASME short courses and AIAA home study courses, this text is intended for undergraduate and graduate students taking Finite Element Methodology courses, engineers working in the industry that need to become familiar with the FEM, and engineers working in the field of heat transfer. It can also be used for distance education courses that can be conducted on the web. Highlights of the new edition include: - Inclusion of MATLAB, MAPLE code listings, along with several COMSOL files, for the example problems within the text. Power point presentations per chapter and a solution manual are also available from the web. - Additional introductory chapters on the boundary element method and the meshless method. - Revised and updated content. - Simple and easy to follow guidelines for understanding and applying the Finite Element Method.

Partial Differential Equations - Walter A. Strauss 2007-12-21

Partial Differential Equations presents a balanced and comprehensive introduction to the concepts and techniques required to solve problems containing unknown functions of multiple variables. While focusing on the three most classical partial differential equations (PDEs)—the wave, heat, and Laplace

equations—this detailed text also presents a broad practical perspective that merges mathematical concepts with real-world application in diverse areas including molecular structure, photon and electron interactions, radiation of electromagnetic waves, vibrations of a solid, and many more. Rigorous pedagogical tools aid in student comprehension; advanced topics are introduced frequently, with minimal technical jargon, and a wealth of exercises reinforce vital skills and invite additional self-study. Topics are presented in a logical progression, with major concepts such as wave propagation, heat and diffusion, electrostatics, and quantum mechanics placed in contexts familiar to students of various fields in science and engineering. By understanding the properties and applications of PDEs, students will be equipped to better analyze and interpret central processes of the natural world.

Solving Nonlinear Partial Differential Equations with Maple and Mathematica - Inna Shingareva 2011-07-24

The emphasis of the book is given in how to construct different types of solutions (exact, approximate analytical, numerical, graphical) of numerous nonlinear PDEs correctly, easily, and quickly. The reader can learn a wide variety of techniques and solve numerous nonlinear PDEs included and many other differential equations, simplifying and transforming the equations and solutions, arbitrary functions and parameters, presented in the book). Numerous comparisons and relationships between various types of solutions, different methods and approaches are provided, the results obtained in Maple and Mathematica, facilitates a deeper understanding of the subject. Among a big number of CAS, we choose the two systems, Maple and Mathematica, that are used worldwide by students, research mathematicians, scientists, and engineers. As in the our previous books, we propose the idea to use in parallel both systems, Maple and Mathematica, since in many research problems frequently it is required to compare independent results obtained by using different computer algebra systems, Maple and/or Mathematica, at all stages of the solution process. One of the main points (related to CAS) is based on the implementation of a whole solution method (e.g. starting from an analytical derivation of exact governing equations, constructing discretizations and analytical formulas of a numerical method, performing numerical procedure, obtaining various visualizations, and comparing the numerical solution obtained with other types of solutions considered in the book, e.g. with asymptotic solution).

Scaling of Differential Equations - Hans Petter Langtangen 2016-06-15

The book serves both as a reference for various scaled models with corresponding dimensionless numbers, and as a resource for learning the art of scaling. A special feature of the book is the emphasis on how to create software for scaled models, based on existing software for unscaled models. Scaling (or non-dimensionalization) is a mathematical technique that greatly simplifies the setting of input parameters in numerical simulations. Moreover, scaling enhances the understanding of how different physical processes interact in a differential equation model. Compared to the existing literature, where the topic of scaling is frequently encountered, but very often in only a brief and shallow setting, the present book gives much more thorough explanations of how to reason about finding the right scales. This process is highly problem dependent, and therefore the book features a lot of worked examples, from very simple ODEs to systems of PDEs, especially from fluid mechanics. The text is easily accessible and example-driven. The first part on ODEs fits even a lower undergraduate level, while the most advanced multiphysics fluid mechanics examples target the graduate level. The scientific literature is full of scaled models, but in most of the cases, the scales are just stated without thorough mathematical reasoning. This book explains how the scales are found mathematically. This book will be a valuable read for anyone doing numerical simulations based on ordinary or partial differential equations.

Advanced Engineering Mathematics - Dennis Zill 2011

Accompanying CD-ROM contains ... "a chapter on engineering statistics and probability / by N. Bali, M. Goyal, and C. Watkins."--CD-ROM label.

Finite Difference Computing with PDEs - Hans Petter Langtangen 2017-06-21

This book is open access under a CC BY 4.0 license. This easy-to-read book introduces the basics of solving partial differential equations by means of finite difference methods. Unlike many of the traditional academic works on the topic, this book was written for practitioners. Accordingly, it especially addresses: the construction of finite difference schemes, formulation and implementation of algorithms, verification of

implementations, analyses of physical behavior as implied by the numerical solutions, and how to apply the methods and software to solve problems in the fields of physics and biology.

Maple V by Example - Martha L. Abell 1999

Maple V By Example, Second Edition bridges the gap between the very elementary handbooks addressing Maple V and the reference books written for advanced Maple V users. Whereas the First Edition focuses on Release 2 of Maple V, the vehicle for the Second Edition is Maple V, Version 5. The new edition remains an appropriate reference for all users of Maple V but is of particular value to students, instructors, engineers, business persons, and other professionals first learning to use Maple V.

Differential Equations with Maple V - Martha L. Abell 2000

Through the use of numerous examples that illustrate how to solve important applications using Maple V, Release 2, this book provides readers with a solid, hands-on introduction to ordinary and partial differential equations. Includes complete coverage of constructing and numerically computing and approximating solutions to ordinary and partial equations.

Microfluidics - Bastian E. Rapp 2022-10-07

Microfluidics: Modeling, Mechanics and Mathematics, Second Edition provides a practical, lab-based approach to nano- and microfluidics, including a wealth of practical techniques, protocols and experiments ready to be put into practice in both research and industrial settings. This practical approach is ideally suited to researchers and R&D staff in industry. Additionally, the interdisciplinary approach to the science of nano- and microfluidics enables readers from a range of different academic disciplines to broaden their understanding. Alongside traditional fluid/transport topics, the book contains a wealth of coverage of materials and manufacturing techniques, chemical modification/surface functionalization, biochemical analysis, and the biosensors involved. This fully updated new edition also includes new sections on viscous flows and centrifugal microfluidics, expanding the types of platforms covered to include centrifugal, capillary and electro kinetic platforms. Provides a practical guide to the successful design and implementation of nano- and microfluidic processes (e.g., biosensing) and equipment (e.g., biosensors, such as diabetes blood glucose sensors) Provides techniques, experiments and protocols that are ready to be put to use in the lab, or in an academic or industry setting Presents a collection of 3D-CAD and image files on a companion website

Scientific Computing - An Introduction using Maple and MATLAB - Walter Gander 2014-04-23

Scientific computing is the study of how to use computers effectively to solve problems that arise from the mathematical modeling of phenomena in science and engineering. It is based on mathematics, numerical and symbolic/algebraic computations and visualization. This book serves as an introduction to both the theory and practice of scientific computing, with each chapter presenting the basic algorithms that serve as the workhorses of many scientific codes; we explain both the theory behind these algorithms and how they must be implemented in order to work reliably in finite-precision arithmetic. The book includes many programs written in Matlab and Maple - Maple is often used to derive numerical algorithms, whereas Matlab is used to implement them. The theory is developed in such a way that students can learn by themselves as they work through the text. Each chapter contains numerous examples and problems to help readers understand the material "hands-on".

Aerospace America - 1994

The Geometrical Study of Differential Equations - Joshua Allensworth Leslie 2001

This volume contains papers based on some of the talks given at the NSF-CBMS conference on "The Geometrical Study of Differential Equations" held at Howard University (Washington, DC). The collected papers present important recent developments in this area, including the treatment of nontransversal group actions in the theory of group invariant solutions of PDEs, a method for obtaining discrete symmetries of differential equations, the establishment of a group-invariant version of the variational complex based on a general moving frame construction, the introduction of a new variational complex for the calculus of difference equations and an original structural investigation of Lie-Backlund transformations. The book opens with a modern and illuminating overview of Lie's line-sphere correspondence and concludes with several interesting open problems arising from symmetry analysis of

PDEs. It offers a rich source of inspiration for new or established researchers in the field. This book can serve nicely as a companion volume to Selected Topics in the Geometrical Study of Differential Equations, by Niky Kamran, in the AMS series, CBMS Regional Conference Series in Mathematics.

Heat Transport in Micro- and Nanoscale Thin Films - Bekir Sami Yilbas 2017-08-23

Heat Transport in Micro- and Nanoscale Thin Films presents aspects and applications of the principle methods of heat transport in relation to nanoscale films. Small-scale parts and thin films are widely used in the electronics industry. However, the drastic change in the thermal conductivity with reducing device size and film thickness modifies the energy transport by heat-carrying phonons in the film. Energy transfer in small-sized devices and thin films deviate from the classical diffusion to radiative transport. This book deals with micro/nano scale heat transfer in small scale devices and the thin films, including interface properties of cross-plane transport. The book fills the gap between applications of the physical fundamentals and energy transport at the micro- and nano scale, which will be valuable for academics, researchers and students in the fields of materials science and energy transport Offers a specialist focus on nanoscale thin films, allowing the reader to create more efficient heat transfer systems Includes in-depth coverage of the formulation of transient energy transport for short durations of heating, which is valuable those working in electronics Focuses on applications and real-life case studies to clearly illustrate how the theories explained in the book can be used in industry

Linear Partial Differential Equations and Fourier Theory - Marcus Pivato 2010-01-07

This highly visual introductory textbook provides a rigorous mathematical foundation for all solution methods and reinforces ties to physical motivation.

Applied Differential Equations - Vladimir A. Dobrushkin 2014-12-16

A Contemporary Approach to Teaching Differential Equations Applied Differential Equations: An Introduction presents a contemporary treatment of ordinary differential equations (ODEs) and an introduction to partial differential equations (PDEs), including their applications in engineering and the sciences. Designed for a two-semester undergraduate course, the text offers a true alternative to books published for past generations of students. It enables students majoring in a range of fields to obtain a solid foundation in differential equations. The text covers traditional material, along with novel approaches to mathematical modeling that harness the capabilities of numerical algorithms and popular computer software packages. It contains practical techniques for solving the equations as well as corresponding codes for numerical solvers. Many examples and exercises help students master effective solution techniques, including reliable numerical approximations. This book describes differential equations in the context of applications and presents the main techniques needed for modeling and systems analysis. It teaches students how to formulate a mathematical model, solve differential equations analytically and numerically, analyze them qualitatively, and interpret the results.

Solving Differential Equations with Maple V, Release 4 - David Barrow 1997-08

This comprehensive book helps students tap into the power of Maple®, thereby simplifying the computations and graphics that are often required in the practical use of mathematics. Numerous examples and exercises provide a thorough introduction to the basic Maple® commands that are needed to solve differential equations. Topics include: numerical algorithms, first order linear systems, homogeneous and nonhomogeneous equations, beats and resonance, Laplace Transforms, qualitative theory, nonlinear systems, and much more.

Differential Equations with Maple V® - Martha L Abell 2014-05-09

Differential Equations with Maple V provides an introduction and discussion of topics typically covered in an undergraduate course in ordinary differential equations as well as some supplementary topics such as Laplace transforms, Fourier series, and partial differential equations. It also illustrates how Maple V is used to enhance the study of differential equations not only by eliminating the computational difficulties, but also by overcoming the visual limitations associated with the solutions of differential equations. The book contains chapters that present differential equations and illustrate how Maple V can be used to solve some typical problems. The text covers topics on differential equations such as first-order ordinary differential equations, higher order differential equations, power series solutions of ordinary differential equations, the

Laplace Transform, systems of ordinary differential equations, and Fourier Series and applications to partial differential equations. Applications of these topics are also provided. Engineers, computer scientists, physical scientists, mathematicians, business professionals, and students will find the book useful.

Numerical Analysis of Partial Differential Equations Using Maple and MATLAB - Martin J. Gander 2018-08-06

This book provides an elementary yet comprehensive introduction to the numerical solution of partial differential equations (PDEs). Used to model important phenomena, such as the heating of apartments and the behavior of electromagnetic waves, these equations have applications in engineering and the life sciences, and most can only be solved approximately using computers. Numerical Analysis of Partial Differential Equations Using Maple and MATLAB provides detailed descriptions of the four major classes of discretization methods for PDEs (finite difference method, finite volume method, spectral method, and finite element method) and runnable MATLAB® code for each of the discretization methods and exercises. It also gives self-contained convergence proofs for each method using the tools and techniques required for the general convergence analysis but adapted to the simplest setting to keep the presentation clear and complete. This book is intended for advanced undergraduate and early graduate students in numerical analysis and scientific computing and researchers in related fields. It is appropriate for a course on numerical methods for partial differential equations.

Numerical Solution of Differential Equations - Zhilin Li 2017-11-30

A practical and concise guide to finite difference and finite element methods. Well-tested MATLAB® codes are available online.

Computational Physics - Rubin H. Landau 2015-09-08

The use of computation and simulation has become an essential part of the scientific process. Being able to transform a theory into an algorithm requires significant theoretical insight, detailed physical and mathematical understanding, and a working level of competency in programming. This upper-division text provides an unusually broad survey of the topics of modern computational physics from a multidisciplinary, computational science point of view. Its philosophy is rooted in learning by doing (assisted by many model programs), with new scientific materials as well as with the Python programming language. Python has become very popular, particularly for physics education and large scientific projects. It is probably the easiest programming language to learn for beginners, yet is also used for mainstream scientific computing, and has packages for excellent graphics and even symbolic manipulations. The text is designed for an upper-level undergraduate or beginning graduate course and provides the reader with the essential knowledge to understand computational tools and mathematical methods well enough to be successful. As part of the teaching of using computers to solve scientific problems, the reader is encouraged to work through a sample problem stated at the beginning of each chapter or unit, which involves studying the text, writing, debugging and running programs, visualizing the results, and the expressing in words what has been done and what can be concluded. Then there are exercises and problems at the end of each chapter for the reader to work on their own (with model programs given for that purpose).

Introduction To Partial Differential Equations (With Maple), An: A Concise Course - Zhilin Li 2021-09-23

The book is designed for undergraduate or beginning level graduate students, and students from interdisciplinary areas including engineers, and others who need to use partial differential equations, Fourier series, Fourier and Laplace transforms. The prerequisite is a basic knowledge of calculus, linear algebra, and ordinary differential equations. The textbook aims to be practical, elementary, and reasonably rigorous; the book is concise in that it describes fundamental solution techniques for first order, second order, linear partial differential equations for general solutions, fundamental solutions, solution to Cauchy (initial value) problems, and boundary value problems for different PDEs in one and two dimensions, and different coordinates systems. Analytic solutions to boundary value problems are based on Sturm-Liouville eigenvalue problems and series solutions. The book is accompanied with enough well tested Maple files and some Matlab codes that are available online. The use of Maple makes the complicated series solution simple, interactive, and visible. These features distinguish the book from other textbooks available in the related area.