第一图书网, tushu007.com
<<常微分方程和微分代数方程的计 >

图书基本信息

书名：<<常微分方程和微分代数方程的计算机方法>>

13位ISBN编号：9787030234865

10位ISBN编号：7030234863

出版时间：2009-1

出版时间：科学出版社

作者：阿舍

页数：314

译者：Linda R.Petzold

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：http://www.tushu007.com

第一图书网, tushu007.com

前言

要使我国的数学事业更好地发展起来，需要数学家淡泊名利并付出更艰苦地努力。
另一方面，我们也要从客观上为数学家创造更有利的发展数学事业的外部环境，这主要是加强对数学事业的支持与投资力度，使数学家有较好的工作与生活条件，其中也包括改善与加强数学的出版工作。
从出版方面来讲，除了较好较快地出版我们自己的成果外，引进国外的先进出版物无疑也是十分重要与必不可少的。
从数学来说，施普林格（springer）出版社至今仍然是世界上最具权威的出版社。
科学出版社影印一批他们出版的好的新书，使我国广大数学家能以较低的价格购买，特别是在边远地区工作的数学家能普遍见到这些书，无疑是对推动我国数学的科研与教学十分有益的事。
这次科学出版社购买了版权，一次影印了23本施普林格出版社出版的数学书，就是一件好事，也是值得继续做下去的事情。
大体上分一下，这23本书中，包括基础数学书5本，应用数学书6本与计算数学书12本，其中有些书也具有交叉性质。
这些书都是很新的，2000年以后出版的占绝大部分，共计16本，其余的也是1990年以后出版的。
这些书可以使读者较快地了解数学某方面的前沿，例如基础数学中的数论、代数与拓扑三本，都是由该领域大数学家编著的“数学百科全书”的分册。
对从事这方面研究的数学家了解该领域的前沿与全貌很有帮助。
按照学科的特点，基础数学类的书以“经典”为主，应用和计算数学类的书以“前沿”为主。
这些书的作者多数是国际知名的大数学家，例如《拓扑学》一书的作者诺维科夫是俄罗斯科学院的院士，曾获“菲尔兹奖”和“沃尔夫数学奖”。
这些大数学家的著作无疑将会对我国的科研人员起到非常好的指导作用。
当然，23本书只能涵盖数学的一部分，所以，这项工作还应该继续做下去。
更进一步，有些读者面较广的好书还应该翻译成中文出版，使之有更大的读者群。
总之，我对科学出版社影印施普林格出版社的部分数学著作这一举措表示热烈的支持，并盼望这一工作取得更大的成绩。

第一图书网, tushu007.com

内容概要

Designed for those people who want to gain a practical knowledge of modem techniques， this book contains all the material necessary for a course on the nmnerical solution of differential equations.Written by two of the field's leading athorities， it provides a unified presentation of initial value and boundary value problems in ODEs as well as differential-algebraic equations.The approach is aimed at a thorough understanding of the issues and methods for practical computation while avoiding an extensive theorem-proof type of exposition.It also addresses reasons why existing software succeeds or fails. This book is a practical and mathematically well informed introduction that emphasizes basic methods and theory， issues in the use and development of mathematical software， and examples from scientific engineering applications.Topics requiring an extensive amount of mathematical development， such as symplectic methods for Hamiltonian systems， are introduced， motivated， and included in the exercises， but a complete and rigorous mathematical presentation is referenced rather than included. This book is appropriate for senior undergraduate or beginning graduate students with a computational focus and practicing engineers and scientists who want to learn about computational differential equations.A beginning course in numerical analysis is needed， and a beginning course in ordinary differential equations would be helpful.

第一图书网, tushu007.com

作者简介

作者：(美国)阿舍 (Uri M.Ascher) 译者：(美国)Linda R.Petzold

第一图书网, tushu007.com

书籍目录

List of FiguresList of TablesPrefacePart Ⅰ：Introduction 1 Ordinary Differential Equations 1.1 IVPs 1.2 BVPs 1.3 Differential-Algebraic Equations 1.4 Families of Application Problems 1.5 Dynamical Systems 1.6 NotationPart Ⅱ：Initial Value Problems 2 On Problem Stability 2.1 Test Equation and General Definitions 2.2 Linear, Constant-Coefficient Systems 2.3 Linear, Variable-Coefficient Systems 2.4 Nonlinear Problems 2.5 Hamiltonian Systems 2.6 Notes and References 2.7 Exercises 3 Basic Methods, Basic Concepts 3.1 A Simple Method：Forward Euler 3.2 Convergence, Accuracy, Consistency, and O-Stability 3.3 Absolute Stability 3.4 Stiffness：Backward Euler 3.4.1 Backward Euler 3.4.2 Solving Nonlinear Equations 3.5 A-Stability, Stiff Decay 3.6 Symmetry：Trapezoidal Method 3.7 Rough Problems 3.8 Software, Notes, and References 3.8.1 Notes 3.8.2 Software 3.9 Exercises 4 One-Step Methods 4.1 The First Runge-Kutta Methods 4.2 General Formulation of Runge-Kutta Methods 4.3 Convergence, O-Stability, and Order for Runge-Kutta Methods 4.4 Regions of Absolute Stability for Explicit Runge-Kutta Methods 4.5 Error Estimation and Control 4.6 Sensitivity to Data Perturbations 4.7 Implicit Runge-Kutta and Collocation Methods 4.7.1 Implicit Runge-Kutta Methods Based on Collocation 4.7.2 Implementation and Diagonally Implicit Methods... 4.7.3 Order Reduction 4.7.4 More on Implementation and Singly Implicit RungeKutta Methods 4.8 Software , Notes, and References 4.8.1 Notes 4.8.2 Software 4.9 Exercises 5 Linear Multistep Methods 5.1 The Most Popular Methods 5.1.1 Adams Methods 5.1.2 BDF 5.1.3 Initial Values for Multistep Methods 5.2 Order, O-Stability, and Convergence 5.2.1 Order 5.2.2 Stability：Difference Equations and the Root Condition 5.2.3 O-Stability and Convergence 5.3 Absolute Stability 5.4 Implementation of hnplicit Linear Multistep Methods 5.4.1 Functional Iteration 5.4.2 Predictor-Corrector Methods 5.4.3 Modified Newton Iteration 5.5 Designing Multistep General-Purpose Software 5.5.1 Variable Step-Size Formulae 5.5.2 Estimating and Controlling the Local Error 5.5.3 Approximating the Solution at Off-Step Points 5.6 Software , Notes, and References 5.6.1 Notes 5.6.2 Software 5.7 ExercisesPart Ⅲ：Boundary Value Problems 6 More Boundary Value Problem Theory and Applications 6.1 Linear BVPs and Green's Function '. 6.2 Stability of BVPs 6.3 BVP Stiffness 6.4 Some Reformulation Tricks 6.5 Notes and References 6.6 Exercises 7 Shooting 7.1 Shooting：A Simple Method and Its Limitations 7.1.1 Difficulties 7.2 Multiple Shooting 7.3 Software , Notes, and References 7.3.1 Notes 7.3.2 Software 7.4 Exercises 8 Finite Difference Methods for Boundary Value Problems 8.1 Midpoint and Trapezoidal Methods 8.1.1 Solving Nonlinear Problems ：Quasi-Linearization 8.1.2 Consistency, O-Stability, and Convergence 8.2 Solving the Linear Equations 8.3 Higher-Order Methods 8.3.1 Collocation 8.3.2 Acceleration Techniques 8.4 More on Solving Nonlinear Problems 8.4.1 Damped Newton 8.4.2 Shooting for Initial Guesses 8.4.3 Continuation 8.5 Error Estimation and Mesh Selection 8.6 Very Stiff Problems 8.7 Decoupling 8.8 Software, Notes, and References 8.8.1 Notes 8.8.2 Software 8.9 ExercisesPart Ⅳ：Differential-Algebraic Equations 9 More on Differential-Algebraic Equations 9.1 Index and Mathematical Structure 9.1.1 Special DAE Forms 9.1.2 DAE Stability 9.2 Index Reduction and Stabilization：ODE with Invariant 9.2.1 Reformulation of Higher-Index DAEs 9.2.2 ODEs with Invariants 9.2.3 State Space Formulation 9.3 Modeling with DAEs 9.4 Notes and References 9.5 Exercises 10 Numerical Methods for Differential-Algebraic Equations 10.1 Direct Discretization Methods 10.1.1 A Simple Method：Backward Euler 10.1.2 BDF and General Multistep Methods 10.1.3 Radau Collocation and Implicit Runge-Kutta Methods 10.1.4 Practical Difficulties 10.1.5 Specialized Runge-Kutta Methods for Hessenberg Index-2 DAEs 10.2 Methods for ODEs on Manifolds 10.2.1 Stabilization of the Discrete Dynamical System 10.2.2 Choosing the Stabilization Matrix F 10.3 Software , Notes, and References 10.3.1 Notes 10.3.2 Software 10.4 ExercisesBibliographyIndex

第一图书网, tushu007.com

章节摘录

插图：

第一图书网, tushu007.com

编辑推荐

《国外数学名著系列(续一)(影印版)41:常微分方程和微分代数方程的计算机方法》由科学出版社出版。

第一图书网, tushu007.com

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:http://www.tushu007.com