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<<偏微分方程与孤波理论>>

图书基本信息

书名：<<偏微分方程与孤波理论>>

13位ISBN编号：9787040254808

10位ISBN编号：7040254808

出版时间：2009-5

出版时间：伍斯瓦茨 (Wazwaz.A.M.) 高等教育出版社 (2009-05出版)

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页数：737

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前言

Partial Differential Equations and Solitary Waves Theory is designed to serve as atext and a reference. The book is designed to be accessible to advanced undergrad-uate and beginning graduate students as well as research monograph to researchersin applied mathematics, science and engineering. This text is different from othertexts in that it explains classical methods in a non abstract ,way and it introducesand explains how the newly developed methods provide more concise methods toprovide efficient results.Partial Differential Equations and Solitary Waves Theory is designed to focusreaders' attentions on these recently developed valuable techniques that have proventheir effectiveness and reliability over existing classical methods. Moreover, this textalso explains the necessary classical methods because the aim is that new methodswould complement the traditional methods in order to improve the understanding ofthe material.The book avoids approaching the subject through the compact and classicalmethods that make the material impossible to be grasped, especially by studentswho do not have the background in these abstract concepts. Compact theorems andabstract handling of the material are not presented in this text.The book was developed as a result of many years of experience in teachingpartial differential equations and conducting research work in this field. The authorhas taken account on his teaching experience, research work as well as valuablesuggestions received from students and scholars from a wide variety of audience.Numerous examples and exercises, ranging in level from easy to difficult, but con-sistent 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 isplenty of material in this text to be covered in two semesters for senior undergradu-ates 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-containedbook divided into two parts：Part I is a coherent survey bringing together newlydeveloped methods for solving PDEs. While some traditional techniques are pre-sented, this part does not require thorough understanding of abstract theories orcompact concepts. Well-selected worked examples and exercises shall guide thereader through the text. Part II provides an extensive exposition of the solitarywaves theory. This part handles nonlinear evolution equations by methods suchas Hirotas bilinear method or the tanh-coth method. A self-contained treatmentis presented to discuss complete integrability of a wide class of nonlinear equa-tions. This part presents in an accessible manner a systematic presentation ofsolitons, multi-soliton solutions, kinks, peakons, cuspons, and compactons. While the whole book can be used as a text for advanced undergraduate andgraduate students in applied mathematics, physics and engineering, Part II will be most useful for graduate students and researchers in mathematics, engineer-ing, and other related fields.

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编辑推荐

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