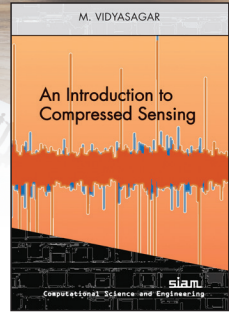
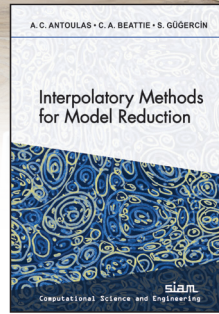
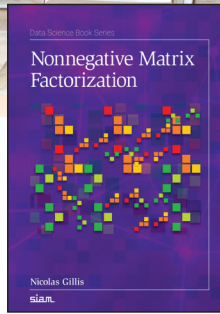
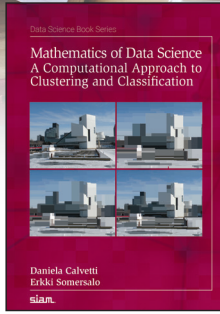
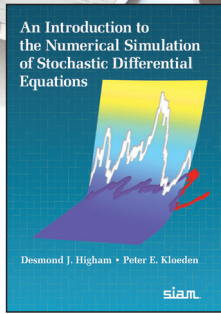


Buy Two or More Books, Get 40% OFF



# Recent Books From SIAM

## An Introduction to the Numerical Simulation of Stochastic Differential Equations

Desmond J. Higham and Peter E. Kloeden

This book provides a lively and accessible introduction to the numerical solution of stochastic differential equations with the aim of making this subject available to the widest possible readership. It presents an outline of the underlying convergence and stability theory while avoiding technical details. Key ideas are illustrated with numerous computational examples and computer code is listed at the end of each chapter. The authors include 150 exercises, with solutions available online, and 40 programming tasks. Several modern topics, including Itô versus Stratonovich calculus, multilevel Monte Carlo, and tau leaping, are discussed.

2021 • xvi + 277 pages • Hardcover • 978-1-61197-42-7  
List \$79.00 • Code \$63.20 • SIAM Member \$55.30 • OT169

## Mathematics of Data Science: A Computational Approach to Clustering and Classification

Daniela Calvetti and Erkki Somersalo

This self-contained textbook provides a solid mathematical basis for understanding popular data science algorithms for clustering and classification and shows that an in-depth understanding of the mathematics powering these algorithms gives insight into the underlying data. It presents a step-by-step derivation of these algorithms, outlining their implementation from scratch in a computationally sound way. The book proposes different ways of visualizing high-dimensional data to unveil hidden internal structures and includes graphical explanations and computed examples using publicly available data sets.

2020 • x + 189 pages • Softcover • 978-1-61197-36-6  
List \$64.00 • Code \$51.20 • SIAM Member \$44.80 • DI01

## Nonnegative Matrix Factorization

Nicolas Gillis

Nonnegative matrix factorization (NMF) in its modern form has become a standard tool in the analysis of high-dimensional data sets. This book provides a comprehensive and up-to-date account of the most important aspects of the NMF problem and is the first book to cover in detail the theoretical aspects of NMF, including geometric interpretation, nonnegative rank, complexity, and uniqueness. It explains why understanding these theoretical insights is key to using this computational tool effectively and meaningfully. Nonnegative Matrix Factorization is accessible to a wide audience and is ideal for anyone interested in the workings of NMF. It discusses new results on identifiability and complexity and the separable NMF and contains MATLAB codes for readers to run numerical examples.

2020 • xxvi + 350 pages • Softcover • 978-1-61197-40-3  
List \$87.00 • Code \$69.60 • SIAM Member \$60.90 • DI02

## Interpolatory Methods for Model Reduction

Athanasios C. Antoulas, Christopher Beattie, and Serkan Gügüercin

Interpolatory methods are among the most widely used model reduction techniques, used to replace large systems of coupled differential and algebraic equations that constitute high fidelity system models with substantially fewer equations that are crafted to control the loss of fidelity that order reduction may induce in the system response. This textbook is the first comprehensive analysis of this approach available in a single, extensive resource. It introduces state-of-the-art methods and covers both classical projection frameworks for model reduction and data-driven, nonintrusive frameworks.

2020 • xii + 232 pages • Softcover • 978-1-61197-07-6  
List \$79.00 • Code \$63.20 • SIAM Member \$55.30 • CS21

## An Introduction to Compressed Sensing

M. Vidyasagar

Compressed sensing is a relatively recent area of research that has applications to signal/image processing and computer algorithms, and it draws from a variety of mathematical techniques such as graph theory, probability theory, linear algebra, and optimization. The author presents significant concepts never before discussed as well as new advances in the theory, providing an in-depth initiation to the field of compressed sensing. The text offers substantive material on graph theory and the design of binary measurement matrices, is the only book to thoroughly study the problem of matrix recovery, and supplies relevant results alongside their proofs in a compact and streamlined presentation that is easy to navigate.

2019 • xii + 341 pages • Softcover • 978-1-61197-11-3  
List \$89.00 • Code \$71.20 • SIAM Member \$62.30 • CS22

## Thinking of writing a book?

Contact SIAM Executive Editor  
Elizabeth Greenspan [greenspan@siam.org](mailto:greenspan@siam.org)

**siam** | Society for Industrial and Applied Mathematics  
**BOOKSTORE**

Visit [bookstore.siam.org](http://bookstore.siam.org). Use code **BKAC21** to receive 40% off on orders of two or more books. Non-SIAM members use the code for 20% off one book. SIAM members automatically get 30% off—no code needed. Discounts cannot be combined. Offer expires June 26, 2021. Outside North and South America, order at [eurospanbookstore.com/siam](http://eurospanbookstore.com/siam) to save on shipping.

# Check out the Advances in Design and Control book series.

## Extending $H^\infty$ Control to Nonlinear Systems

Control of Nonlinear Systems to Achieve Performance Objectives

**J. William Helton and Matthew R. James**

1999 • xxii + 333 pages • Softcover • 978-0-898714-40-1  
List \$106.50 • Code \$85.20 • SIAM Member \$74.55 • DC01

## Advances in Linear Matrix Inequality Methods in Control

**Edited by Laurent El Ghaoui and Silviu-Iulian Niculescu**

1999 • xxviii + 372 pages • Softcover • 978-0-898714-38-8  
List \$127.50 • Code \$102.00 • SIAM Member \$89.25 • DC02

## Perspectives in Flow Control and Optimization

**Max D. Gunzburger**

2002 • xiv + 261 pages • Hardcover • 978-0-898715-27-9  
List \$99.00 • Code \$79.20 • SIAM Member \$69.30 • DC05

## Approximation of Large-Scale Dynamical Systems

**Athanasios C. Antoulas**

2005 • xxv + 479 pages • Softcover • 978-0-898716-58-0  
List \$121.50 • Code \$97.20 • Member \$85.05 • DCS06

## Introduction to Shape Optimization Theory, Approximation, and Computation

**J. Haslinger and R. A. E. Mäkinen**

2003 • xviii + 273 pages • Hardcover • 978-0-898715-36-1  
List \$108.00 • Code \$ 86.40 • SIAM Member \$75.60 • DC07

## Nonlinear Output Regulation Theory and Applications

**Jie Huang**

2004 • xvi + 318 pages • Hardcover • 978-0-898715-62-0  
List \$102.00 • Code \$81.60 • SIAM Member \$71.40 • DC08

## Applied Dynamic Programming for Optimization of Dynamical Systems

**Rush D. Robinett III, David G. Wilson, G. Richard Eisler, and John E. Hurtado**

2005 • xviii + 260 pages • Hardcover • 978-0-898715-86-6  
List \$85.50 • Code \$68.40 • SIAM Member \$59.85 • DC09

## Control Perspectives on Numerical Algorithms and Matrix Problems

**Amit Bhaya and Eugenius Kaszkurewicz**

2006 • xxv + 272 pages • Softcover • 978-0-898716-02-3  
List \$119.00 • Code \$95.20 • SIAM Member \$83.30 • DC10

## Adaptive Control Tutorial

**Petros Ioannou and Baris Fidan**

2006 • xvi + 389 pages • Softcover • 978-0-898716-15-3  
List \$117.50 • Code \$94.00 • SIAM Member \$82.25 • DC11

## Applied Stochastic Processes and Control for Jump-Diffusions

Modeling, Analysis, and Computation

**Floyd B. Hanson**

2007 • xxix + 443 • Softcover • 978-0-898716-33-7  
List \$121.50 • Code \$97.20 • SIAM Member \$85.05 • DC13

## Linear Feedback Control

Analysis and Design with MATLAB

**Dingyü Xue, YangQuan Chen, and Derek P. Atherton**

2007 • xii + 354 pages • Softcover • 978-0-898716-38-2  
List \$116.00 • Code \$92.80 • SIAM Member \$81.20 • DC14

## Lagrange Multiplier Approach to Variational Problems and Applications

**Kazufumi Ito and Karl Kunisch**

2008 • xviii + 341 pages • Softcover • 978-0-898716-49-8  
List Price \$116.00 • Code \$92.80 • SIAM Member Price \$81.20 • DC15

## Boundary Control of PDEs

A Course on Backstepping Designs

**Miroslav Krstic and Andrey Smyshlyaev**

2008 • x + 192 pages • Hardcover • 978-0-89871-650-4  
List \$104.00 • Code \$83.20 • SIAM Member \$72.80 • DC16

## Stochastic Processes, Estimation, and Control

**Jason L. Speyer and Walter H. Chung**

2011 • xiv + 383 pages • Hardcover • 978-1-611971-95-8  
List \$116.00 • Code \$92.80 • SIAM Member \$81.20 • DCH17

## UAV Cooperative Decision and Control

Challenges and Practical Approaches

**Edited by Tal Shima and Steven J. Rasmussen**

2008 • xxii + 164 pages • Hardcover • 978-0-898716-64-1  
List \$99.50 • Code \$79.60 • SIAM Member \$69.65 • DC18

## Primer on Optimal Control Theory

**Jason L. Speyer and David H. Jacobson**

2010 • xiii + 307 pages • Hardcover • 978-0-898716-94-8  
List \$101.00 • Code \$80.80 • SIAM Member \$70.70 • DC20

## L1 Adaptive Control Theory

Guaranteed Robustness with Fast Adaptation

**Naira Hovakimyan and Chengyu Cao**

2010 • Approx. xix + 317 pages • Softcover • 978-0-898717-04-4  
List \$97.00 • Code \$77.60 • SIAM Member \$67.90 • DC21

## Shapes and Geometries

Metrics, Analysis, Differential Calculus, and Optimization  
Second Edition

**Michel C. Delfour and Jean-Paul Zolésio**

2011 • xxiii + 622 pages • Hardcover • 978-0-898719-36-9  
List \$131.00 • Code \$104.80 • SIAM Member \$91.70 • DC22

## Control and Optimization with Differential-Algebraic Constraints

**Lorenz T. Biegler, Stephen L. Campbell, and Volker Mehrmann, Editors**

2012 • xi + 344 pages • Softcover • 978-1-611972-24-5  
List \$109.00 • Code \$87.20 • SIAM Member \$76.30 • DC23

## Applications to Regular and Bang-Bang Control

Second-Order Necessary and Sufficient Optimality Conditions in Calculus of Variations and Optimal Control

**Nikolai P. Osmolovskii and Helmut Maurer**

2012 • xviii + 382 pages • Softcover • 978-1-611972-35-1  
List \$119.50 • Code \$95.60 • SIAM Member \$83.65 • DC24

## Nonlinear Control Under Nonconstant Delays

**Nikolaos Bekiaris-Liberis and Miroslav Krstic**

2013 • xii + 299 pages • Hardcover • ISBN 978-1-611973-17-4  
List \$105.50 • Code \$84.40 • SIAM Member \$73.85 • DC25

## Nonlinear Time Scale Systems in Standard and Nonstandard Forms

Analysis and Control

**Anshu Narang-Siddarth and John Valasek**

2014 • xvii + 219 pages • Hardcover • 978-1-611973-33-4  
List \$100.00 • Code \$80.00 • SIAM Member \$70.00 • DC26

## Stability, Control, and Computation for Time-Delay Systems

An Eigenvalue-Based Approach,  
Second Edition

**Wim Michiels and Silviu-Iulian Niculescu**

2014 • xxiii + 435 pages • Softcover • 978-1-611973-62-4  
List \$121.50 • Code \$97.20 • SIAM Member \$85.05 • DC27

## The Shapes of Things

A Practical Guide to Differential Geometry and the Shape Derivative

**Shawn W. Walker**

2015 • ix + 154 pages • Softcover • 978-1-611973-95-2  
List \$76.50 • Code \$61.20 • SIAM Member \$53.55 • DC28

## AIMD Dynamics and Distributed Resource Allocation

**M. Corless, C. King, R. Shorten, and F. Wirth**

2016 • xiv + 235 pages • Softcover • 978-1-611974-21-8  
List \$87.00 • Code \$69.60 • SIAM Member \$60.90 • DC29

## Game Theory with Engineering Applications

**Dario Bauso**

2016 • xxvii + 292 pages • Softcover • 978-1-611974-27-0  
List \$85.00 • Code \$68.00 • SIAM Member \$59.50 • DC30

## High-Gain Observers in Nonlinear Feedback Control

**Hassan K. Khalil**

2017 • vii + 324 pages • Hardcover • 978-1-611974-85-0  
List \$89.00 • Code \$71.20 • SIAM Member \$62.30 • DC31

## Frequency Domain Techniques for $H^\infty$ Control of Distributed Parameter Systems

**Hitay Özbay, Suat Gümüüşsoy, Kenji Kashima, and Yutaka Yamamoto**

2018 • xii + 192 pages • Softcover • 978-1-611975-39-0  
List \$79.00 • Code \$63.20 • SIAM Member \$55.30 • DC32

## Passive Network Synthesis

An Approach to Classification

**Alessandro Morelli and Malcolm C. Smith**

2019 • vi + 153 pages • Softcover • 978-1-611975-81-9  
List \$64.00 • Code \$51.20 • SIAM Member \$44.80 • DC33

## Advanced and Optimization Based Sliding Mode Control

Theory and Applications

**Antonella Ferrara, Gian Paolo Incremona, and Michele Cucuzzella**

2019 • xxii + 279 pages • Softcover • 978-1-611975-83-3  
List \$89.00 • Code \$71.20 • SIAM Member \$62.30 • DC34

## Piecewise Affine Control

Continuous-Time, Sampled-Data, and Networked Systems

**Luis Rodrigues, Behzad Samadi, and Miad Moarref**

2019 • xviii + 224 pages • Softcover • 978-1-611975-89-5  
List \$89.00 • Code \$71.20 • SIAM Member \$62.30 • DC35

## Practical Methods for Optimal Control Using Nonlinear Programming

Third Edition

**John T. Betts**

2020 • xiv + 731 pages • Hardcover • 978-1-611976-18-2  
List \$119.00 • Code \$95.20 • SIAM Member \$83.30 • DC36

## Observability

A New Theory Based on the Group of Invariance

**Agostino Martinelli**

2020 • xiv + 262 pages • Softcover • 978-1-611976-24-3  
List \$84.00 • Code \$67.20 • SIAM Member \$58.80 • DC37

**siam** | Society for Industrial and Applied Mathematics  
**BOOKSTORE**

Visit [bookstore.siam.org](https://bookstore.siam.org). Use code **BKAC21** to receive 40% off on orders of two or more books. Non-SIAM-members use the code for 20% off one book. SIAM members automatically get 30% off—no code needed. Discounts cannot be combined. Offer expires June 26, 2021. Outside North and South America, order at [eurospanbookstore.com/siam](https://eurospanbookstore.com/siam) to save on shipping.