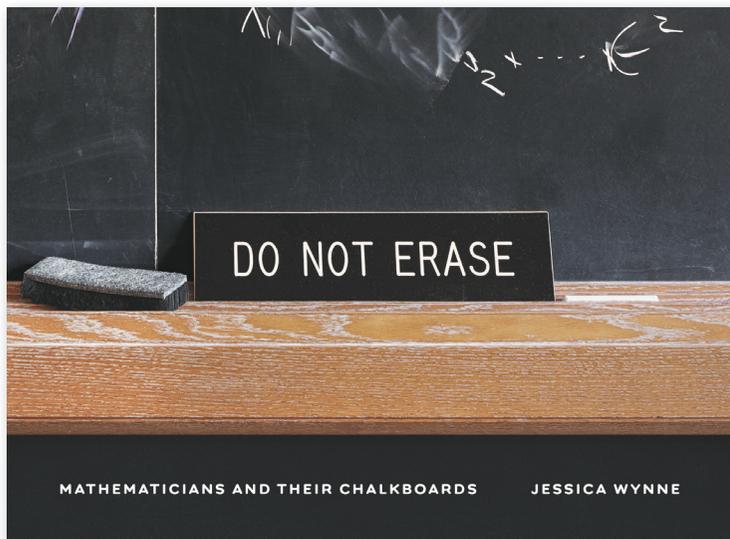


# Princeton Mathematics

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2021





## Do Not Erase

“A mathematician, like a painter or poet, is a maker of patterns,” wrote the British mathematician G. H. Hardy. In *Do Not Erase*, photographer Jessica Wynne presents remarkable examples of this idea through images of mathematicians’ chalkboards. While other fields have replaced chalkboards with whiteboards and digital presentations, mathematicians remain loyal to chalk for puzzling out their ideas and communicating their research. Wynne offers more than one hundred stunning photographs of these chalkboards, gathered from a diverse group of mathematicians around the world. The photographs are accompanied by essays from each mathematician, reflecting on their work and processes. Together, pictures and words provide an illuminating meditation on the unique relationships among mathematics, art, and creativity.

The mathematicians featured in this collection comprise exciting new voices alongside established figures, including Sun-Yung Alice Chang, Alain Connes, Misha Gromov, Andre Neves, Kasso

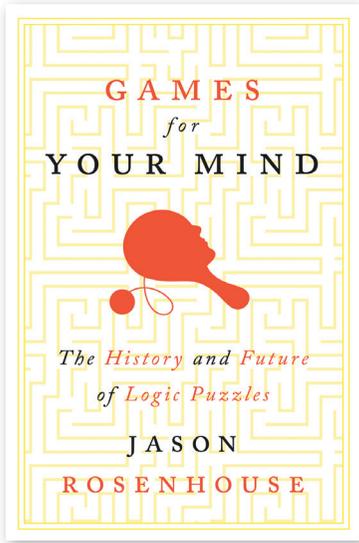
Okoudjou, Peter Shor, Christina Sormani, Terence Tao, Claire Voisin, and many others.

The companion essays give insights into how the chalkboard serves as a special medium for mathematical expression. The volume also includes an introduction by the author, an afterword by *New Yorker* writer Alec Wilkinson, and biographical information for each contributor.

**Jessica Wynne** is associate professor of photography at the Fashion Institute of Technology. Her photographs are in collections at the Morgan Library and the Museum of Modern Art (SF), and her work has been exhibited at the Whitney Museum of American Art and the Cleveland Center for Contemporary Art. She has been featured in such publications as the *New York Times*, the *Guardian*, and *Fortune*.

Website [www.jessicawynne.com](http://www.jessicawynne.com)

June 2021. 252 pages. 108 color illus.  
 Hardback 9780691199221 \$35.00 | £30.00  
 ebook 9780691222820



A lively and engaging look at logic puzzles and their role in recreation, mathematics, and philosophy

## Games for Your Mind

Logic puzzles were first introduced to the public by Lewis Carroll in the late nineteenth century and have been popular ever since. Games like Sudoku and Mastermind are fun and engrossing recreational activities, but they also share deep foundations in mathematical logic and are worthy of serious intellectual inquiry. *Games for Your Mind* explores the history and future of logic puzzles while enabling you to test your skill against a variety of puzzles yourself.

In this informative and entertaining book, Jason Rosenhouse begins by introducing readers to logic and logic puzzles and goes on to reveal the rich history of these puzzles. He shows how Carroll's puzzles presented Aristotelian logic as a game for children, yet also informed his scholarly work on logic. He reveals how another pioneer of logic puzzles, Raymond Smullyan, drew on classic puzzles about liars and truth-tellers to illustrate Kurt Gödel's theorems and illuminate profound questions in mathematical logic. Rosenhouse then presents a new vision for the future of logic puzzles based on nonclassical logic, which is used today in computer science and automated reasoning to manipulate large and sometimes contradictory sets of data.

Featuring a wealth of sample puzzles ranging from simple to extremely challenging, this lively and engaging book brings together many of the most ingenious puzzles ever devised, including the "Hardest Logic Puzzle Ever," metapuzzles, paradoxes, and the logic puzzles in detective stories.

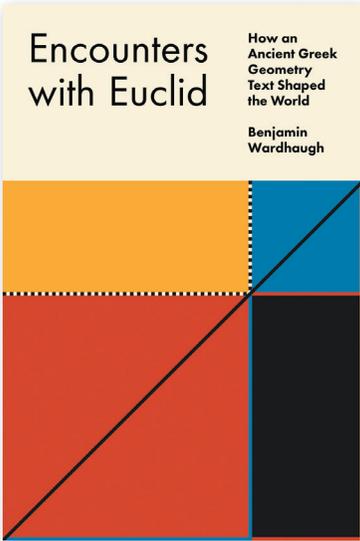
**Jason Rosenhouse** is professor of mathematics at James Madison University. He is the author of *The Monty Hall Problem: The Remarkable Story of Math's Most Contentious Brain Teaser* and *Among the Creationists: Dispatches from the Anti-Evolutionist Front Line*. He is the coauthor (with Laura Taalman) of *Taking Sudoku Seriously: The Math behind the World's Most Popular Pencil Puzzle* and the coeditor (with Jennifer Beineke) of *The Mathematics of Various Entertaining Subjects* (Vols. 1–3) (Princeton).

2020. 352 pages. 35 b/w illus. 32 tables.

Hardback 9780691174075

\$29.95 | £25.00

ebook 9780691200347



A sweeping cultural history of one of the most influential mathematical books ever written

## Encounters with Euclid

Euclid's *Elements of Geometry* is one of the fountainheads of mathematics—and of culture. Written around 300 BCE, it has traveled widely across the centuries, generating countless new ideas and inspiring such figures as Isaac Newton, Bertrand Russell, Abraham Lincoln, and Albert Einstein. *Encounters with Euclid* tells the story of this incomparable mathematical masterpiece, taking readers from its origins in the ancient world to its lasting influence today.

In this lively and informative book, Benjamin Wardhaugh explains how Euclid's text journeyed from antiquity to the Renaissance, introducing some of the many readers, copyists, and editors who left their mark on the *Elements* before handing it on. He shows how some read the book as a work of philosophy, while others viewed it as a practical guide to life. He examines the many different contexts in which Euclid's book and his geometry were put to use, from the Neoplatonic school at Athens and the workshops of Restoration London to the Jesuit mission in China and the artisans' studios of medieval Baghdad. Wardhaugh shows how the *Elements* inspired ideas in theology, art, and music, and how the book has acquired new relevance to the strange geometries of dark matter and curved space.

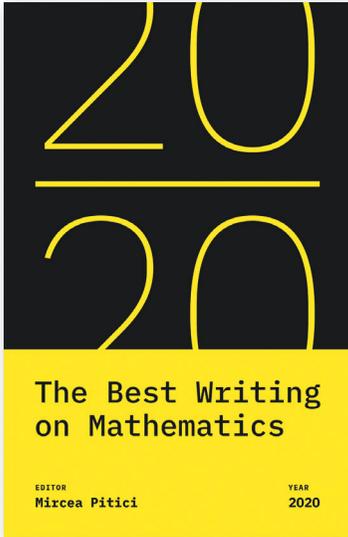
*Encounters with Euclid* traces the life and afterlives of one of the most remarkable works of mathematics ever written, revealing its continuing role in the timeless search for order and reason in an unruly world.

**Benjamin Wardhaugh** is a historian of mathematics and the author of *Gunpowder and Geometry: The Life of Charles Hutton, Pit Boy, Mathematician, and Scientific Rebel* and *How to Read Historical Mathematics* (Princeton) and the editor of *A Wealth of Numbers: An Anthology of 500 Years of Popular Mathematics Writing* (Princeton).

March 2021. 416 pages. 34 b/w illus.

Hardback 9780691211695 \$29.95 | £25.00 ebook 9780691219813

For sale only in North America



The year's finest mathematical writing from around the world

## The Best Writing on Mathematics 2020

This annual anthology brings together the year's finest mathematics writing from around the world. Featuring promising new voices alongside some of the foremost names in the field, *The Best Writing on Mathematics 2020* makes available to a wide audience many articles not easily found anywhere else—and you don't need to be a mathematician to enjoy them. These writings offer surprising insights into the nature, meaning, and practice of mathematics today. They delve into the history, philosophy, teaching, and everyday aspects of math, and take readers behind the scenes of today's hottest mathematical debates.

Here, Steven Strogatz reveals how calculus drives advances in virology, Paul Thagard argues that the power of mathematics stems from its combination of realistic and fictional qualities, and Erica Klarreich describes how Hao Huang used the combinatorics of cube nodes to solve a longstanding problem in computer science. In other essays, John Baez tells how he discovered the irresistible attractions of algebraic geometry, Mark Colyvan compares the radically different explanatory practices of mathematics and science, and Boris Odehnl reviews some surprising properties of multidimensional geometries. And there's much, much more.

In addition to presenting the year's most memorable writings on mathematics, this must-have anthology includes a bibliography of other notable writings and an introduction by the editor.

This book belongs on the shelf of anyone interested in where math has taken us—and where it is headed.

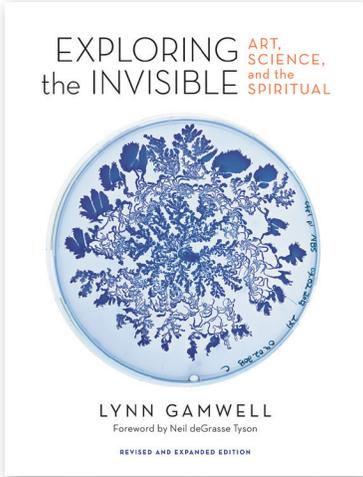
**Mircea Pitici** teaches mathematics at Syracuse University and has edited *The Best Writing on Mathematics* since 2010.

The Best Writing on Mathematics

2020. 264 pages. 16 color + 91 b/w illus. 1 table.

Paperback 9780691207568 \$24.95 | £22.00

Hardback 9780691207575 \$85.00 | £70.00 ebook 9780691213651



How science changed the way artists understand reality

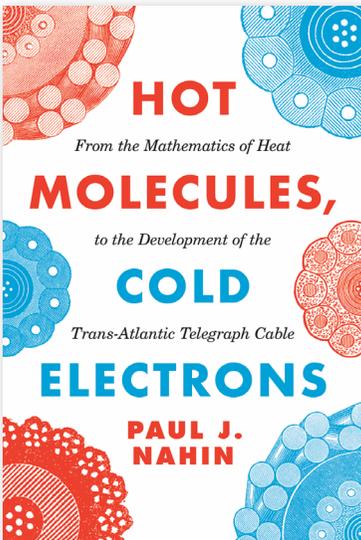
## Exploring the Invisible

*Exploring the Invisible* shows how modern art expresses the first secular, scientific worldview in human history. Now fully revised and expanded, this richly illustrated book describes two hundred years of scientific discoveries that inspired French Impressionist painters and Art Nouveau architects, as well as Surrealists in Europe, Latin America, and Japan. With a foreword by Neil deGrasse Tyson and a wealth of stunning images, this edition of *Exploring the Invisible* draws on the latest scholarship to provide a global perspective on the scientists and artists who explore life on Earth, human consciousness, and the space-time universe.

**Lynn Gamwell** is a lecturer in the history of art, science, and mathematics at the School of Visual Arts in New York.

**Neil deGrasse Tyson** is director of the Hayden Planetarium at the American Museum of Natural History.

2020. 528 pages. 332 color + 183 b/w illus.  
Hardback 9780691191058 \$49.95 | £42.00



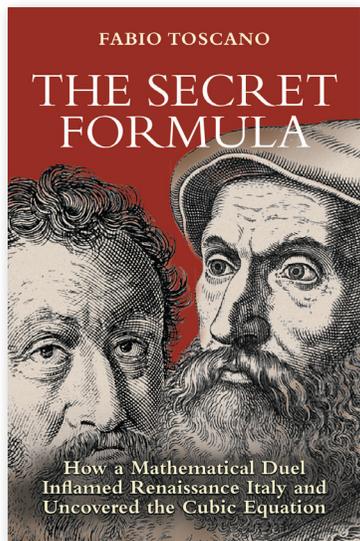
An entertaining mathematical exploration of the heat equation and its role in the triumphant development of the trans-Atlantic telegraph cable

## Hot Molecules, Cold Electrons

Heat, like gravity, shapes nearly every aspect of our world and universe, from how milk dissolves in coffee to how molten planets cool. The heat equation, a cornerstone of modern physics, demystifies such processes, painting a mathematical picture of the way heat diffuses through matter. Presenting the mathematics and history behind the heat equation, *Hot Molecules, Cold Electrons* tells the remarkable story of how this foundational idea brought about one of the greatest technological advancements of the modern era.

**Paul J. Nahin** is the author of many popular math books, including *How to Fall Slower Than Gravity*, *Dr. Euler's Fabulous Formula*, and *An Imaginary Tale* (all Princeton). He is professor emeritus of electrical engineering at the University of New Hampshire.

2020. 232 pages. 37 b/w illus.  
Hardback 9780691191720 \$24.95 | £22.00 ebook 9780691199948



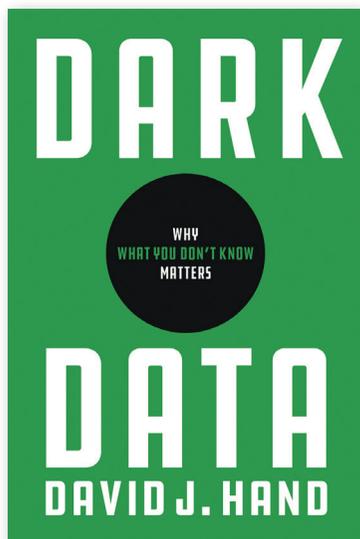
The legendary Renaissance math duel that ushered in the modern age of algebra

## The Secret Formula

*The Secret Formula* tells the story of two Renaissance mathematicians whose jealousies, intrigues, and contentious debates led to the discovery of a formula for the solution of the cubic equation. Niccolò Tartaglia was a talented and ambitious teacher who possessed a secret formula. He wrote it down in the form of a poem to prevent other mathematicians from stealing it. Gerolamo Cardano was a physician, gifted scholar, and notorious gambler who would not hesitate to use flattery and even trickery to learn Tartaglia's secret. A lively and compelling account of genius, betrayal, and all-too-human failings, *The Secret Formula* reveals the epic rivalry behind one of the fundamental ideas of modern algebra.

**Fabio Toscano** is a science writer for newspapers and television and is the author of many popular science books.

2020. 176 pages. 2 b/w illus.  
Hardback 9780691183671     \$24.95 | £22.00     ebook 9780691200323



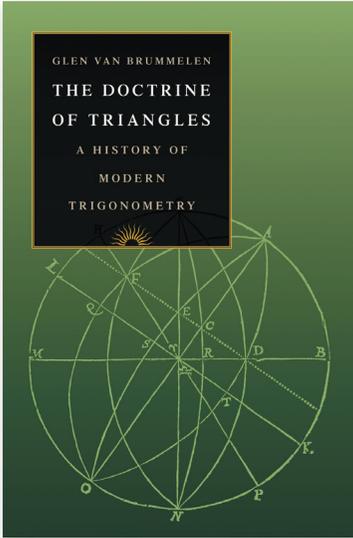
A practical guide to making good decisions in a world of missing data

## Dark Data

In the era of big data, it is easy to imagine that we have all the information we need to make good decisions. But in fact the data we have are never complete, and may be only the tip of the iceberg. Just as much of the universe is composed of dark matter, invisible to us but nonetheless present, the universe of information is full of dark data that we overlook at our peril. In *Dark Data*, data expert David Hand takes us on a fascinating and enlightening journey into the world of the data we *don't* see.

**David J. Hand** is emeritus professor of mathematics and senior research investigator at Imperial College London, a former president of the Royal Statistical Society, and a fellow of the British Academy.

2020. 344 pages. 6 b/w illus. 6 tables.  
Hardback 9780691182377     \$29.95 | £25.00     ebook 9780691198859  
Audiobook 9780691199177



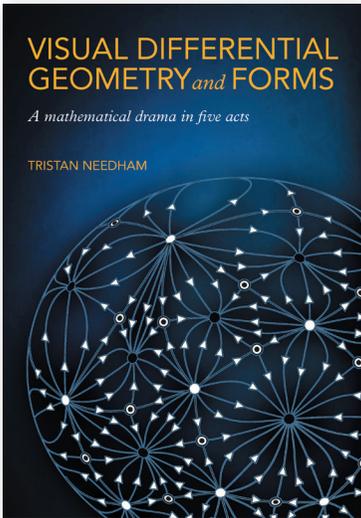
“*The Doctrine of Triangles* succeeds brilliantly in making this history accessible. . . . A pleasure to read.”  
 —Dennis Duke, Florida State University

## The Doctrine of Triangles

*The Doctrine of Triangles* offers an interdisciplinary history of trigonometry that spans four centuries, starting in 1550 and concluding in the 1900s. Glen Van Brummelen tells the story of trigonometry as it evolved from an instrument for understanding the heavens to a practical tool, used in fields such as surveying and navigation. In Europe, China, and America, trigonometry aided and was itself transformed by concurrent mathematical revolutions, as well as the rise of science and technology. *The Doctrine of Triangles* brings trigonometry’s rich historical past full circle into the modern era.

**Glen Van Brummelen** is dean of the faculty of natural and applied sciences at Trinity Western University, and a historian of mathematics and astronomy.

June 2021. 376 pages. 122 b/w illus. 6 tables.  
 Hardback 9780691179414      \$29.95 | £25.00      ebook 9780691219875



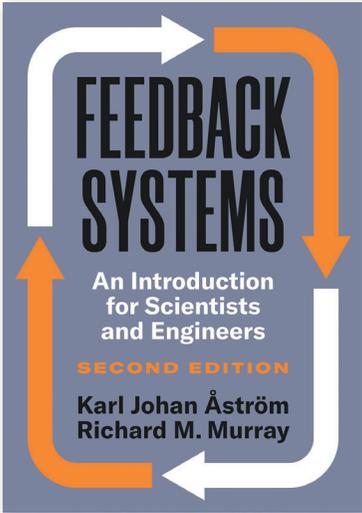
An inviting, intuitive, and visual exploration of differential geometry and forms

## Visual Differential Geometry and Forms

*Visual Differential Geometry and Forms* fulfills two principal goals. In the first four acts, Tristan Needham puts the geometry back into differential geometry. Using 235 hand-drawn diagrams, Needham deploys Newton’s geometrical methods to provide geometrical explanations of the classical results. In the fifth act, he offers the first undergraduate introduction to differential forms that treats advanced topics in an intuitive and geometrical manner. Requiring only basic calculus and geometry, *Visual Differential Geometry and Forms* provocatively rethinks the way this important area of mathematics should be considered and taught.

**Tristan Needham** is professor of mathematics at the University of San Francisco.

June 2021. 584 pages. 239 b/w illus.  
 Paperback 9780691203706      \$45.00 | £38.00  
 Hardback 9780691203690      \$125.00 | £104.00      ebook 9780691219899



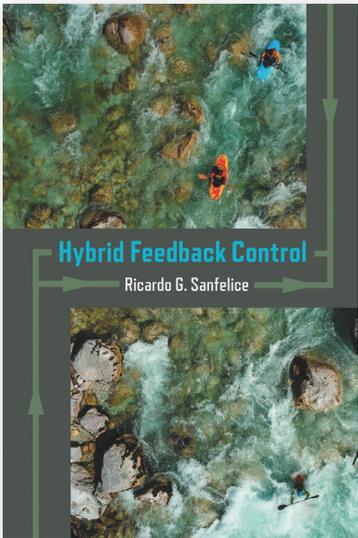
The essential introduction to the principles and applications of feedback systems—now fully revised and expanded

## Feedback Systems

This textbook covers the mathematics needed to model, analyze, and design feedback systems. Now more user-friendly than ever, this revised and expanded edition of *Feedback Systems* is a one-volume resource for students and researchers in mathematics and engineering. It has applications across a range of disciplines that utilize feedback in physical, biological, information, and economic systems.

**Karl Johan Åström** is senior professor of automatic control at Lund University in Sweden. **Richard M. Murray** is the Thomas E. and Doris Everhart Professor of Control and Dynamical Systems and Bioengineering at the California Institute of Technology.

February 2021. 528 pages. 290 b/w illus + 9 tables.  
Hardback 9780691193984 \$95.00 | £78.00 ebook 9780691213477



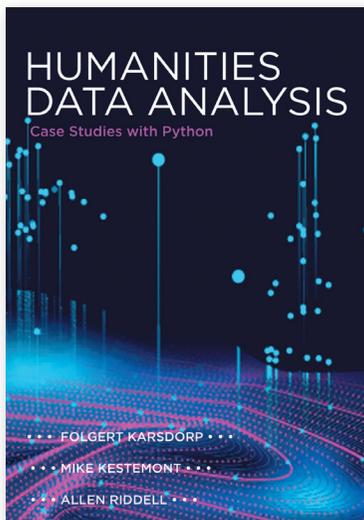
A comprehensive introduction to hybrid control systems and design

## Hybrid Feedback Control

Hybrid control systems exhibit both discrete changes, or jumps, and continuous changes, or flow. Hybrid control systems feature widely across disciplines, including biology, computer science, and engineering, and examples range from the control of cellular responses to self-driving cars. Although classical control theory provides powerful tools for analyzing systems that exhibit either flow or jumps, it is ill-equipped to handle hybrid control systems. Relevant to dynamical systems theory, applied mathematics, and computer science, *Hybrid Feedback Control* will be useful to students and researchers working on hybrid systems, cyber-physical systems, control, and automation.

**Ricardo G. Sanfelice** is professor of electrical and computer engineering at the University of California, Santa Cruz. He is the coauthor of *Hybrid Dynamical Systems* (Princeton).

December 2020. 424 pages. 78 b/w illus. 1 table.  
Hardback 9780691180229 \$75.00 | £62.00 ebook 9780691189536



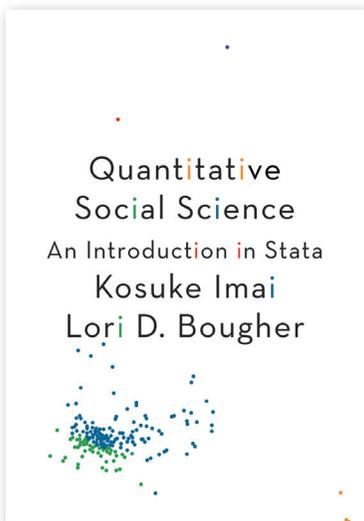
A practical guide to data-intensive humanities research using the Python programming language

## Humanities Data Analysis

The use of quantitative methods in the humanities and related social sciences has increased considerably in recent years. Despite this growth, there are few resources to take advantage of these powerful tools. *Humanities Data Analysis* offers the first intermediate-level guide to quantitative data analysis for humanities students. This practical textbook, which assumes a basic knowledge of Python, teaches readers the necessary skills for conducting humanities research in the rapidly developing digital environment.

**Folgert Karsdorp** is a postdoctoral researcher at the Meertens Institute of the Royal Netherlands Academy of Arts and Sciences. **Mike Kestemont** is assistant professor of literature at the University of Antwerp. **Allen Riddell** is assistant professor of information science at Indiana University.

January 2021. 360 pages. 69 color + 12 b/w illus. 5 tables.  
Hardback 9780691172361 \$45.00 | £38.00 ebook 9780691200330



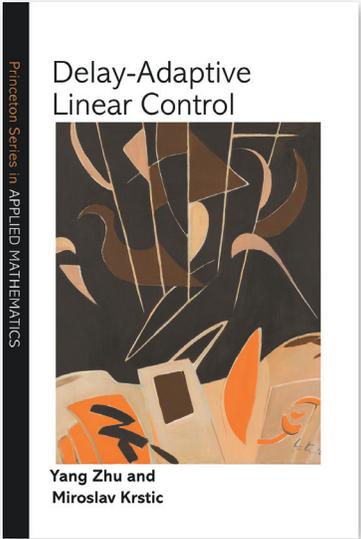
The Stata edition of the groundbreaking textbook on data analysis and statistics for the social sciences and allied fields

## Quantitative Social Science

Quantitative analysis is an increasingly essential skill for social science research, yet students in the social sciences and related areas typically receive little training in it—or if they do, they usually end up in statistics classes that offer few insights into their field. This textbook is a practical introduction to data analysis and statistics written especially for undergraduates and beginning graduate students in the social sciences and allied fields, such as business, economics, education, political science, psychology, sociology, public policy, and data science.

**Kosuke Imai** is Professor of Government and of Statistics at Harvard University. **Lori D. Bougher** is a data and statistical analyst at the Niehaus Center for Globalization and Governance at Princeton University.

March 2021. 432 pages. 79 color + 11 b/w illus. 49 tables.  
Paperback 9780691191096 \$49.95 | £42.00  
Hardback 9780691191089 \$95.00 | £78.00 ebook 9780691191294



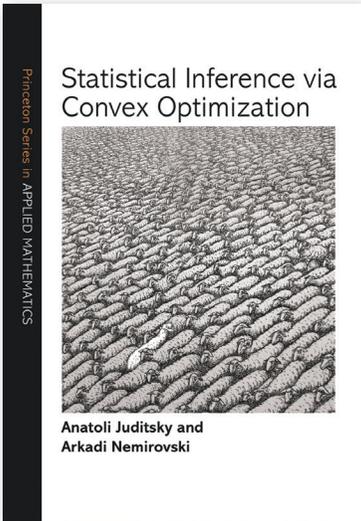
## Delay-Adaptive Linear Control

Actuator and sensor delays are among the most common dynamic phenomena in engineering practice, and when disregarded, they render controlled systems unstable. Over the past sixty years, predictor feedback has been a key tool for compensating such delays, but conventional predictor feedback algorithms assume that the delays and other parameters of a given system are known. When incorrect parameter values are used in the predictor, the resulting controller may be as destabilizing as without the delay compensation.

Presenting breakthroughs in adaptive control and control of delay systems, *Delay-Adaptive Linear Control* offers powerful new tools for the control engineer and the mathematician.

**Yang Zhu** is a postdoctoral researcher in control theory and engineering at Tel Aviv University. **Miroslav Krstic** is distinguished professor of mechanical and aerospace engineering at the University of California, San Diego.

2020. 352 pages. 48 b/w illus. 16 tables.  
 Hardback 9780691202549 \$85.00 | £70.00 ebook 9780691203317



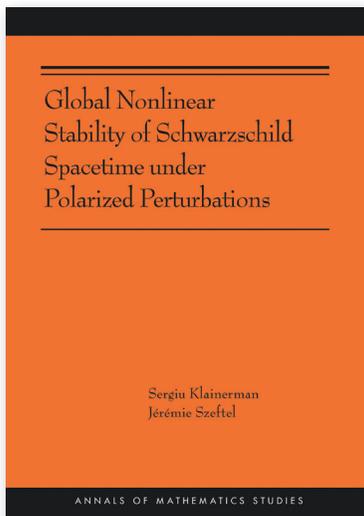
## Statistical Inference via Convex Optimization

This authoritative book draws on the latest research to explore the interplay of high-dimensional statistics with optimization. Through an accessible analysis of fundamental problems of hypothesis testing and signal recovery, Anatoli Juditsky and Arkadi Nemirovski show how convex optimization theory can be used to devise and analyze near-optimal statistical inferences.

*Statistical Inference via Convex Optimization* features exercises with solutions along with extensive appendixes, making it ideal for use as a graduate text.

**Anatoli Juditsky** is professor of applied mathematics and chair of statistics and optimization at the Multidisciplinary Institute in Artificial Intelligence at the Université Grenoble Alpes in France. **Arkadi Nemirovski** is the John Hunter Chair and professor of industrial and systems engineering at the Georgia Institute of Technology.

2020. 656 pages. 40 b/w illus.  
 Hardback 9780691197296 \$85.00 | £70.00 ebook 9780691200316



## Global Nonlinear Stability of Schwarzschild Spacetime under Polarized Perturbations

One of the major outstanding questions about black holes is whether they remain stable when subject to small perturbations. An affirmative answer to this question would provide strong theoretical support for the physical reality of black holes. In this book, Sergiu Klainerman and Jérémie Szeftel take a first important step toward solving the fundamental black hole stability problem in general relativity by establishing the stability of nonrotating black holes—or Schwarzschild spacetimes—under so-called polarized perturbations. Essential reading for mathematicians and physicists alike, this book introduces a rich theoretical framework.

**Sergiu Klainerman** is Eugene Higgins Professor of Mathematics at Princeton University. **Jérémie Szeftel** is a CNRS senior researcher in mathematics at the Laboratoire Jacques-Louis Lions of Sorbonne Université in Paris.

December 2020. 856 pages. 13 b/w illus.

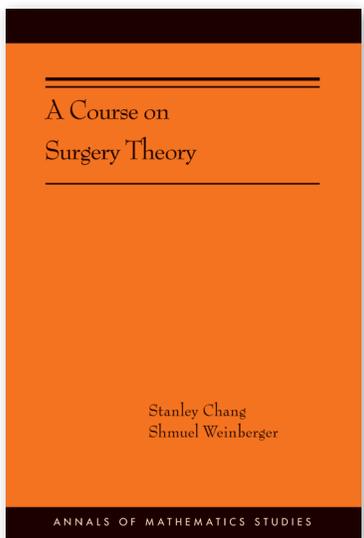
Paperback 9780691212425

\$75.00 | £62.00

Hardback 9780691212432

\$165.00 | £136.00

ebook 9780691218526



## A Course on Surgery Theory

Surgery theory, a subfield of geometric topology, is the study of the classifications of manifolds. *A Course on Surgery Theory* offers a modern look at this important mathematical discipline and some of its applications. In this book, Stanley Chang and Shmuel Weinberger explain some of the triumphs of surgery theory during the past three decades, from both an algebraic and geometric point of view. They also provide an extensive treatment of basic ideas, main theorems, active applications, and recent literature. The authors methodically cover all aspects of surgery theory, connecting it to other relevant areas of mathematics, including geometry, homotopy theory, analysis, and algebra.

**Stanley Chang** is the Mildred Lane Kemper Professor of Mathematics at Wellesley College. **Shmuel Weinberger** is the Andrew MacLeish Distinguished Service Professor of Mathematics at the University of Chicago.

January 2021. 472 pages. 14 b/w illus.

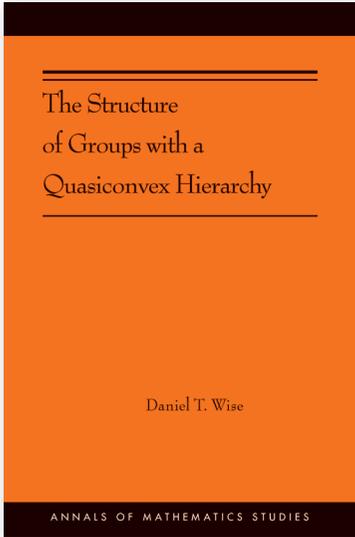
Paperback 9780691160498

\$75.00 | £62.00

Hardback 9780691160481

\$165.00 | £136.00

ebook 9780691200354



## The Structure of Groups with a Quasiconvex Hierarchy

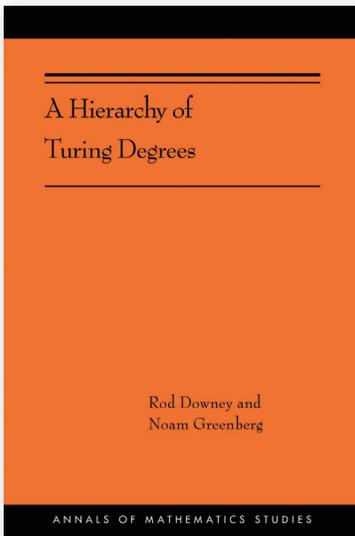
This monograph on the applications of cube complexes constitutes a breakthrough in the fields of geometric group theory and 3-manifold topology. Many fundamental new ideas and methodologies are presented here for the first time, including a cubical small-cancellation theory generalizing ideas from the 1960s, a version of Dehn Filling that functions in the category of special cube complexes, and a variety of results about right-angled Artin groups. The book culminates by establishing a remarkable theorem about the nature of hyperbolic groups that are constructible as amalgams.

**Daniel T. Wise** is James McGill Professor in the Department of Mathematics and Statistics at McGill University. His previous book is *From Riches to Raags: 3-Manifolds, Right-Angled Artin Groups, and Cubical Geometry*.

February 2021. 376 pages. 166 color illus.

Paperback 9780691170459 \$75.00 | £62.00

Hardback 9780691170442 \$165.00 | £136.00 ebook 9780691213507



## A Hierarchy of Turing Degrees

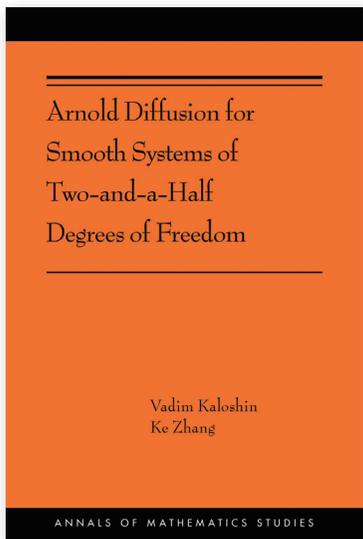
Computability theory is a branch of mathematical logic and computer science that has become increasingly relevant in recent years. In *A Hierarchy of Turing Degrees*, Rod Downey and Noam Greenberg introduce a new hierarchy that allows them to classify the combinatorics of constructions from many areas of computability theory, including algorithmic randomness, Turing degrees, effectively closed sets, and effective structure theory. This unifying hierarchy gives rise to new natural definability results for Turing degree classes, demonstrating how dynamic constructions become reflected in definability. Downey and Greenberg present numerous construction techniques involving high-level nonuniform arguments, and their self-contained work is appropriate for graduate students and researchers.

**Rod Downey** and **Noam Greenberg** are professors of mathematics at Victoria University of Wellington in New Zealand.

2020. 240 pages. 3 b/w illus.

Paperback 9780691199665 \$75.00 | £62.00

Hardback 9780691199658 \$165.00 | £136.00 ebook 9780691200217



## Arnold Diffusion for Smooth Systems of Two-and-a-Half Degrees of Freedom

Arnold diffusion is one of the most important problems in the fields of dynamical systems and mathematical physics. Since it was discovered by Vladimir Arnold in 1963, it has attracted the efforts of some of the most prominent researchers in mathematics. The question is whether a typical perturbation of a particular system will result in chaotic or unstable dynamical phenomena. In this groundbreaking book, Vadim Kaloshin and Ke Zhang provide the first complete proof of Arnold diffusion, demonstrating that there is topological instability for typical perturbations of five-dimensional integrable systems (two-and-a-half degrees of freedom).

**Vadim Kaloshin** is the Michael Brin Chair in Mathematics at the University of Maryland, College Park. **Ke Zhang** is associate professor of mathematics at the University of Toronto.

2020. 224 pages. 21 b/w illus.

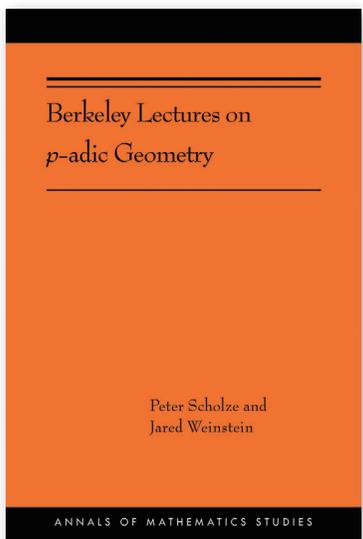
Paperback 9780691202525

\$75.00 | £62.00

Hardback 9780691202532

\$165.00 | £136.00

ebook 9780691204932



## Berkeley Lectures on $p$ -adic Geometry

*Berkeley Lectures on  $p$ -adic Geometry* presents an important breakthrough in arithmetic geometry. In 2014, leading mathematician Peter Scholze delivered a series of lectures at the University of California, Berkeley, on new ideas in the theory of  $p$ -adic geometry. Building on his discovery of perfectoid spaces, Scholze introduced the concept of “diamonds,” which are to perfectoid spaces what algebraic spaces are to schemes. The introduction of diamonds, along with the development of a mixed-characteristic shtuka, set the stage for a critical advance in the discipline. In this book, Peter Scholze and Jared Weinstein show that the moduli space of mixed-characteristic shtukas is a diamond, raising the possibility of using the cohomology of such spaces to attack the Langlands conjectures for a reductive group over a  $p$ -adic field.

**Peter Scholze** is a professor at the University of Bonn and director of the Max Planck Institute for Mathematics.

**Jared Weinstein** is associate professor of mathematics at Boston University.

2020. 264 pages. 5 b/w illus.

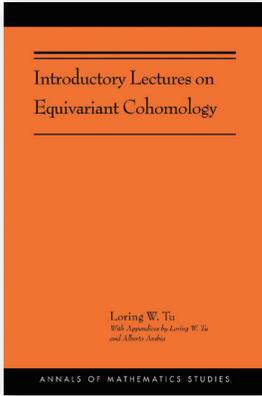
Paperback 9780691202082

\$75.00 | £62.00

Hardback 9780691202099

\$165.00 | £136.00

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## Introductory Lectures on Equivariant Cohomology

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**Loring W. Tu** is professor of mathematics at Tufts University.

2020. 200 pages. 37 b/w illus.

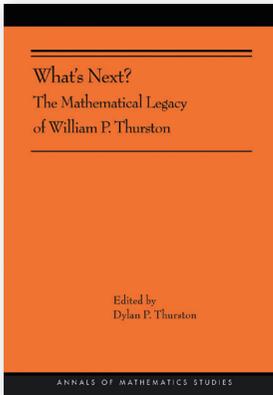
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**Dylan P. Thurston** is professor of mathematics at Indiana University, Bloomington. He is an editor of the journal *Quantum Topology*.

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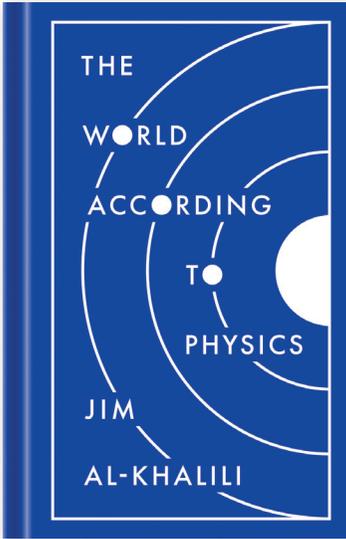
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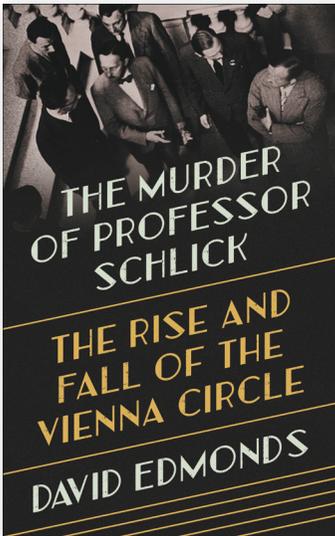
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On June 22, 1936, the philosopher Moritz Schlick was on his way to deliver a lecture at the University of Vienna when Johann Nelböck, a deranged former student of Schlick's, shot him dead on the university steps. Some Austrian newspapers defended the madman, while Nelböck himself argued in court that his onetime teacher had promoted a treacherous Jewish philosophy. David Edmonds traces the rise and fall of the Vienna Circle—an influential group of brilliant thinkers led by Schlick—and of a philosophical movement that sought to do away with metaphysics and pseudoscience in a city darkened by fascism, anti-Semitism, and unreason.

**David Edmonds** is a distinguished research fellow at the Oxford Uehiro Centre for Practical Ethics.

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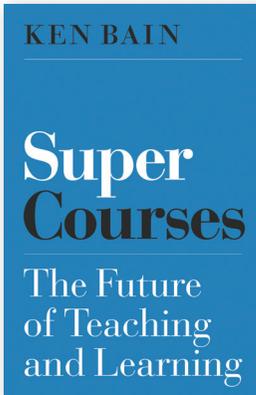
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**Jessica McCrory Calarco** is associate professor of sociology at Indiana University.

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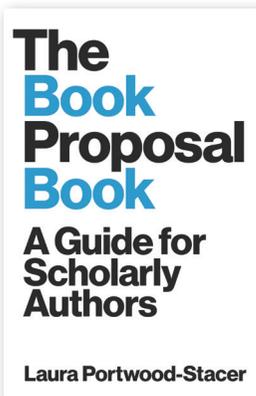
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**Ken Bain** taught as a history professor, founded teaching centers, and is the president of the Best Teachers Institute.

March 2021. 296 pages.  
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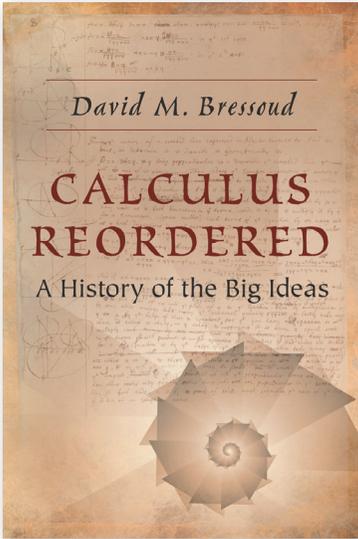
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**Laura Portwood-Stacer**, PhD, is a developmental editor and founder of Manuscript Works, a consultancy serving academic authors around the world.

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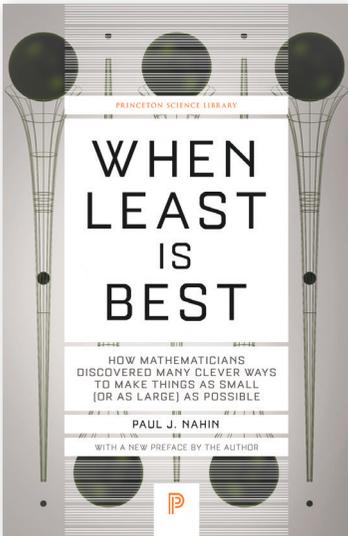
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**David M. Bressoud** is DeWitt Wallace Professor Emeritus at Macalester College and Director of the Conference Board of the Mathematical Sciences.

May 2021. 248 pages. 74 b/w illus. 1 table.  
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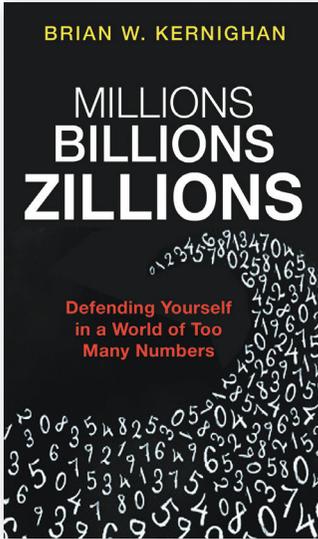
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What is the best way to photograph a speeding bullet? How can lost hikers find their way out of a forest? Why does light move through glass in the least amount of time possible? *When Least Is Best* combines the mathematical history of extrema with contemporary examples to answer these intriguing questions and more. Paul Nahin shows how life often works at the extremes and he considers how mathematicians over the centuries have grappled with these problems of minima and maxima. Throughout, Nahin examines entertaining conundrums, such as how to build the shortest bridge possible between two towns, how to vary speed during a race, and how to make the perfect basketball shot. *When Least Is Best* will delight math enthusiasts everywhere.

**Paul J. Nahin** is professor emeritus of electrical engineering at the University of New Hampshire.

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 May 2021. 392 pages. 99 b/w illus.  
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An essential guide to recognizing bogus numbers and misleading data

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Numbers are often intimidating, confusing, and even deliberately deceptive—especially when they are really big. The media loves to report on millions, billions, and trillions, but frequently makes basic mistakes or presents such numbers in misleading ways. And misunderstanding numbers can have serious consequences, since they can deceive us in many of our most important decisions, including how to vote, what to buy, and whether to make a financial investment. In this short, accessible, enlightening, and entertaining book, Brian Kernighan teaches anyone—even diehard math-phobes—how to demystify the numbers that assault us every day.

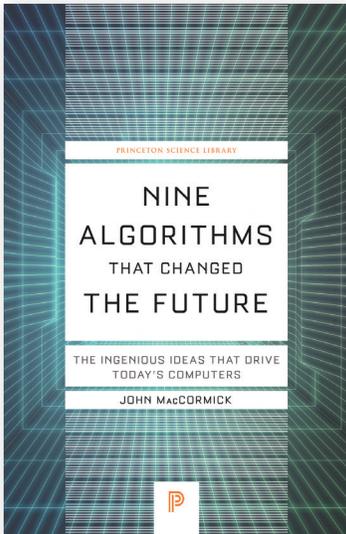
**Brian W. Kernighan** is professor of computer science at Princeton University.

2020. 176 pages. 30 b/w illus.

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Nine revolutionary algorithms that power our computers and smartphones

## Nine Algorithms That Changed the Future

Every day, we use our computers to perform remarkable feats. A simple web search picks out a handful of relevant needles from the world's biggest haystack. Uploading a photo to Facebook transmits millions of pieces of information. We use public-key cryptography to transmit secret information like credit card numbers, and we use digital signatures to verify the identity of the websites we visit. How do our computers perform these tasks with such ease? John MacCormick answers this question in language anyone can understand, using vivid examples to explain the fundamental tricks behind nine computer algorithms.

**John MacCormick** is associate professor of computer science at Dickinson College.

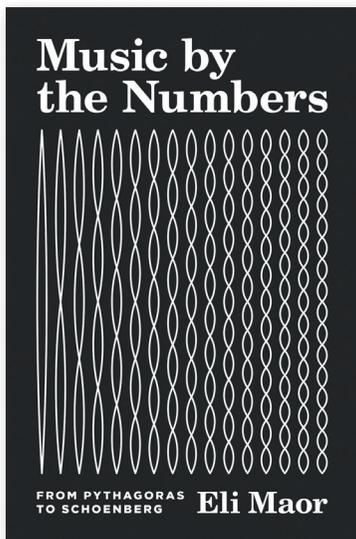
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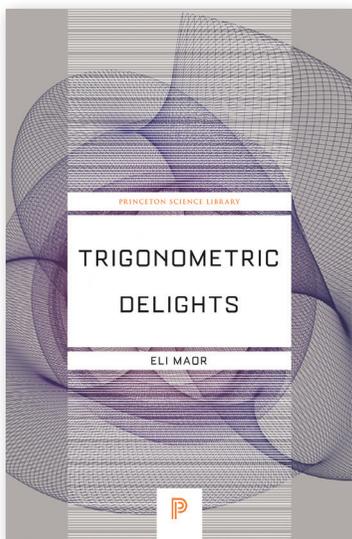
How music has influenced mathematics, physics, and astronomy from ancient Greece to the twentieth century

## Music by the Numbers

Music is filled with mathematical elements. The works of Bach are often said to possess a math-like logic, and Arnold Schoenberg, Iannis Xenakis, and Karlheinz Stockhausen wrote music explicitly based on mathematical principles. Yet Eli Maor argues that it is music that has had the greater influence on mathematics, not the other way around. Starting with Pythagoras, proceeding through Schoenberg, and bringing the story up to the present with contemporary string theory, *Music by the Numbers* tells a fascinating story of composers, scientists, inventors, and eccentrics who have played a role in the age-old relationship between music, mathematics, and the physical sciences.

**Eli Maor** is a former professor of the history of mathematics at Loyola University Chicago.

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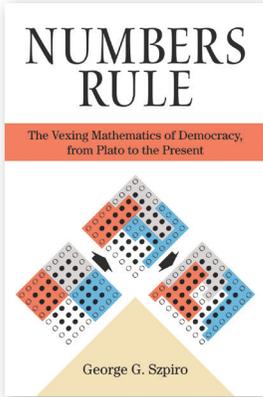
A fun, entertaining exploration of the ideas and people behind the growth of trigonometry

## Trigonometric Delights

Rejecting the usual descriptions of sine, cosine, and their trigonometric relatives, Eli Maor brings the subject to life in a compelling blend of history, biography, and mathematics. From the proto-trigonometry of the Egyptian pyramid builders and the first true trigonometry developed by Greek astronomers, to the epicycles and hypocycles of the toy Spirograph, Maor presents both a survey of the main elements of trigonometry and a unique account of its vital contribution to science and social growth. A tapestry of stories, curiosities, insights, and illustrations, *Trigonometric Delights* irrevocably changes how we see this essential mathematical discipline.

**Eli Maor** is a former professor of the history of mathematics at Loyola University Chicago.

Princeton Science Library  
2020. 256 pages. 107 b/w illus.  
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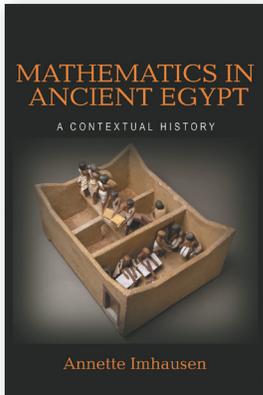
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Since the very birth of democracy in ancient Greece, the simple act of voting has given rise to mathematical paradoxes that have puzzled some of the greatest philosophers, statesmen, and mathematicians. *Numbers Rule* traces the epic quest by these thinkers to create a more perfect democracy and adapt to the ever-changing demands that each new generation places on our democratic institutions.

**George G. Szpiro**, PhD, is a mathematician and journalist.

2020. 240 pages. 21 tables.  
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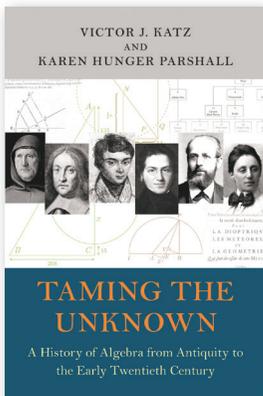
A survey of ancient Egyptian mathematics across three thousand years

## Mathematics in Ancient Egypt

Drawing from mathematical texts, architectural drawings, administrative documents, and other sources, Annette Imhausen surveys three thousand years of Egyptian history to present an integrated picture of theoretical mathematics in relation to the daily practices of Egyptian life and social structures.

**Annette Imhausen** is professor of the history of science at Goethe University, Frankfurt. She is the author of *Egyptian Algorithms*.

2020. 248 pages. 29 b/w illus. 11 tables.  
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A history of algebra from antiquity to the early twentieth century

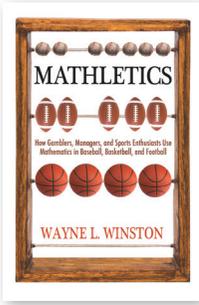
## Taming the Unknown

What is algebra? For some, it is an abstract language of  $x$ 's and  $y$ 's. For mathematics majors and professional mathematicians, it is a world of axiomatically defined constructs like groups, rings, and fields. *Taming the Unknown* considers how these two seemingly different types of algebra evolved and how they relate.

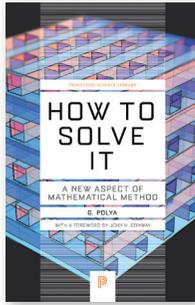
**Victor J. Katz** is professor of mathematics emeritus at the University of the District of Columbia. **Karen Hunger Parshall** is professor of history and mathematics at the University of Virginia.

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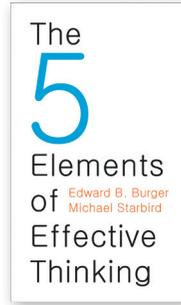
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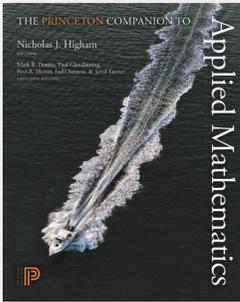
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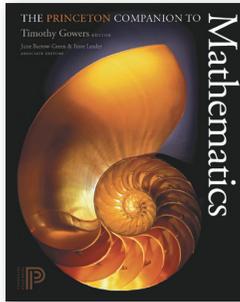
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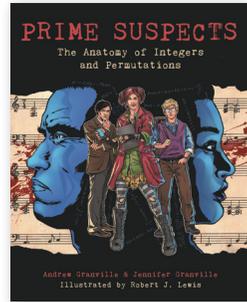
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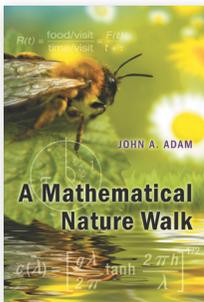
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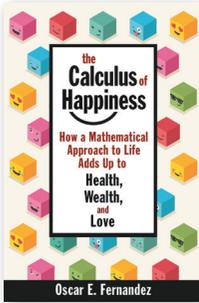


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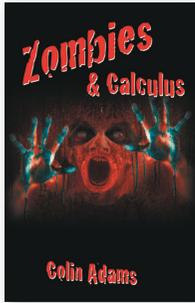


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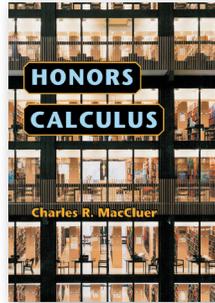
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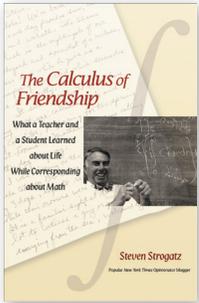
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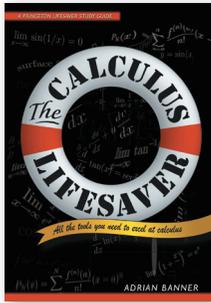
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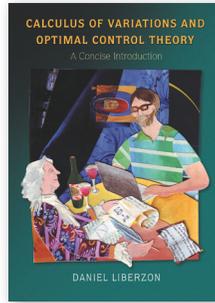
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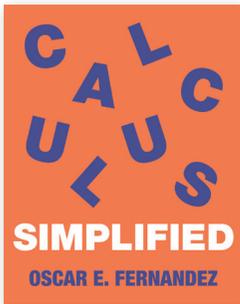
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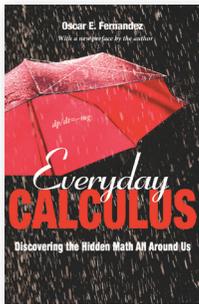
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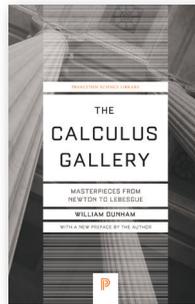
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