

<<计算物理学导论>>

图书基本信息

书名：<<计算物理学导论>>

13位ISBN编号：9787510035203

10位ISBN编号：7510035201

出版时间：2011-6

出版时间：世界图书出版公司

作者：庞涛

页数：385

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>

<<计算物理学导论>>

内容概要

《计算物理学导论(第2版)》是一部本科生和低年级研究生学习计算物理的教程。这是第二版，将第一版做了全面的更新和修订，改进后的课程不仅提供了学习计算物理学的基本方法，也全面介绍了计算科学领域的最新进展。书中讲述了许多具体例子，包括现代物理和相关领域的数值方法实践计算。每章末有练习题。本书不仅是一部教程，更是相关计算领域的的一本很好的参考书。

目次：绪论；函数逼近；数值微积分；基础数值法；常微分方程；矩阵数值法；光谱分析法；偏微分方程；分子动力学模拟；模拟连续系统；蒙特卡罗模拟；遗传算法和程序；数值重正化。

<<计算物理学导论>>

作者简介

作者：(美国)庞涛 (Tao Pang)

<<计算物理学导论>>

书籍目录

preface to first edition

preface

acknowledgments

1 introduction

1.1 computation and science

1.2 the emergence of modern computers

1.3 computer algorithms and languages

exercises

2 approximation of a function

2.1 interpolation

2.2 least-squares approximation

2.3 the millikan experiment

2.4 spline approximation

2.5 random-number generators

exercises

3 numerical calculus

3.1 numerical differentiation

3.2 numerical integration

3.3 roots of an equation

3.4 extremes of a function

3.5 classical scattering

exercises

4 ordinary differential equations

4.1 initial-value problems

4.2 the euler and picard methods

4.3 predictor-corrector methods

4.4 the runge-kutta method

4.5 chaotic dynamics of a driven pendulum

4.6 boundary-value and eigenvalue problems

4.7 the shooting method

4.8 linear equations and the sturm-liouville problem

4.9 the one-dimensional schrödinger equation

exercises

5 numerical methods for matrices

5.1 matrices in physics

5.2 basic matrix operations

5.3 linear equation systems

5.4 zeros and extremes of multivariable functions

5.5 eigenvalue problems

5.6 the faddeev-leverrier method

5.7 complex zeros of a polynomial

5.8 electronic structures of atoms

5.9 the lanczos algorithm and the many-body problem

5.10 random matrices

exercises

<<计算物理学导论>>

6 spectral analysis

- 6.1 fourier analysis and orthogonal functions
- 6.2 discrete fourier transform
- 6.3 fast fourier transform
- 6.4 power spectrum of a driven pendulum
- 6.5 fourier transform in higher dimensions
- 6.6 wavelet analysis
- 6.7 discrete wavelet transform
- 6.8 special functions
- 6.9 gaussian quadratures
- exercises

7 partial differential equations

- 7.1 partial differential equations in physics
- 7.2 separation of variables
- 7.3 discretization of the equation
- 7.4 the matrix method for difference equations
- 7.5 the relaxation method
- 7.6 groundwater dynamics
- 7.7 initial-value problems
- 7.8 temperature field of a nuclear waste rod
- exercises

8 molecular dynamics simulations

- 8.1 general behavior of a classical system
- 8.2 basic methods for many-body systems
- 8.3 the verlet algorithm
- 8.4 structure of atomic clusters
- 8.5 the gear predictor-corrector method
- 8.6 constant pressure, temperature, and bond length
- 8.7 structure and dynamics of real materials
- 8.8 ab initio molecular dynamics
- exercises

9 modeling continuous systems

- 9.1 hydrodynamic equations
- 9.2 the basic finite element method
- 9.3 the ritz variational method
- 9.4 higher-dimensional systems
- 9.5 the finite element method for nonlinear equations
- 9.6 the particle-in-cell method
- 9.7 hydrodynamics and magnetohydrodynamics
- 9.8 the lattice boltzmann method
- exercises

10 monte carlo simulations

- 10.1 sampling and integration
- 10.2 the metropolis algorithm
- 10.3 applications in statistical physics
- 10.4 critical slowing down and block algorithms
- 10.5 variational quantum monte carlo simulations

<<计算物理学导论>>

- 10.6 green's function monte carlo simulations
- 10.7 two-dimensional electron gas
- 10.8 path-integral monte carlo simulations
- 10.9 quantum lattice models
- exercises
- 11 genetic algorithm and programming
 - 11.1 basic elements of a genetic algorithm
 - 11.2 the thomson problem
 - 11.3 continuous genetic algorithm
 - 11.4 other applications
 - 11.5 genetic programming
 - exercises
- 12 numerical renormalization
 - 12.1 the scaling concept
 - 12.2 renormalization transform
 - 12.3 critical phenomena: the ising model
 - 12.4 renormalization with monte carlo simulation
 - 12.5 crossover: the kondo problem
 - 12.6 quantum lattice renormalization
 - 12.7 density matrix renormalization
 - exercises
- references
- index

章节摘录

版权页：插图：The basic idea behind a genetic algorithm is to follow the biological process of evolution in selecting the path to reach an optimal configuration of a given complex system. For example, for an interacting many-body system, the equilibrium is reached by moving the system to the configuration that is at the global minimum on its potential energy surface. This is single-objective optimization, which can be described mathematically as searching for the global minimum of a multivariable function. Multiobjective optimization involves more than one equation, for example, a search for the minima of g_k . Both types of optimization can involve some constraints. We limit ourselves to single-objective optimization here. For a detailed discussion on multi-objective optimization using the genetic algorithm, see Deb.

<<计算物理学导论>>

编辑推荐

《计算物理学导论(第2版)》是由世界图书出版公司出版的。

<<计算物理学导论>>

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>