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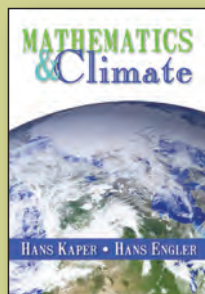
## Atmospheric and Oceanographic Sciences

### Mathematics and Climate

Hans Kaper and Hans Engler

*"Accessible explanations in key areas where climate and mathematics meet...The best book of the year in the fields of meteorology/climatology/atmospheric sciences..."*

— Atmospheric Science Librarians  
International (ASLI)



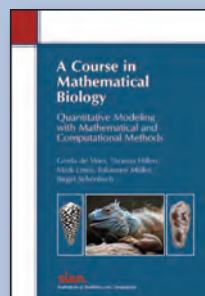
**Used in these courses:** Mathematics of Climate (University of Georgia); Introduction to the Mathematics of Climate (University of Minnesota); Mathematical Models (Wichita State University); and more.

2013 • xx + 295 pages • Softcover • 978-1-611972-60-3 • Order Code OT131  
Prices: List \$59.00 • SIAM Member \$41.30 • **Adoption Discount \$47.20**

## Biological Sciences

### A Course in Mathematical Biology: *Quantitative Modeling with Mathematical and Computational Methods*

Gerda de Vries, Thomas Hillen,  
Mark Lewis, Johannes Müller,  
and Birgitt Schönfisch



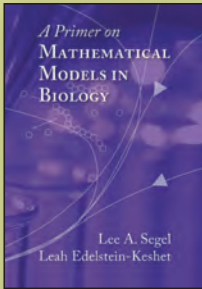
*Mathematical Modeling and Computation 12*

*"There really is not a book that is directly comparable. Students will be able to study any area of biology with a mathematical perspective. The projects and the introduction to computation are a real bonus."*

— Fred Brauer, Department of Mathematics,  
University of British Columbia.

**Used in these courses:** Introduction to Mathematical Biology (Oregon State University); Mathematical Biology (Johns Hopkins University); Mathematical and Computational Modeling in Biology and Physics (University of Notre Dame); and more.

2006 • xii + 309 pages • Softcover • 978-0-898716-12-2 • Order Code MM12  
Prices: List \$79.50 • SIAM Member \$55.65 • **Adoption Discount \$63.60**



## Biological Sciences

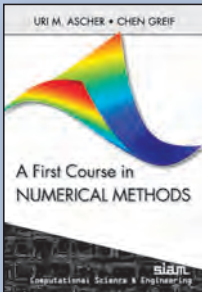
### A Primer on Mathematical Models in Biology

Lee A. Segel and  
Leah Edelstein-Keshet

This textbook grew out of a course that the popular and highly respected applied mathematician Lee Segel taught at the Weizman Institute and it represents his unique perspective. It is intended for upper level undergraduates in mathematics, graduate students in biology, and lower-level graduate students in mathematics who would like exposure to biological modeling.

**Used in these courses:** Mathematical Models in the Life Sciences (Boston University); Mathematics in Biology and Medicine (Colorado State University); Complexity in Biological Systems (Binghamton University); and more.

2013 • xxvi + 424 pages • Softcover • 978-1-611972-49-8 • Order Code OT129  
Prices: List \$69.00 • SIAM Member \$48.30 • **Adoption Discount \$55.20**



## Computational Mathematics

### A First Course in Numerical Methods

Uri M. Ascher and Chen Greif

*Computational Science and Engineering 7*

This popular text is aimed at undergraduates and beginning graduate students who seek practical knowledge of modern techniques in scientific computing. It provides a variety of exercises within each chapter and review questions aimed at self-testing.

**Used in these courses:** Numerical Analysis and Differential Equations (Cornell University); Introduction to Numerical Analysis (Penn State University); Numerical Analysis and Computation (University of Southern California); and more.

2011 • xxii + 552 pages • Softcover • 978-0-898719-97-0 • Order Code CS07  
Prices: List \$98.00 • Member \$68.60 • **Adoption Discount \$78.40**

## Computational Mathematics

# Programming Projects in C for Students of Engineering, Science, and Mathematics

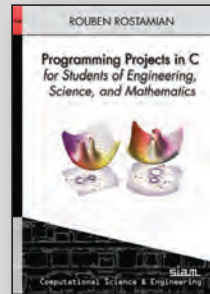
Rouben Rostamian

*Computational Science and Engineering* 13

*"Learning to program in C is invaluable to any career in applied mathematics, scientific computing, or computational science and engineering. This book provides a quick-start guide for writing and compiling programs and contains projects that can be selected according to the reader's interest. Like learning to drive a stick shift, scientific programming in C is a lifetime skill that will enable the reader to 'get around' in a variety of environments."*

— Tamara G. Kolda, Sandia National Laboratories

2014 • xvi + 393 • Softcover • 978-1-611973-49-5 • Order Code CS13  
Prices: List \$69.00 • Member \$48.30 • **Adoption Discount \$55.20**



## Computational Science and Engineering

# Insight Through Computing: A MATLAB Introduction to Computational Science and Engineering

Charles F. Van Loan and K.-Y. Daisy Fan

*"I highly recommend Insight Through Computing for teaching introductory MATLAB® programming to undergraduate science and engineering students. The sequence of topics moves logically from basic programming constructs to more advanced concepts, and the examples and problems reinforce computational approximations and convergence using simple geometric ideas."*

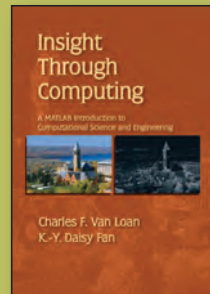
— Prof. Ed Hall, University of Virginia

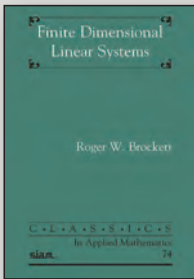
*"Students liked the code snippets and the various online videos that complemented the text well."*

— Prof. Benjamin Ong, Michigan Technological University

**Used in these courses:** Introduction to Scientific Computing and Problem Solving (Brown University); Introduction to Programming with MATLAB® (UCLA); Programming and Mathematical Problem Solving (Virginia Polytechnic University); and more.

2010 • xviii + 434 pages • Softcover • 978-0-898716-91-7 • Order Code OT117  
Prices: List \$63.50 • SIAM Member \$44.45 • **Adoption Discount \$50.80**





## Control and Systems Theory

# Finite Dimensional Linear Systems

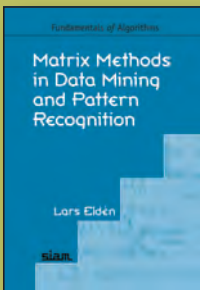
Roger W. Brockett

*Classics in Applied Mathematics 74*

Originally published in 1970, *Finite Dimensional Linear Systems* is a classic textbook that provides a solid foundation

for learning about dynamical systems and encourages students to develop a reliable intuition for problem solving. The theory of linear systems has been the bedrock of control theory for 50 years and has served as the springboard for many significant developments, all the while remaining impervious to change. Since linearity lies at the heart of much of the mathematical analysis used in applications, a firm grounding in its central ideas is essential.

2015 • xvi + 244 pages • Softcover • 978-1-611973-87-7 • Order Code CL74  
Prices: List \$74.00 • SIAM Member \$51.80 • **Adoption Discount \$59.20**



## Data Mining

# Matrix Methods in Data Mining and Pattern Recognition

Lars Eldén

*Fundamentals of Algorithms 4*

This application-oriented book describes how modern matrix methods can be used to solve problems in data mining and pattern recognition. It is intended for undergraduate students who have previously taken an introductory scientific computing/numerical analysis course. Graduate students in various data mining and pattern recognition areas who need an introduction to linear algebra techniques will also find the book useful.

**Used in these courses:** Numerical Analysis (Florida State University); Applied Linear Algebra (University of California-Davis); Theory and Applications of Pattern Recognition (University of Wisconsin-Madison); and more.

2007 • x + 224 pages • Softcover • 978-0-898716-26-9 • Order Code FA04  
Prices: List \$76.00 • SIAM Member \$53.20 • **Adoption Discount \$60.80**

## Dynamical Systems

# Differential Dynamical Systems

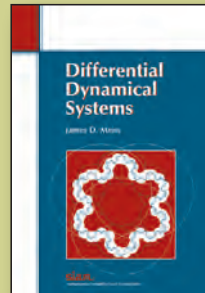
James D. Meiss

*Mathematical Modeling and Computation 14*

This book combines much of the material found in a traditional course on ordinary differential equations with an introduction to the more modern theory of dynamical systems. Applications of this theory to physics, biology, chemistry, and engineering are shown through examples in such areas as population modeling, fluid dynamics, electronics, and mechanics.

**Used in these courses:** Ordinary Differential Equations (Duke University); Advanced Ordinary Differential Equations (New Jersey Institute of Technology); Ordinary Differential Equations and Dynamical Systems (University of Massachusetts-Amherst); and more.

2007 • xxii + 412 pages • Softcover • 978-0-898716-35-1 • Order Code MM14  
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## Financial Mathematics

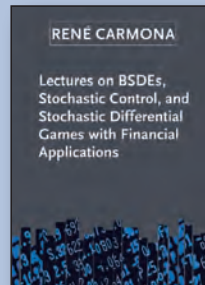
# Lectures on BSDEs, Stochastic Control, and Stochastic Differential Games with Financial Applications

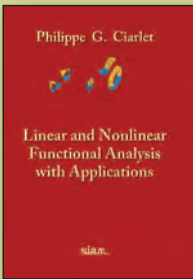
René Carmona

*Financial Mathematics 01*

The goal of this textbook is to introduce students to the stochastic analysis tools which play an increasing role in the probabilistic approach to optimization problems, including stochastic control and stochastic differential games. While optimal control is taught in many graduate programs in applied mathematics and operations research, the author was intrigued by the lack of coverage of the theory of stochastic differential games.

2016 • x + 265 pages • Softcover • 978-1-611974-23-2 • Order Code FM01  
Prices: List \$84.00 • SIAM Member \$58.80 • **Adoption Discount \$67.20**





## Functional Analysis

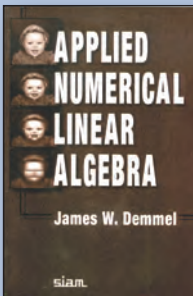
# Linear and Nonlinear Functional Analysis with Applications

Philippe G. Ciarlet

This single-volume textbook covers the fundamentals of linear and nonlinear functional analysis, illustrating most of the basic theorems with numerous applications to linear and nonlinear PDEs and to selected topics from numerical analysis and optimization theory. It offers 401 problems and 52 figures, plus historical notes and many original references that provide an idea of the genesis of the important results, and it covers most of the core topics from functional analysis.

**Used in these courses:** Nonlinear Functional Analysis (George Mason University); Selected Topics in Applied Mathematics (Indiana University).

2013 • xiv + 832 pages • Hardcover • 978-1-611972-58-0 • Order Code OT130  
Prices: List \$98.00 • SIAM Member \$68.60 • **Adoption Discount \$78.40**



## Linear Algebra

# Applied Numerical Linear Algebra

James W. Demmel

*"I chose this textbook because it provided very clear explanations of the derivations of the algorithms presented, and it included exercises that varied in terms of difficulty level and emphasis on either theory or practice."*

— Prof. James Lambers, University of Southern Mississippi

*"This is an excellent graduate-level textbook for people who want to learn or teach the state of the art of numerical linear algebra. The book is very easy to use in the classroom since it provides pointers, in the book and on the author's home page, to lots of available MATLAB and LAPACK routines, and it has a large number of homework problems marked with Easy, Medium and Hard."*

— Xia-Chuan Cai, Department of Computer Science, University of Colorado

**Used in these courses:** Applied Mathematics (Kansas State University); Advanced Numerical Analysis (Michigan State University); Matrix Theory and Numerical Linear Algebra (University of Kentucky).

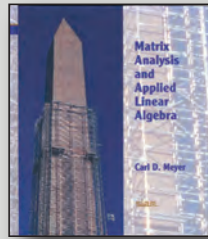
1997 • xii + 419 pages • Softcover • 978-0-898713-89-3 • Order Code OT56  
Prices: List \$82.50 • SIAM Member \$57.75 • **Adoption Discount \$66.00**



## Linear Algebra

# Matrix Analysis and Applied Linear Algebra

Carl D. Meyer



*"This book combines the best of what you look for in a reference and a textbook. It is comprehensive and detailed but with so many great problems and examples that it is guaranteed to excite the undergraduate reader. I enjoyed the book throughout, but found the treatment of the FFT to be particularly original and effective."*

— Prof. Charles Van Loan, Cornell University

*"The book covers an impressive range of material. It contains a number of topics not found in similar books. Professor Meyer takes great care in explaining abstract concepts."*

— Prof. Ilse Ipsen, North Carolina State University

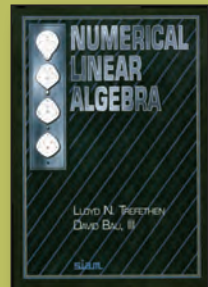
**Used in these courses:** Linear Algebra and Matrix Theory (Baylor University); Linear Algebra with Applications (University of Minnesota); Introduction to Linear and Nonlinear Optimization (University of California-San Diego); and more.

2000 • xii + 718 pages • Hardcover • 978-0-898714-54-8 • Order Code OT71  
Prices: List \$106.50 • SIAM Member \$74.55 • **Adoption Discount \$85.20**  
Includes CD-ROM and Solutions Manual

## Linear Algebra

# Numerical Linear Algebra

Lloyd N. Trefethen and David Bau, III



*"I find the book extremely well written and organized. I like the mixture of theory versus computation. The methods are thoroughly introduced and analyzed without getting bogged down in technical details—not easy to do."*

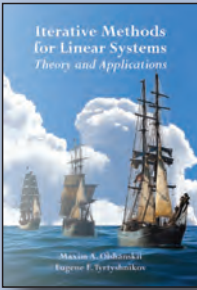
— Prof. Pierre Gremaud, North Carolina State University

*"A beautifully written textbook offering a distinctive and original treatment. It will be of use to all who teach or study the subject."*

— Prof. Nicholas J. Higham, University of Manchester

**Used in these courses:** Advanced Numerical Analysis (Clemson University); Computational Linear Algebra (Rensselaer Polytechnic University); Numerical Analysis (Rice University); and more.

1997 • xii + 361 pages • Softcover • 978-0-898713-61-9 • Order Code OT50  
Prices: List \$67.00 • SIAM Member \$46.90 • **Adoption Discount \$53.60**



## Numerical Analysis

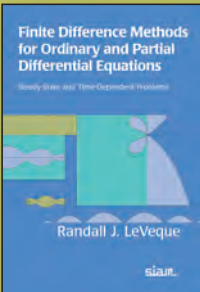
### Iterative Methods for Linear Systems: *Theory and Applications*

Maxim A. Olshanskii and  
Eugene E. Tyrtysnikov

This book supplements standard texts on numerical mathematics for first-year graduate and advanced undergraduate courses and is suitable for advanced graduate classes covering numerical linear algebra and Krylov subspace and multigrid iterative methods. It offers a mathematically rigorous introduction to fundamental iterative methods for systems of linear algebraic equations and approaches the development and analysis of algorithms from various algorithmic and mathematical perspectives.

**Used in:** Topics in Numerical Analysis (University of Wisconsin-Milwaukee)

2014 • xvi + 247 pages • Softcover • 978-1-611973-45-7 • Order Code OT138  
Prices: List \$85.00 • SIAM Member \$59.50 • **Adoption Discount \$68.00**



## Numerical Analysis

### Finite Difference Methods for Ordinary and Partial Differential Equations: *Steady-State and Time-Dependent Problems*

Randall J. LeVeque

*"This book provides everything needed: meticulous exploration of the numerical techniques, examples and exercises, as well as algorithms and MATLAB codes."*

— Prof. Vivi Andasari, Boston University

*"LeVeque's book is full of very clear explanations, and it has been a great resource for both our math students and students from other areas of science and engineering."*

— Prof. Samuel N. Stechmann, University of Wisconsin

**Used in these courses:** Numerical Methods for Partial Differential Equations (Columbia University); Numerical Solutions of Differential Equations (University of California-Berkeley); Numerical Methods for Scientific Computing (University of Michigan) and more.

2007 • xiv + 341 pages • Softcover • 978-0-898716-29-0 • Order Code OT98  
Prices: List \$69.50 • SIAM Member \$48.65 • **Adoption Discount \$55.60**

## Optimization

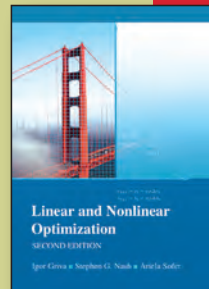
# Linear and Nonlinear Optimization, Second Edition

Igor Griva, Stephen G. Nash, and Ariela Sofer

This widely used textbook introduces the applications, theory, and algorithms of linear and nonlinear optimization, with an emphasis on the practical aspects of the material. Its unique modular structure provides flexibility to accommodate the varying needs of instructors, students, and practitioners with different levels of sophistication in these topics. The succinct style of this second edition is punctuated with numerous real-life examples and exercises, and the authors include accessible explanations of topics that are not often mentioned in textbooks, such as duality in nonlinear optimization, primal-dual methods for nonlinear optimization, filter methods, and applications such as support-vector machines.

**Used in these courses:** Optimization Theory (Central Michigan University); Applied Math Programming (Drexel University); Survey of Optimization (Texas A&M University); and more.

2009 • xxii + 742 pages • Hardcover • 978-0-898716-61-0 • Order Code OT108  
Prices: List \$104.50 • SIAM Member \$73.15 • **Adoption Discount 83.60**



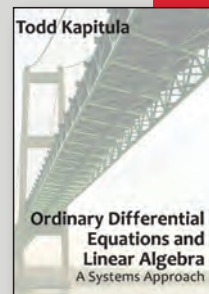
## Ordinary Differential Equations

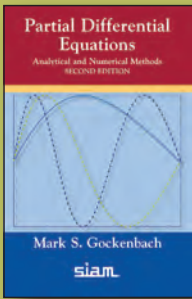
# Ordinary Differential Equations and Linear Algebra: A Systems Approach

Todd Kapitula

This recently published textbook is intended for students who have had one year of calculus and are taking a first class in ODEs. Its goal is to help students master both ODEs and linear algebra in a one-semester course. Linear algebra is developed first, with an eye toward solving linear systems of ODEs. A computer algebra system is used for intermediate calculations (Gaussian elimination, complicated integrals, etc.); however, the text is not tailored toward a particular system.

2015 • xii + 300 pages • Softcover • 978-1-611974-08-9 • Order Code OT145  
Prices: List \$79.00 • SIAM Member \$55.30 • **Adoption Discount \$63.20**





## Partial Differential Equations

### Partial Differential Equations: *Analytical and Numerical Methods,* *Second Edition*

Mark S. Gockenbach

*“Overall, it is difficult to find a well written text, aimed at undergraduates, offering an approachable survey of the basics of PDEs and numerical methods; in this regard, Gockenbach delivers.”*

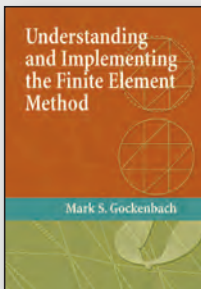
— Prof. Travis B. Thompson, Rice University

*“One of the things I really like about Gockenbach’s PDE book is that it takes the point of view of spectral theory of linear operators, where the boundary conditions appear in the space of functions on which the operator acts. This is really the right way to think about these problems.”*

— Prof. Margaret Cheney, Colorado State University

**Used in these courses:** Advanced Mechanical Engineering Analysis (Case Western Reserve University); Applied Differential Equations (Ohio State University); Numerical Analysis of Differential Equations (University of Texas-Dallas); and more.

2010 • xviii + 654 • Hardcover • 978-0-898719-35-2 • Order Code OT122  
Prices: List \$91.00 • SIAM Member \$63.70 • **Adoption Discount \$72.80**



## Partial Differential Equations

### Understanding and Implementing the Finite Element Method

Mark S. Gockenbach

*“Upon completion of this book a student or researcher would be well prepared to employ finite elements for an application problem or proceed to the cutting edge of research in finite element methods. The accuracy and the thoroughness of the book are excellent.”*

— Anthony Kearsley, research mathematician,  
National Institute of Standards and Technology

**Used in these courses:** Finite Element Methods (University of Connecticut); Numerical Solutions for Differential Equations (Virginia Commonwealth University); Mathematical Foundation of Finite Element Methods (Missouri University of Science & Technology); and more.

2006 • xvi + 363 pages • Softcover • 978-0-898716-14-6 • Order Code OT97  
Prices: List \$100.00 • SIAM Member \$70.00 • **Adoption Discount \$80.00**

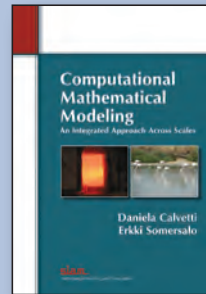
## Simulation and Modeling

# Computational Mathematical Modeling: *An Integrated Approach Across Scales*

Daniela Calvetti and Erkki Somersalo

*Mathematical Modeling and Computation 17*

This book concentrates on two modeling paradigms: the macroscopic, in which the authors describe phenomena in terms of time evolution via ordinary differential equations, and the microscopic, which requires knowledge of random events and probability. The text emphasizes the development of computational skills to construct predictive models and analyze the results. To elucidate the concepts, a wealth of examples and portions of MATLAB® code used by the authors are included.



**Used in:** Mathematical Modeling (Case Western Reserve University).

2013 • x + 222 pages • Softcover • 978-1-611972-47-4 • Order Code MM17  
Prices: List \$71.50 • SIAM Member \$50.05 • **Adoption Discount \$57.20**

## Simulation and Modeling

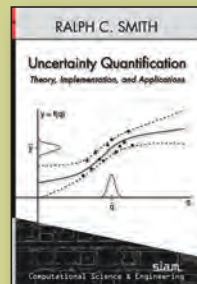
# Uncertainty Quantification: *Theory, Implementation, and Applications*

Ralph C. Smith

*Computational Science and Engineering 12*

*"This book stands out in its coverage of a broad but connected range of topics in uncertainty quantification. ...[it] does an excellent job of capturing the state of the art. The author addresses an area that is very active in terms of current research and manages to provide a foundation for methods that are becoming well established."*

— Karen Willcox, MIT



**Used in these courses:** Topics in Applied Statistics: Uncertainty Quantification (Indiana University); Uncertainty Quantification for Physical and Biological Models (North Carolina State University).

2014 • xviii + 382 pages • Hardcover • 978-1-611973-21-1 • Order Code CS12  
Prices: List \$74.00 • SIAM Member \$51.80 • **Adoption Discount \$59.20**



## Simulation and Modeling

### Math Modeling: *Getting Started and Getting Solutions*

K. M. Bliss, K. R. Fowler, and B. J. Galluzzo

*"Math modeling is challenging, but it's also surprisingly accessible. This guidebook is designed to remove perceived roadblocks by presenting modeling as a highly-creative iterative process in which multiple approaches—to the same*

*problem—can lead to meaningful results."*

—Co-author Ben Galluzzo, Shippensburg University

This handbook provides instructions and a process for building mathematical models using a variety of examples to answer wide-ranging questions. Also included are a companion document that makes connections to the Common Core State Standards as well as easy-to-use reference cards for those who want to get straight to the crux of modeling. The full-color guide is suitable for teachers as well as high school and undergraduate students interested in learning how to model.

2013 • 72 pgs. • 978-1-611973-57-0 • List \$15.00 • Order Code MMGS

**View online:** [M3Challenge.siam.org/handbook](http://M3Challenge.siam.org/handbook)



## Simulation and Modeling

### GAIMME: *Guidelines for Assessment & Instruction in Mathematical Modeling Education*

Edited by Sol Garfunkle  
and Michelle Montgomery

A partnership between SIAM and COMAP, *Guidelines for Assessment and Instruction in Mathematical Modeling Education* (GAIMME) enables the modeling process to be understood as part of STEM studies and research, and taught as a basic tool for problem solving and logical thinking. GAIMME helps define core competencies to include in student experiences, and provides direction to enhance math modeling education at all levels. A mix of professionals wrote and reviewed to present various levels and perspectives.

2016 • xii + 206 pages • Softcover • 978-1-611974-43-0  
List Price \$20.00 • Order Code GAIM

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### Climate Modeling for Scientists and Engineers

John B. Drake

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Prices: List \$69.00 • SIAM Member \$48.30 • Adoption Discount \$55.20

## Biological Sciences

### Mathematical Models in Biology

Leah Edelstein-Keshet

2005 • xliii + 586 pages • Softcover • 978-0-898715-54-5 • Order Code CL46  
Prices: List \$64.50 • SIAM Member \$45.15 • Adoption Discount \$51.60

## Computational Mathematics

### Computational Matrix Analysis

Alan J. Laub

2012 • xiv + 154 pages • Softcover • 978-1-611972-20-7 • Order Code OT125  
Prices: List \$49.00 • SIAM Member \$34.30 • Adoption Discount \$39.20

### Linear and Nonlinear Inverse Problems with Practical Applications

Jennifer L. Mueller and Samuli Siltanen

2012 • xiv + 351 pages • Softcover • 978-1-611972-33-7 • Order Code CS10  
Prices: List \$87.00 • SIAM Member \$60.90 • Adoption Discount \$69.60

### Scientific Computing with Case Studies

Dianne P. O'Leary

2008 • xvi + 383 pages • Softcover • 978-0-898716-66-5 • Order Code OT109  
Prices: List \$101.00 • SIAM Member \$70.70 • Adoption Discount \$80.80

## Control and Systems Theory

### Boundary Control of PDEs: A Course on Backstepping Designs

Miroslav Krstic and Andrey Smyshlyaev

2008 • x + 192 pages • Hardcover • 978-0-89871-650-4 • Order Code DC16  
Prices: List \$97.50 • SIAM Member \$68.25 • Adoption Discount \$78.00

### Stochastic Systems: Estimation, Identification, and Adaptive Control

P. R. Kumar and Pravin Varaiya

2015 • xviii + 358 pages • Softcover • 978-1-611974-25-6 • Order Code CL75  
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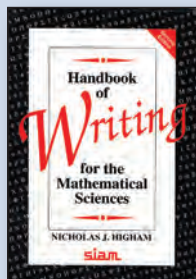
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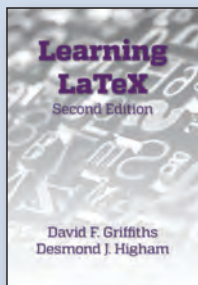
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