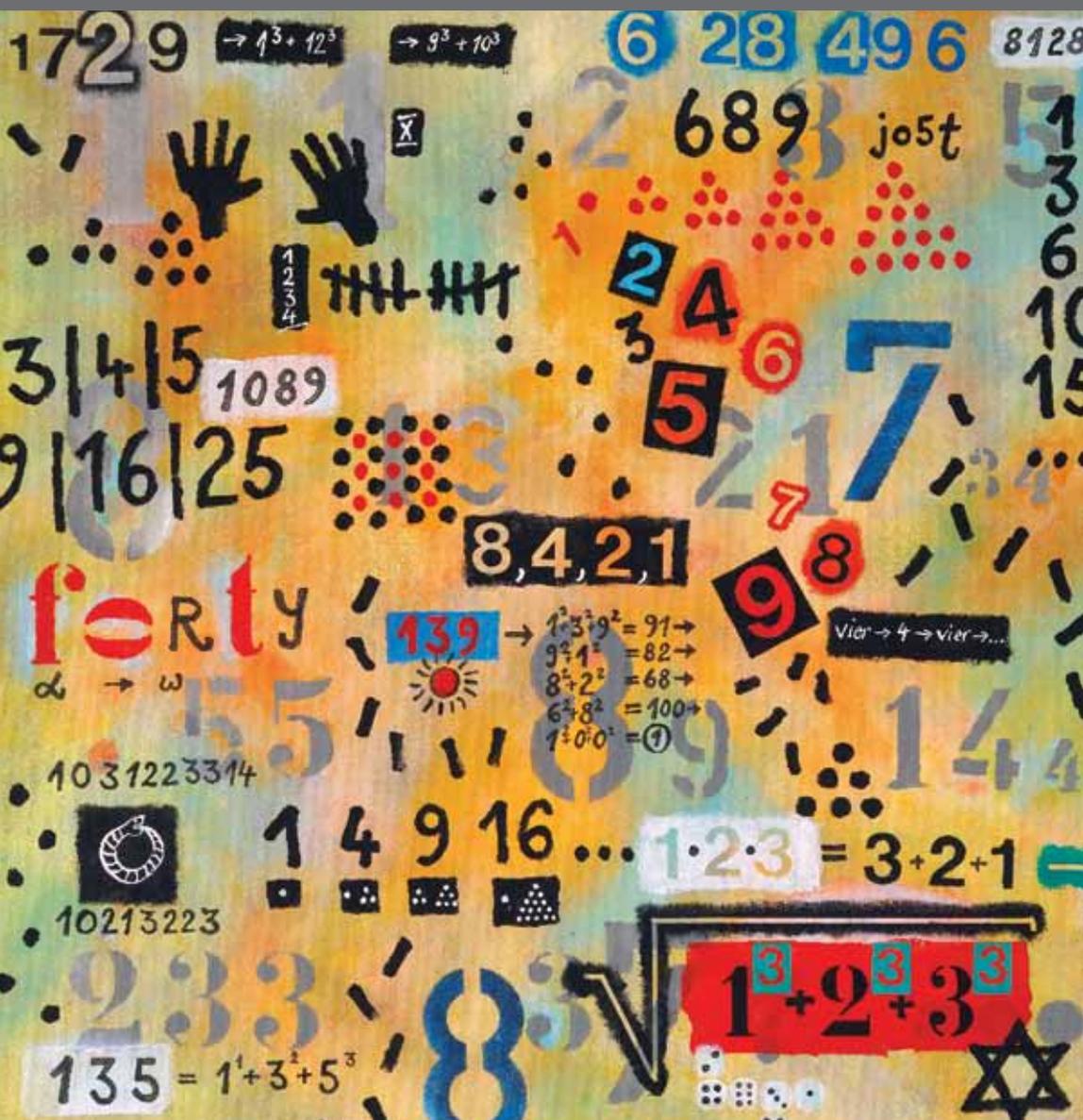


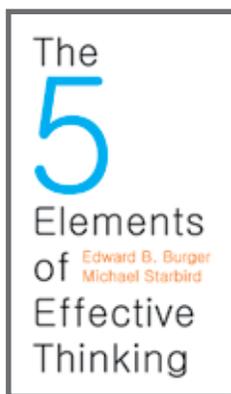
# Mathematics

## 2013



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Edward B. Burger is the Francis Christopher Oakley Third Century Professor of Mathematics at Williams College, an educational and business consultant, and a former vice provost at Baylor University.

Michael Starbird is University Distinguished Teaching Professor at The University of Texas at Austin and an educational and business consultant.

NEW

## The 5 Elements of Effective Thinking Edward B. Burger & Michael Starbird

“Think ... fail ... question ... understand ... change ... learn: in their powerful new book, Burger and Starbird show students, teachers, and everyone else how to harness the genius of learning. *The 5 Elements* argues that the door to knowledge is not opened by a magical test. Instead, the key is for each of us to boldly embrace a willingness to fail while organizing persistent approaches to thinking. Even more than helping one master content, this book can lead to a satisfying and rewarding life of the mind.”

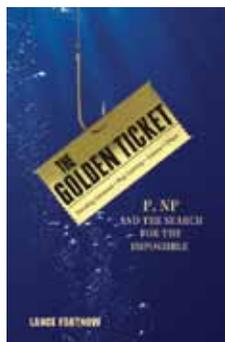
—Dennis Van Roekel, president of the National Education Association

*The 5 Elements of Effective Thinking* presents practical, lively, and inspiring ways for you to become more successful through better thinking. The idea is simple: You can learn how to think far better by adopting specific strategies. Brilliant people aren’t a special breed—they just use their minds differently. By using the straightforward and thought-provoking techniques in *The 5 Elements of Effective Thinking*, you will regularly find imaginative solutions to difficult challenges, and you will discover new ways of looking at your world and yourself—revealing previously hidden opportunities.

The book offers real-life stories, explicit action items, and concrete methods that allow you to attain a deeper understanding of any issue, exploit the power of failure as a step toward success, develop a habit of creating probing questions, see the world of ideas as an ever-flowing stream of thought, and embrace the uplifting reality that we are all capable of change. No matter who you are, the practical mind-sets introduced in the book will empower you to realize any goal in a more creative, intelligent, and effective manner. Filled with engaging examples that unlock truths about thinking in every walk of life, *The 5 Elements of Effective Thinking* is written for all who want to reach their fullest potential—including students, parents, teachers, businesspeople, professionals, athletes, artists, leaders, and lifelong learners.

2012. 168 pages. 1 halftone.  
Cl: 978-0-691-15666-8 \$19.95 | £13.95

Cover image: *Hardy's Taxi*, acrylic on canvas, 60 x 60cm; [eugenjost@bluewin.ch](mailto:eugenjost@bluewin.ch)



FORTHCOMING

## The Golden Ticket

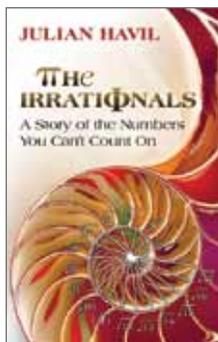
P, NP, and the Search for the Impossible  
Lance Fortnow

"You will love this book. It's completely accessible and captures the thrill, potential, and heartbreak of an edgy mathematical problem in terms that nonmathematicians will appreciate. After reading *The Golden Ticket*, I sort of hope P isn't NP after all."  
—Vint Cerf, Google Vice President

The P-NP problem is the most important open problem in computer science, if not all of mathematics. *The Golden Ticket* provides a nontechnical introduction to P-NP, its rich history, and its algorithmic implications for everything we do with computers and beyond. In this informative and entertaining book, Lance Fortnow traces how the problem arose during the Cold War on both sides of the Iron Curtain, and gives examples of the problem from a variety of disciplines, including economics, physics, and biology. He explores problems that capture the full difficulty of the P-NP dilemma, from discovering the shortest route through all the rides at Disney World to finding large groups of friends on Facebook. But difficulty also has its advantages. Hard problems allow us to safely conduct electronic commerce and maintain privacy in our online lives.

Lance Fortnow is professor and chair of the School of Computer Science at the Georgia Institute of Technology.

April 2013. 176 pages. 41 halftones. 41 line illus.  
Cl: 978-0-691-15649-1 \$26.95 | £18.95



NEW

## The Irrationals

A Story of the Numbers You Can't Count On  
Julian Havil

"*The Irrationals* is a true mathematician's and historian's delight."

—Robert Schaefer, *New York Journal of Books*

The ancient Greeks discovered them, but it wasn't until the nineteenth century that irrational numbers were properly understood and rigorously defined, and even today not all their mysteries have been revealed. In *The Irrationals*, the first popular and comprehensive book on the subject, Julian Havil tells the story of irrational numbers and the mathematicians who have tackled their challenges, from antiquity to the twenty-first century. Along the way, he explains why irrational numbers are surprisingly difficult to define—and why so many questions still surround them.

Julian Havil is a retired former master at Winchester College, England.

2012. 312 pages. 100 line illus.  
Cl: 978-0-691-14342-2 \$29.95 | £19.95

### Also by Julian Havil

#### Impossible?

Surprising Solutions to  
Counterintuitive Conundrums

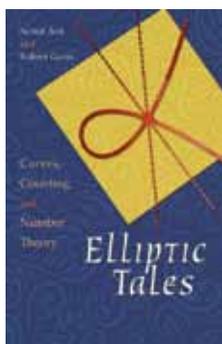
"Julian Havil has quietly joined the ranks of the very best writers of popular mathematics."

—John Watkins, *Mathematical Intelligence*

2011. 256 pages. 75 line illus.  
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Curves, Counting, and Number Theory  
Avner Ash & Robert Gross

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—Sungkon Chang, *Times Higher Education*

*Elliptic Tales* describes the latest developments in number theory by looking at one of the most exciting unsolved problems in contemporary mathematics—the Birch and Swinnerton-Dyer Conjecture. The Clay Mathematics Institute is offering a prize of \$1 million to anyone who can discover a general solution to the problem. In this book, Avner Ash and Robert Gross guide readers through the mathematics they need to understand this captivating problem.

Avner Ash is professor of mathematics at Boston College. Robert Gross is associate professor of mathematics at Boston College.

2012. 280 pages. 52 line illus. 16 tables.  
Cl: 978-0-691-15119-9 \$29.95 | £19.95

### Also by Avner Ash & Robert Gross

With a new preface by the authors  
**Fearless Symmetry**  
Exposing the Hidden Patterns of Numbers

2008. 312 pages. 1 halftone. 2 line illus.  
Pa: 978-0-691-13871-8 \$25.95 | £17.95



NEW

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a Napkin  
Lawrence Weinstein

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Lawrence Weinstein is University Professor of Physics at Old Dominion University.

2012. 384 pages. 95 halftones.  
Pa: 978-0-691-15080-2 \$19.95 | £13.95

### Guesstimation

Solving the World's Problems on the Back  
of a Cocktail Napkin  
Lawrence Weinstein & John A. Adam

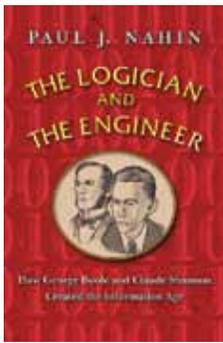
"[A] left-brain book that helps you approximate answers to the types of questions actually asked in some job interviews today."

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NEW

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How George Boole and Claude Shannon Created the Information Age

**Paul J. Nahin**

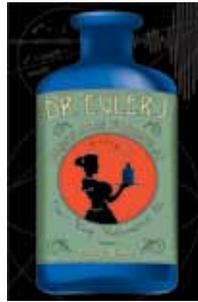
"In this book, Nahin brings to life the immense practical outcomes of deep theoretical ideas... By following the story of George Boole and Claude Shannon with a lively historical style, and a futuristic extension to quantum computing, Nahin makes the connection of theory and practice into something vivid and compelling."

—Andrew Hodges, author of *Alan Turing: The Enigma*

Boolean algebra, also called Boolean logic, is at the heart of the electronic circuitry in everything we use—from our computers and cars, to our kitchen gadgets and home appliances. How did a system of mathematics established in the Victorian era become the basis for such incredible technological achievements a century later? In *The Logician and the Engineer*, best-selling popular math writer Paul Nahin combines engaging problems and a colorful historical narrative to tell the remarkable story of how two men in different eras—mathematician and philosopher George Boole (1815–1864) and electrical engineer and pioneering information theorist Claude Shannon (1916–2001)—advanced Boolean logic and became founding fathers of the electronic communications age.

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

2012. 248 pages. 2 halftones. 41 line illus. 25 tables.  
Cl: 978-0-691-15100-7 \$24.95 | £16.95



Also by Paul J. Nahin

## Number-Crunching

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**Persi Diaconis & Ron Graham**

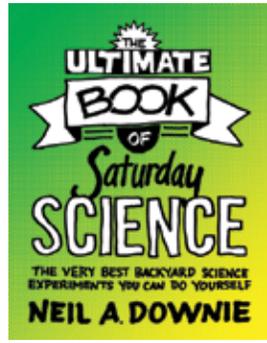
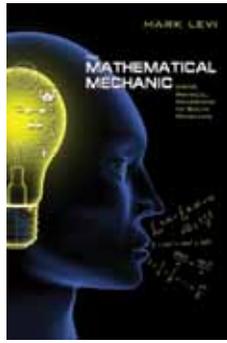
"[F]ascinating.... *Magical Mathematics* [is] a dazzling tour of math-based magic tricks.... [E]xploring the math behind these tricks will, in truth, only deepen the mystery. For, as the authors remind us, sometimes the methods are as magical as the tricks themselves."

—Alex Stone, *Wall Street Journal*

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Mark Levi

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Mark Levi is professor of mathematics at Pennsylvania State University.

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### Also by Mark Levi

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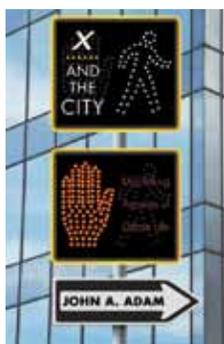
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Neil A. Downie is a lead scientist with Air Products and Chemicals, Inc., and visiting professor of multidisciplinary engineering at the University of Surrey.

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John A. Adam is professor of mathematics at Old Dominion University.

2012. 344 pages. 2 halftones. 104 line illus. 8 tables.  
Cl: 978-0-691-15464-0 \$29.95 | £19.95

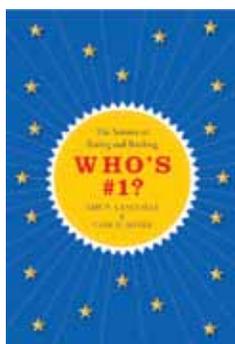
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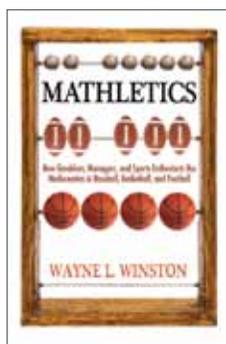
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A website's ranking on Google can spell the difference between success and failure for a new business. NCAA football ratings determine which schools get to play for the big money in postseason bowl games. Product ratings influence everything from the clothes we wear to the movies we select on Netflix. Ratings and rankings are everywhere, but how exactly do they work? *Who's #1?* offers an engaging and accessible account of how scientific rating and ranking methods are created and applied to a variety of uses.

Amy N. Langville is associate professor of mathematics at the College of Charleston. Carl D. Meyer is professor of mathematics at North Carolina State University.

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Wayne L. Winston is the John and Esther Reese Professor of Decision Sciences at Indiana University's Kelley School of Business.

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Dana Mackenzie is a frequent contributor to *Science*, *Discover*, and *New Scientist*. He has a PhD in mathematics from Princeton and was a mathematics professor for thirteen years before becoming a full-time writer.

2012. 224 pages. 26 color illus. 17 halftones. 12 line illus.

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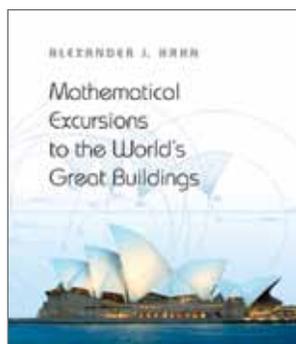
John MacCormick is currently a professor of computer science at Dickinson College.

June 2013. 232 pages. 5 halftones. 98 line illus. 1 table.

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Cl: 978-0-691-14714-7 \$27.95 | £19.95





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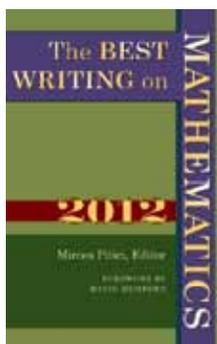
"Modern architects rely on algebra and calculus. Hahn turns these tools on historical structures from the Parthenon to the Hagia Sophia to St. Paul's Cathedral, revealing how they hold up and explaining the causes of visible contortions and cracks.... More engrossingly, Hahn employs mathematics to explore how architects have conceived of buildings through the ages. In the case of Milan's cathedral, Hahn's discussion is especially rich because his maths plays out against a backdrop of detailed historical documentation, including the testimony of the German [master builder]."

—Jonathon Keats, *New Scientist*

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Alexander J. Hahn is professor of mathematics at the University of Notre Dame.

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Mircea Pitici, a PhD candidate in mathematics education at Cornell University, teaches math and writing at Cornell and Ithaca College.

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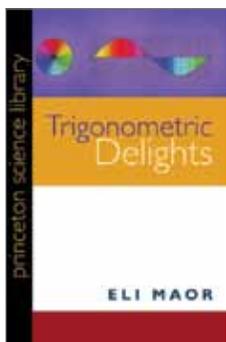
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Eli Maor teaches the history of mathematics at  
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David S. Richeson is associate professor of math-  
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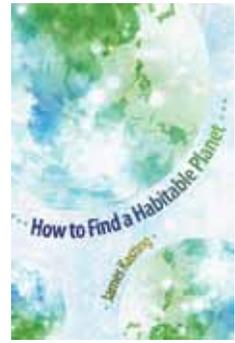
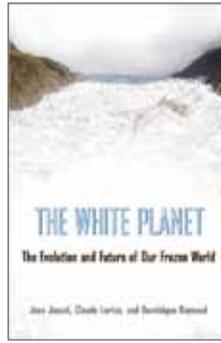
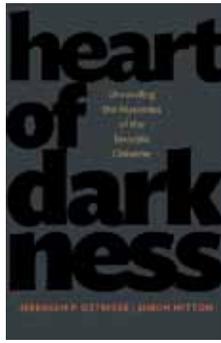
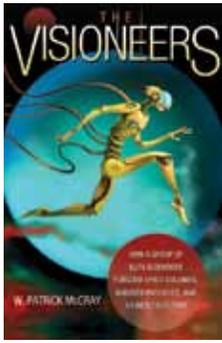
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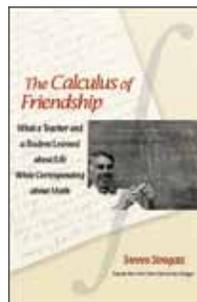
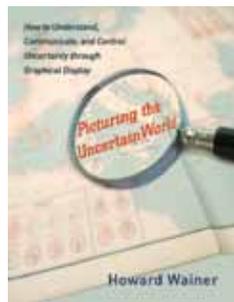
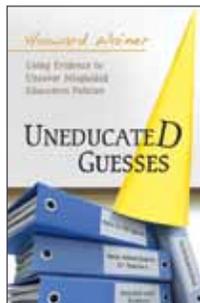
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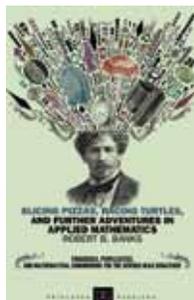
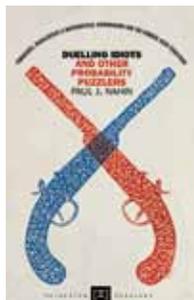
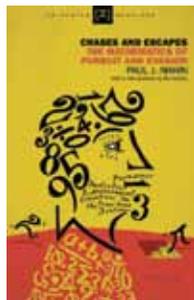
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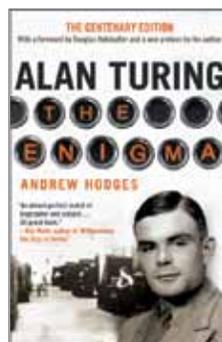
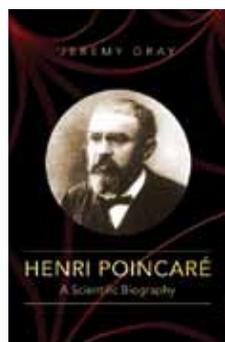
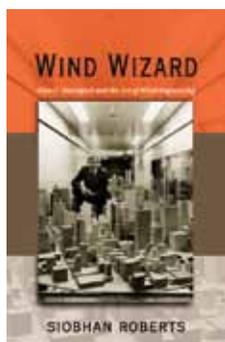
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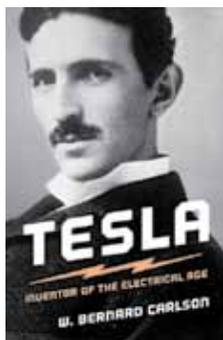
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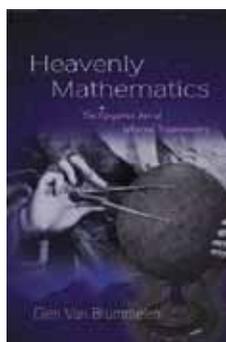
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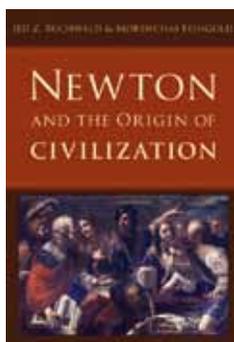
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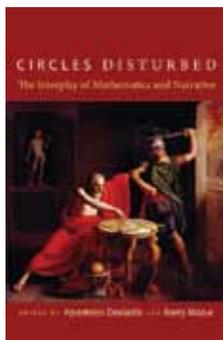
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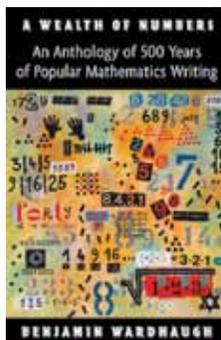
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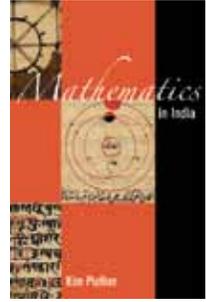
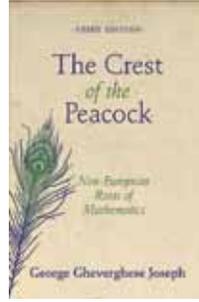
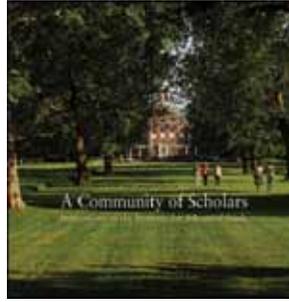
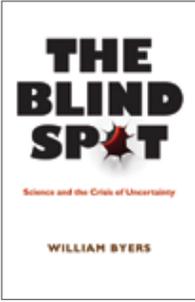
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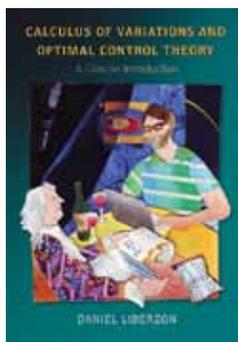
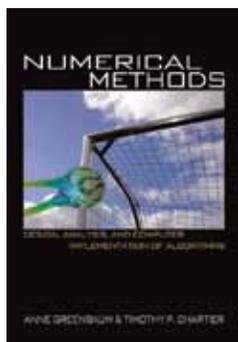
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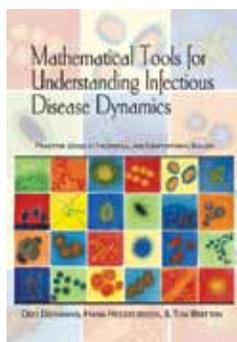
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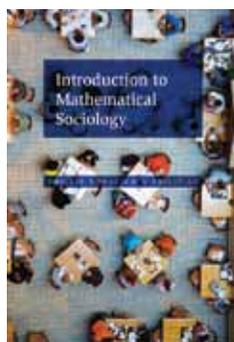
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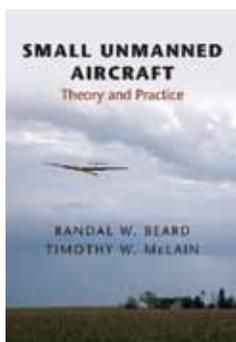
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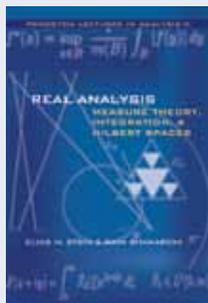
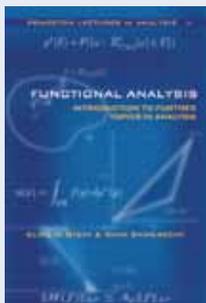
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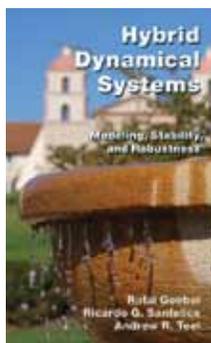
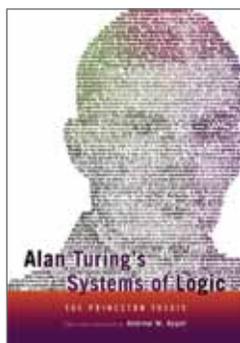
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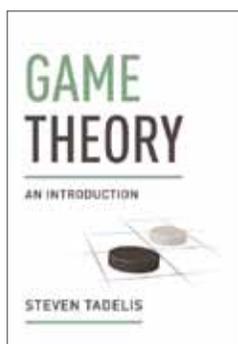
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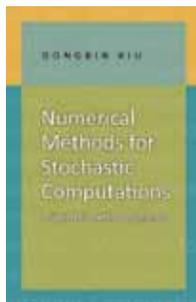
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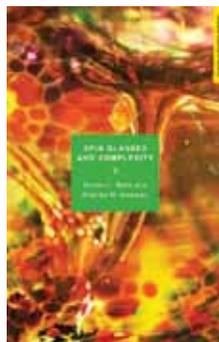
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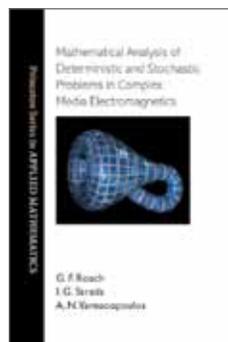
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Xinyi Yuan is assistant professor of mathematics at Princeton University. Shou-wu Zhang is professor of mathematics at Princeton University and Columbia University. Wei Zhang is assistant professor of mathematics at Columbia University.

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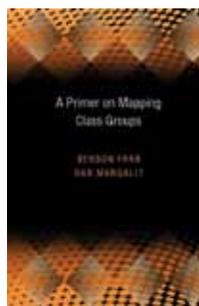
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