25 YEARS OF PUBLISHING World Scientific
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Algebra & Number Theory
2006/2007

A COURSE IN LINEAR ALGEBRA WITH APPLICATIONS
(2nd Edition)
by **Derek J S Robinson** *(University of Illinois at Urbana-Champaign, USA)*

This is the second edition of the best-selling introduction to linear algebra. Presupposing no knowledge beyond calculus, it provides a thorough treatment of all the basic concepts, such as vector space, linear transformation and inner product. The concept of a quotient space is introduced and related to solutions of linear system of equations, and a simplified treatment of Jordan normal form is given.

Numerous applications of linear algebra are described, including systems of linear recurrence relations, systems of linear differential equations, Markov processes, and the Method of Least Squares. An entirely new chapter on linear programing introduces the reader to the simplex algorithm with emphasis on understanding the theory behind it.

Contents: Matrix Algebra; Systems of Linear Equations; Determinants; Introduction to Vector Spaces; Basis and Dimension; Linear Transformations; Orthogonality in Vector Spaces; Eigenvectors and Eigenvalues; More Advanced Topics; Linear Programing.

Key Features
- Proceeds at a gentle pace, yet provides full proofs
- Includes a new chapter on linear programing

452pp	Sep 2006	
981-270-023-4	US$84	£48
981-270-024-2(pbk)	US$42	£24

THE UNIVERSAL MANDELBROT SET
Beginning of the Story
by **V Dolotin** & **A Morozov** *(ITEP, Russia)*

This book is devoted to the structure of the Mandelbrot set — a remarkable and important feature of modern theoretical physics, related to chaos and fractals and simultaneously to analytical functions, Riemann surfaces, phase transitions and string theory. The Mandelbrot set is one of the bridges connecting the world of chaos and order.

The authors restrict consideration to discrete dynamics of a single variable. This restriction preserves the most essential properties of the subject, but drastically simplifies computer simulations and the mathematical formalism.

The coverage includes a basic description of the structure of the set of orbits and pre-orbits associated with any map of an analytic space into itself. A detailed study of the space of orbits (the algebraic Julia set) as a whole, together with related attributes, is provided. Also covered are: moduli space in the space of maps and the classification problem for analytic maps, the relation of the moduli space to the bifurcations (topology changes) of the set of orbits, a combinatorial description of the moduli space (Mandelbrot and secondary Mandelbrot sets) and the corresponding invariants (discriminants and resultants), and the construction of the universal discriminant of analytic functions in terms of series coefficients. The book concludes by solving the case of the quadratic map using the theory and methods discussed earlier.

Contents: Notions and Notation; Summary; Fragments of Theory; Map $f(x) = X2 + c$: From Standard Example to General Conclusions.

250pp (approx.)	Winter 2006	
981-256-837-9	US$58	£33

HIGHLIGHTS

SELECTED PAPERS OF WANG YUAN
edited by **Wang Yuan**
(Chinese Academy of Sciences, China)
pg **4**

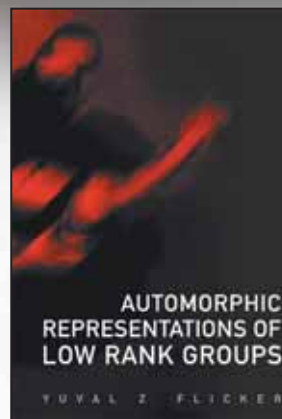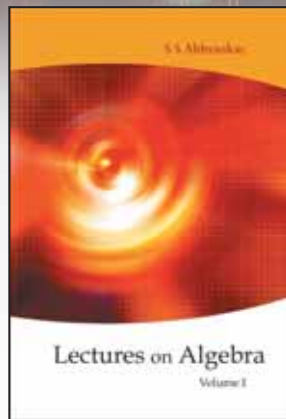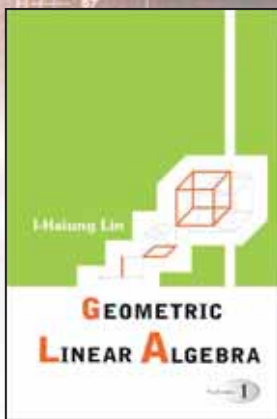**ANALYTIC NUMBER THEORY**
An Introductory Course
by **Paul T Bateman** & **Harold G Diamond**
(University of Illinois at Urbana-Champaign)
pg **5**

GALOIS' THEORY OF ALGEBRAIC EQUATIONS
by **Jean-Pierre Tignol**
(Université Catholique de Louvain, Belgium)
pg **10**

GEOMETRIC LINEAR ALGEBRA

(Volume 1)
by **I-Hsiung Lin** *(National Taiwan Normal University, China)*

This accessible book for beginners uses intuitive geometric concepts to create abstract algebraic theory with a special emphasis on geometric characterizations. The book applies known results to describe various geometries and their invariants, and presents problems concerned with linear algebra, such as in real and complex analysis, differential equations, differentiable manifolds, differential geometry, Markov chains and transformation groups. The clear and inductive approach makes this book unique among existing books on linear algebra both in presentation and in content.

Contents: The Affine and Linear Structures of R1, R2 and R3: The One-Dimensional Real Vector Space R (or R1); The Two-Dimensional Real Vector Space R2; The Three-Dimensional Real Vector Space R3.

Key Features
- Contains over 250 figures and numerous examples and challenging exercises
- Provides intensive applications of eigenvalues to geometric problems
- Almost every algebraic (computational) process is guided by some geometric way of thinking or by the use of   graphics

880pp	Mar 2005	
981-256-087-4	US$98	£60
981-256-132-3(pbk)	US$54	£33

LECTURES ON ALGEBRA

Volume I
by **S S Abhyankar** *(Purdue University, USA)*

This book is a timely survey of much of the algebra developed during the last several centuries including its applications to algebraic geometry and its potential use in geometric modeling.

The present volume makes an ideal textbook for an abstract algebra course, while the forthcoming sequel, Lectures on Algebra II, will serve as a textbook for a linear algebra course. The author's fondness for algebraic geometry shows up in both volumes, and his recent preoccupation with the applications of group theory to the calculation of Galois groups is evident in the second volume which contains more local rings and more algebraic geometry. Both books are based on the author's lectures at Purdue University over the last few years.

Contents: Quadratic Equations; Curves and Surfaces; Tangents and Polars; Varieties and Models; Projective Varieties; Pause and Refresh.

Key Features
- A self-contained survey of the field
- The first three lectures constitute a booklet for a basic abstract algebra course
- The fourth lecture is a booklet on commutative algebra

756pp	Jul 2006	
981-256-826-3	US$88	£51

AUTOMORPHIC REPRESENTATIONS OF LOW RANK GROUPS

by **Yuval Z Flicke**r *(The Ohio State University, USA)*

The book develops the technique of comparison of twisted and stabilized trace formulae and considers the "Fundamental Lemma" on orbital integrals of spherical functions. Comparison of trace formulae is simplified using "regular" functions and the "lifting" is stated and proved by means of character relations.

This permits an intrinsic definition of partition of the automorphic representations of SL(2) into packets, and a definition of packets for U(3), a proof of multiplicity one theorem and rigidity theorem for SL(2) and for U(3), a determination of the self-contragredient representations of PGL(3) and those on GL(3, E) fixed by transpose-inverse-bar. In particular, the multiplicity one theorem is new and recent.

Contents: On the Symmetric Square Lifting: Functoriality and Norms; Orbital Integrals; Twisted Trace Formula; Total Global Comparison; Applications of a Trace Formula; Computation of a Twisted Character; Automorphic Representations of the Unitary Group U(3, E/F): Local Theory; Trace Formula; Liftings and Packets; Zeta Functions of Shimura Varieties of U(3): Automorphic Representations; Local Terms; Real Representations; Galois Representations.

Key Features
- Deals with the simplest testing-ground cases of a principal method in the confluence of contemporary number theory, representation theory, and arithmetic geometry
- A unified presentation — not just a collection of reprints — by an expert, and in many cases the originator, of the subject matter
- Accessible to students, yet of interest to experts
- Derives most of the important results through simpler techniques than often used in the area
- Fully updated to include significant new research

500pp	Jun 2006	
981-256-803-4	US$87	£50

CONTINUED FRACTIONS

by **Doug Hensley** *(Texas A&M University, USA)*

The Euclidean algorithm is one of the oldest in mathematics, while the study of continued fractions as tools of approximation goes back at least to Euler and Legendre. While our understanding of continued fractions and related methods for simultaneous diophantine approximation has burgeoned over the course of the past decade and more, many of the results have not been brought together in book form. Continued fractions have been studied from the perspective of number theory, complex analysis, ergodic theory, dynamic processes, analysis of algorithms, and even theoretical physics, which has further complicated the situation.

This book places special emphasis on continued fraction Cantor sets and the Hausdorff dimension, algorithms and analysis of algorithms, and multi-dimensional algorithms for simultaneous diophantine approximation. Extensive, attractive computer-generated graphics are presented, and the underlying algorithms are discussed and made available.

Contents: Generalizations of the gcd and the Euclidean Algorithm; Continued Fractions with Small Partial Quotients; Ergodic Theory; Complex Continued Fractions; Multidimensional Diophantine Approximation; Powers of an Algebraic Integer; Marshall Hall's Theorem; Functional-Analytic Techniques; The Generating Function Method; Conformal Iterated Function Systems; Convergence of Continued Fractions.

260pp   Mar 2006
981-256-477-2   US$78   £45

STRUCTURE OF HILBERT SPACE OPERATORS

by **Chunlan Jiang** *(Hebei Normal University, China)* & **Zongyao Wang** *(East China University of Science and Technology, China)*

This book exposes the internal structure of non-self-adjoint operators acting on complex separable infinite dimensional Hilbert space, by analyzing and studying the commutant of operators. A unique presentation of the theorem of Cowen–Douglas operators is given. The authors take the strongly irreducible operator as a basic model, and find complete similarity invariants of Cowen–Douglas operators by using K-theory, complex geometry and operator algebra tools.

Contents: Jordan Standard Theorem and K0-Group; Approximate Jordan Theorem of Operators; Unitary Invariant and Similarity Invariant of Operators; The Similarity Invariant of Cowen–Douglas Operators; Some Other Results About Operator Structure.

Key Features
- Explores the frontiers of the subject through a unified treatment and organization reach the frontier of this subject
- Accessible to postgraduate students armed with the basics of operator theory and operator algebras

260pp   Mar 2006
981-256-616-3   US$58   £33

Series on Number Theory and Its Applications – Vol. 1

ARITHMETIC GEOMETRY AND NUMBER THEORY

edited by **Lin Weng** *(Kyushu University, Japan)* & **Iku Nakamura** *(Hokkaido University, Japan)*

This invaluable collection brings the reader to the frontier of current developments in arithmetic geometry and number theory through the works of Deninger–Werner in vector bundles on curves over p-adic fields; of Jiang on local gamma factors in automorphic representations; of Weng on Deligne pairings and Takhtajan–Zograf metrics; of Yoshida on CM-periods; of Yu on transcendence of special values of zetas over finite fields. In addition, the lecture notes presented by Weng at the University of Toronto from October to November 2005 explain basic ideas and the reasons (not just the language and conclusions) behind Langlands' fundamental, yet notably difficult, works on the Eisenstein series and spectral decompositions.

And finally, a brand new concept by Weng called the Geometric Arithmetic program that uses algebraic and/or analytic methods, based on geometric considerations, to develop the promising and yet to be cultivated land of global arithmetic that includes non-abelian Class Field Theory, Riemann Hypothesis and non-abelian Zeta and L Functions, etc.

Contents: On Local g-Factors (D H Jiang); Deligne Pairings over Moduli Spaces of Punctured Riemann Surfaces (K Obitsu et al.); Vector Bundles on Curves over Cp (A Werner); Absolute CM-periods — Complex and p-Adic (H Yoshida); Special Zeta Values in Positive Characteristic (J Yu); Automorphic Forms, Eisenstein Series and Spectral Decompositions (L Weng); Geometric Arithmetic: A Program (L Weng).

412pp   Jun 2006
981-256-814-X   US$64   £37

INTERNATIONAL JOURNAL OF NUMBER THEORY (IJNT)

www.worldscinet.com/ijnt/ijnt.shtml

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Michel Waldschmidt *(Université Pierre et Marie Curie)*

Top Accessed Articles

Elliptic Functions And The Quintuple, Hirschhorn and Winquist Product Identities
Heng Huat Chan *(National University of Singapore, Singapore)*, **Zhi-Guo Liu** *(East China Normal University, China)* & **Say Tiong Ng** *(National University of Singapore, Singapore)*

On Perfect Powers In Lucas Sequences
Yann Bugeaud *(Université Louis Pasteur, France)*, **Florian Luca** *(Universidad Nacional Autónoma de México, México)*, **Maurice Mignotte** *(Université Louis Pasteur, France)* & **Samir Siksek** *(University of Warwick, Coventry, United Kingdom)*

On A Problem Of Carlitz
Ioulia Baoulina *(The Institute of Mathematical Sciences, CIT Campus, India)*

On a Certain General Exponential Sum
H. Maier *(University of Ulm, Germany)* & **A. Sankaranarayanan** *(School of Mathematics, TIFR, India)*

Local Monodromy Of P-adic Differential Equations: An Overview
Kiran S. Kedlaya *(Massachusetts Institute of Technology, USA)*

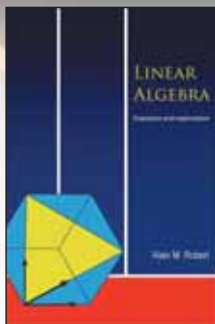# LINEAR ALGEBRA
Examples and Applications
by **Alain M Robert** (*Université de Neuchâtel, Switzerland*)

"I found several interesting and unusual problems that I'll probably use in exams ... I recommend this book as supplementary reading for anyone interested in Linear Algebra, specially students looking for a change from their textbook. Instructors will find here some interesting material that they can use in class and in exams. I did."

MAA Online Book Review

"I recommend this book as a reference for teachers who need to find interesting examples that would motivate the study of Linear Algebra."

Professor Heng Huat Chan
National University of Singapore

This short but rigorous book approaches the main ideas of linear algebra through carefully selected examples and relevant applications. It is intended for students with various interests in mathematics, as well as established scientists seeking to refresh their basic mathematical culture.

Key Features
• Includes some humorous sketches pinpointing key concepts
• Discusses infinite bases in a neat way via illuminating examples
• In an appendix on probability theory, linear independence and independence for random variables are compared

388pp	Aug 2005	
981-256-432-2	US$67	£39
981-256-499-3(pbk)	US$36	£21

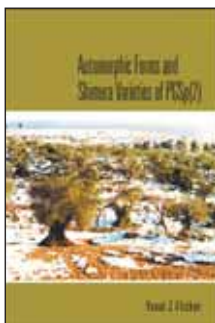# AUTOMORPHIC FORMS AND SHIMURA VARIETIES OF PGSp(2)
by **Yuval Z Flicker** (*The Ohio State University, USA*)

The area of automorphic representations is a natural continuation of studies in the 19th and 20th centuries on number theory and modular forms. A guiding principle is a reciprocity law relating infinite dimensional automorphic representations with finite dimensional Galois representations. Simple relations on the Galois side reflect deep relations on the automorphic side, called "liftings." This in-depth book concentrates on an initial example of the lifting, from a rank 2 symplectic group $PGSp(2)$ to $PGL(4)$, reflecting the natural embedding of $Sp(2,\mathbb{C})$ in $SL(4,\mathbb{C})$. It develops the technique of comparing twisted and stabilized trace formulae. It gives a detailed classification of the automorphic and admissible representation of the rank two symplectic $PGSp(2)$ by means of a definition of packets and quasi-packets, using character relations and trace formulae identities. It also shows multiplicity one and rigidity theorems for the discrete spectrum.

Applications include the study of the decomposition of the cohomology of an associated Shimura variety, thereby linking Galois representations to geometric automorphic representations.
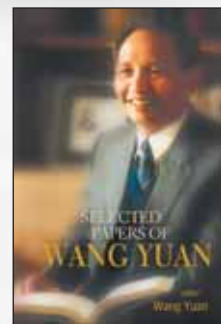
Contents: Lifting Automorphic Forms of PGSp(2) to PGL(4): Basic Facts; Trace Formulae; Lifting from SO(4) to PGL(4); Lifting from PGSp(2) to PGL(4); Fundamental Lemma; Zeta Functions of Shimura Varieties of PGSp(2): Automorphic Representations; Local Terms; Real Representations; Galois Representations; Background: On Automorphic Forms; On Artin's Conjecture.

340pp	Aug 2005	
981-256-403-9	US$66	£38

SELECTED PAPERS OF WANG YUAN
edited by **Wang Yuan** (*Chinese Academy of Sciences, China*)

This volume presents a comprehensive collection of Wang Yuan's original important papers which are not available elsewhere, since the majority of the papers were published in China.

Covering both pure number theory and applied mathematics, this book is important for understanding Wang Yuan's academic career and also the development of Chinese mathematics in recent years, since Wang Yuan's work has a wide-ranging influence in China.

Wang Yuan is a professor and academician of the Chinese Academy of Sciences. He received his honorable Doctorship from Hong Kong Baptist University. He has published 70 papers and ten books.

Contents: Number Theory: On Some Properties of Integral Valued Polynomials; On Sieve Methods and Some of Their Applications; On the Estimation of Character Sum and Its Applications; Diophantine Inequalities for Forms in and Algebraic Number Field; Small Solutions of Congruences; Numerical Analysis and Statistics: A Note on Interpolation of a Certain Class of Functions; On Numerical Integration of Periodic Functions of Several Variables; A Note on Uniform Distribution and Experimental Design; Number Theoretic Method in Applied Statistics; Uniform Design of Experiments with Mixtures; and other papers.

512pp	Jun 2005	
981-256-197-8	US$105	£64

ALGEBRA COLLOQUIUM (AC)

www.worldscinet.com/ac/ac.shtml

Editor-in-Chief
Zhexian Wan
(Chinese Academy of Sciences, China)

Managing Editor
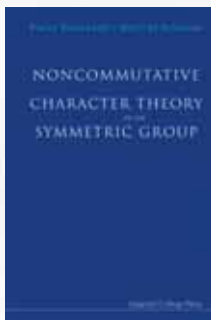**Zhongming Tang** *(Suzhou University, China)*

Aims & Scope
Algebra Colloquium is an international mathematical journal founded at the beginning of 1994. It is edited by the Academy of Mathematics & Systems Science, Chinese Academy of Sciences, jointly with Suzhou University, and published quarterly in English in every March, June, September and December. Algebra Colloquium carries original research articles of high level in the field of pure and applied algebra. Original papers from related areas, which have applications to algebra, are also published. This journal reflects the latest developments in algebra and promotes international academic exchanges.

NONCOMMUTATIVE CHARACTER THEORY OF THE SYMMETRIC GROUP

by **Dieter Blessenohl** *(Christian-Albrechts-Universität Kiel, Germany)* & **Manfred Schocker** *(University of Wales Swansea, UK)*

A new approach to the character theory of the symmetric group has been developed during the past fifteen years which is in many ways more efficient, more transparent, and more elementary. In this approach, to each permutation is assigned a class function of the corresponding symmetric group. Problems in character theory can thereby be transferred into a completely different setting and reduced to combinatorial problems on permutations in a natural and uniform way.

This is the first account in book form entirely devoted to the new "noncommutative method". As a modern and comprehensive survey of the classical theory the book contains such fundamental results as the Murnaghan–Nakayama and Littlewood–Richardson rules as well as more recent applications in enumerative combinatorics and in the theory of the free Lie algebra. But it is also an introduction to the vibrant theory of certain combinatorial Hopf algebras such as the Malvenuto–Reutenauer algebra of permutations.
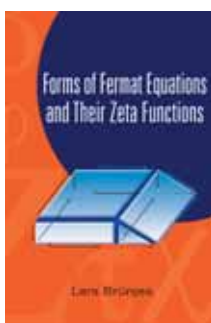
Key Features
- A new uniform and transparent approach at undergraduate level to character theory of the symmetric group
- First account of the material in book form
- Introduction to the Malvenuto–Reutenauer algebra of permutations and related combinatorial Hopf algebras
- A new detailed and complete treatment of the Robinson–Schensted correspondence including the results of Schützenberger, Knuth and Greene

184pp   Jan 2005
1-86094-511-2   US$48   £29

FORMS OF FERMAT EQUATIONS AND THEIR ZETA FUNCTIONS

by **Lars Brünjes** *(University of Regensburg, Germany)*

In this volume, an abstract theory of 'forms' is developed, thus providing a conceptually satisfying framework for the classification of forms of Fermat equations. The classical results on diagonal forms are extended to the broader class of all forms of Fermat varieties.

The main topic is the study of forms of the Fermat equation over an arbitrary field K. Using Galois descent, all such forms are classified; particularly, a complete and explicit classification of all cubic binary equations is given. If K is a finite field containing the d-th roots of unity, the Galois representation on l-adic cohomology (and so in particular the zeta function) of the hypersurface associated with an arbitrary form of the Fermat equation of degree d is computed.
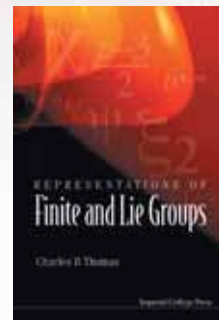
Key Features
- Detailed proofs with many diagrams
- Self-contained, assuming only basic knowledge of commutative algebra and algebraic geometry, including needed facts on I-adic cohomology and varieties over finite fields
- Application of modern theory (l-adic cohomology) to a 'down-to-earth' problem (counting solutions of equations), thereby combining the abstract with the concrete and demonstrating how to use the machinery of modern arithmetic geometry to answer elementary questions

248pp   Oct 2004
981-256-039-4   US$60   £37

REPRESENTATIONS OF FINITE AND LIE GROUPS

by **Charles B Thomas** *(University of Cambridge, UK)*

This book provides an introduction to representations of both finite and compact groups. The proofs of the basic results are given for the finite case, but are so phrased as to hold without change for compact topological groups with an invariant integral replacing the sum over the group elements as an averaging tool. Among the topics covered are the relation between representations and characters, the construction of irreducible representations, induced representations and Frobenius reciprocity. Special emphasis is given to exterior powers, with the symmetric group Sn as an illustrative example. The book concludes with a chapter comparing the representations of the finite group $SL_2(p)$ and the non-compact Lie group $SL_2(\mathbb{R})$.

Contents: Basic Representation Theory-I; Induced Representations and Their Characters; Multilinear Algebra and l-rings; Representations of Compact Groups; Lie Groups and Algebras; $SL_2(p)$ and $SL_2(\mathbb{R})$.

156pp   Oct 2004
1-86094-482-5   US$48   £29
1-86094-484-1(pbk)   US$28   £17
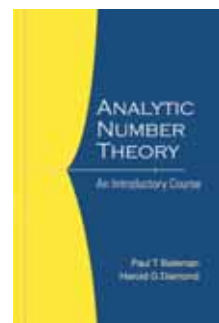

ANALYTIC NUMBER THEORY
An Introductory Course
by **Paul T Bateman** & **Harold G Diamond** *(University of Illinois at Urbana-Champaign)*

"This book also includes a nice introduction to sieve methods ... Overall, this is a nice well-written book with plenty of material for a one-year graduate course. It would also make nice supplementary reading for a student or researcher learning the subject."
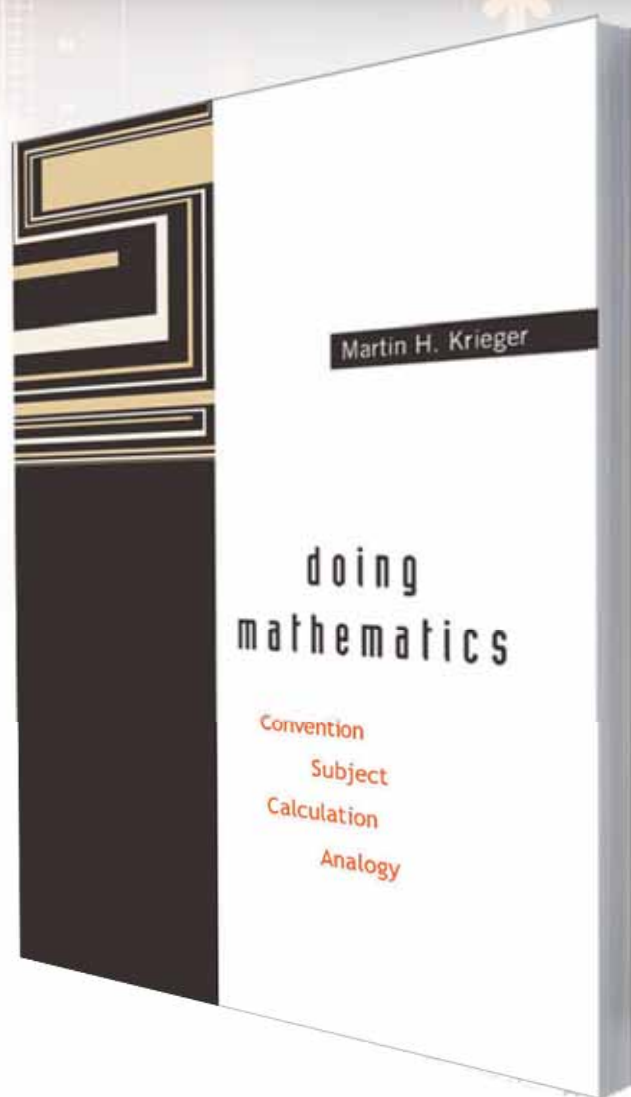**MAA Online Book Review**

"This is a nice introductory book on analytic number theory for students or readers with some background in real analysis, complex analysis, number theory and abstract algebra … There are various exercises throughout the entire book. Moreover, at the end of each chapter, historical backgrounds and developments of each particular subject or theorem are given together with references."
Mathematical Reviews

This valuable book focuses on a collection of powerful methods of analysis that yield deep number-theoretical estimates. Particular attention is given to counting functions of prime numbers and multiplicative arithmetic functions. Both real variable ("elementary") and complex variable ("analytic") methods are employed.

376pp   Sept 2004
981-238-938-5   US$78   £48
981-256-080-7(pbk)   US$42   £26

DOING MATHEMATICS
Convention, Subject, Calculation, Analogy
by **Martin H Krieger** *(University of Southern California, USA)*

"Both challenging and provocative reading, Doing Mathematics sheds bright light on some of the main characteristics of the mathematical quest."
Library of Science

"Krieger has made some effort to accommodate different levels of readers, for example structuring his text so that lay readers are alerted to sections that can be safely skipped and paragraphs that provide nontechnical summaries."
Mathematical Association of America

"The book Doing Mathematics by Martin Krieger is truly a masterpiece. He has not only explained ways of doing mathematical work to the aspiring mathematicians and the intelligent laymen, but also shown how the various pieces of research work are related to each other. Even experts may not have realized such inter-relations. The cases studied include especially the stability of matter and the Ising model, two topics of great depth. Such clear explanations cannot be found anywhere else. Furthermore, his style of writing makes the book exceptionally enjoyable to read."
T T Wu
Gordon Mckay Professor of Applied Physics & Professor of Physics

"This is the first time I have seen a mathematician deal substantively with the issue of mathematics as culturally based, and he does it superbly and mathematically ... Although this book is no easy read, it is well worth the effort, and I am sure it will stimulate and inform, perhaps even surprise, the most sophisticated of mathematical readers. It is refreshing to find such a book being published."
Mathematical Reviews

This book discusses some ways of doing mathematical work and the subject matter that is being worked upon and created. It argues that the conventions we adopt, the subject areas we delimit, what we can prove and calculate about the physical world, and the analogies that work for mathematicians — all depend on mathematics, what will work out and what won't. And the mathematics, as it is done, is shaped and supported, or not, by convention, subject matter, calculation, and analogy. The cases studied include the central limit theorem of statistics, the sound of the shape of a drum, the connection between algebra and topology, the stability of matter, the Ising model, and the Langlands Program in number theory and representation theory.

Contents: Convention: How Means and Variances are Entrenched as Statistics; Subject: The Fields of Topology; Appendix: The Two-Dimensional Ising Model of a Ferromagnet; Calculation: Strategy, Structure, and Tactics in Applying Classical Analysis; Analogy: A Syzygy Between a Research Program in Mathematics and a Research Program in Physics; In Concreto: The City of Mathematics.

About the Author

Martin Krieger has taught at the University of California (Berkeley), the University of Minnesota (Twin Cities), MIT, and the University of Michigan (Ann Arbor). He has been a fellow at the Center for Advanced Study in the Behavioral Sciences and at the National Humanities Center. He is professor of planning at the University of Southern California. Professor Krieger was trained as physicist.

Professor Krieger's earlier books include Marginalism and Discontinuity, Tools for the Crafts of Knowledge and Decision (1989), Doing Physics, How Physicists Take Hold of the World (1992), and Constitutions of Matter, Mathematically Modeling the Most Everyday of Physical Phenomena (1996).

Doing Mathematics is a Library of Science selection.

AN INTRODUCTION TO COMMUTATIVE ALGEBRA
From the Viewpoint of Normalization
by **Huishi Li** *(Jiaying University, China)*

"The text comes complete with useful examples and exercises ... the student will appreciate this enthusiastic account of core classical topics at the heart of commutative algebra."

Mathematical Reviews

Designed for a one-semester course in mathematics, this textbook presents a concise and practical introduction to commutative algebra in terms of normal (normalized) structure. It shows how the nature of commutative algebra has been used by both number theory and algebraic geometry. Many worked examples and a number of problem (with hints) can be found in the volume. It is also a convenient reference for researchers who use basic commutative algebra.

Contents: Local Rings, DVRs, and Localization; Integral Extensions and Normalization; The Ring A_K in $K = Q(\mu)$; Algebraic Geometry.

188pp   Aug 2004
981-238-951-2   US$46   £28

FUNCTION FIELD ARITHMETIC
by **Dinesh S Thakur** *(University of Arizona, USA)*

"It is dense with mathematics, but there is also motivation and discussion. The overall feeling is that of a very helpful survey of a very interesting field."

MAA Online Book Review

"Thakur's book is a welcome addition to the collection of books on the arithmetic of Drinfel'd modules and objects related to them. Written by an expert in the field, the book's style is generally informal, without compromising rigor. It certainly will be useful to graduate students wishing to pursue research in the area of function fields, and at the same time it can be used as a reference book. Many of the important results on special values and transcendence are due to Thakur himself, so in many places the reader gets the 'insider's look' on the subject, and sees how the ideas which go into the proofs were gradually developed."

Mathematical Reviews

"Thakur's book is a valuable contribution to the theory of arithmetic function fields ... The author has included several interesting examples and discusses many open problems."

Zentralblatt MATH

Contents: Number Fields and Function Fields; Drinfeld Modules; Explicit Class Field Theory; Gauss Sums and Gamma Functions; Zeta Functions; Higher Rank Theory; Higher Dimensions and Geometric Tools; Applications to Gauss Sums, Gamma and Zeta Values; Diophantine Approximation; Transcendence Results; Automata and Algebraicity: Applications.

404pp   Jun 2004
981-238-839-7   US$92   £56

Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore – Vol. 2

REPRESENTATIONS OF REAL AND p-ADIC GROUPS
edited by **Eng-Chye Tan** & **Chen-Bo Zhu** *(National University of Singapore, Singapore)*

The Institute for Mathematical Sciences at the National University of Singapore hosted a research program on "Representation Theory of Lie Groups" from July 2002 to January 2003. As part of the program, tutorials for graduate students and junior researchers were given by leading experts in the field.

This invaluable volume collects the expanded lecture notes of those tutorials. The topics covered include uncertainty principles for locally compact abelian groups, fundamentals of representations of p-adic groups, the Harish–Chandra–Howe local character expansion, classification of the square-integrable representations modulo cuspidal data, Dirac cohomology and Vogan's conjecture, multiplicity-free actions and Schur–Weyl–Howe duality.

Contents: Three Uncertainty Principles for an Abelian Locally Compact Group (T Przebinda); Lectures on Representations of p-Adic Groups (G Savin); Lectures on Harmonic Analysis for Reductive p-Adic Groups (S DeBacker); On Classification of Some Classes of Irreducible Representations of Classical Groups (M Tadiæ); Dirac Operators in Representation Theory (J-S Huang & P Pandžiæ); On Multiplicity-Free Actions (C Benson & G Ratcliff); Multiplicity-Free Spaces and Schur–Weyl–Howe Duality (R Goodman).

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Mathematical Reviews

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In this book, ultrametric Banach algebras are studied with the help of topological considerations, properties from affinoid algebras, and circular filters which characterize absolute values on polynomials and make a nice tree structure. The Shilov boundary does exist for normed ultrametric algebras.

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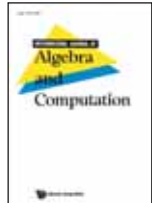
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Top Accessed Articles
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Luis Ribes *(Carleton University, Canada)* & **Pavel Zalesskii** *(Universidade de Brasilia, Brazil)*

Abstract
Let C be a nonempty class of finite groups closed under taking subgroups, quotients and extensions. We consider groups G endowed with their pro-C topology, and say that G is 2-subgroup separable if whenever H and K are finitely generated closed subgroups of G, then the subset HK is closed. We prove that if the groups G1 and G2 are 2-subgroup separable, then so is their free product G1*G2. This extends a result to T. Coulbois. The proof uses actions of groups on abstract and profinite trees.

Universal Cellular Automaton Over A Hexagonal Tiling With 3 States
A. Gajardo & **E. Goles** *(Universidad de Chile, Chile)*

Abstract
A universal three-state three-neighbor cellular automaton will be constructed. The space selected for this cellular automaton is a hexagonal tiling where the cells are in the vertices and the neighbors are the three nearest cells. We define the local transition rule as well as the basic elements that will aid to build digital circuits and, by the way, prove the universality of this cellular automaton. The local transition rule is defined to be isotropic.

Unavoidable And Almost Unavoidable Sets Of Words
Jason P. Bell *(Simon Fraser University, Canada)*

Abstract
A set of words over a finite alphabet is called an unavoidable set if every word of sufficiently long length must contain some word from this set as a subword. Motivated by a theorem from automata theory, we introduce the notion of an almost unavoidable set and prove certain asymptotic estimates for the size of almost unavoidable sets of uniform length.

GALOIS' THEORY OF ALGEBRAIC EQUATIONS

by **Jean-Pierre Tignol** *(Université Catholique de Louvain, Belgium)*

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"… it is indeed a methodological masterpiece within the vast existing literature on this subject … this work is a very welcome addition to the ample literature on classical Galois theory, especially so from the viewpoints of culture, history, and methodology in mathematical science. The author has done a great service to the entire mathematical community."

Mathematics Abstracts

"Jean-Pierre Tignol has written a marvelous book. Anyone who wants to learn about the history and methodology of the centuries-long effort to solve algebraic equations should study it carefully. Not only does the author provide a detailed history of the struggles to solve equations, but at each stage he provides enough of the mathematical content so that the mathematically sophisticated reader can actually learn the details of the various solution procedures."
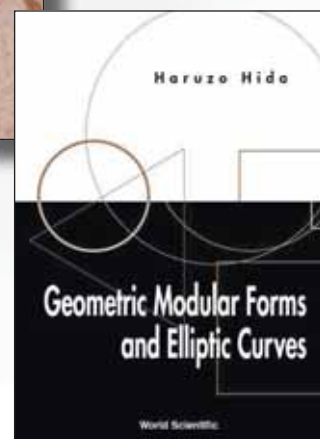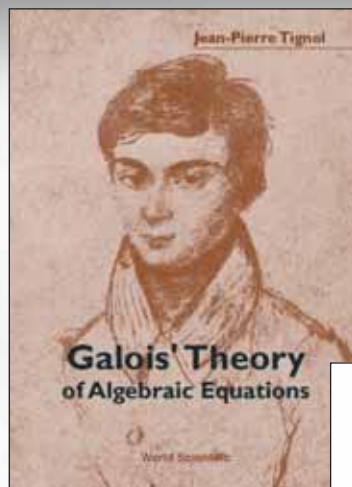
Mathematical Reviews

"A pleasant feature is the use of modern notation and terminology to explain the original ideas of Cardano, Viète, Descartes, Newton, Lagrange, Waring, Gauss, Ruffini, Abel, Galois, etc., making the book accessible to any undergraduate student of mathematics, and to any mathematician interested in the historical development of mathematical ideas."

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Galois' Theory of Algebraic Equations gives a detailed account of the development of the theory of algebraic equations, from its origins in ancient times to its completion by Galois in the nineteenth century. The main emphasis is placed on equations of at least the third degree, i.e. on the developments during the period from the sixteenth to the nineteenth century. The appropriate parts of works by Cardano, Lagrange, Vandermonde, Gauss, Abel and Galois are reviewed and placed in their historical perspective, with the aim of conveying to the reader a sense of the way in which the theory of algebraic equations has evolved and has led to such basic mathematical notions as "group" and "field". A brief discussion on the fundamental theorems of modern Galois theory is included. Complete proofs of the quoted results are provided, but the material has been organized in such a way that the most technical details can be skipped by readers who are interested primarily in a broad survey of the theory.

This book will appeal to both undergraduate and graduate students in mathematics and the history of science, and also to teachers and mathematicians who wish to obtain a historical perspective of the field. The text has been designed to be self-contained, but some familiarity with basic mathematical structures and with some elementary notions of linear algebra is desirable for a good understanding of the technical discussions in the later chapters.

Contents: Quadratic Equations; Cubic Equations; Quartic Equations; The Creation of Polynomials; A Modern Approach to Polynomials; Alternative Methods for Cubic and Quartic Equations; Roots of Unity; Symmetric Functions; The Fundamental Theorem of Algebra; Lagrange; Vandermande; Gauss on Cyclotomic Equations; Ruffini and Abel on General Equations; Galois.

348pp Apr 2001
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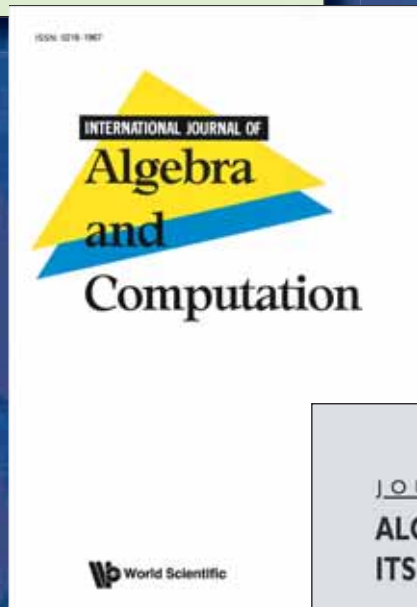
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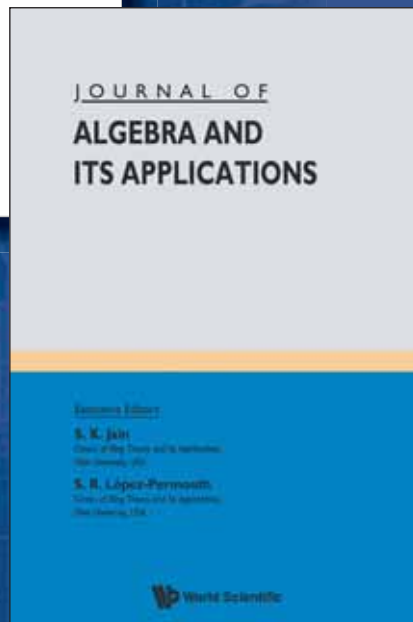
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