

<<偏微分方程与孤波理论>>

图书基本信息

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前言

Partial Differential Equations and Solitary Waves Theory is designed to serve as a text and a reference. The book is designed to be accessible to advanced undergraduate and beginning graduate students as well as research monograph to researchers in applied mathematics, science and engineering. This text is different from other texts in that it explains classical methods in a non abstract way and it introduces and explains how the newly developed methods provide more concise methods to provide efficient results. Partial Differential Equations and Solitary Waves Theory is designed to focus readers' attentions on these recently developed valuable techniques that have proven their effectiveness and reliability over existing classical methods. Moreover, this text also explains the necessary classical methods because the aim is that new methods would complement the traditional methods in order to improve the understanding of the material. The book avoids approaching the subject through the compact and classical methods that make the material impossible to be grasped, especially by students who do not have the background in these abstract concepts. Compact theorems and abstract handling of the material are not presented in this text. The book was developed as a result of many years of experience in teaching partial differential equations and conducting research work in this field. The author has taken account on his teaching experience, research work as well as valuable suggestions received from students and scholars from a wide variety of audience. Numerous examples and exercises, ranging in level from easy to difficult, but consistent with the material, are given in each section to give the reader the knowledge, practice and skill in partial differential equations and solitary waves theory. There is plenty of material in this text to be covered in two semesters for senior undergraduates and beginning graduates of Mathematics, Science, and Engineering.

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内容概要

Partial Differential Equations and Solitary Waves Theory is a self-contained book divided into two parts : Part I is a coherent survey bringing together newly developed methods for solving PDEs. While some traditional techniques are pre-sented, this part does not require thorough understanding of abstract theories or compact concepts. Well-selected worked examples and exercises shall guide the reader through the text. Part II provides an extensive exposition of the solitary waves theory. This part handles nonlinear evolution equations by methods such as Hirota's bilinear method or the tanh-coth method. A self-contained treatment is presented to discuss complete integrability of a wide class of nonlinear equations. This part presents in an accessible manner a systematic presentation of solitons, multi-soliton solutions, kinks, peakons, cuspons, and compactons. While the whole book can be used as a text for advanced undergraduate and graduate students in applied mathematics, physics and engineering, Part II will be most useful for graduate students and researchers in mathematics, engineering, and other related fields.

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