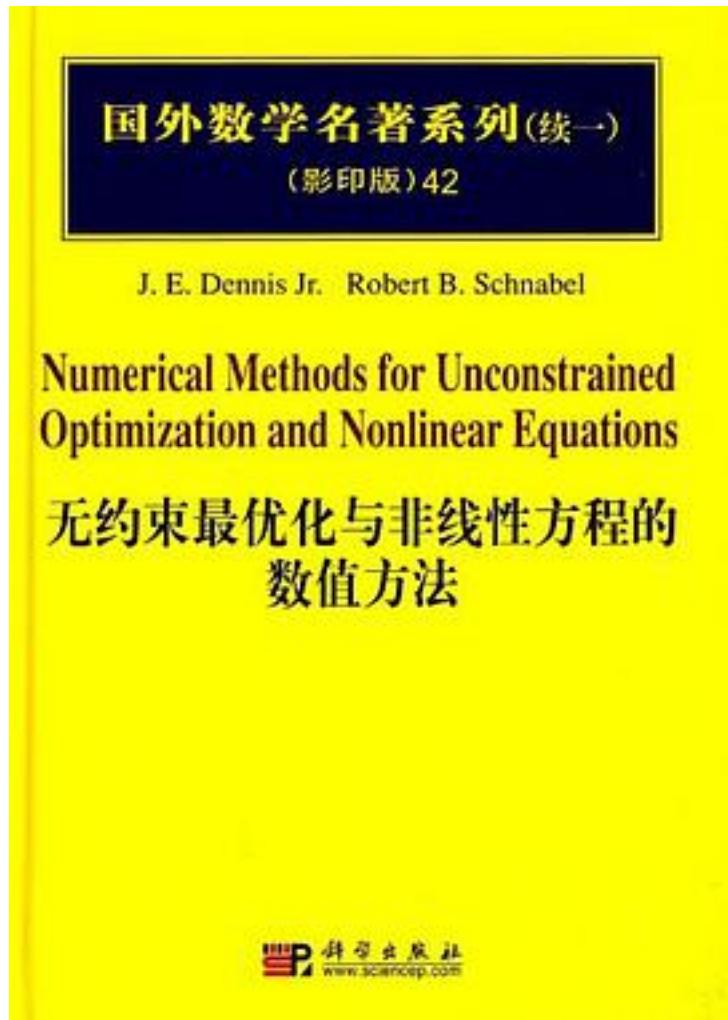


无约束最优化与非线性方程的数值方法



[无约束最优化与非线性方程的数值方法](#) [_下载链接1](#)

著者:J. E. Dennis

出版者:科学出版社

出版时间:2009-1

装帧:精装

isbn:9787030234827

《国外数学名著系列(续1)(影印版)42:无约束最优化与非线性方程的数值方法》 is a

standard for a complete description of the methods for unconstrained optimization and the solution of nonlinear equations....this republication is most welcome and this volume should be in every library. Of course, there exist more recent books on the topics and somebody interested in the subject cannot be satiated by looking only at this book. However, it contains much quite-well-presented material and I recommend reading it before going to other publications.

作者介绍:

目录: PREFACE TO THE CLASSICS EDITION

PREFACE

1 INTRODUCTION

1.1 Problems to be considered

1.2 Characteristics of "real-world" problems

1.3 Finite-precision arithmetic and measurement of error

1.4 Exercises

2 NONLINEAR PROBLEMS IN ONE VARIABLE

2.1 What is not possible

2.2 Newton's method for solving one equation in one unknown

2.3 Convergence of sequences of real numbers

2.4 Convergence of Newton's method

2.5 Globally convergent methods for solving one equation in one unknown

2.6 Methods when derivatives are unavailable

2.7 Minimization of a function of one variable

2.8 Exercises

3 NUMERICAL LINEAR ALGEBRA BACKGROUND

3.1 Vector and matrix norms and orthogonality

3.2 Solving systems of linear equations—matrix factorizations

3.3 Errors in solving linear systems

3.4 Updating matrix factorizations

3.5 Eigenvalues and positive definiteness

3.6 Linear least squares

3.7 Exercises

4 MULTIVARIABLE CALCULUS BACKGROUND

4.1 Derivatives and multivariable models

4.2 Multivariable finite-difference derivatives

4.3 Necessary and sufficient conditions for unconstrained minimization

4.4 Exercises 83

5 NEWTON'S METHOD FOR NONLINEAR EQUATIONS AND UNCONSTRAINED MINIMIZATION

5.1 Newton's method for systems of nonlinear equations

5.2 Local convergence of Newton's method

5.3 The Kantorovich and contractive mapping theorems

5.4 Finite-difference derivative methods for systems of nonlinear equations

5.5 Newton's method for unconstrained minimization

5.6 Finite-difference derivative methods for unconstrained minimization

5.7 Exercises

6 GLOBALLY CONVERGENT MODIFICATIONS OF NEWTON'S METHOD

6.1 The quasi-Newton framework

6.2 Descent directions

6.3 Line searches

6.3.1 Convergence results for properly chosen steps

6.3.2 Step selection by backtracking

6.4 The model-trust region approach

6.4.1 The locally constrained optimal ("hook") step

6.4.2 The double dogleg step

6.4.3 Updating the trust region

6.5 Global methods for systems of nonlinear equations

6.6 Exercises

7 STOPPING, SCALING, AND TESTING

7.1 Scaling

7.2 Stopping criteria

7.3 Testing

7.4 Exercises

8 SECANT METHODS FOR SYSTEMS OF NONLINEAR EQUATIONS

8.1 Broyden's method

8.2 Local convergence analysis of Broyden's method

8.3 Implementation of quasi-Newton algorithms using Broyden's update

8.4 Other secant updates for nonlinear equations

8.5 Exercises

9 SECANT METHODS FOR UNCONSTRAINED MINIMIZATION

9.1 The symmetric secant update of Powell

9.2 Symmetric positive definite secant updates

9.3 Local convergence of positive definite secant methods

9.4 Implementation of quasi-Newton algorithms using the positive definite secant update

9.5 Another convergence result for the positive definite secant method

9.6 Other secant updates for unconstrained minimization

9.7 Exercises

10 NONLINEAR LEAST SQUARES

10.1 The nonlinear least-squares problem

10.2 Gauss-Newton-type methods

10.3 Full Newton-type methods

10.4 Other considerations in solving nonlinear least-squares problems

10.5 Exercises

11 METHODS FOR PROBLEMS WITH SPECIAL STRUCTURE

11.1 The sparse finite-difference Newton method

11.2 Sparse secant methods

11.3 Deriving least-change secant updates

11.4 Analyzing least-change secant methods

11.5 Exercises

A APPENDIX: A MODULAR SYSTEM OF ALGORITHMS FOR UNCONSTRAINED MINIMIZATION AND NONLINEAR EQUATIONS (by Robert Schnabel)

B APPENDIX: TEST PROBLEMS (by Robert Schnabel)

REFERENCES

AUTHOR INDEX

SUBJECT INDEX

• • • • • (收起)

[无约束最优化与非线性方程的数值方法_下载链接1](#)

标签

数学

优化

评论

[无约束最优化与非线性方程的数值方法](#) [下载链接1](#)

书评

very clear account of the knowledge in this area up to 1990's

[无约束最优化与非线性方程的数值方法](#) [下载链接1](#)