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## BULLETIN BIBLIOGRAPHIQUE

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G.W. STEWART. — **Afternotes on numerical analysis.** — A series of lectures on elementary numerical analysis presented at the University of Maryland at College Park and recorded after the fact. — Un vol. broché,  $18 \times 25,5$ , de x, 200 p. — Prix: US\$29.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1996.

This book presents the central ideas of modern numerical analysis in a vivid and straightforward fashion with a minimum of fuss and formality. Stewart designed this volume while teaching an upper-division course in introductory numerical analysis. To clarify what he was teaching, he wrote down each lecture immediately after it was given. Simple examples are used to introduce each topic, then the author quickly moves on to the discussion of important methods and techniques.

V.V. PRASOLOV, A.B. SOSSINSKY. — **Knots, links, braids and 3-manifolds: an introduction to the new invariants in low-dimensional topology.** — Translations of mathematical monographs, vol. 154. — Un vol. relié,  $18 \times 26$ , de viii, 239 p. — Prix: US\$76.00. — American Mathematical Society, Providence R.I., 1997.

This book is primarily an elementary introduction to the remarkable work of Vaughan Jones and Victor Vassiliev on knot and link invariants and its more recent modifications and generalizations, including a mathematical treatment of the Jones-Witten invariants. It may also be viewed as an introduction to some of the most attractive geometric aspects of three-dimensional topology including braid theory, surgery of 3-manifolds, and branched coverings.

*Contents:* Knots, links, and ribbons. Knot and link invariants. Braids. 3-manifolds. Homeomorphisms of surfaces. Surgery of 3-manifolds. Branched coverings. Skein invariants of 3-manifolds. Invariants of links in 3-manifolds.

**Handbook of logic and language.** — Edited by Johan van Benthem, Alice ter Meulen. — Un vol. relié,  $17 \times 25$ , de xix, 1247 p. — Prix: US\$178.25. — North-Holland, Amsterdam, The MIT Press, Cambridge, MA, 1997.

This Handbook documents the main trends in current research between logic and language, including its broader influence in computer science, linguistic theory and cognitive science. This appears to be the first Handbook to bring logic-language interface to the fore. Both aspects of the interaction between logic and language are demonstrated in the book i.e. firstly, how logical systems are designed and modified in response to linguistic needs and secondly, how mathematical theory arises in this process and how it affects subsequent linguistic theory. The Handbook presents concise, impartial accounts of the topics covered. Where possible, an author and a commentator have cooperated to ensure the proper breadth and technical content of the papers. The handbook is self-contained, and individual articles are of the highest quality.

S. Neil RASBAND. — **Chaotic dynamics of nonlinear systems.** — Wiley professional paperback series. — A Wiley-Interscience publication. — Un vol. broché, 15,5 × 23,5, de x, 230 p. — Prix: US\$47.50. — J. Wiley, New York, 1990.

Chaos is a young science, and only in recent years have its important examples become well understood and its methods well developed and standardized. This volume presents the major models for the transitions to chaos exhibited by dynamic systems. Rasband introduces the “classical” topics and examples that have emerged as fundamental to the discipline. The most important routes to chaos are described in a unified framework and supported by integrated problem sets. This book is an accessible introduction to the theory, techniques, and applications of chaos for researchers as well as teachers and students of physics, mathematics, and engineering.

Dirk HACHENBERGER. — **Finite fields: normal bases and completely free elements.** — The Kluwer international series in engineering and computer science. — Un vol. relié, 16 × 24, de xii, 171 p. — Prix: Dfl. 165.00. — Kluwer Academic Publishers, Boston, 1997.

The central topic of the book is the famous normal basis theorem, a classical result from field theory. The main problems considered in the present work are the characterization, the enumeration, and the explicit construction of completely free elements in arbitrary finite dimensional extensions over finite fields. Up to now, there is no work done stating whether the universal property of a completely free element can be used to accelerate arithmetic computations in finite fields. However, the search for such elements leads to a deeper insight of the structure of finite fields. Therefore, the present work belongs to constructive algebra and constitutes a contribution to the theory of finite fields.

Calvin D. AHLBRANDT and Allan C. PETERSON. — **Discrete Hamiltonian systems: difference equations, continued fractions, and Riccati equations.** — Kluwer texts in the mathematical sciences, vol. 16. — Un vol. relié, 16 × 24,5, de xiv, 374 p. — Prix: Dfl. 270.00. — Kluwer Academic Publishers, Dordrecht, 1996.

This book explores several aspects of discrete Hamiltonian systems. It is unique in that it provides interconnections between symplectic systems, recessive and dominant solutions, various discrete Riccati equations, and continued fraction representations of solutions of Riccati equations. It also presents variable step size discrete variational theory, a discrete Legendre transformation from discrete Euler-Lagrange equations to discrete Hamiltonian systems.

Saul STAHL. — **Introductory modern algebra: a historical approach.** — Un vol. relié, 16,5 × 24,5, de xii, 322 p. — Prix: US\$ 69.50. — John Wiley, New York, 1997.

Much of modern algebra has its roots in the solvability of equations by radicals. Most introductory modern algebra texts, however, tend to employ an axiomatic strategy, beginning with abstract groups and ending with fields, while ignoring the issue of solvability. This book, by contrast, traces the historical development of modern algebra from the Renaissance solution of the cubic equation to Galois's expositions of his major ideas.

Jean-Pierre LAFON. — **Algèbre: exercices et problèmes corrigés.** — Collection Livrets d'exercices. — Un vol. broché, 13 × 19, de 123 p. — Prix: FF 58.00. — Hermann, Paris, 1997.

Destiné aux étudiants en licence de mathématiques comme aux candidats à l'agrégation et aux élèves des classes préparatoires, cet ouvrage traite des théories des groupes, anneaux, modules et corps. Des problèmes de cours sans démonstration sont suivis de questions, d'exercices, de problèmes et de nombreux corrigés.

Jean-Pierre LAFON. — **Équations algébriques: exercices et problèmes corrigés.** — Collection Livrets d'exercices. — Un vol. broché,  $13 \times 19$ , de 121 p. — Prix: FF 58.00. — Hermann, Paris, 1997.

En complément à *Algèbre* de la même collection, ce livre traite des équations algébriques à une ou plusieurs inconnues et des premiers éléments de géométrie algébrique, de théorie algébrique des nombres et d'algèbre commutative. Des rappels de cours sans démonstration sont suivis de questions, d'exercices, de problèmes et de nombreux corrigés.

André GRAMAIN. — **Géométrie élémentaire.** — Collection Méthodes. — Un vol. broché,  $15 \times 22$ , de x, 262 p. — Prix: FF 160.00. — Hermann, Paris, 1997.

Les méthodes mises en jeu sont celles de l'algèbre linéaire, de la géométrie analytique et de la géométrie des transformations. L'approche n'est pas celle de la géométrie axiomatique: le cadre choisi est celui des espaces vectoriels réels. L'algèbre linéaire élémentaire étant supposée acquise, le produit scalaire usuel et le groupe orthogonal sont introduits et étudiés en détail en dimensions deux et trois. La géométrie affine est étudiée dans le même cadre. La géométrie projective est abordée en suivant le fil conducteur des coordonnées homogènes. Les méthodes analytiques de la géométrie cartésienne sont utilisées progressivement dans l'esprit d'une initiation d'usagers peu experts.

Michel CRITON. — **Les jeux mathématiques.** — Que sais-je, vol. 3220. — Un vol. broché,  $11,5 \times 17,5$ , de 126 p. — Presses Universitaires de France, Paris, 1997.

Le but de cet essai est de mettre l'accent sur un loisir de l'esprit ignoré du plus grand nombre, mais riche d'une très longue tradition qui se perpétue depuis presque quatre millénaires: celles des divertissements à caractère mathématique ou logique. Pour l'amateur de jeux mathématiques, peu importe que le problème soit profond ou superficiel, seul compte le plaisir de la recherche et de la postérité.

J.K. TRUSS. — **Foundations of mathematical analysis.** — Oxford science publications. — Un vol. relié,  $16,5 \times 24$ , de XIII, 349 p. — Prix: £ 40.00. — Clarendon Press, Oxford, 1997.

Many branches of mathematics originate in questions about the fundamental number systems of mathematical analysis. This book will examine the construction of these number systems in the context of the areas of mathematics for which they provide a starting point. Arising out of this, the author describes a number of central topics in or connected with analysis, particularly from a foundational angle. Many of these questions have important implications for the philosophy of mathematics, such as the concept of "number" itself, problems of categoricity in axiom systems for the real and natural numbers, consistency and completeness, and the nature of proofs suitable for their discussion.

**Complex algebraic geometry.** — Edited by János Kollár. — IAS/Park City mathematics series, vol. 3. — Un vol. relié,  $18,5 \times 26$ , de xi, 340 p. — Prix: £ 45.00. — American Mathematical Society, Providence R.I., distributed by Oxford University Press, Oxford, 1997.

The third Summer Session of the Regional Geometry Institute in Park City, Utah, in 1993 was devoted to algebraic geometry. The main part of the program consisted of the following six series of lectures, listed in the order they were given: Introduction to algebraic geometry, Miles Reid. — Linear series on varieties, Robert Lazarsfeld. — Intersection homology of algebraic varieties, Eduard Looijenga. — Mathematical aspects of mirror symmetry, David Morrison. — Vanishing theorems and Shafarevich maps, János Kollár. — Semi-stable flips, Shigefumi Mori.

Marc YOR. — **Some aspects of Brownian motion. Part II: Some recent martingale problems.** — Lectures in mathematics ETH Zürich. — Un vol. broché, 17×24, de XII, 144 p. — Prix: SFr. 32.00. — Birkhäuser Verlag, Basel, 1997.

These notes are drawn from the second half of lectures given by the author at ETH in a Nachdiplom course (winter term 1991-92), and six lectures in November and December 1993. They are organized in nine chapters, six of which are devoted to: expansion of filtration formulae; Burkholder-Gundy inequalities up to any random time; martingales which vanish on the zero set of Brownian motion; the Azéma-Emery martingales and chaos representation; the filtration of truncated Brownian motion; attempts to characterize the Brownian filtration. The three remaining chapters concern principal value of diffusion local times, probabilistic representations of the Riemann zeta function, and progress made on some topics discussed in Part I.

Hans RIEDWYL. — **Lineare Regression und Verwandtes: Beispiele mit Lösungsvorschlägen.** — Unter Mitarbeit von Mathias Ambühl. — Un vol. broché, 17×24, de VIII, 133 p. — Prix: SFr. 32.00. — Birkhäuser Verlag, Basel, 1997.

Neben der linearen Regressionsgeraden und dem Mittelwertsvergleich (ANOVA oder *t*-Test) kann auch die Handhabung von weitergehenden Problemstellungen wie jene der Parallelität oder des Abstandes zweier Regressionsgeraden, Polynomanpassung, Regressionsebene, mehrfach lineare Regression, Diskriminanz- und Faktorenanalyse geübt werden. Das Buch ist in zwei Teile gegliedert: im ersten Teil werden die Daten unter Angabe der Quelle und einer kurzen Formulierung des Problems präsentiert. Der zweite Teil enthält Lösungsvorschläge für die Beispiele.

Yoichi MIYAKO, Thomas PETERNELL. — **Geometry of higher dimensional algebraic varieties.** — DMV Seminar, Bd. 26. — Un vol. broché, 17,5×24, de VI, 217 p. — Prix: SFr. 38.00. — Birkhäuser Verlag, Basel, 1997.

The subject of this book is the classification theory and geometry of higher dimensional varieties: existence and geometry of rational curves via characteristic *p*-methods, manifolds with negative Kodaira dimension, vanishing theorems, the theory of extremal rays (Mori theory), and minimal models. The book gives a state-of-the-art introduction to a difficult and not readily accessible subject which has undergone enormous development in the last two decades. With no loss of precision, the volume focuses on the spread of ideas rather than on a deliberate inclusion of all proofs.

**Current and future directions in applied mathematics.** — Edited by Mark Alber, Bei Hu, Joachim Rosenthal. — Un vol. relié, 16,5×24,5, de VIII, 261 p. — Prix: SFr. 68.00. — Birkhäuser, Boston, 1997.

This volume contains survey articles and general thoughts and views on applied mathematics by the plenary speakers and panelists of a symposium on current and future directions in applied mathematics, which was held in the Spring of 1996 at the University of Notre Dame. Each speaker was asked to discuss specifically open questions and important trends and available tools in their fields, the advice they would give to students entering these fields, and the links between pure and applied mathematics with respect to future developments.

Kenneth FALCONER. — **Techniques in fractal geometry.** — Un vol. relié, 16×23,5, de XVII, 256 p. — Prix: £24.95. — John Wiley, Chichester, 1997.

Much of the material presented in this book has come to the fore in recent years. This includes methods for studying dimensions and other parameters of fractal sets and measures, as

well as more sophisticated techniques such as the thermodynamic formalism and tangent measures. In addition to general theory, many examples and applications are described, in areas such as differential equations and harmonic analysis. The book is mathematically precise, but aims to give an intuitive feel for the subject, with underlying concepts described in a clear and accessible manner.

Kenneth FALCONER. — **Fractal geometry: mathematical foundations and applications.** — Un vol. broché, 15,5 × 23, de xxii, 288 p. — Prix: £14.99. — John Wiley, Chichester, 1990.

This book provides an accessible treatment of the mathematics of fractals and their dimensions. It is aimed at those wanting to use fractals in their own areas of mathematics or science. The first part of the book covers the general theory of fractals and their geometry. Results are stated precisely, but technical measure theoretic ideas are avoided and difficult proofs are sketched or omitted. The second part contains a variety of examples and applications in mathematics and physics.

Martin A. GUEST. — **Harmonic maps, loop groups, and integrable systems.** — London Mathematical Society student texts, vol. 38. — Un vol. broché, 15,5 × 23, de xiii, 194 p. — Prix: £14.95 (relié: £40.00). — Cambridge University Press, Cambridge, 1997.

This is an accessible introduction to some of the fundamental connections between differential geometry, Lie groups, and integrable Hamiltonian systems. The specific goal of the book is to show how the theory of loop groups can be used to study harmonic maps. By concentrating on the main ideas and examples, the book leads up to topics of current research.

J. LE POTIER. — **Lectures on vector bundles.** — Cambridge studies in advanced mathematics, vol. 54. — Un vol. relié, 16 × 23,5, de viii, 251 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1997.

This work consists of two courses on the moduli spaces of vector bundles. The first part tackles the classification of vector bundles on algebraic curves. The construction and elementary properties of the moduli spaces of stable bundles are also discussed. In particular Hilbert-Grothendieck schemes of vector bundles are constructed, and Mumford's geometric invariant theory is succinctly treated. The second part centres on the structure of the moduli space of semi-stable sheaves on the projective plane. Existence conditions for sheaves of given rank and Chern class and construction ideas are sketched in the general context of projective algebraic surfaces.

Hiroshi KUNITA. — **Stochastic flows and stochastic differential equations.** — Cambridge studies in advanced mathematics, vol. 24. — Un vol. broché, 15,5 × 23, de xiv, 346 p. — Prix: £19.95 (relié: £55.00). — Cambridge University Press, Cambridge, 1997.

The author begins with a discussion of Markov processes, martingales and Brownian motion, followed by a review of Itô's stochastic analysis. The next chapter deals with continuous semimartingales with spatial parameters, in order to study stochastic flow, and a generalization of Itô's equation. Stochastic flows and their relation with this generalized equation are considered in chapter 4. It is shown that solutions of a given stochastic differential equation define stochastic flows of diffeomorphisms. Chapter 5 is devoted to limit theorems involving stochastic flows, and the book ends with a treatment of stochastic partial differential equations through the theory of stochastic flows. Applications to filtering theory are discussed.

J.R. NORRIS. — **Markov chains.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5 × 26, de xvi, 237 p. — Prix: £27.50. — Cambridge University Press, Cambridge, 1997.

The author presents both discrete-time and continuous-time chains and also discusses reversibility. He uses random walks as important examples, as well as Poisson processes and birth-and-death processes. A distinguishing feature of the book is an introduction to more advanced topics such as martingales and potentials, in the established context of Markov chains. This book explains methods of calculation for transition probabilities, hitting probabilities, long-run averages and equilibrium probabilities.

Lothar SACHS. — **Angewandte Statistik: Anwendung statistischer Methoden.** — Achte, völlig neu bearbeitete und erweiterte Aufl. — Un vol. broché, 16,5 × 24,5, de xxxiv, 881 p. — Prix: DM 98.00. — Springer, Berlin, 1997.

Der „Sachs“ ist das Standardwerk zum Lernen, Anwenden und Nachschlagen statistischer Methoden. Praktiker und Studenten, auch ohne besondere mathematische Vorkenntnisse, finden in einer einzigartigen Informationsfülle alles, was sie wissen müssen - übersichtlich, verständlich und praxisbezogen, mit Beispielen belegt und durch Bildmaterial veranschaulicht.

Die 8. Auflage enthält zahlreiche Aktualisierungen und Verbesserungen, wie neue Methoden, Beispiele und Arbeitshilfen, die die Handhabung des Buches noch effizienter gestalten. Der neue „Sachs“ ergänzt jedes Statistik-Software-Handbuch und ist damit das Nachschlagewerk der Wahl für alle, die Daten gewinnen, beschreiben und beurteilen müssen.

Keith DEVLIN, Duska ROSENBERG. — **Language at work: analyzing communication breakdown in the workplace to inform systems design.** — CSLI lecture notes, no. 66. — Un vol. broché, 15,5 × 23, de vii, 212 p. — Prix: £12.95 (relié: £35.00). — CSLI, Stanford, distributed by Cambridge University Press, Cambridge, 1996.

This book examines grammars and other descriptions of language by combining the scientific and the practical. The scientific motivation is to unite distinct intellectual traditions, mathematics and descriptive social science, which have tried to provide an adequate explanation of language and its use on their own to no avail. This volume argues that Situation Theory, a theory of information couched in mathematics, has provided a uniform framework for the investigation of the creative aspects of language use. The authors explore the application of Situation Theory in the study of language use in everyday communication to improve human/computer interaction.

Dietrich BRAESS. — **Finite elements: theory, fast solvers, and applications in solid mechanics.** — Un vol. broché, 15,5 × 23, de xvi, 323 p. — Prix: £17.95 (relié: £50.00). — Cambridge University Press, Cambridge, 1997.

The most important application of the finite element method is the numerical solution of elliptical partial differential equations. This is covered in depth in this book. It is a textbook for graduate students who do not necessarily have any particular background in differential equations, but require an introduction to finite elements for engineering or mathematics applications.

William P. THURSTON. — **Three-dimensional geometry and topology, vol. 1.** — Edited by Silvio Levy. — Princeton mathematical series, vol. 35. — Un vol. relié, 16,5 × 24,5, de x, 311 p. — Prix: US\$39.50. — Princeton University Press, Princeton, 1997.

This book develops some of the extraordinary richness, beauty, and power of geometry in two and three dimensions, and the strong connection of geometry with topology. Hyperbolic

geometry is the star. A strong effort has been made to convey not just denatured formal reasoning (definitions, theorems, and proofs), but a living feeling for the subject. There are many figures, examples, and exercises of varying difficulty.

**Classics in game theory.** — Edited by Harold W. Kuhn. — Frontiers of economic research. — Un vol. broché, 15 × 23,5, de xv, 362 p. — Prix: US\$22.95 (relié: US\$65.00). — Princeton University Press, Princeton, New Jersey, 1997.

This volume assembles in one sourcebook the basic contributions to the field that followed on the publication of *Theory of games and economic behavior* by John von Neumann and Oskar Morgenstern (Princeton, 1944). The theory of games, first given a rigorous formulation by von Neumann in a paper in 1928, is a subfield of mathematics and economics that models situations in which individuals compete and cooperate with each other. In the “heroic era” of research that began in the late 1940s, the foundations of the current theory were laid; it is these fundamental contributions that are collected in this volume.

Daniel BUMP. — **Automorphic forms and representations.** — Cambridge studies in advanced mathematics, vol. 55. — Un vol. relié, 16 × 24, de xii, 574 p. — Prix: £65.00. — Cambridge University Press, Cambridge, 1997.

This book covers both the “classical” and “representation theoretic” views of automorphic forms in a style which is accessible to graduate students entering the field. The treatment is based on complete proofs, which reveal the uniqueness principles underlying the basic constructions. The book features extensive foundational material on the representation theory of  $GL(1)$  and  $GL(2)$  over local fields, the theory of automorphic representations,  $L$ -functions and advanced topics such as the Langlands conjectures, the Weil representation, the Rankin-Selberg method and the triple  $L$ -function, examining this subject matter from many different and complementary viewpoints.

Yûsaku KOMATU. — **Distortion theorems in relation to linear integral operators.** — Mathematics and its applications, vol. 385. — Un vol. relié, 17 × 25, de viii, 305 p. — Prix: Dfl. 225.00. — Kluwer Academic Publishers, Dordrecht, 1996.

This book represents over twenty years of research on distortions of functionals under actions of linear integral operators. It is divided into two parts. The first part addresses linear integral operators, establishing their properties and attempting to arrive at both specialisations as well as generalisations to be used in the second part. The second part is devoted mainly to the development of several kinds of distortions under actions of integral operators for various familiar functionals. Among the topics that are treated are absolute modulus, real part, range, length and area, angular derivative, etc. Also, distortions on the class of univalent functions and its subclasses, Carathéodory class, and distortions by a differential operator are dealt with.

**Nonlinear evolutionary partial differential equations.** — International Conference on Nonlinear Evolutionary Partial Differential Equations, June 21-25, 1993, Beijing, People’s Republic of China. — Edited by Xia-Xi Ding and Tai-Ping Liu. — AMS/IP studies in advanced mathematics, vol. 3. — Un vol. broché, 18 × 25,5, de xiii, 637 p. — Prix: £52.50. — American Mathematical Society, Providence, R.I., distributed by Oxford University Press, Oxford, 1997.

The topics for the conference was selected, after long deliberation, because of its importance in the natural sciences as well as its mathematical interest. The topics discussed included conservation laws, dispersion waves, Einstein’s theory of gravitation, reaction-diffusion equations, solution of the Navier-Stokes equations, etc. New results on these subjects were presented, and they are described in this volume.

**Group theory in China.** — Edited by Zhe-xian Wan, Sheng-ming Shi. — Mathematics and its applications (Chine series). — Un vol. relié, 17×25, de 261 p. — Prix: Dfl. 185.00. — Kluwer Academic Publishers, Dordrecht, 1996.

Hsio-Fu Tuan is a Chinese mathematician who has made important contributions to the theories of both finite groups and Lie groups. He has also had a great influence on the development of algebra, and particularly group theory in China. The present volume consists of a collection of essays on various aspects of group theory written by some of his former students and colleagues in honour of his eightieth birthday. The papers contain the main general results, as well as recent ones, on certain topics within this discipline.

**Parallel numerical algorithms.** — Edited by David E. Keyes, Ahmed Sameh and V. Venkatakrishnan. — ICASE/LaRC interdisciplinary series in science and engineering, vol. 4. — Un vol. relié, 17×25, de xi, 395 p. — Prix: Dfl. 295.00. — Kluwer Academic Publishers, Dordrecht, 1997.

In this volume, designed for computational scientists and engineers working on applications requiring the memories and processing rates of large-scale parallelism, leading algorithmists survey their own field-defining contributions, together with enough historical and bibliographical perspective to permit working one's way to the frontiers. This book is distinguished from earlier surveys in parallel numerical algorithms by its extension of coverage beyond core linear algebraic methods into tools more directly associated with partial differential and integral equations - though still with an appealing generality - and by its focus on practical medium-granularity parallelism, approachable through traditional programming languages.

Ian ANDERSON. — **Combinatorial designs and tournaments.** — Oxford science publications. — Oxford lecture series in mathematics and its applications, vol. 6. — Un vol. relié, 16,5×24, de xi, 237 p. — Prix: £32.50. — Clarendon Press, Oxford, 1997.

This book is a completely revised and updated version of the popular and successful *Combinatorial designs: construction methods*. It includes explanations throughout of the historical development of the study of tournaments as well as numerous exercises. The presentation is clear and readable, and the book provides material on the construction of tournament designs not readily available elsewhere. Contents include orthogonal and self-orthogonal latin squares, Room squares, league schedules and whist tournaments.

Harry JOE. — **Multivariate models and dependence concepts.** — Monographs on statistics and applied probability, vol. 73. — Un vol. relié, 14,5×22,5, de xviii, 399 p. — Prix: £39.00. — Chapman & Hall, London, 1997.

Multivariate models, statistical inference and data analysis for multivariate non-normal response data (for example, binary, ordinal, count, extreme value) with covariates are covered in this book. Dependence concepts are used to construct and analyze multivariate distributions and models. Graduate students, lecturers and researchers in statistics, probability and biostatistics will want to read this book, as it is the first book to contain a deep coverage of the subject.

Iain L. MACDONALD, Walter ZUCCHINI. — **Hidden Markov and other models for discrete-valued time series.** — Monographs on statistics and applied probability, vol. 70. — Un vol. relié, 14,5×22,5, de xvi, 236 p. — Prix: £35.00. — Chapman & Hall, London, 1997.

This book makes the models for discrete-valued time series available for practical use for the first time in a single volume. It introduces a new, versatile and computationally tractable class of

models, the “hidden Markov” models. A detailed account of these is presented here, and then these and other models are applied to data from a wide range of subjects as diverse as medicine, climatology, geophysics, animal behaviour, finance and sociology.

David HAND, Martin CROWDER. — **Practical longitudinal data analysis.** — Chapman & Hall texts in statistical science series. — Un vol. relié, 16,5 × 24, de x, 232 p. — Prix : £ 35.00. — Chapman & Hall, London, 1996.

This text describes regression-based approaches to analysing longitudinal and repeated measures data. Particular features are its emphasis on statistical rather than probabilistic models, its detailed discussion of the relationships between different approaches, and its illustration of practical applications through extensive examples, all using real data. Where commercially available software exists, this is used, and the program code and output are illustrated. An extensive data appendix provides many real data sets, beyond those used for the examples, which can serve as the basis for exercises.

Paul GARRETT. — **Buildings and classical groups.** — Un vol. relié, 16,5 × 24, de x, 373 p. — Prix : £ 55.00. — Chapman & Hall, London, 1997.

This is the first book to combine in a single volume development of both these subjects, as well as essential background material on Coxeter groups, geometric algebra and discrete valuation rings. It develops the basic theory of buildings and BN-pairs, with special attention given to the results necessary for application to the representation theory of p-adic groups. In particular, both spherical and affine buildings are treated, as well as the “spherical building at infinity” attached to an affine building. Many otherwise apocryphal results are covered in detail. The classical matrix groups play a prominent role, not merely to illustrate general results, but as primary objects of interest. Results and terminology relevant to classical groups are introduced and fully developed.

Robert E. O'MALLEY, Jr. — **Thinking about ordinary differential equations.** — Cambridge texts in applied mathematics. — Un vol. broché, 15,5 × 23, de x, 247 p. — Prix : £ 14.95 (relié : £ 40.00). — Cambridge University Press, Cambridge, 1997.

The text includes brief expositions of standard topics including first-order equations, homogeneous and nonhomogeneous second-order linear equations, power series expansions about regular and regular singular points, linear systems theory, and stability concepts for both the phase plane and higher-dimensional systems. A variety of exercises and examples is included, and readers are encouraged to try alternative approaches to find solutions that integrate and build upon ideas introduced in earlier chapters.

V. JONES, V.S. SUNDER. — **Introduction to subfactors.** — London Mathematical Society lecture note series, vol. 234. — Un vol. broché, 15,5 × 23, de xii, 162 p. — Prix : £ 22.95. — Cambridge University Press, Cambridge, 1997.

Subfactors have been a subject of considerable research activity for about 15 years and are known to have significant relations with other fields such as low-dimensional topology and algebraic quantum field theory. These notes give an introduction to the subject suitable for a student who has only a little familiarity with the theory of Hilbert space. A new pictorial approach to subfactors is presented in the final chapter.

**Arithmetic geometry: Cortona 1994.** — Edited by Fabrizio Catanese. — Symposia mathematica, vol. 37. — Un vol. relié, 16×23,5, de x, 300 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1997.

*From the preface:* The I.N.d.A.M. Symposium “Arithmetic Geometry” took place on the days October 16 - October 21 in the “Palazzzone” of the Scuola Normale located in Cortona (Arezzo, Italy). The success of the Symposium relies... not only on the very lively discussions which lead to refinements and improvements of several conjectures presented in the talks, but also on the broad spectrum of topics and methods covered; the variety of approaches and topics touched upon is also reflected in the contributions appearing in these Proceedings.

**Representation theory and algebraic geometry.** — Edited by A. Martsinkovsky, G. Todorov. — London Mathematical Society lecture note series, vol. 238. — Un vol. broché, 15,5 × 23, de vii, 123 p. — Prix: £20.95. — Cambridge University Press, Cambridge, 1997.

This book contains seven lectures delivered at the Maurice Auslander Memorial Conference at Brandeis University in March 1995. The variety of topics covered at the conference reflects the breadth of Maurice Auslander’s contribution to mathematics, which includes commutative algebra and algebraic geometry, homological algebra and representation theory. He was one of the founding fathers of homological ring theory and representation theory of Artin algebras. Undoubtedly, the most characteristic feature of his mathematics was the profound use of homological and functorial techniques.

**Yves MEYER, Ronald COIFMAN.** — **Wavelets: Calderón-Zygmund and multilinear operators.** — Translated by David Salinger. — Cambridge studies in advanced mathematics, vol. 48. — Un vol. relié, 16×23,5, de xix, 314 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1997.

Since their introduction nearly forty years ago, there has been great development of the theory of Calderón-Zygmund operators. In this volume the new theory is fully described, in particular so-called paradifferential operators and the Cauchy kernel on Lipschitz curves, and their connection with wavelet bases is explored. Sparse matrix representations of these operators can be given in terms of wavelet bases which have important applications in image processing and numerical analysis for example. This was not possible with the old theory that used Fourier analysis. The method is now widely studied and used to tackle a wide variety of problems that occur in science and engineering.

**Gerhard BREWKA, Jürgen DIX, and Kurt KONOLIGE.** — **Nonmonotonic reasoning: an overview.** — CSLI lecture notes, vol. 73. — Un vol. broché, 15×23, de x, 179 p. — Prix: £14.95 (relié: £37.50). — Cambridge University Press, Cambridge, 1997.

Nonmonotonic reasoning is a subfield of artificial intelligence trying to find more realistic formal models of reasoning than classical logic. This up-to-date survey of research in the area of nonmonotonic reasoning includes a concise description of the most influential nonmonotonic logics (e.g. circumscription, autoepistemic logic and default logic), a presentation of recent research in abduction, as well as an overview of semantics for logic programs with default negation. The primary goal of this volume is to make recent results in the field more accessible. The volume points also to relevant literature for further study.

**J.E. CREMONA.** — **Algorithms for modular elliptic curves.** — Second edition. — Un vol. broché, 21×30, de 375 p. — Prix: £45.00. — Cambridge University Press, Cambridge, 1997.

This book presents a thorough treatment of many algorithms concerning the arithmetic of elliptic curves, with remarks on computer implementation. It is in three parts. First, the author

describes in detail the construction of modular elliptic curves giving an explicit algorithm for their computation using modular symbols. Secondly, a collection of algorithms for the arithmetic of elliptic curves is presented; some of these have not appeared in book form before. They include: finding torsion and non-torsion points, computing heights, finding isogenies and periods, and computing the ranks. Finally, an extensive set of tables is provided giving the results of the author's implementations of the algorithms. This revised second edition contains a number of corrections to the original, as well as a new table of the degrees of the modular parametrizations and a new section on how these were computed. Several other sections have been substantially revised and improved.

Vladimir N. SACHKOV. — **Probabilistic methods in combinatorial analysis.** — Encyclopedia of mathematics and its applications, vol. 56. — Un vol. relié, 16 × 24, de x, 246 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1997.

This work explores the role of probabilistic methods for solving combinatorial problems. The author begins with a discussion of block designs and Latin squares before proceeding to treat transversals, devoting much attention to enumerative problems. The main role in these problems is played by generating functions, which are considered in Chapter 4. The general combinatorial scheme is then introduced, and, in the final chapter, Pólya's enumerative theory is discussed. This is an important book, describing many ideas not previously available in English; the author has taken the opportunity to rewrite parts of the original Russian text and to refresh the references where appropriate.

Konrad ENGEL. — **Sperner theory.** — Encyclopedia of mathematics and its applications, vol. 65. — Un vol. relié, 16 × 24, de ix, 417 p. — Prix: £50.00. — Cambridge University Press, Cambridge, 1997.

The starting point of this book is Sperner's theorem, which answers the question: What is the maximum possible size of a family of pairwise unrelated (with respect to inclusion) subsets of a finite set? This theorem stimulated the development of a fast growing theory dealing with extremal problems on finite sets and, more generally, on finite partially ordered sets. This book presents Sperner theory from a unified point of view, bringing combinatorial techniques together with methods from programming (flow theory and polyhedral combinatorics), from linear algebra (Jordan decompositions, Lie-algebra representations and eigenvalue methods), from probability theory (limit theorems), and from enumerative combinatorics (Möbius inversion).

M. LOTHAIRE. — **Combinatorics on words.** — Foreword by Roger Lyndon. — Cambridge mathematical library. — Un vol. broché, 15 × 23, de xvii, 238 p. — Prix: £17.95. — Cambridge University Press, Cambridge, 1997.

Combinatorics on words, or finite sequences, has grown into an independent theory finding substantial applications in computer science, automata theory and linguistics. This volume was the first to attempt to present a thorough treatment of this theory. All of the main results and techniques are covered. Topics discussed include: Thue's square free words; Van der Waerden's theorem; Ramsey's theorem; factorization of free monoids including applications to free Lie-algebras; equations in words, etc.

Boris ROSENFELD. — **Geometry of Lie groups.** — Mathematics and its applications, vol. 393. — Un vol. relié, 16 × 25, de xviii, 393 p. — Prix: Dfl. 295.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This book represents the fruit of the author's many years of research and teaching. The introductory chapter contains the necessary background information from algebra, topology, and

geometry of real spaces. Chapter 1 presents more specialized information on associative and nonassociative algebras and on Lie groups and algebras. In Chapters 2 through 6 geometric interpretations of all simple Lie groups of classes  $A_n$ ,  $B_n$ ,  $C_n$ , and  $D_n$  as well as of finite groups of Lie type, are given. In Chapter 7, for the first time ever, geometric interpretations of *all* simple and quasisimple Lie groups of exceptional classes  $G_2$ ,  $F_4$ ,  $E_6$ ,  $E_7$  and  $E_8$  are given.

**International handbook of mathematics education.** — Edited by A.J. Bishop, K. Clements, C. Keitel, J. Kilpatrick, C. Laborde. — Kluwer international handbooks of education, vol 4. — 2 vol. reliés,  $16 \times 25$ , de 1364 p. — Prix: Dfl. 595.00 pour l'ensemble des deux volumes. — Kluwer Academic Publishers, Dordrecht, 1997.

This Handbook presents an overview and analysis of the international “state-of-the-field” of mathematics education at the end of the 20<sup>th</sup> century. The more than 150 authors, editors and chapter reviewers involved in its production come from a range of countries and cultures. They have created a book of 36 original chapters in four sections, surveying the variety of practices, and the range of disciplinary interconnections, which characterize the field today, and providing perspectives on the study of mathematics education for the 21<sup>st</sup> century. It is first and foremost a reference work, and will appeal to anyone seeking up to date knowledge about the main developments in mathematics education. — *Contents*: Curriculum, goals, contents, resources. — Teaching and learning mathematics. — Perspectives and interdisciplinary contexts. — Social condition and perspectives on professional development.

**Geometric topology.** — 1993 Georgia International Topology Conference, August 2-13, 1993, University of Georgia, Athens, Georgia. — Edited by William H. Kazez. — AMS/ISP studies in advanced mathematics, vol. 2, parts 1 and 2. — 2 vol. reliés,  $18,5 \times 26$ , de xi, 604 p. et xi, 473 p. respectivement. — Prix: £65.00. — American Mathematical Society, Providence, R.I. and International Press, Cambridge, MA, distributed by Oxford University Press, Oxford, 1997.

The texts of this two-part volume include research and expository articles and problem sets. The conference covered a wide variety of topics in geometric topology. Kirby's problem list, which contains a thorough description of the progress made on each of the problems and includes a very complete bibliography, makes the work useful for specialists and non-specialists who want to learn about the progress made in many areas of topology. Gabai's problem list, which focuses on foliations and laminations of 3-manifolds, collects for the first time in one paper definitions, results, and problems that may serve as a defining source in the subject area.

Peter E. CROMWELL. — **Polyhedra.** — Un vol. relié,  $18 \times 25$ , de xiii, 451 p. — Prix: £30.00. — Cambridge University Press, Cambridge, 1997.

This book comprehensively documents the many and varied ways that polyhedra have come to the fore throughout the development of mathematics. The author strikes a balance between covering the historical development of the theory surrounding polyhedra, and presenting a rigorous treatment of the mathematics involved. It is attractively illustrated with hundreds of diagrams to illustrate ideas that might otherwise prove difficult to grasp. Historians of mathematics as well as those more interested in the mathematics itself, will find this book fascinating.

Glenn FULFORD, Peter FORRESTER, Arthur JONES. — **Modelling with differential and difference equations.** — Australian Mathematical Society lecture series, vol. 10. — Un vol. broché,  $15 \times 23$ , de x, 405 p. — Prix: £19.95 (relié: £50.00). — Cambridge University Press, Cambridge, 1997.

The real world can be modelled using mathematics, and the construction of such models is the theme of this book. The authors concentrate on the techniques used to set up mathematical

models and describe many systems in full detail, covering both differential and difference equations in depth. Amongst the broad spectrum of topics studied in this book are: mechanics, genetics, thermal physics, economics and population studies.

Svante JANSON. — **Gaussian Hilbert spaces.** — Cambridge tracts in mathematics, vol. 129. — Un vol. broché,  $16 \times 23$ , de x, 340. — Prix: £40.00. — Cambridge University Press, Cambridge, 1997.

This book treats the very special and fundamental mathematical properties that hold for a family of Gaussian (or normal) random variables. Such random variables have many applications in probability theory, other parts of mathematics, statistics and theoretical physics. The emphasis throughout this book is on the mathematical structures common to all these applications. This will be an excellent resource for all researchers whose work involves random variables.

R. LOWEN. — **Approach spaces: the missing link in the topology-uniformity-metric triad.** — Oxford Mathematical Monographs. — Un vol. relié,  $17 \times 24,5$ , de x, 253 p. — Prix: £60.00. — Clarendon Press, Oxford, 1997.

This book gives a new and complete development of the fundamentals of the theory of approach spaces as originally introduced by the author between 1987 and 1989. Approach spaces form a supercategory of the categories of topological spaces and of metric spaces, and the main purpose for their introduction was to solve the problem of the nonmetrizability of arbitrary initial structures of metrizable topological spaces. Thus, in general, an approach structure is the richest structure, overlying the initial topology, which one can preserve when making such initial structures.

Helga FETTER, Berta GAMBOA DE BUEN. — **The James forest.** — London Mathematical Society Lecture Note Series, vol. 236. — Un vol. broché,  $15,5 \times 23$ , de xi, 255 p. — Prix: £27.95. — Cambridge University Press, Cambridge, 1997.

The James space  $J$  and the James tree space  $JT$  were constructed as counterexamples to several outstanding conjectures in Banach space theory. This book is a compendium of most of the known results about these spaces, frequently taken from the original sources, but presented in a unified and up-to-date fashion. Generalizations of  $J$  and  $JT$  are also discussed and other pathological Banach spaces are introduced.

Domenico BERTOLONI MELI. — **Equivalence and priority: Newton versus Leibniz.** — Including Leibniz's unpublished manuscripts on the *Principia*. — Un vol. broché,  $16 \times 24$ , de ix, 318 p. — Prix: £25.00. — Clarendon Press, Oxford, 1997.

In this book, the author examines several hitherto unpublished manuscripts in Leibniz's own hand illustrating his first reading of and reaction to Newton's *Principia*. Contrary to Leibniz's own claim, this new evidence shows that he had studied Newton's masterpiece before publishing *An essay on the causes of celestial motions*. Dr. Bertoloni Meli analyses the important implications of this episode for a variety of themes ranging from priority claims to the mathematization of nature in the seventeenth century.

Jean-Pierre KAHANE and Pierre-Gilles LEMARIÉ-RIEUSSET. — **Fourier series and wavelets.** — Studies in the development of modern mathematics, vol. 3. — Un vol. relié,  $17,5 \times 25,5$ , de xii, 394 p. — Prix: £78.00. — Gordon and Breach Publishers, Amsterdam, distributed by International Publishers Distributor, Reading, Berkshire, UK, 1997.

This monograph presents the history and achievements of one of the most important figures in modern mathematics, covering the work of Fourier from his first memoir on the analytical

theory of heat to the latest developments in wavelet theory. The work is divided into two parts: the first deals with Fourier series in the classical sense, decomposition of a function into harmonic components, while the second part expounds the modern theory of wavelets – the most recent tool in pure and applied harmonic analysis. The second part of the book is a self-contained exposition, and may serve as a reference on wavelets.

R. Tyrrel ROCKAFELLAR. — **Convex analysis.** — Princeton landmarks in mathematics and physics. — Un vol. broché, 15×23, de xviii, 451 p. — Prix: US\$22.95. — Princeton University Press, Princeton, New Jersey, 1997.

Available for the first time in paperback, this classic study presents readers with a coherent branch of nonlinear mathematical analysis that is especially suited to the study of optimization problems. Rockafellar's theory differs from classical analysis in that differentiability assumptions are replaced by convexity assumption. The topics treated in this volume include: systems of inequalities, the minimum or maximum of a convex function over a convex set, Lagrange multipliers, minimax theorems and duality, as well as basic results about the structure of convex sets and the continuity and differentiability of convex functions and saddle-functions.

Richard M. ROYALL. — **Statistical evidence: a likelihood paradigm.** — Monographs on statistics and applied probability, vol. 71. — Un vol. relié, 14×23, de xvi, 191 p. — Prix: £35.00. — Chapman & Hall, London, 1997.

This monograph addresses the general problem of interpreting statistical data as evidence, and focuses on the law of likelihood, which is fundamental to the solution. *Statistical Evidence* examines the strengths and weaknesses of the approach of Neyman and Pearson, and that of Fisher, and then proposes an alternative. This alternative paradigm provides, in the law of likelihood, the explicit concept of evidence that is missing from the others. At the same time it retains the elements of objective measurement and control of the frequency of misleading results, features which made the old paradigms an important part of science.

Mark J. ABLOWITZ, Athanassios S. FOKAS. — **Complex variables: introduction and applications.** — Cambridge texts in applied mathematics. — Un vol. broché, 15×22, de xii, 647 p. — Prix: £19.95 (relié: £55.00). — Cambridge University Press, Cambridge, 1997.

The study of complex variables is important for students in engineering and the physical sciences and is a central subject in mathematics. Part I of this text provides an introduction to the subject, including analytic functions, integration, series, and residue calculus and also includes transform methods, ODE's in the complex plane, numerical methods and more. Part II contains conformal mapping, asymptotic expansions, and the study of Riemann-Hilbert problems. The authors also provide an extensive array of applications, illustrative examples, and homework exercises.

Pierre MEUNIER. — **Agrégation interne de mathématiques: exercices d'oral corrigés et commentés.** — Collection Mathématiques. — Un vol. broché, 15×22, de 355 p. — Presses universitaires de France, Paris, 1997.

Ce recueil d'exercices d'oral à usage des candidats à l'agrégation interne de mathématiques, mais aussi des élèves inscrits aux concours d'entrée aux grandes écoles scientifiques, est constitué de seize chapitres, classés par thèmes, où figurent de nombreux exercices, rédigés avec le souci de rendre leur compréhension accessible au plus grand nombre et ce dans le délai le plus bref possible. Chaque chapitre est assorti d'un résumé de quelques lignes ayant pour but de présenter « l'esprit » avec lequel le thème étudié dans ce chapitre est abordé.

H. NARAYANAN. — **Submodular functions and electrical networks.** — Annals of discrete mathematics, vol. 54. — Un vol. relié, 17×25, de xxx, 650 p. — Prix: Dfl. 285.00. — North-Holland, Amsterdam, 1997.

Presenting a topological approach to electrical network theory, this book demonstrates the strong links that exist between submodular functions and electrical networks. The book contains: a detailed discussion of graphs, matroids, vector spaces and the algebra of generalized minors, relevant to network analysis (particularly to the construction of efficient simulators); a detailed discussion of submodular function theory in its own right; topics covered include various operations, dualization, convolution and Dilworth truncation as well as the related notions of principal partition and principal lattice of partitions.

Robert E. GREENE, Steven G. KRANTZ. — **Function theory of one complex variable.** — Pure and applied mathematics. — Un vol. relié, 16×24, de xiii, 496 p. — Prix: £ 55.00. — John Wiley, New York, 1997.

This book presents a new approach to one of mathematics' oldest fields. It departs from the tradition of teaching complex analysis as a self-contained subject and, instead, treats the subject as a natural development from calculus. It also shows how complex analysis is used in other areas, exploring connections with calculus, algebra, geometry, topology, and other parts of analysis. The authors provide the ideal framework for a first-year graduate course in complex analysis. The book is also for those using complex numbers and functions in applied fields.

Malay GHOSH, Nitis MUKHOPADHYAY, Pranab K. SEN. — **Sequential estimation.** — Wiley series in probability and statistics. — Un vol. relié, 16×24, de xiv, 480 p. — Prix: £ 55.00. — John Wiley, New York, 1997.

The book is the first, single-source guide to the theory and practice of both classical and modern sequential estimation techniques — including parametric and nonparametric methods. Researchers in sequential analysis will appreciate the unified, logically integrated treatment of the subject, as well as coverage of important contemporary procedures not covered in more general sequential analysis texts, such as: shrinkage estimation, empirical and hierarchical Bayes procedures, multistage sampling and accelerated sampling procedures, time-sequential estimation, etc.

Norman L. JOHNSON, Samuel KOTZ, N. BALAKRISHNAN. — **Discrete multivariate distribution.** — Wiley series in probability and statistics, Applied probability and statistics section. — Un vol. relié, 16×24, de xxii, 299 p. — Prix: £ 65.00. — John Wiley, New York, 1997.

The book covers all significant advance that have occurred in the field over the past quarter century in the theory, methodology, computational procedures, and applications of discrete multivariate distributions in a wide range of disciplines. Distributions covered include multinomial, binomial, negative binomial, Poisson, power series, hypergeometric, Pólya-Eggenberger, Ewens, order  $s$ , and some families of distributions. Each distribution is presented in its own chapter, along with necessary details and descriptions of real-world applications gleaned from the current literature on discrete multivariate distributions.

**Intelligent methods in signal processing and communications.** — Edited by D. DoCampo, A.R. Figueiras-Vidal, F. Pérez-González. — Un vol. relié, 16×24, de xvi, 318 p. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1997.

This book contains fourteen chapters on intelligent techniques applied to signal processing and communications engineering problems. The book combines new basic concepts with clear

practical applicability, along with emergent applications in telecommunications and signal processing. The method and applications presented include a variety of timely topics: antenna arrays, spread spectrum, adaptive systems, biometric identification, neural networks, non-linear and chaotic systems, filter banks, genetic algorithms.

**General inequalities 7.** — 7<sup>th</sup> International Conference at Oberwolfach, November 13 - 18, 1995. — Edited by C. Bandle, W.N. Everitt, L. Losonczi, W. Walter. — International series of numerical mathematics, vol. 123. — Un vol. relié, 17 × 24, de XII, 404 p. — Prix: SFr. 168.00. — Birkhäuser Verlag, Basel, 1997.

This is perhaps the last remaining field comprehended and used by mathematicians in all areas of the discipline. New inequalities are discovered every year. There are numerous applications in a wide variety of fields, from mathematical physics to biology and economics. This volume contains the proceedings of the General Inequalities 7 Meeting, held at Oberwolfach in November 1995. It not only contains the latest results, but it is also a useful reference for lecturers and researchers.

**George Boole: selected manuscripts on logic and its philosophy.** — Edited by Ivor Grattan-Guinness, Gérard Bornet. — Science networks/Historical studies, vol. 20. — Un vol. relié, 17 × 24, de LXIV, 236 p. — Prix: SFr. 48.00. — Birkhäuser Verlag, Basel, 1997.

George Boole (1815-1864) is well known to mathematicians for his research and textbooks on the calculus, but his name has spread world-wide for his innovations in symbolic logic and the development and applications made since his days. Boole wrote manuscript essays, especially after the publication of his second book; several were intended for a non-technical work, "The Philosophy of Logic", which he was not able to complete. This book contains an edited selection of Boole's manuscript essays. The editors have provided a substantial introduction which not only relates them to Boole's publications and the historical context of his time, but also describes their strange history, as family, followers and scholars have tried to confect an edition.

Igor V. NOVOZHILOV. — **Fractional analysis: methods of motion decomposition.** — Un vol. relié, 16 × 24, de x, 231 p. — Prix: SFr. 108.00. — Birkhäuser, Boston, 1997.

The book deals with a method of formalized construction of approximate mathematical models of dynamic systems, which combines the method of similitude and perturbation theory and algorithms of asymptotic expansions in small parameter. This method was termed by Kline "fractional analysis". The goal of the book is to apply the ideas of fractional analysis to finite-dimensional controlled systems. The most advantageous feature of the book is an algorithm of fractional analysis, developed by the author, as well as a large number of examples of its application for problems of mechanics, control, vehicle dynamics, gyroscopy, robotics, etc.

**Numerical methods and software tools in industrial mathematics.** — Edited by Morten Dæhlen, Aslak Tveito. — Un vol. relié, 16 × 24, de 400 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1997.

The main contribution of this book is the discussion on how modern concepts in computer science can be applied in order to develop scientific software that is easier to extend, maintain and use than the traditional counterparts. Key features are: Introduction to object-oriented numerics — Thorough discussion of efficiency of C++ in scientific computing — Presentation of Diffpack, a set of software tools for solving partial differential equations — Presentation of Siscat, a set of software tools for modeling scattered data — An overview of Krylov Subspace methods for solving linear equations — Surface modeling — Web site for the book, containing additional resources and selected topics.

**Surveys in combinatorics, 1997.** — Edited by R.A. Bailey. — London Mathematical Society lecture note series, vol. 241. — Un vol. broché, 15,5×23, de xiii, 338 p. — Prix: £24.95. — Cambridge University Press, Cambridge, 1997.

This volume contains the invited lectures given at the Sixteenth British Combinatorial Conference, held in July 1997. Included is an illustration of how recent developments in group theory lead to advances in graph theory, and an exciting new construction of one of the Mathieu groups. Other articles show how to construct a block design, and how to use finite geometries. An account is given of the computational complexity of counting.

Sergio ALBEVERIO, Jürgen JOST, Sylvie PAYCHA, Sergio SCARLATTI. — **A mathematical introduction to string theory: variational problems, geometric and probabilistic methods.** — London Mathematical Society lecture note series, vol. 225. — Un vol. broché, 15,5×23, de viii, 135 p. — Prix: £22.95. — Cambridge University Press, Cambridge, 1997.

Classical string theory is concerned with the propagation of classical 1-dimensional curves or “strings”, and the theory has connections to the calculus of variations, minimal surfaces and harmonic maps. The quantization of string theory gives rise to problems in different areas, according to the method used. The representation theory of Lie, Kac-Moody and Virasoro algebras have been used for such quantization.

Allan PINKUS, Samy ZAFRANY. — **Fourier series and integral transforms.** — Un vol. broché, 15,5×23, de viii, 189 p. — Prix: £12.95. — Cambridge University Press, Cambridge, 1997.

The aim of this book is to provide the reader with a basic understanding of Fourier series, Fourier transforms and Laplace transforms. The book is an expanded and polished version of the authors's notes for a one semester course, for students of mathematics, electrical engineering, physics and computer science.

W. FILTER, K. WEBER. — **Integration theory.** — Chapman & Hall mathematics series. — Un vol. broché, 16×23,5, de xii, 294 p. — Chapman & Hall, London, 1997.

This text presents an introduction to the theories of measure and integration, which are important in functional analysis, probability theory, the theory of fractals and many other branches of pure and applied mathematics. The approach taken in this book differs from other treatments in that the Daniell method is used to construct the integral with respect to a null-continuous positive linear functional, obtaining — in some sense — the best available integral, and in that the theory of vector lattices is used as the main tool for the development of the theory. The book pays particular attention to integrals derived from positive measures and includes a large number of exercises.

D.L. JOHNSON. — **Presentations of groups.** — Second edition. — London Mathematical Society student texts, vol. 15. — Un vol. broché, 15,5×23, de x, 216 p. — Cambridge University Press, Cambridge, 1997.

The aim of this book is to provide an introduction to combinatorial group theory. Any reader who has completed first courses in linear algebra, group theory and ring theory will find this book accessible. The emphasis is on computational techniques but rigorous proofs of all theorems are supplied. This new edition has been revised throughout, including new exercises and an additional chapter on proving that certain groups are infinite.

**Model theory of groups and automorphism groups.** — Blaubeuren, August 1995. — Edited by David M. Evans. — London Mathematical Society lecture note series, vol. 244. — Un vol. broché, 15,5 × 23, de xvi, 212 p. — Prix: £24.95. — Cambridge University Press, Cambridge, 1997.

Beginning with an introductory chapter describing relevant background material, the book contains contributions from many leading international figures in this area. Topics described include automorphism groups of algebraically closed fields, the model theory of pseudo-finite fields and applications to the subgroup structure of finite Chevalley groups. Model theory of modules, and aspects of model theory of various classes of groups, including free groups are also discussed. The book also contains the first comprehensive survey of finite covers. Many new proofs and simplifications of recent results are presented and the articles contain many open problems.

Pertti LOUNESTO. — **Clifford algebras and spinors.** — London Mathematical Society lecture note series, vol. 239. — Un vol. broché, 15,5 × 23, de ix, 306 p. — Prix: £27.95. — Cambridge University Press, Cambridge, 1997.

The beginning chapters could be read by undergraduates; vectors, complex numbers and quaternions are introduced with an eye on Clifford algebras. The next chapters include treatments of the quantum mechanics of the electron, electromagnetism and special relativity with a flavour of Clifford algebras. The book also gives the first comprehensive survey of the present research on Clifford algebras. A new classification of spinors is introduced, one based on bilinear covariants of physical observables. This reveals a new class of spinors, residing between the Weyl, Majorana and Dirac spinors. Scalar products of spinors are classified by involutory anti-automorphisms of Clifford algebras.

Walter GAUTSCHI. — **Numerical analysis: an introduction.** — Un vol. relié, 16 × 24, de xiii, 506 p. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1997.

The topics included in the book are presented with a view toward stressing basic principles and maintaining simplicity and teachability as far as possible. In this sense, the text is an “Introduction”. Contrary to tradition, the text does not include numerical linear algebra, which is felt by the author to have matured into an autonomous discipline having an identity of its own and therefore deserving treatment in separate books and separate courses at the graduate level. For similar reasons, the numerical solution of partial differential equations is not covered either.

George G. LORENTZ. — **Mathematics from Leningrad to Austin: George G. Lorentz' selected works in real, functional and numerical analysis.** — Edited by Rudolph A. Lorentz. — Contemporary mathematicians. — 2 vol. reliés, 19 × 26, de xviii, 648 p. et xxxvi, 548 p. respectivement. — Prix: SFr. 198.00 chaque vol. et SFr. 358.00 l'ensemble. — Birkhäuser, Boston, 1997.

The works of George G. Lorentz, spanning more than sixty years, have played a significant role in the development and evolution of almost all areas of mathematical analysis. The papers presented in these volumes represent a selection of his best works, augmented by commentary from his students and colleagues. This “selecta” contains approximately two third of the papers George G. Lorentz wrote from 1932 to 1994. The first volume contains the papers on summability and number theory and interpolation. The second volume contains the fields: real and functional analysis and approximation theory. Each of these groups of papers is introduced by a review of the contents and significance, respectively of the impact of these papers.

David ACHESON. — **From calculus to chaos: an introduction to dynamics.** — Un vol. broché, 15,5 × 24, de IX, 269 p. — Prix: £25.00. — Oxford University Press, Oxford, 1997.

This book is an introduction to applications of calculus, from Newton's time to the present days. These often involve question of dynamics, i.e. of how and why things change with time. Problems of this kind lie at the heart of applied mathematics, physics, and engineering. The book is aimed at a wide readership, and assumes only some knowledge of elementary calculus. There are exercises (with full solutions) and a simple but powerful computer program.

**Acta numerica 1997.** — Volume 6. — Un vol. relié, 18 × 25, de 551 p. — Prix: £38.00. — Cambridge, Cambridge University Press, 1997.

R. Cools: Constructing cubature formulae. — W. Dahmen: Wavelet and multiscale methods for operator equations. — L. Greengard and V. Rokhlin: A new version of the fast multipole method for the Laplace equation in three dimensions. — M.H. Gutknecht: Lanczos-type solvers for nonsymmetric linear systems of equations. — T.Y. Li: Numerical solution of multivariate polynomial systems by homotopy continuation methods. — R.L. Petzold, L.O. Jay and J. Yen: Numerical solution of highly oscillatory ordinary differential equations. — C. Ringhofer: Computational methods for semiclassical and quantum transport in semiconductor devices. — S. Smale: Complexity theory and numerical analysis.

**Topological nonlinear analysis II: degree, singularity and variations.** — Edited by Michele Matzeu and Alfonso Vignoli. — Progress in nonlinear differential equations and their applications, vol. 27. — Un vol. relié, 16 × 24, de VI, 601 p. — Prix: SFr. 218.00. — Birkhäuser, Boston, 1997.

The main purpose of the present volume is to give a survey of some of the most significant achievements obtained by topological methods in nonlinear analysis during the last three decades. The survey articles presented are concerned with three main streams of research, that is topological degree, singularity theory and variational methods. They reflect the personal taste of the authors, all of them well known and distinguished specialists. A common feature of these articles is to start with an historical introduction and conclude with recent results, giving a dynamic picture of the state of the art on these topics.

Augustin BANYAGA. — **The structure of classical diffeomorphism groups.** — Mathematics and its applications, vol. 400. — Un vol. relié, 17 × 25, de XI, 197 p. — Prix: Dfl. 180.00. — Kluwer Academic Publishers, Dordrecht, 1997.

The book introduces and explains most of the main techniques and ideas in the study of the structure of diffeomorphism groups. A quite complete proof of Thurston's theorem on the simplicity of some diffeomorphism groups is given. The method of the proof is generalized to symplectic and volume-preserving diffeomorphisms. The Mather-Thurston theory relating foliations with diffeomorphism groups is outlined. A central role is played by the flux homomorphism. Various cohomology classes connected with the flux are defined on the group of diffeomorphisms. The main results on the structure of diffeomorphism groups are applied to showing that classical structures are determined by their automorphism groups, a contribution to the Erlanger Program of Klein.

Uri ELIAS. — **Oscillation theory of two-term differential equations.** — Mathematics and its applications, vol. 396. — Un vol. relié, 17 × 25, de VII, 217 p. — Prix: Dfl. 185.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This volume considers the two-term linear differential equations  $L_n y + p(x)y = 0$ , where  $L_n$  is a disconjugate operator of order  $n$  and  $p(x)$  has a fixed sign. Special attention is paid to the

equation  $y^{(n)} + p(x)y = 0$ . These equations enjoy a very rich structure and are the natural generalization of the Sturm-Liouville operator. Many proofs are given and the original proof is never copied verbatim. Numerous new results are included. Among the topics which are discussed are oscillation and nonoscillation, disconjugacy, various types of disfocality, extremal configurations of zeros, comparison theorems, classification of solutions according to their behaviour near infinity and their dominance properties.

Jürgen FUCHS, Christoph SCHWEIGERT. — **Symmetries, Lie algebras and representations: a graduate course for physicists.** — Cambridge monographs on mathematical physics. — Un vol. relié, 18,5 × 25,5, de xxi, 438 p. — Prix: £60.00. — Cambridge University Press, Cambridge, 1997.

The first three chapters show how Lie algebras arise naturally from symmetries of physical systems and illustrate through examples much of their general structure. Chapters 4 to 13 give a detailed introduction to Lie algebras and their representations, covering the Cartan-Weyl basis, simple and affine Lie algebras, real forms and Lie groups, the Weyl group, automorphisms, loop algebras and highest weight representations. Chapters 14 to 22 cover specific further topics, such as Verma modules, Casimirs, tensor products and Clebsch-Gordan coefficients, invariant tensors, subalgebras and branching rules, Young tableaux, spinors, Clifford algebras and supersymmetry, representations on function spaces, and Hopf algebras and representation rings.

**Numerical methods in finance.** — Edited by L.C.G. Rogers and D. Talay. — Publications of the Newton Institute. — Un vol. relié, 16 × 24, de x, 326 p. — Prix: £35.00. — Cambridge University Press, Cambridge, 1997.

This book, based on lectures given at the Newton Institute as a part of a broader programme, describes a wide variety of numerical methods used in financial analysis: computation of option prices, especially of American option prices, by finite difference and other methods; numerical solution of portfolio management strategies; statistical procedures, identification of models; Monte Carlo methods; numerical implications of stochastic volatilities. Articles have been written in pedagogic style and made reasonably self-contained, covering both mathematical matters and practical issues in numerical problems.

**Modern software tools for scientific computing.** — Edited by E. Arge, A.M. Bruaset, H.P. Langtangen. — Un vol. relié, 16 × 24, de 380 p. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1997.

This book presents 17 carefully selected and refereed chapters originally presented at the SciTools'96 Workshop in Oslo, Norway. The chapters emphasize the design of large software codes, computational efficiency, object-oriented programming in scientific computing, reliability of numerical software, and parallel computing. Some topics and features: parallel CFD software, multilevel methods for PDEs, advanced ODE solvers, computational steering, computational finance, scattered data approximation, splines and hierarchical surfaces, high-level algorithmic specification, automatic code generation, etc.

Richard P. STANLEY. — **Enumerative combinatorics, vol. 1.** — Cambridge studies in advanced mathematics, vol. 49. — Un vol. relié, 16 × 24, de xi, 325 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1997.

This book is the first of a two-volume basic introduction to enumerative combinatorics at a level suitable for graduate students and research mathematicians. Much of the book is devoted to the theory and applications of generating functions, a fundamental tool in enumerative combinatorics. The four chapters are devoted to an introduction to enumeration, sieve methods, partially

ordered sets, and rational generating functions. The material was chosen to cover those parts of enumerative combinatorics of greatest applicability and with the most important connections with other areas of mathematics.

**R.B. BAPAT, T.E.S. RAGHAVAN. — Nonnegative matrices and applications.** — Encyclopedia of mathematics and its applications, vol. 64. — Un vol. relié, 16×24, de XIII, 336 p. — Prix : £45.00. — Cambridge University Press, Cambridge, 1997.

This book presents an integrated treatment of the theory of nonnegative matrices, emphasizing connections with the themes of game theory, combinatorics, inequalities, optimization, and mathematical economics. Some related classes of positive matrices such as positive semidefinite matrices,  $M$ -matrices,  $P$ -matrices, and distance matrices are also discussed, but the main emphasis is on entrywise nonnegative matrices. About half of the material in the book presents standard topics in a novel fashion, the remaining portion reports many new results in matrix theory for the first time in a book form.

**Comparison geometry.** — Edited by Karsten Grove and Peter Petersen. — Mathematical Sciences Research Institute Publications, vol. 30. — Un vol. relié, 16×24, de x, 262 p. — Prix : £30.00. — Cambridge University Press, Cambridge, 1997.

This book documents the recent focus on a branch of Riemannian geometry called comparison geometry. This volume is an up-to-date reflection of the recent development regarding spaces with lower (or two-sided) curvature bounds. The content of the volume reflects some of the most exciting activities in comparison geometry during the year and especially of the Mathematical Sciences Research Institute's workshop devoted to the subject. Both survey and research articles are featured. Each of the survey articles stems from recent developments concerning either classical or more recent important problems.

**Gauge theory and symplectic geometry.** — Edited by Jacques Hurtubise and François Lalonde, technical editor Gert Sabidussi. — NATO ASI series, Series C: Mathematical and physical sciences, vol. 488. — Un vol. relié, 16×24, de xvii, 212 p. — Prix : Dfl. 195.00. — Kluwer Academic Publishers, Dordrecht, 1997.

The present book includes some of the first expository material of Seiberg-Witten theory, which has revolutionised the subjects since its introduction in late 1994. Topics covered include : introductions to Seiberg-Witten theory, to applications of the S-W theory to four dimensional manifold topology, and to the classification of symplectic manifolds; an introduction to the theory of pseudo-holomorphic curves and to quantum cohomology; algebraically integrable Hamiltonian systems and moduli spaces, the stable topology of gauge theory, Morse-Floer theory, pseudo-convexity and its relations to symplectic geometry, generating functions, Frobenius manifolds and topological quantum field theory.

**Yoichi MOTOHASHI. — Spectral theory of the Riemann zeta-function.** — Cambridge tracts in mathematics, vol. 127. — Un vol. relié, 16×23,5, de ix, 228 p. — Prix : £29.95. — Cambridge University Press, Cambridge, 1997.

This book shows that the function is closely bound with automorphic forms and that many results from there can be woven with techniques and ideas from analytic number theory to yield new insights into, and views of, the zeta-function itself. The story starts with an elementary but unabridged treatment of the spectral resolution of the non-Euclidean Laplacian and the trace formulas. This is achieved by the use of standard tools from analysis rather than any heavy machinery, forging a substantial aid for beginners in spectral theory as well.

Alexandre DEDE. — **Exercices de mathématiques.** — Collection Major. — Un vol. broché,  $17,5 \times 24$ , de xii, 442 p. — Prix: FF 128.00. — Presses Universitaires de France, Paris, 1997.

Ce livre s'adresse aux étudiants des classes préparatoires HEC, voie économique, mais également aux étudiants du DEUG en sciences économiques. Il propose plus de 260 exercices corrigés portant sur le programme de première année. Un résumé de cours est systématiquement fourni au début de chaque chapitre, présentant les définitions et résultats essentiels que l'étudiant doit connaître. Les exercices sont de difficulté graduée, de l'exercice d'application immédiate du cours à l'exercice de niveau concours. Les solutions fournissent conseils et méthodes au lecteur.

K.L. CHUNG, R.J. WILLIAMS. — **Introduction to stochastic integration.** — Second edition. — Probability and its applications. — Un vol. relié,  $16 \times 23,5$ , de xv, 276 p. — Prix: SFr. 88.00. — Birkhäuser, Boston, 1990.

Using the modern approach, the stochastic integral is defined for predictable integrands and local martingales; then Itô's change of variable formula is developed for continuous martingales. Applications include a characterization of Brownian motion, Hermite polynomials of martingales, the Feynman-Kac functional and the Schrödinger equation. For Brownian motion, the topics of local time, reflected Brownian motion, and time change are discussed. New to the second edition are a discussion of the Cameron-Martin-Girsanov transformation and a final chapter which provides an introduction to stochastic differential equations, as well as many exercises for classroom use.

Jan CHABROWSKI. — **Variational methods for potential operator equations: with applications to nonlinear elliptic equations.** — de Gruyter studies in mathematics, vol. 24. — Un vol. relié,  $18 \times 24,5$ , de ix, 290 p. — Prix: DM 189.00. — Walter de Gruyter, Berlin, 1997.

In this book we are concerned with methods of the variational calculus which are directly related to the theory of partial differential equations of elliptic type. The methods which we discuss and describe here go far beyond elliptic equations. In particular, these methods can be applied to Hamiltonian systems, nonlinear wave equations and problems related to surfaces of prescribed mean curvature... The material discussed and covered by this book requires some knowledge of functional analysis, nonlinear partial differential equations and the theory of Sobolev spaces. For the reader's convenience, most of the required prerequisites are given in an appendix.

Pavel DRÁBEK, Alois KUFNER, Francesco NICOLOSI. — **Quasilinear elliptic equations with degenerations and singularities.** — de Gruyter series in nonlinear analysis and applications, vol. 5. — Un vol. relié,  $18 \times 24,5$ , de xii, 219 p. — Prix: DM 198.00. — Walter de Gruyter, Berlin, 1997.

The book focuses on the existence and bifurcation of weak solutions in appropriate weighted Sobolev spaces. The main tools are functional analytic methods based on the variational approach and the theory of topological degree of monotone type nonlinear mappings. Topics covered include: existence results for second order boundary value problems on bounded as well as unbounded domains based on special (truncation) techniques; existence results for higher order boundary value problems in a rather general setting; an extensive study of the  $\tilde{n}$ -Laplacian and its degenerated and singular modifications, mainly existence and bifurcation results on bounded domains as well as on the whole Euclidean space.

**Computer-intensive methods in control and signal processing: the curse of dimensionality.** — Edited by Kevin Warwick, Miroslav Káry. — Un vol. relié, 16,5 × 24,5, de XVI, 303 p. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1997.

Due to the rapid increase in readily available computing power, a corresponding increase in the complexity of problems being tackled has occurred in the field of systems. A plethora of new methods which can be used on the problems has also arisen with a constant desire to deal with more difficult applications. Unfortunately, by increasing the accuracy in models employed, along with the use of appropriate algorithms, the resultant computations can often be of very high dimension, leading to practical difficulties in solving them. This brings with it a whole new breed of problem which has come to be known as “the curse of dimensionality”. This book is based upon the 2<sup>nd</sup> IEEE European Workshop on Computer-Intensive Methods in Control and Signal Processing, in Prague, August 1996.

Maurice AUSLANDER, Idun REITEN, Sverre O. SMALØ. — **Representation theory of Artin algebras.** — Cambridge studies in advanced mathematics, vol. 36. — Un vol. broché, 15,5 × 23, de XIV, 425 p. — Prix: £22.95 (relié: £55.00). — Cambridge University Press, Cambridge, 1997.

The main aim of the book is to illustrate how the theory of almost split sequences is used in the representation theory of Artin algebras. However, other foundational aspects of the subject are developed: for example, the representations of quivers with relations and their interpretation as modules over the factors of path algebras are discussed in detail. These results give concrete illustrations of some of the more abstract concepts and theorems. The book includes complete proofs of all theorems, and numerous exercises.

**Geometry, combinatorial designs and related structures.** — Proceedings of the first Pythagorean conference. — Edited by J.W.P. Hirschfeld, S.S. Magliveras, M.J. de Resmini. — London Mathematical Society lecture note series, vol. 245. — Un vol. broché, 15,5 × 23, de VII, 258 p. — Prix: £27.95. — Cambridge University Press, Cambridge, 1997.

An introductory chapter discusses topics presented in each of the main chapters, and is followed by articles from leading international figures in the field. These include a discussion of the current state of finite geometry from a group-theoretical viewpoint, and surveys of difference sets and of small embeddings of partial cycle systems into Steiner triple systems. Also presented are successful searches for spreads and packing of designs, rank three geometries with simplicial residues and generalized quadrangles satisfying Veblen’s Axiom. In addition, there are articles on new 7-designs, biplanes, various aspects of triple systems, and many other topics.

Henry MCKEAN, Victor MOLL. — **Elliptic curves: function theory, geometry, arithmetic.** — Un vol. relié, 16,5 × 23,5, de XIII, 280 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1997.

After an informal preparatory chapter on rational functions, Riemann surfaces, and the like, the book follows a historical path, beginning with practical examples of elliptic integrals and the discovery of Abel and Gauss that the inversion of such an integral yields an elliptic function. This is followed by chapters on Jacobi’s theta functions, modular groups and modular functions, Abel’s and Hermite’s work on the quintic, Kronecker and Weber’s imaginary quadratic field, and the Mordell-Weil theorem on the rational points of elliptic curves.

Lynn Margaret BATTEN. — **Combinatorics of finite geometries.** — Second edition. — Un vol. broché, 15×23, de xiv, 193 p. — Prix: £16.95 (relié: £45.00). — Cambridge University Press, Cambridge, 1997.

This book begins with an elementary combinatorial approach to finite geometries based on finite sets of points and lines, and moves into the classical work on affine and projective planes. This is followed by chapters dealing with polar spaces, partial geometries, and generalized quadrangles. The second edition contains an entirely new chapter on blocking sets in linear spaces, which highlights some of the most important applications of blocking sets — from the initial game-theoretic setting to their very recent use in cryptography.

Nicholas PIPPENGER. — **Theories of computability.** — Un vol. relié, 16×23,5, de ix, 251 p. — Prix: £30.00. — Cambridge University Press, Cambridge, 1997.

This book gives an account of computability that embraces not only the general theory created by Turing and others in the 1930s, but also the theory of finite functions and relations initiated by Post, the theory of regular languages from a number of points of view (finite automata, regular expressions, logical expressions, etc.), and the theory of other families of languages (especially context-free languages). These are addressed from the classical perspective of their generation by grammars and from the more modern perspective as rational cones. The treatment of the classical theory of computable functions and relations takes the form of a tour through basic recursive function theory, starting with an axiomatic foundation and developing the essential methods to survey the most memorable results of the field.

Frank O. WAGNER. — **Stable groups.** — London Mathematical Society lecture note series, vol. 240. — Un vol. broché, 15,5×23, de ix, 309 p. — Prix: £27.95. — Cambridge University Press, Cambridge, 1997.

The study of stable groups connects model theory, algebraic geometry and group theory. It analyses groups which possess a certain very general dependence relation (Shelah's notion of "forking"), and tries to derive structural properties from this. These may be group-theoretic (nilpotency or solubility of a given group), algebro-geometric (identification of a group as an algebraic group), or model-theoretic (description of the definable sets). In this book, the general theory of stable groups is developed from the beginning (including a chapter on preliminaries in group theory and model theory), concentrating on the model- and group-theoretic aspects.

**Geometric Galois actions.** — Vol. 1: Around Grothendieck's *Esquisse d'un programme*, and vol. 2: The inverse Galois problem, moduli spaces and mapping class group. — Edited by Leila Schneps and Pierre Lochak. — London Mathematical Society lecture note series, vol. 242 et 243. — 2 vol. brochés, 15,5×23, de 293 p. et ix, 347 p. respectivement. — Prix: £24.95 chacun des deux volumes. — Cambridge University Press, Cambridge, 1997.

The first of these two companion volumes on anabelian algebraic geometry, contains the famous, but hitherto unpublished manuscript *Esquisse d'un programme* (Sketch of a program) by Alexandre Grothendieck. This work, written in 1984, fourteen years after his retirement from public life in mathematics, together with the closely connected letter to Gerd Faltings, dating from 1983 and also published for the first time in this volume, describe a powerful program of future mathematics, unifying aspects of geometry and arithmetic via the central point of moduli spaces of curves; it is written in an artistic and informal style. The book also contains several articles on subjects directly related to the ideas explored in the manuscripts; these are surveys of mathematics due to Grothendieck, explanations of points raised in the *Esquisse*, and surveys on progress in the domains described there. — From the introduction of the second volume: "This

volume grew out of the conference which was held at Luminy in August 1995 on the theme “Geometry and arithmetic of moduli spaces”. In some sense, it was conceived as a sequel to the 1993 Luminy Conference on “*The Grothendieck Theory of Dessins d’Enfants*”... The second conference revolved mostly around some “multidimensional” versions of the themes considered in the first one.

Alfred North WHITEHEAD and Bertrand RUSSELL. — **Principia mathematica to \*56.** — Cambridge Mathematical Library. — Un vol. broché, 15,5×23, de XLVI, 410 p. — Prix: £32.50. — Cambridge University Press, Cambridge, 1997.

The great three-volume Principia Mathematica is deservedly the most famous work ever written on the foundations of mathematics. This abridged text of volume I contains the material that is most relevant to an introductory study of logic and the philosophy of mathematics. It contains the whole of the preliminary sections... , the whole of part I (in which the logical properties of propositions, propositional functions, classes and relations are established), section A of part II (dealing with unit classes and couples), and appendices A and C (which give further developments of the argument on the theory of deduction and truth functions).

**Intuitive geometry.** — Edited by Imre Bárány, Károly Böröczky. — Bolyai Society mathematical studies, vol. 6. — Un vol. relié, 17,5×24,5, de 443 p. — János Bolyai Mathematical Society, Budapest, 1997.

This book is the proceedings of the fifth Intuitive Geometry Conference that was held in Budapest, Sept 3-8, 1995. It contains eight surveys and several research papers. — *Surveys*: I. Bárány, S. Onn: Carathéodory’s theorem, colourful and applicable. — P. Goodey, R. Schneider, W. Weil: Projection functions of convex bodies. — Y.S. Kupitz, H. Martini: Geometric aspects of the generalized Fermat-Torricelli problem. — M. Lassak: A survey of algorithms for on-line packing and covering by sequences of convex bodies. — P. McMullen: Polytope algebras, tensor weights and piecewise polynomials. — F. Shahrokhi, O. Sykora, L. Székely, I. Vrto: Crossing numbers: bounds and applications. — L. Szabó: Recent results on illumination problems. — J. Wills: Sphere packings, lattices and crystals. — *Research papers*: The twenty-one research papers in the volume contain significant new results.

**Handbook of numerical analysis, vol. 5: Techniques of scientific computing (part 2).** — Edited by P.G. Ciarlet, J.-L. Lions. — Un vol. relié, 17,5×24,5, de x, 818 p. — Prix: Dfl. 300.00. — North-Holland/Elsevier, Amsterdam, 1997.

This series of volumes aims to cover all the major aspects of numerical analysis, serving as the basic reference work on the subject. Each volume will concentrate on one, two, or three, particular topics. Each article, written by an expert, is an in-depth survey, reflecting the most recent trends in the field, and is essentially self-contained. — *Contents of vol. 5*: E.L. Allgower and K. Georg: Numerical path following. — C. Bernardi and Y. Maday: Spectral methods. — G. Caloz and J. Rappaz: Numerical analysis for nonlinear and bifurcation problems. — Y. Meyer: Wavelets and fast numerical algorithms. — J.-J. Risler: Computer aided geometric design.

Frank C. HOPPENSTEADT. — **An introduction to the mathematics of neurons: modeling in the frequency domain.** — Second edition. — Cambridge studies in mathematical biology, vol. 6. — Un vol. broché, 15,5×23, de xx, 211 p. — Prix: £16.95 (relié: £45.00). — Cambridge University Press, Cambridge, 1997.

Signal processing aspects of neural networks are presented and studied in this book. Background material in electronic circuits, mathematical modeling and analysis, signal processing, and neurosciences are presented first, followed by three chapters of applications.

Small and large networks of neurons are described. A theory of mnemonic surfaces is developed. Throughout, the focus is on the network's behavior near places where phase changes can occur.

Kendall E. ATKINSON. — **The numerical solution of integral equations of the second kind.** — Un vol. relié, 16×23,5, de xvi, 552 p. — Prix: £50.00. — Cambridge University Press, Cambridge, 1997.

The initial chapters provide a general framework for the numerical analysis of Fredholm integral equations of the second kind, covering degenerate kernel, projection, and Nyström methods. Additional discussions of multivariable integral equations and iteration methods update the reader on the state of the art in this area. The final chapters focus on the numerical solution of boundary integral equation reformulations of Laplace's equation, in both two and three dimensions.

A.N. SHARKOVSKY, S.F. KOLYADA, A.G. SIVAK and V.V. FEDORENKO. — **Dynamics of one-dimensional maps.** — Mathematics and its applications, vol. 407. — Un vol. relié, 16×25, de ix, 261 p. — Prix: Dfl. 270.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This volume has two main goals. Firstly, it acquaints the reader with the fundamentals of the theory of one-dimensional dynamical systems. Very simple nonlinear maps with the single point of extremum, also called unimodal maps, are studied. Unimodality is found to impose hardly any restrictions on the dynamical behaviour. Secondly, it equips the reader with the comprehensive view of the problems appearing in the theory of dynamical systems and describes the methods used for their solution in the case of one-dimensional maps.

Hidetoshi MARUBAYASHI, Haruo MIYAMOTO and Akira UEDA. — **Non-commutative valuation rings and semi-hereditary orders.** — K-monographs in mathematics, vol. 3. — Un vol. relié, 16,5×24,5, de viii, 191 p. — Prix: Dfl. 160.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This is the first self-contained summary of non-Noetherian orders in a simple Artinian ring, a subject in which much progress has been made in the last decade. The contents of the book are mainly Dubrovin valuation rings and semi-hereditary orders, including Prüfer and semi-local Bezout orders, which are considered, in a sense, as global theories of Dubrovin valuation rings. These are then developed further, and applied to give some examples such as Dubrovin valuation rings in crossed product algebras, semi-hereditary maximal order in certain matrix rings, and the idealizers of semi-hereditary orders and Henselization of Bezout orders.

E.S. LJAPIN and A.E. EVSEEV. — **The theory of partial algebraic operations.** — Mathematics and its applications, vol. 414. — Un vol. relié, 16×25, de x, 235 p. — Prix: Dfl. 225.00. — Kluwer Academic Publishers, Dordrecht, 1997.

The main aim of this book is to present a systematic theory of partial groupoids, the so-called "paragoids", i.e. systems with a single partial binary operation, giving the foundations of this theory, the main problems, and its most important results with full proofs. Attention is paid to specific features of the theory of partial groupoids. This theory is distinct from the theory of total operations (groups, semi-groups etc.) and the theory of transformations, but they are connected, and their relations are also studied.

N.L. GOL'DMAN. — **Inverse Stefan problems.** — Mathematics and its applications, vol. 412. — Un vol. relié, 16×24, de vi, 250 p. — Prix: Dfl. 225.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This monograph presents a new theory and methods of solving inverse Stefan problems for quasilinear parabolic equations in domains with free boundaries. This new approach to the

theory of ill-posed problems is useful for the modelling of nonlinear processes with phase transforms in thermophysics and mechanics of continuous media. Regularisation methods and algorithms are developed for the numerical solution of inverse Stefan problems ensuring substantial savings in computational costs. Results of calculations for important applications in a continuous casting and for the treatment of materials using laser technology are also given.

**Microlocal analysis and spectral theory.** — Edited by Luigi Rodino. — NATO ASI series, Series C: Mathematical and physical sciences, vol. 490. — Un vol. relié, 16,5 × 24,5, de VIII, 443 p. — Prix: Dfl. 360.00. — Kluwer Academic Publishers, Dordrecht, 1997.

There has been considerable recent progress in the field of microlocal analysis. In a broad sense the subject is the modern version of the classical Fourier technique for solving partial differential equations, with the localization process taking account of dual variables.

The papers collected here emphasize the topics of microlocal methods in the study of linear PDEs (analytic-Gevrey regularity of the solutions, elliptic boundary value problems, higher microlocalization), and applications to spectral theory (Schrödinger equation, asymptotic behaviour of the eigenvalues, semiclassical analysis in large dimensions and statistical mechanics).

**Operator algebras and applications.** — Edited by Aristides Katavatos. — NATO ASI series, Serie C: Mathematical and physical sciences, vol. 495. — Un vol. relié, 16,5 × 14,5, de IX, 467 p. — Prix: Dfl. 335.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This volume presents a survey of some of the latest developments in the field in a form that is detailed enough to be accessible to advanced graduate students as well as researchers in the field. Among the topics treated are: operator spaces, Hilbert modules, limit algebras, reflexive algebras and subspaces, relations to basis theory,  $C^*$  algebraic quantum groups, endomorphisms of operator algebras, conditional expectations and projection maps, and applications, particularly to wavelet theory. The volume also features an historical paper offering a new approach to the Pythagoreans' discovery of irrational numbers.

Ravi R. AGARWAL and Patricia J.Y. WONG. — **Advanced topics in difference equations.** — Mathematics and its applications, vol. 404. — Un vol. relié, 16 × 25, de 507 p. — Prix: Dfl. 395.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This monograph is a collection of the results the authors have obtained on difference equations and inequalities. In the last few years this discipline has gone through such a dramatic development that it is no longer feasible to present an exhaustive survey of all research. However, this state-of-the-art volume offers a representative overview of the authors' recent work, reflecting some of the major advances in the field as well as the diversity of the subject.

**The mathematics of long-range aperiodic order.** — Edited by Robert V. Moody. — NATO ASI series, Series C: Mathematical and physical sciences, vol. 489. — Un vol. relié, 16 × 25, de xv, 555 p. — Prix: Dfl. 420.00. — Kluwer Academic Publishers, Dordrecht, 1997.

In this book devoted entirely to the mathematics of long-range aperiodic order the reader will find survey and research articles on the major areas of mathematics and mathematical physics that are emerging in this new field, including tilings, discrete geometry, diffraction and harmonic analysis, self similarity and symmetry, non-crystallographic root systems, the cut and project method, number theoretical considerations, aperiodic Ising models and Schrödinger operators.

Nikolai N. TARKHANOV. — **The analysis of solutions of elliptic equations.** — Mathematics and its applications, vol. 406. — Un vol. relié, 17×24,5, de xx, 479 p. — Prix: Dfl. 395.00. — Kluwer Academic Publisher, Dordrecht, 1997.

This volume focuses on the analysis of solutions to general elliptic equations. A wide range of topics is touched upon, such as removable singularities, Laurent expansions, approximation by solutions, Carleman formulas, quasiconformality. While the basic setting is the Dirichlet problem for the Laplacian, there is some discussion of the Cauchy problem. Care is taken to distinguish between results which hold in a very general setting (arbitrary elliptic equations with the unique continuation property) and those which hold under more restrictive assumptions on the differential operators (homogeneous, of first order).

Guri I. MARCHUK. — **Mathematical modelling of immune response in infectious diseases.** — Mathematics and its applications, vol. 395. — Un vol. relié, 16×25, de viii, 347 p. — Prix: Dfl. 280.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This is the first monograph to present a unified approach to using mathematical models in the study of qualitative and quantitative regularities of immune response dynamics in infectious diseases within individual organisms. These mathematical models are formulated as systems of delay-differential equations. Simple mathematical models of infectious diseases, antiviral immune response and antibacterial response were developed and applied to the study of hepatitis B, influenza A, infectious bacterial pneumonia, and mixed infections. Particular attention was paid to the development of efficient computational procedures for solving the initial value problem for stiff delay-differential equations and to the parameter identification problem.

J.P. WARD. — **Quaternions and Cayley numbers: algebra and applications.** — Mathematics and its applications, vol. 403. — Un vol. broché, 16×25, de xi, 235 p. — Prix: Dfl. 195.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This monograph is an accessible account of the normed algebras over the real field, particularly the quaternions and the Cayley numbers. The application of quaternions to spherical geometry and mechanics is considered and the relation between quaternions and rotations in 3- and 4-dimensional Euclidean space is fully developed. The algebra of complexified quaternions is described and applied to electromagnetism and to special relativity. By looking at a 3-dimensional complex space the author explores the use of a quaternion formalism to the Lorentz transformation and examines the classification of electromagnetic and Weyl tensors. In the final chapter, extensions of quaternion algebra to the alternative non-associative algebra of Cayley numbers are investigated.

**Advances in combinatorial methods and applications to probability and statistics.** — Edited by N. Balakrishnan. — Statistics for industry and technology. — Un vol. relié, 18×26, de xxxiv, 562 p. — Prix: SFr. 148.00. — Birkhäuser, Boston, 1997.

In this book, recent advances in lattice paths and combinatorial problems are described and surveyed for results and methodologies. Their significant applications are extensively surveyed in a number of important areas: the study of urn models, queueing theory, study of waiting time problems, statistical distribution theory, and in the development of nonparametric statistics. Numerous examples are also presented to provide the reader with a clear understanding of the methods presented, as well as insight into their applications.

Carlos S. KUBRUSLY. — **An introduction to models and decompositions in operator theory.** — Un vol. relié, 16×24, de xii, 132 p. — Prix: SFr. 68.00. — Birkhäuser, Boston, 1997.

Decompositions and models for Hilbert-space operators have been very active research topics in operator theory over the past three decades. This book is intended as an introduction to

this crucial part of operator theory, providing for the student a unified access, from an abstract point of view, to an active research field. It focuses on decompositions and models as if they were the main characters in a plot, chosen from a myriad of equally important characters and highlighted for their illustrative attributes. The approach is elementary in the sense that all proofs use only standard results of single operator theory.

**S.L. SOBOLEV and V.L. VASKEVICH.** — **The theory of cubature formulas.** — Mathematics and its applications vol. 415. — Un vol. relié, 17×25, de xxi, 416 p. — Prix: Dfl. 350.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This volume considers various methods for constructing cubature and quadrature formulas of arbitrary degree. These formulas are intended to approximate the calculation of multiple and conventional integrals over a bounded domain of integration. Particular emphasis is placed on invariant cubature formulas and those for a cube, a simplex, and other polyhedra. Here, the techniques of functional analysis and partial differential equations are applied to the classical problem of numerical integration, to establish many important and deep analytical properties of cubature formulas.

**A. GARDINER.** — **The Mathematical Olympiad handbook: an introduction to problem solving based on the first 32 British Mathematical Olympiads 1965-1996.** — Oxford science publications. — Un vol. broché, 15,5×23,5, de xii, 229 p. Prix: £ 14.95. — Oxford University Press, Oxford, 1997.

The book gives hints and outline solutions to each problem from the first 32 British Mathematical Olympiads from 1975 onwards. An overview is given of the basic mathematical skills needed, and a list of books for further reading is provided. Working through the exercises provides a valuable source of extension and enrichment for all pupils and adults interested in mathematics.

**M. POHST and H. ZASSENHAUS.** — **Algorithmic algebraic number theory.** — Encyclopedia of mathematics and its applications, vol. 30. — Un vol. broché, 15×22,5, de xiv, 499 p. — Prix: £ 24.95 (relié: £ 70.00). — Cambridge University Press, Cambridge, 1997.

Now in paperback, this classic book is addressed to all lovers of number theory. On the one hand, it gives a comprehensive introduction to constructive algebraic number theory, and is suited as a textbook for a course on that subject. On the other hand many parts go beyond an introduction and make the user familiar with recent research in the field. Both computer scientists interested in higher arithmetic and those teaching algebraic number theory will find the book of value.

**New results in operator theory and its applications: the Israel M. Glazman Memorial Volume.** — Edited by I. Gohberg, Yu. Lyubich. — Operator theory: advances and applications, vol. 98. — Un vol. relié, 17×24, de vi, 257 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1997.

This volume is dedicated to the memory of Israel Glazman, an outstanding personality and distinguished mathematician. The present book opens with an essay devoted to Glazman's life and scientific achievements. It focuses on the areas of his unusually wide interests and consists of 18 mathematical papers in spectral theory of differential operators and linear operators in Hilbert and Banach spaces, analytic operator functions, ordinary and partial differential equations, functional equations, mathematical physics, nonlinear functional analysis, approximation theory and optimization, and mathematical statistics.