

<<微分方程数值方法引论>>

图书基本信息

书名：<<微分方程数值方法引论>>

13位ISBN编号：9787030313874

10位ISBN编号：7030313879

出版时间：2011-6

出版时间：科学出版社

作者：霍姆斯

页数：238

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>

## <<微分方程数值方法引论>>

### 内容概要

本书内容包括：初值问题、两点边界值问题、扩散问题、平流方程、椭圆型问题等。

## &lt;&lt;微分方程数值方法引论&gt;&gt;

## 书籍目录

Preface

1 Initial Value Problems

1.1 Introduction

1.1.1 Examples of IVPs

1.2 Methods Obtained from Numerical Differentiation .

1.2.1 The Five Steps

1.2.2 Additional Difference Methods

1.3 Methods Obtained from Numerical Quadrature

1.4 Runge--Kutta Methods

1.5 Extensions and Ghost Points

1.6 Conservative Methods

1.6.1 Velocity Verlet

1.6.2 Symplectic Methods

1.7 Next Steps

Exercises

2 Two-Point Boundary Value Problems

2.1 Introduction

2.1.1 Birds on a Wire

2.1.2 Chemical Kinetics

2.2 Derivative Approximation Methods

2.2.1 Matrix Problem

2.2.2 Tridiagonal Matrices

2.2.3 Matrix Problem Revisited

2.2.4 Error Analysis

2.2.5 Extensions

2.3 Residual Methods

2.3.1 Basis Functions

2.3.2 Residual

2.4 Shooting Methods

2.5 Next Steps

Exercises

3 Diffusion Problems

3.1 Introduction

3.1.1 Heat Equation

3.2 Derivative Approximation Methods

3.2.1 Implicit Method

3.2.2 Theta Method

3.3 Methods Obtained from Numerical Quadrature

3.3.1 Crank-Nicolson Method

3.3.2 L-Stability

3.4 Methods of Lines

3.5 Collocation

3.6 Next Steps

Exercises

4 Advection Equation

## <<微分方程数值方法引论>>

- 4.1 Introduction
  - 4.1.1 Method of Characteristics
  - 4.1.2 Solution Properties
  - 4.1.3 Boundary Conditions
- 4.2 First-Order Methods
  - 4.2.1 Upwind Scheme
  - 4.2.2 Downwind Scheme
  - 4.2.3 Numerical Form of Dependence
  - 4.2.4 Stability
- 4.3 Improvements
  - 4.3.1 Lax-Wendroff Method
  - 4.3.2 Monotone Methods
  - 4.3.3 Upwind Revisited
- 4.4 Implicit Methods
- Exercises
- 5 Numerical Wave Propagation
  - 5.1 Introduction
    - 5.1.1 Solution Methods
    - 5.1.2 Plane Wave Solutions
  - 5.2 Explicit Method
    - 5.2.1 Diagnostics
    - 5.2.2 Numerical Experiments
  - 5.3 Numerical Plane Waves
    - 5.3.1 Numerical Group Velocity
  - 5.4 Next Steps
  - Exercises
- 6 Elliptic Problems
  - 6.1 Introduction
    - 6.1.1 Solutions
    - 6.1.2 Properties of the Solution
  - 6.2 Finite Difference Approximation
    - 6.2.1 Building the Matrix
    - 6.2.2 Positive Definite Matrices
  - 6.3 Descent Methods
    - 6.3.1 Steepest Descent Method
    - 6.3.2 Conjugate Gradient Method
  - 6.4 Numerical Solution of Laplace's Equation
  - 6.5 Preconditioned Conjugate Gradient Method
  - 6.6 Next Steps
  - Exercises
- A Appendix
  - A.1 Order Symbols
  - A.2 Taylor's Theorem
  - A.3 Round-Off Error
    - A.3.1 Function Evaluation
    - A.3.2 Numerical Differentiation
  - A.4 Floating-Point Numbers

<<微分方程数值方法引论>>

References

Index

## <<微分方程数值方法引论>>

### 编辑推荐

This book shows how to derive and analyze numerical methods for solving differential equations, including both ordinary and partial differential equations. The objective is that students learn to solve differential equations numerically and understand the mathematical and computational issues that arise when this is done. Includes an extensive collection of exercises which develop both the analytical and computational aspects of the material. In addition to more than 100 illustrations, the book includes a large collection of supplemental material: exercise sets, MATLAB computer codes for both student and instructor, lecture slides and movies.

<<微分方程数值方法引论>>

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>