

# Numerical Recipes Routines And Examples In Basic

This concise guide to trouble-shooting offers practical advice on detecting and removing the bugs, preserving significant figures, avoiding extraneous solutions, and finding efficient iterative processes for solving nonlinear equations. 1996 edition.

This book is for students following an introductory course in numerical methods, numerical techniques or numerical analysis. It introduces MATLAB as a computing environment for experimenting with numerical methods. It approaches the subject from a pragmatic viewpoint; theory is kept at a minimum commensurate with comprehensive coverage of the subject and it contains abundant worked examples which provide easy understanding through a clear and concise theoretical treatment.

This edition places even greater emphasis on 'learning by doing' than the previous edition. Fully documented MATLAB code for the numerical methods described in the book will be available as supplementary material to the book on <http://extras.springer.com>

The Numerical Recipes Code CD-ROM contains, in a single omnibus edition, all the source code for the routines and examples from: Numerical Recipes in Fortran 77: The Art of Scientific Computing (Second Edition), Numerical Recipes in Fortran 90: The Art of Parallel Scientific Computing, Numerical Recipes in C: The Art of Scientific Computing (Second Edition), both ANSI and K&R C, Numerical Recipes in Pascal: The Art of Scientific Computing, and Numerical Recipes Routines and Examples in BASIC. The ISO 9660 standard format can be used by both IBM PC and Macintosh compatible computers. HTML files included on the CD-ROM allow the use of any Web browser to navigate among all the program files. The CD-ROM also contains the complete public domain SLATEC Common Mathematical Library, a comprehensive collection of over 1400 mathematical and statistical

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routines. A code use license is included.

This CDROM contains all the source code for the routines and examples from Numerical Recipes in C: The Art of Scientific Computing (Second Edition) and Numerical Recipes in C++: The Art of Scientific Computing (Second Edition) as well as the affiliated example books. The C++ routines, in ANSI/ISO C++ source code, can be used with almost any existing C++ vector/matrix class library, according to user preference. A simple class library for stand-alone use is also included. The ISO 9660 standard format CD-ROM can be used by Windows (all versions) and Macintosh compatible computers, using any Web browser to navigate among the program files. Included with the CD-ROM is a license to use all the copyrighted Numerical Recipes code on a single Windows or Macintosh compatible computer. Both scientific programmers new to C++, and experienced C++ programmers who need access to the Numerical Recipes routines, can benefit from this new version of a classic text.

Iterative Methods for Sparse Linear Systems

Fortran 77 and Numerical Methods

Applied Numerical Methods Using MATLAB

Numerical Recipes in C++

Numerical Methods in Engineering with Python 3

Numerical Recipes in FORTRAN 77: Volume 1, Volume 1 of

Fortran Numerical Recipes

**Learn to fully harness the power of Microsoft Excel(r) to perform scientific and engineering calculations With this text as your guide, you can significantly enhance Microsoft Excel's(r) capabilities to execute the calculations needed to solve a variety of chemical, biochemical, physical, engineering, biological, and medicinal problems. The text begins with two chapters that introduce you to Excel's Visual Basic for Applications (VBA) programming language, which allows you to expand Excel's(r)**

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capabilities, although you can still use the text without learning VBA. Following the author's step-by-step instructions, here are just a few of the calculations you learn to perform: \* Use worksheet functions to work with matrices \* Find roots of equations and solve systems of simultaneous equations \* Solve ordinary differential equations and partial differential equations \* Perform linear and non-linear regression \* Use random numbers and the Monte Carlo method This text is loaded with examples ranging from very basic to highly sophisticated solutions. More than 100 end-of-chapter problems help you test and put your knowledge to practice solving real-world problems. Answers and explanatory notes for most of the problems are provided in an appendix. The CD-ROM that accompanies this text provides several useful features: \* All the spreadsheets, charts, and VBA code needed to perform the examples from the text \* Solutions to most of the end-of-chapter problems \* An add-in workbook with more than twenty custom functions This text does not require any background in programming, so it is suitable for both undergraduate and graduate courses. Moreover, practitioners in science and engineering will find that this guide saves hours of time by enabling them to perform most of their calculations with one familiar spreadsheet package.

These example books published as part of the Numerical Recipes, Second Edition series are source programs that demonstrate all of the Numerical Recipes subroutines. Each example program contains comments and is prefaced by a short description of how it functions. The books consist of all the material from the original edition as well

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as new material from the Second Edition. They will be valuable for readers who wish to incorporate procedures and subroutines into their own source programs. They are available in Fortran, C, and C++.

The second volume of the Fortran Numerical Recipes series, **Numerical Recipes in Fortran 90** contains a detailed introduction to the Fortran 90 language and to the basic concepts of parallel programming, plus source code for all routines from the second edition of Numerical Recipes. This volume does not repeat any of the discussion of what individual programs actually do, the mathematical methods they utilize, or how to use them.

Now the omnibus edition **Numerical Recipes Code CDROM** contains all the source code from the brand-new **Numerical Recipes in C++** and the **Numerical Recipes in C++ Example Book**, including a stand-alone class library, in addition to all the source code for the routines and examples from: **Numerical Recipes in Fortran 77: The Art of Scientific Computing (Second Edition)**; **Numerical Recipes in Fortran 90: The Art of Parallel Scientific Computing**; **Numerical Recipes in C: The Art of Scientific Computing (Second Edition)**; **Numerical Recipes in Pascal: The Art of Scientific Computing**; **Numerical Recipes Routines and Examples in BASIC** plus the complete public domain **SLATEC Common Mathematical Library**, a freely redistributable collection of over 1400 mathematical and statistical routines, and many other extras. The ISO 9660 standard format CD-ROM can be used by Windows (all versions) and Macintosh compatible computers. HTML files included on the CD-ROM allow the use of any Web browser to navigate among all the

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**program files. Included with the CD-ROM is a license to use all the copyrighted Numerical Recipes code on a single Windows or Macintosh compatible computer.**

**Computational Finance**

**Numerical Methods for Pricing Financial Instruments**

**Preventing Errors in Scientific and Engineering Calculations**

**Revised Edition**

**Matrix Algorithms Volume 2**

**LAPACK95 Users' Guide**

***Accompanying CD-ROM contains ... "working computer code, demonstration applications, and also PDF versions of several research articles that are referred to in the book." -- d.j.***

***A single omnibus edition containing all the Numerical Recipes source code in all languages, including the brand-new C++, plus a single screen license for a LINUX or UNIX workstation.***

***At last researchers have an inexpensive library of Java-based numeric procedures for use in scientific computation. The first and only book of its kind, A Numeric Library in Java for Scientists and Engineers is a translation into Java of the library NUMAL (NUMerical procedures in ALgol 60). This groundbreaking text presents procedural descriptions for linear algebra, ordinary and partial differential equations, optimization, parameter estimation, mathematical physics, and other tools that are indispensable to any dynamic research group. The book offers test programs that allow researchers to execute the examples provided; users are free to construct their own tests and apply the numeric procedures to them in order to observe a successful computation or simulate failure. The entry for each***

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*procedure is logically presented, with name, usage parameters, and Java code included. This handbook serves as a powerful research tool, enabling the performance of critical computations in Java. It stands as a cost-efficient alternative to expensive commercial software package of procedural components.*

*Now all the routines from the Numerical Recipes second edition plus all the test programs from the Numerical Recipes Example Book are available on one diskette. Diskettes are available in both C or FORTRAN for the IBM/PC and the Macintosh. These diskettes can save hours of tedious keyboarding, allowing readers to quickly and easily run the test programs and to adapt the recipes to their own needs.*

*Ordinary and Partial Differential Equation Routines in C, C++, Fortran, Java, Maple, and MATLAB  
Numerical Recipes Routines and Examples in BASIC (First Edition)*

*Includes Source Code for Numerical Recipes in C, Fortran 77, Fortran 90, Pascal, BASIC, Lisp and Modula 2 plus many extras*

*Numerical Recipes Multi-Language Code CD ROM with LINUX Or UNIX Single-Screen License Revised Version  
Numerical Recipes in C*

*A Numerical Library in C for Scientists and Engineers*

This is the greatly revised and greatly expanded Second Edition of the hugely popular Numerical Recipes: The Art of Scientific Computing. The product of a unique collaboration among four leading scientists in academic research and industry Numerical Recipes is a complete text and

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reference book on scientific computing. In a self-contained manner it proceeds from mathematical and theoretical considerations to actual practical computer routines. With over 100 new routines bringing the total to well over 300, plus upgraded versions of the original routines, this new edition remains the most practical, comprehensive handbook of scientific computing available today. Highlights of the new material include: -A new chapter on integral equations and inverse methods -Multigrid and other methods for solving partial differential equations -Improved random number routines - Wavelet transforms -The statistical bootstrap method -A new chapter on "less-numerical" algorithms including compression coding and arbitrary precision arithmetic. The book retains the informal easy-to-read style that made the first edition so popular, while introducing some more advanced topics. It is an ideal textbook for scientists and engineers and an indispensable reference for anyone who works in scientific computing. The Second Edition is available in FORTRAN, the traditional language for numerical calculations and in the increasingly popular C language.

LAPACK95 Users' Guide provides an

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introduction to the design of the LAPACK95 package.

Provides an introduction to numerical methods for students in engineering. It uses Python 3, an easy-to-use, high-level programming language.

Now the acclaimed Second Edition of Numerical Recipes is available in the C++ object-oriented programming language. Including and updating the full mathematical and explanatory contents of Numerical Recipes in C, this new version incorporates completely new C++ versions of the more than 300 Numerical Recipes routines that are widely recognized as the most accessible and practical basis for scientific computing. The product of a unique collaboration among four leading scientists in academic research and industry, Numerical Recipes is a complete text and reference book on scientific computing. In a self-contained manner it proceeds from mathematical and theoretical considerations to actual practical computer routines. Highlights include linear algebra, interpolation, special functions, random numbers, nonlinear sets of equations, optimization, eigensystems, Fourier methods and wavelets, statistical tests, ODEs and PDEs, integral equations and inverse theory.



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The authors approach to C++ preserves the efficient execution that C users expect, while simultaneously employing a clear, object-oriented interface to the routines. Tricks and tips for scientific computing in C++ are liberally included. The routines, in ANSI/ISO C++ source code, can thus be used with almost any existing C++ vector/matrix class library, according to user preference. A simple class library for stand-alone use is also included in the book. Both scientific programmers new to C++, and experienced C++ programmers who need access to the Numerical Recipes routines, can benefit from this important new version of an invaluable, classic text.

**FORTRAN 90 for Scientists and Engineers  
Numerical Methods for Large Eigenvalue  
Problems**

**Numerical Recipes in FORTRAN Example  
Book**

**Numerical Recipes in C Diskette for  
Macintosh Version 2.0**

**An Introduction with Java & Smalltalk**

*Numerical Recipes Routines and Examples in  
BASIC (First Edition) Cambridge University  
Press*

*This book systematically classifies the  
mathematical formalisms of computational  
models that are required for solving problems*

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*in mathematics, engineering and various other disciplines. It also provides numerical methods for solving these problems using suitable algorithms and for writing computer codes to find solutions. For discrete models, matrix algebra comes into play, while for continuum framework models, real and complex analysis is more suitable. The book clearly describes the method-algorithm-code approach for learning the techniques of scientific computation and how to arrive at accurate solutions by applying the procedures presented. It not only provides instructors with course material but also serves as a useful reference resource. Providing the detailed mathematical proofs behind the computational methods, this book appeals to undergraduate and graduate mathematics and engineering students. The computer codes have been written in the Fortran programming language, which is the traditional language for scientific computation. Fortran has a vast repository of source codes used in real-world applications and has continuously been upgraded in line with the computing capacity of the hardware. The language is fully backwards compatible with its earlier versions, facilitating integration with older source codes.*

*Fortran Is The Pioneer Computer Language Originally Designed To Suit Numerical, Scientific And Engineering Computations. In Spite Of The Birth Of Several Computer Languages, Fortran Is Still Used As A Primary*

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*Tool For Programming Numerical Computations. In This Book All The Features Of Fortran 77 Have Been Elaborately Explained With The Support Of Examples And Illustrations. Programs Have Been Designed And Developed In A Systematic Way For All The Classical Problems. All The Topics Of Numerical Methods Have Been Presented In A Simple Style And Algorithms Developed. Complete Fortran 77 Programs And More Than One Sets Of Sample Data Have Been Given For Each Method. The Content Of The Book Have Been Carefully Tailored For A Course Material Of A One Semester Course For The Computer Science, Mathematics And Physics Students.*

*A comprehensive guide to understanding the language of C offers solutions for everyday programming tasks and provides all the necessary information to understand and use common programming techniques. Original. (Intermediate).*

*Example Book C*

*Source Code for the Second Edition Versions of C, C++, Fortran 77, Fortran 90, and the First Edition Versions of Pascal, BASIC, Lisp and Modula 2 plus many extras*

*Numerical Analysis*

*Guide to Scientific Computing in C++*

*The Art of Scientific Computing*

*Routines and Examples in BASIC ; Companion Manual to 'Numerical Recipes: the Art of Scientific Computing'*

**In recent years, with the introduction of new media**

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products, there has been a shift in the use of programming languages from FORTRAN or C to MATLAB for implementing numerical methods. This book makes use of the powerful MATLAB software to avoid complex derivations, and to teach the fundamental concepts using the software to solve practical problems. Over the years, many textbooks have been written on the subject of numerical methods. Based on their course experience, the authors use a more practical approach and link every method to real engineering and/or science problems. The main benefit is that engineers don't have to know the mathematical theory in order to apply the numerical methods for solving their real-life problems. An Instructor's Manual presenting detailed solutions to all the problems in the book is available online. This book presents computer programming as a key method for solving mathematical problems. There are two versions of the book, one for MATLAB and one for Python. The book was inspired by the Springer book TCSE 6: A Primer on Scientific Programming with Python (by Langtangen), but the style is more accessible and concise, in keeping with the needs of engineering students. The book outlines the shortest possible path from no previous experience with programming to a set of skills that allows the students to write simple programs for solving common mathematical problems with

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numerical methods in engineering and science courses. The emphasis is on generic algorithms, clean design of programs, use of functions, and automatic tests for verification.

"There are few books that show how to build programs of any kind. One common theme is compiler building, and there are shelves full of them. There are few others. It's an area, or a void, that needs filling. this book does a great job of showing how to build numerical analysis programs." -David N. Smith, IBM T J Watson Research Center

Numerical methods naturally lend themselves to an object-oriented approach. Mathematics builds high-level ideas on top of previously described, simpler ones. Once a property is demonstrated for a given concept, it can be applied to any new concept sharing the same premise as the original one, similar to the ideas of reuse and inheritance in object-oriented (OO) methodology. Few books on numerical methods teach developers much about designing and building good code. Good computing routines are problem-specific. Insight and understanding are what is needed, rather than just recipes and black box routines. Developers need the ability to construct new programs for different applications. Object-Oriented Implementation of Numerical Methods reveals a complete OO design methodology in a clear and systematic way. Each method is presented in a consistent format,

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beginning with a short explanation and following with a description of the general OO architecture for the algorithm. Next, the code implementations are discussed and presented along with real-world examples that the author, an experienced software engineer, has used in a variety of commercial applications. Features: Reveals the design methodology behind the code, including design patterns where appropriate, rather than just presenting canned solutions. Implements all methods side by side in both Java and Smalltalk. This contrast can significantly enhance your understanding of the nature of OO programming languages. Provides a step-by-step pathway to new object-oriented techniques for programmers familiar with using procedural languages such as C or Fortran for numerical methods. Includes a chapter on data mining, a key application of numerical methods.

Mathematics of Computing -- General.

Numerical Methods with Worked Examples: Matlab Edition

Numerical Methods of Mathematics Implemented in Fortran

Fundamentals of Engineering Numerical Analysis  
Methods for Computer Vision, Machine Learning,  
and Graphics

Excel for Scientists and Engineers

Numerical Methods

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*This well-respected text gives an introduction to the theory and application of modern numerical approximation techniques for students taking a one- or two-semester course in numerical analysis. With an accessible treatment that only requires a calculus prerequisite, Burden and Faires explain how, why, and when approximation techniques can be expected to work, and why, in some situations, they fail. A wealth of examples and exercises develop students' intuition, and demonstrate the subject's practical applications to important everyday problems in math, computing, engineering, and physical science disciplines. The first book of its kind built from the ground up to serve a diverse undergraduate audience, three decades later Burden and Faires remains the definitive introduction to a vital and practical subject. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. This easy-to-read textbook/reference presents an essential guide to object-oriented C++ programming for scientific computing. With a practical focus on learning by example, the theory is supported by numerous exercises. Features: provides a specific focus on the application of C++ to scientific computing, including parallel computing using MPI; stresses the importance of a clear programming style to minimize the introduction of errors into code; presents a practical introduction to procedural programming in C++, covering variables, flow of control, input and output, pointers, functions, and reference variables; exhibits the efficacy of classes, highlighting the main features of object-orientation; examines more*

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*advanced C++ features, such as templates and exceptions; supplies useful tips and examples throughout the text, together with chapter-ending exercises, and code available to download from Springer.*

*Software -- Programming Languages.*

*This revised edition discusses numerical methods for computing eigenvalues and eigenvectors of large sparse matrices. It provides an in-depth view of the numerical methods that are applicable for solving matrix eigenvalue problems that arise in various engineering and scientific applications. Each chapter was updated by shortening or deleting outdated topics, adding topics of more recent interest, and adapting the Notes and References section.*

*Significant changes have been made to Chapters 6 through 8, which describe algorithms and their implementations and now include topics such as the implicit restart techniques, the Jacobi-Davidson method, and automatic multilevel substructuring.*

*Numerical Recipes Code CD-ROM with UNIX Single Screen License CD-ROM*

*The Art of Parallel Scientific Computing*

*A Numerical Library in Java for Scientists and Engineers*

*Numerical Algorithms*

*Numerical Recipes in Fortran 90: Volume 2, Volume 2 of Fortran Numerical Recipes*

*Programming for Computations - MATLAB/Octave*

Since the original publication of this book, available computer power has increased greatly. Today, scientific computing is playing an ever more prominent role as a tool in scientific discovery and engineering analysis. In this second edition, the key addition is an introduction to the



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finite element method. This is a widely used technique for solving partial differential equations (PDEs) in complex domains. This text introduces numerical methods and shows how to develop, analyse, and use them. Complete MATLAB programs for all the worked examples are now available at [www.cambridge.org/Moin](http://www.cambridge.org/Moin), and more than 30 exercises have been added. This thorough and practical book is intended as a first course in numerical analysis, primarily for new graduate students in engineering and physical science. Along with mastering the fundamentals of numerical methods, students will learn to write their own computer programs using standard numerical methods. This is the second volume in a projected five-volume survey of numerical linear algebra and matrix algorithms. It treats the numerical solution of dense and large-scale eigenvalue problems with an emphasis on algorithms and the theoretical background required to understand them. The notes and reference sections contain pointers to other methods along with historical comments. The book is divided into two parts: dense eigenproblems and large eigenproblems. The first part gives a full treatment of the widely used QR algorithm, which is then applied to the solution of generalized eigenproblems and the computation of the singular value decomposition. The second part treats Krylov sequence methods such as the Lanczos and Arnoldi algorithms and presents a new treatment of the Jacobi-Davidson method. These volumes are not intended to be encyclopedic, but provide the reader with the theoretical and practical background to read the research literature and implement or modify new algorithms.

The introduction of the Fortran 90 standard is the first

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significant change in the Fortran language in over 20 years. this book is designed for anyone wanting to learn Fortran for the first time or or a programmer who needs to upgrade from Fortran 77 to Fortran 90. Employing a practical, problem-based approach this book provides a comprehensive introduction to the language. More experienced programmers will find it a useful update to the new standard and will benefit from the emphasis on science and engineering applications.

Here the 350 routines and programs originally published in Numerical Recipes: The Art of Scientific Computing are given in BASIC. The accompanying Numerical Recipes Example Book contains programs which demonstrate the subroutines. This book brings routines and programs together, along with computer code and code captions from both this and the Example book.

Second Edition

MASTERING ALGORITHMS WITH C. Avec une disquette

A Gentle Introduction to Numerical Simulations with MATLAB/Octave

Object-Oriented Implementation of Numerical Methods  
Numerical Recipes Source Code in C and C++ CD ROM  
with Windows or Macintosh Single-Screen License  
Numerical Recipes

This extensive library of computer programs-written in C language-allows readers to solve numerical problems in areas of linear algebra, ordinary and partial differential equations, optimization, parameter estimation, and special

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functions of mathematical physics. The library is based on NUMAL, the program assemblage developed and used at the Centre for Mathematics and Computer Science in Amsterdam, one of the world's leading research centers. The important characteristic of the library is its modular structure. Because it is highly compact, it is well-suited for use on personal computers. The library offers the expert a prodigious collection of procedures for implementing numerical methods. The novice can experiment with the worked examples provided and use the more comprehensive procedures to perform mathematical computations. The library provides a powerful research tool for computer scientists, engineers, and applied mathematicians. Applicable materials can be downloaded from the CRC Press website.

This book provides a set of ODE/PDE integration routines in the six most widely used computer languages, enabling scientists and engineers to apply ODE/PDE analysis toward solving complex problems. This text concisely reviews integration algorithms, then analyzes the widely used Runge-Kutta method. It first presents a complete code before discussing Numerical Algorithms: Methods for Computer Vision, Machine Learning, and Graphics

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presents a new approach to numerical analysis for modern computer scientists. Using examples from a broad base of computational tasks, including data processing, computational photography, and animation, the textbook introduces numerical modeling and algorithmic design.

This book contains the routines and demonstration programs from the first edition of the highly acclaimed reference book, *Numerical Recipes: The Art of Scientific Computing*. It includes computer code and code captions from the book and example book and the commentary from the example book. The author employs a contemporary version of BASIC, Microsoft QuickBasic 4.5, which roughly follows the structure of FORTRAN; in fact, the recipes found in this book are easily adapted for other modern forms of BASIC. This book is recommended for use with one of the main Numerical Recipes books, such as *Numerical Recipes in Fortran 77* [[link to 43064X](#)]. The programs contained in this book are also available as machine-readable code on the Numerical Recipes Code CD-ROM with Windows/Macintosh Single Screen License [[link to 576083](#)].

Eigensystems

Real Computing Made Real

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Source Code for the Second Edition Versions of C, C++, Fortran 77, Fortran 90, and the First Edition Versions of Pascal, Basic, Lisp and Modula 2 Plus Many Extras

Numerical Recipes Multi-Language Code CD ROM with Windows, DOS, or Macintosh Single-Screen License

The Numerical Recipes Code CD-ROM contains, in a single omnibus edition, all the source code for the routines and examples from: Numerical Recipes in Fortran 77: The Art of Scientific Computing (Second Edition), Numerical Recipes in Fortran 90: The Art of Parallel Scientific Computing, Numerical Recipes in C: The Art of Scientific Computing (Second Edition), both ANSI and K&R C, Numerical Recipes in Pascal: The Art of Scientific Computing, and Numerical Recipes Routines and Examples in BASIC. The ISO 9660 standard format CD-ROM includes HTML files that allow the use of any Web browser to navigate among the program files. The CD-ROM also contains the complete public domain SLATEC Common Mathematical Library, a comprehensive collection of over 1400 mathematical and statistical routines. A UNIX one-screen code use license is included.