



Back Matter

The American Mathematical Monthly, Vol. 106, No. 1. (Jan., 1999)

Stable URL:

<http://links.jstor.org/sici?sici=0002-9890%28199901%29106%3A1%3C%3ABM%3E2.0.CO%3B2-B>

The American Mathematical Monthly is currently published by Mathematical Association of America.

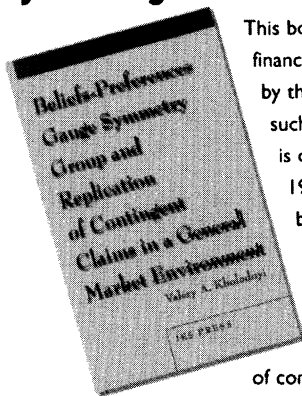
Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/maa.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

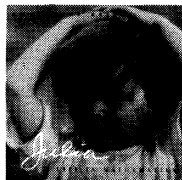
The JSTOR Archive is a trusted digital repository providing for long-term preservation and access to leading academic journals and scholarly literature from around the world. The Archive is supported by libraries, scholarly societies, publishers, and foundations. It is an initiative of JSTOR, a not-for-profit organization with a mission to help the scholarly community take advantage of advances in technology. For more information regarding JSTOR, please contact support@jstor.org.

Beliefs-Preferences Gauge Symmetry Group and Replication of Contingent Claims in a General Market Environment



This book studies the actual financial phenomena underlying the evaluation of financial derivatives, which is today virtually identified with and even replaced by the study of the mathematical aspects of stochastic calculus as a model for such phenomena. It expresses the view that the study of financial phenomena is on the brink of a revolution similar to that of quantum physics in the 1920s. A fundamental symmetry, a gauge symmetry, is introduced between beliefs of market participants and their preferences in a general market environment for a market with exchange of an arbitrary number of arbitrary underlying securities. The practical applications of this gauge symmetry range from the detection of a new type of true arbitrage to the beliefs-preferences-independent valuation and dynamic replication of contingent claims in a general market environment.

To Order Call: 1-888-437-4979 • Special Introductory Price \$149.00
ISBN 0-9663032-1-0, Hardcover, 460 Pages. • Additional Discount Available for Full-time Students
IES Press • P.O. Box 14008 • Research Triangle Park, NC • 27709
For Other IES Press Publications, See Web Site: www.ieslc.com



THE MATHEMATICAL ASSOCIATION OF AMERICA

Julia a life in mathematics

Constance Reid

Constance Reid, an established writer about mathematicians, has written an excellent and loving book, about her sister Julia Robinson, the mathematician. The author has written that she wants the book to be one for all age groups and she has succeeded admirably in making it so. Julia wanted to be known as a mathematician, not a woman mathematician and rightly so! However, she was, and is, a wonderful role model for women aspiring to be mathematician. What a great gift this book would be!

—Alice Schafer, Former President, AWM

This book is a small treasure, one which I want to share with all my mathematical friends. The assembly of several articles and additional photos and remarks provides the image of a mathematician of extraordinary taste, tenacity and generosity.... Julia Robinson broke ground in displaying the deep connections between number theory and logic. Her results have led to a very active area today, making the appearance of this book very timely. Her work and her example are however timeless and I can think of no better advice to give a young mathematician, either in how to do mathematics. or how to behave in mathematics, than: "Be like Julia!"

—Carol Wood, Deputy Director, MSRI

Julia is the story of the life of Julia Bowman Robinson, the gifted and highly original mathematician who during her lifetime was recognized in ways that no other woman mathematician had been recognized up to that time. In 1976 she became the first woman mathematician elected to the National Academy of Sciences and in 1983 the first woman elected president of the American Mathematical Society.

This unusual book, profusely illustrated with previously unpublished personal and mathematical memorabilia, brings together in one volume the prizewinning "Autobiography of Julia Robinson" by her sister, the popular mathematical biographer Constance Reid, and three very personal articles about her work by outstanding mathematical colleagues.

All royalties from sales of this book will go to fund a Julia Robinson Prize in Mathematics at the high school from which she graduated.

Catalog Code: JULIA/JR

136 pp., Hardbound, 1996, ISBN 0-88385-520-8
List: \$27.00 MAA Member: \$20.00

Phone in Your Order Now! ☎ 1-800-331-1622

Prentice Hall Advanced Mathematics

New Titles

Introduction to Analysis

Arthur Mattuck, MIT

Multivariable Calculus with Vectors

Hartley Rogers, Jr., MIT

Differential Equations: Modeling with MATLAB®

Paul Davis, Worcester Polytechnic Institute
Cleve Moler

Discrete Mathematics, Fourth Edition

Ken Ross and Charles Wright, both of the
University of Oregon

Abstract Algebra, Second Edition

David Dummit and Richard Foote, both of the
University of Vermont

Numerical Methods Using MATLAB®, Third Edition

John Mathews, California State University
at Fullerton
Kurtis Fink, Northwest State University

A Contextual History of Mathematics

Ronald Calinger, Catholic University of America

Introduction to Mathematical Programming

Russell Walker, Carnegie-Mellon University

Differential Equations and Linear Algebra, Second Edition

Stephen Goode, California State University
at Fullerton

Calculus with Early Vectors

by Phillip Zenor, Edward Slaminka, and Donald Thaxton, all of Auburn University

Starting with an introduction to vectors in Chapter 1 and integrating this topic (and differential equations) throughout, this text is written for students taking a concurrent calculus-based physics course. Physics and engineering applications receive extra emphasis.

Vector Calculus, Linear Algebra, and Differential Form: A Unified Approach

John Hubbard, Cornell University
Barbara Hubbard

Advanced Calculus: A Friendly Approach

Witold Kosmala, Appalachian State University

Introductory Combinatorics, Third Edition

Richard Brualdi, University of Wisconsin

Foundations of Plane Geometry

Harvey Blau, Northern Illinois University
John Wetzel, University of Illinois, Urbana

Introduction to Topology

Dennis Roseman, University of Iowa

Partial Differential Equations: Sources and Solutions

Arthur David Snider, University of South Florida

Principles of Mathematical Problem Solving

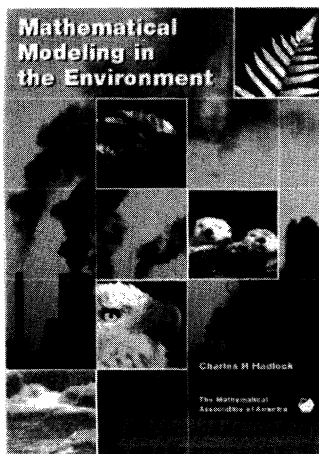
Martin Erickson and Joe Flowers, both of Truman
State University

A First Course in Fourier Analysis

David Kammler, Southern Illinois University

Visit us on the Web at www.prenhall.com





Mathematical Modeling in the Environment

Charles Hadlock

Series: Classroom Resource Materials

Packaged with a PC compatible disk that enhances the material in the text.

Suitable for classroom adoption in an innovative course for

- a general education mathematics elective
- a mathematics or science major advanced elective
- an interdisciplinary course, even at a relatively elementary level
- a mathematical modeling course in a civil/environmental engineering program

This book has a dual objective: first, to introduce the reader to some of the most important and widespread environmental issues of the day; and second, to illustrate the vital role played by mathematical models in investigating these issues. The environmental issues addressed include: ground-water contamination, air pollution, and hazardous material emergencies. These issues are presented in their full real-world context, not as scientific or mathematical abstractions; and for background, readers are invited to investigate their status in their own communities.

The first part of the book leads the reader through relatively elementary modeling of these phenomena, including simple algebraic equations for ground water, slightly more complex algebraic equations (preferably implemented on a spreadsheet or other computerized framework) for air pollution, and a fully computerized modeling package for hazardous materials incident analysis. The interplay between physical intuition and mathematical analysis is emphasized.

For more advanced readers, the second part of the book returns to the same three subjects but with a higher level of mathematical sophistication (adjustable to the preparation of the reader by selection of subsections.) Many important classical mathematical themes are developed through this context, examples coming from single and multivariable calculus, differential equations, numerical analysis, linear algebra and probability. The material is presented in such a way as to minimize the required background and to encourage the subsequent study of some of these fields.

An elementary course for a general audience could be based entirely on Part I, and a higher level mathematics, sci-

ence, or engineering course could move quickly to Part 2.

A PC compatible diskette packaged with the text contains a spreadsheet program that facilitates the numerical experimentation with the Gaussian plume equation introduced in Chapter 3, as well as public domain DOS program (ARCHIE) for evaluating the consequences from various hazardous materials scenarios (e.g., the physical extent of flammable and toxic vapor clouds). Text is not tied to the use of this software, but it is included as an aid to meet the pedagogical objectives of the text.

Catalog Code: ENV/SA

312 pp., Paperbound, 1998, ISBN 0-88385-709-X

List: \$55.00 MAA Member: \$43.95

Instructor's and Solutions Manual for *Mathematical Modeling in the Environment*

Charles Hadlock

Contains the complete solutions and further discussion of nearly every exercise presented in the textbook. This includes both the mathematical/computational exercises as well as the research questions and investigations. Readers will benefit greatly from perusing solutions to the problems whether they have worked them out themselves or not. Students using this volume will still need to work out solutions of research questions using their own sources and adapting them to their own geographic locations, or using their own computational schemes, so this volume could well be useful for students in many course contexts. Enrichment material is included on the topics of some of the exercises. Advice for teachers who lack previous environmental experience, but who want to teach this material is also provided and makes it practical for such persons to offer a course based on these volumes.

Catalog Code: EVS/SA

150 pp., Paperbound, 1998, ISBN 0-88385-713-8

List: \$18.95 MAA Member: \$14.95



New from William Dunham,
award-winning author of
Journey through Genius:
The Great Theorems of Mathematics,
and *The Mathematical Universe....*

Euler

The Master of Us All

William Dunham

Series: Dolciani Mathematical Expositions

Without question, Leonhard Euler (1707-1783) ranks among history's greatest mathematicians. Across six decades of unmatched productivity, and despite a visual impairment that grew ever worse, he charted the course of mathematics throughout the eighteenth century and beyond. His reputation is captured in Laplace's famous admonition, "Read Euler, read Euler. He is the master of us all."

Written for the mathematically literate reader, this book provides a glimpse of Euler in action. Following an introductory biographical sketch are chapters describing his contributions to eight different topics—number theory, logarithms, infinite series, analytic number theory, complex variables, algebra, geometry, and combinatorics. Each chapter begins with a prologue to establish the historical context and then proceeds to a detailed consideration of one or more Eulerian theorems on the sub-

ject at hand. Each chapter concludes with an epilogue surveying subsequent developments or addressing related questions that remain unanswered to this day. At the end of the book is a brief outline of Euler's collected works, the monumental *Opera Omnia*, whose publication has consumed virtually all of the twentieth century.

In all, the book contains three dozen proofs from this remarkable individual. Yet this is merely the tip of the scholarly iceberg, for Euler produced over 30,000 pages of pure and applied mathematics during his lifetime. *Euler: The Master of Us All* samples the work of a mathematician whose influence, industry, and ingenuity are of the very highest order.

Catalog Code: DOL-22/JR

192 pp., Paperbound, ISBN- 0-88385-328-0

List: \$29.95 MAA Member: \$23.95

Phone in Your Order Now! ☎ 1-800-331-1622

Monday – Friday 8:30 am – 5:00 pm

FAX (301) 206-9789

or mail to: The Mathematical Association of America, PO Box 91112, Washington, DC 20090-1112

Shipping and Handling: Postage and handling are charged as follows: USA orders (shipped via UPS): \$2.95 for the first book, and \$1.00 for each additional book. Canadian orders: \$4.50 for the first book and \$1.50 for each additional book. Canadian orders will be shipped within 10 days of receipt of order via the fastest available route. We do not ship via UPS into Canada unless the customer specially requests this service. Canadian customers who request UPS shipment will be billed an additional 7% of their total order. Overseas orders: \$3.50 per item ordered for books sent surface mail. Airmail service is available at a rate of \$7.00 per book. Foreign orders must be paid in US dollars through a US bank or through a New York clearinghouse. Credit Card orders are accepted for all customers.

	QTY.	CATALOG CODE	PRICE	AMOUNT
Name _____	_____	DOL-22/JR	_____	_____
Address _____	All orders must be prepaid with the exception of books purchased for resale by bookstores and wholesalers.			Shipping & handling _____
City _____ State _____ Zip _____	Payment <input type="checkbox"/> Check <input type="checkbox"/> VISA <input type="checkbox"/> MasterCard			TOTAL _____
Phone _____	Credit Card No. _____ Expires ____/____			
	Signature _____			

AMERICAN MATHEMATICAL SOCIETY

New Titles from the AMS

Rings and Things and a Fine Array of Twentieth Century Associative Algebra

Carl Faith, *Professor Emeritus, Rutgers University, New Brunswick, NJ*

This book surveys more than 125 years of aspects of associative algebras, especially ring and module theory. It is the first to probe so extensively such a wealth of historical development. Moreover, the author brings the reader up to date, in particular through his report on the subject in the second half of the twentieth century.

Included in the book are certain categorical properties from theorems of Frobenius and Stickelberger on the primary decomposition of finite Abelian groups; Hilbert's basis theorem and his Nullstellensatz, including the modern formulations of the latter by Krull, Goldman, and others; Maschke's theorem on the representation theory of finite groups over a field; and the fundamental theorems of Wedderburn on the structure of finite dimensional algebras and finite skew fields and their extensions by Brauer, Kaplansky, Chevalley,

Goldie, and others. A special feature of the book is the in-depth study of rings with chain condition on annihilator ideals pioneered by Noether, Artin, and Jacobson and refined and extended by many later mathematicians.

Two of the author's prior works, *Algebra: Rings, Modules and Categories, I and II* (Springer-Verlag, 1973), are devoted to the development of modern associative algebra and ring and module theory. Those works serve as a foundation for the present survey, which includes a bibliography of over 1,600 references and is exhaustively indexed.

In addition to the mathematical survey, the author gives candid and descriptive impressions of the last half of the twentieth century in "Part II: Snapshots of Some Mathematical Friends and Places". Beginning with his teachers and fellow graduate students at the University of Kentucky and at Purdue, Faith discusses his Fulbright-Nato Postdoctoral at Heidelberg and at the Institute for Advanced Study (IAS) at Princeton, his year as a visiting scholar at Berkeley, and the many acquaintances he met there and in subsequent travels in India, Europe, and most recently, Barcelona.

Comments on the book:

Researchers in algebra should find it both enjoyable to read and very useful in their work. In all cases, [Faith] cites full references as to the origin and development of the theorem I know of no other work in print which does this as thoroughly and as broadly.

—John O'Neill, *University of Detroit at Mercy*

"Part II: Snapshots of Some Mathematical Friends and Places" is wonderful! [It is] a joy to read! Mathematicians of my age and younger will relish reading "Snapshots".

—James A. Huckaba,
University of Missouri-Columbia

Mathematical Surveys and Monographs, Volume 65;
1999; 420 pages; Hardcover; ISBN 0-8218-0993-8; List \$99;
Individual member \$59; Order code SURV/65MM91

Prospects in Mathematics

Invited Talks on the Occasion of the 250th Anniversary of Princeton University

Hugo Rossi, *Mathematical Sciences Research Institute, Berkeley, CA, Editor*

In celebration of Princeton University's 250th anniversary, the mathematics department held a conference entitled "Prospects in Mathematics". The purpose of the conference was to speculate on future directions of research in mathematics.

This collection of articles provides a rich panorama of current mathematical activity in many research areas. From Gromov's lecture on quantitative differential topology to Witten's discussion of string theory, new ideas and techniques transfixed the audience of international mathematicians. The volume contains 11 articles by leading mathematicians, including historical presentations by J. Milnor and D. Spencer. It provides a guide to some of the most significant mathematical work of the past decade.

Cover picture of Old Fine Hall at Princeton University is courtesy of Robert P. Matthews, Communications Department, Princeton University.
1999; 154 pages; Hardcover; ISBN 0-8218-0975-X; List \$29;
All AMS members \$23; Order code PIMMM91

M-Theory

Edward Witten, *Institute for Advanced Study, Princeton, NJ*



The problem of unifying quantum mechanics and gravity in a single coherent theory represents an enormous obstacle to full understanding of the forces of nature. The mysterious M-theory has emerged as a likely candidate for such a unifying theory. Whether the "M" stands for marvel or matrix, magic or membrane, it is clear that this area of research is among the most exciting and most profound in all of science today. Edward Witten, one of the world's boldest innovators in this field, provides insights into these extraordinary developments in a completely expository presentation. Students and researchers specializing in mathematics and physics will find this lecture especially appealing. However, because it is completely nontechnical, large parts of it can easily be appreciated by viewers with little or no scientific or mathematical training.

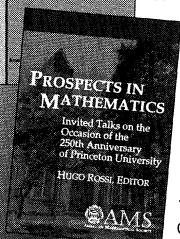
1998; NTSC format on one-half inch VHS videotape, approximately 60 minutes; ISBN 0-8218-1350-1; List \$54.95; Individual member \$34.95; Order code VIDEO/101MM91



AMS

AMERICAN MATHEMATICAL SOCIETY

Rings and Things and a Fine Array of Twentieth Century Associative Algebra
Carl Faith



All prices subject to change. Charges for delivery are \$3.00 per order. For optional air delivery outside of the continental U. S., please include \$6.50 per item. *Prepayment required.*
Order from: **American Mathematical Society**, P. O. Box 5904, Boston, MA 02206-5904, USA. For credit card orders, fax 1-401-455-4046 or call toll free 1-800-321-4AMS (4267) in the U. S. and Canada, 1-401-455-4000 worldwide. Or place your order through the AMS bookstore at www.ams.org/bookstore. Residents of Canada, please include 7% GST.

SPRINGER FOR MATHEMATICS

PAULO RIBENBOIM, Queen's University, Kingston, Ontario, Canada

FERMAT'S LAST THEOREM FOR AMATEURS

In 1995, Andrew Wiles completed a proof of Fermat's last theorem. Although this was certainly a great mathematical feat, one shouldn't dismiss earlier attempts made by clever amateurs and famous mathematicians alike to solve the problems. In this book, aimed at amateurs curious about the unfolding of the subject, the author restricts his attention exclusively to elementary methods which may only have led to partial solutions, but their interest goes beyond Fermat's problem.

1999/APP. 376 PP./HARDCOVER/\$39.95/ISBN 0-387-98508-5

E. KAMERICH, Catholic University of Nijmegen, The Netherlands

A GUIDE TO MAPLE®

This "hands-on" book is for people who are interested in immediately putting Maple to work. The reader is provided with a compact, fast, and surveyable guide that introduces them to the extensive capabilities of the software. The book is sufficient for standard use of Maple and will provide techniques for extending Maple for more specialized work. The author discusses the reliability of results systematically and presents ways of testing questionable results. The book allows a reader to become a user almost immediately and helps him/her to grow gradually to a broader and more proficient use. As a consequence, some subjects are dealt with in an introductory way early in the book, with references to a more detailed discussion later on.

1998/352 PP., 41 ILLUS./HARDCOVER/\$39.95
ISBN 0-387-94116-9

JOE MAZUR, Marlboro College, VT

EXPLORATIONS IN CALCULUS

Explorations in Calculus is a completely self-contained, cross platform CD tutorial package and electronic study guide for students taking calculus at the college or high school level.

Among the many features of the CD are: sounds and animations, text files, examples and exercises, a drawing program, progress checks, feedback, hints to problem solving, and cut and paste and notepad capabilities.

1999/APP. 24 PP., 68 ILLUS./\$37.95 (TENT.)
ISBN 0-387-14249-5
TEXTS IN MATHEMATICAL SCIENCES

Now available bundled with Student Minitab!

ALLAN ROSSMAN, Dickinson College, Carlisle, PA and
BETH L. CHANCE, University of the Pacific, Stockton, CA

WORKSHOP STATISTICS

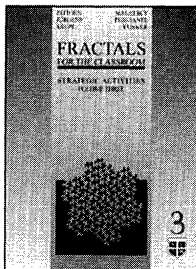
Student Minitab Version

1999/152 PP./SOFTCOVER/\$59.95 (TENT.)
ISBN 0-387-91580-X

HEINZ-OTTO PEITGEN and **HARTMUT JÜRGENS**, both of University of Bremen, Germany, **DIETMAR SAUPE**, University of Freiburg, Germany, **EVAN MALETSKY**, Montclair State University, NJ and **TERRY PERCIANTE**, Wheaton College, IL

FRACTALS FOR THE CLASSROOM STRATEGIC ACTIVITIES

Volume 3



This third and final volume of *Strategic Activities* focuses on fractal images and the mechanisms by which they are formed. The general pattern and specific steps used to construct a fractal image illustrated throughout this volume comprise

an iterated function system. The objective of this volume is to investigate the processes and often surprising results of applying such systems. The contents of this volume joined with the details contained in the prior two books provide a comprehensive survey of fractal geometry and chaos theory. In addition to the notions of this new and emerging discipline, the dynamic nature of the research and the experimental characteristics of related applications provide an engaging paradigm for classroom activity.

Contents: Connections to the Curriculum

- Foreword (by Jana Wallace)
- IFS in Two Dimensions
- IFS and Geometric Genetic Codes
- Answers

1998/APP. 121 PP., 285 ILLUS./SOFTCOVER/\$24.95 (TENT.)
ISBN 0-387-98420-8

Order Today!

Call: 1-800-SPRINGER or **Fax:** (201)-348-4505

Write: Springer-Verlag New York, Inc.,
Dept. S273, PO Box 2485, Secaucus, NJ
07096-2485

Visit: Your local technical bookstore

E-mail: orders@springer-ny.com

Instructors: Call or write for info on textbook exam copies

YOUR 30-DAY RETURN PRIVILEGE
IS ALWAYS GUARANTEED!



Springer

<http://www.springer-ny.com>

