BULLETIN BIBLIOGRAPHIQUE

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Généralités

Howard ANTON. — **Calculus, vol. 1.** — 6th edition. — Un vol. broché, $21,5 \times 26$, de XXXI, 560 p. + 1 CD-ROM. — ISBN 0-471-24331-0. — Prix: £17.99. — John Wiley & Sons, New York, 1998.

This is a major revision. In keeping with current trends in calculus, the goal for this edition is to focus on conceptual understanding and applicability of the subject matter. This edition is designed to ensure that the book is sufficiently flexible that it will continue to meet the needs of those using the last edition and at the same time provide a fresh approach for those instructors who are taking their calculus course in a new direction. An internet experimental site has been established to complement the text. The joined CD-ROM for IBM compatibles and Macintosh provides students with an electronic form of detailed solutions to odd-numbered exercises, sample tests, pre-calculus review material, a brief introduction to some aspects of linear algebra.

Alan L. CARAY, Michael K. MURRAY, (Editors). — **Geometric analysis and Lie theory in mathematics and physics.** — Australian Mathematical Society lecture series, vol. 11. — Un vol. broché, $15,5 \times 23$, de IX, 290 p. — ISBN 0-521-62490-8. — Prix: £24.95. — Cambridge University Press, Cambridge, 1997.

This book brings together a selection of the best lectures from many graduate workshops held at the Australian National Institute for Theoretical Physics in Adelaide. The lectures presented here describe subjects currently of great interest, generally at the interface between mathematics and physics. Topics covered include quantum groups, the operator algebra approach to the integer quantum Hall effect, solvable lattice models and Hecke algebras, Yangians, equivariant cohomology and symplectic geometry, and von Neumann invariants of covering spaces.

Eric CONNALLY, Deborah HUGHES-HALLETT. — **Functions modeling change: a preparation for calculus, preliminary edition.** — Student solutions manual. — Un vol. broché, $21,5 \times 28$, de 173 p. — ISBN 0-471-23781-7. — Prix: £22.50. — John Wiley & Sons, New York, 1998.

This book contains the solutions of exercises provided in the manual with the same title. The central theme of the manual is functions as models of change. The authors emphasize that functions can be grouped into families and that functions can be used as models for real-world behavior. Because linear, exponential, power, and periodic functions are more frequently used to model physical phenomena, they are introduced before polynomial and rational functions. Once introduced, a family of functions is compared and contrasted with other families of functions.

Peter J. Eccles. — **An introduction to mathematical reasoning: numbers, sets and functions.** — Un vol. broché, 15,5×23, de xii, 350 p. — ISBN 0-521-59718-8. — Prix: £14.95 (relié: £40.00). — Cambridge University Press, Cambridge, 1997.

The purpose of this book is to introduce the basic ideas of mathematical proof to students embarking on university mathematics. The emphasis is on helping the reader in understanding and constructing proofs and writing clear mathematics. This is achieved by exploring set theory, combinatorics and number theory, topics which include many fundamental ideas which are part of the tool kit of any mathematician. There are over 250 problems which include questions to interest and challenge the most able student but also plenty of routine exercises to help familiarize the reader with the basic ideas.

A.C. Fowler. — **Mathematical models in the applied sciences.** — Cambridge texts in applied mathematics. — Un vol. broché, 17,5×24,5, de xiv, 402 p. — ISBN 0-521-46703-9. — Prix: £24.95 (relié: £65.00). — Cambridge University Press, Cambridge, 1997.

This book illustrates how models of continuous processes in a variety of applications can be derived, simplified, and analyzed. Using examples from an impressive array of disciplines, including industrial, environmental, and biological sciences, the presentation emphasizes the uniformity of the approach used by the applied mathematical grounding in calculus and analysis and provides a wealth of examples for students of mathematics, engineering, and the range of applied sciences.

Bernard Gostiaux. — **Exercices de mathématiques spéciales, t. 1: Algèbre.** — Collection «Mathématiques». — Un vol. broché, 15×21,5, de xi, 248 p. — ISBN 2-13-048727-0. — Prix: FF 198.00. — Presses universitaires de France, Paris, 1997.

L'auteur s'est efforcé en rédigeant ces exercices, de répondre à la question qui se pose à tous les candidats au concours de grandes écoles: comment organiser rationnellement la recherche de la solution d'un problème? Dans cet esprit, le présent ouvrage ne se limite pas à l'énoncé d'une collection de résultats à connaître, mais se veut constituer un essai d'exposition par l'exemple d'une méthode de travail.

Bernard Gostiaux. — **Exercices de mathématiques spéciales, t. 2: Topologie, analyse.** — Collection «Mathématiques». — Un vol. broché, 15×21,5, de 305 p. — ISBN 2-13-048728-9. — Prix: FF 218.00. — Presses universitaires de France, Paris, 1997.

Ces exercices de topologie et d'analyse ont été choisis avec le souci de montrer comment faire usage de parties partout denses dans un espace, pour ramener la vérification d'une propriété ponctuelle sur l'espace à une telle partie, en présence de stabilité par continuité. Ce type de méthode présente certaines analogies avec l'utilisation de parties génératrices pour caractériser les morphismes en algèbre. La notion de connexité a été développée pour mettre en évidence ses applications.

Bernard Gostiaux. — **Exercices de mathématiques spéciales, t. 3: Géométrie, géométrie différentielle.** — Collection «Mathématiques». — Un vol. broché, 15×21,5, de 325 p. — ISBN 2-13-048729-7. — Prix: FF 218.00. — Presses universitaires de France, Paris, 1997.

Si l'utilisation de logiciels performants rend caducs de nombreux exercices de construction de courbes, elle ne dispense pas pour autant le candidat aux concours des grandes écoles de justifications rigoureuses. Le texte met en évidence la manière selon laquelle l'algèbre ou la topologie peuvent intervenir pour décomposer la résolution d'un travail compliqué en étapes simples. L'auteur a privilégié l'étude de questions où la géométrie analytique nécessite l'étude du mode de représentation et du choix du repère.

Jeremy GUNAWARDENA, (Editor). — **Idempotency.** — Publications of the Newton Institute, vol. 11. — Un vol. relié, 16×23,5, de XII, 443 p. — ISBN 0-521-55344-X. — Prix: £55.00. — Cambridge University Press, Cambridge, 1998.

Certain nonlinear optimisation problems arising in such disparate areas as the theory of computation, pure and applied probability, and mathematical physics can be solved by linear methods, provided one replaces the usual number system with one in which addition satisfies the idempotent law. Only recently has a systematic study of the subject emerged. This volume is a record of a workshop organised by Hewlett-Packard's Basic Research Institute in the Mathematical Sciences (BRIMS), which brought together for the first time many leading researchers in the area. It includes also a broad introduction to idempotency, and a bibliography of the subject.

Jürgen JOST. — **Postmodern analysis.** — Universitext. — Un vol. broché, 16×24, de XV, 353 p. — ISBN 3-540-63485-1. — Prix: DM 58.00. — Springer, Berlin, 1998.

The book is an introduction to advanced analysis at the beginning graduate level that blends a modern presentation with concrete examples and applications, in particular in the areas of calculus of variations and partial differential equations. The book does not strive for abstraction for its own sale, but tries rather to impart a working knowledge of the key methods of contemporary analysis, in particular those that are also relevant for application in physics. It provides a streamlined and quick introduction to the fundamental concepts of Banach space and Lebesgue integration theory and the basic notions of the calculus of variations, including Sobolev space theory.

François LE LIONNAIS. — **Les grands courants de la pensée mathématique.** — Avec un avant-propos de Jean Ballard et une lettre inédite de Paul Valéry, préface de Bernard Teissier. — Collection Histoire de la pensée. — Un livre broché, 14×21, de 533 p. — ISBN 2-7056-6332-0. — Prix: FF 180.00. — Hermann, Paris, 1998.

Ce livre a été l'un des ouvrages préférés de plusieurs générations de mathématiciens. Malgré les progrès des mathématiques pendant les dernières décennies, il reste fascinant; il aura juste cinquante ans en 1998. L'ouvrage est consacré aux mathématiques, mais ses lecteurs n'ont pas besoin d'être mathématiciens. On y trouve une idéologie des mathématiques, insensible au déclin des idéologies. C'est un livre collectif et la pérennité de tels livres est inhabituelle. C'est donc mieux qu'un classique: un livre rare.

Frank MORGAN. — **Calculus lite.** — Second edition. — Un vol. relié, 16×23,5, de XIV, 299 p. — ISBN 1-56881-070-9. — Prix: US$59.90. — A.K. Peters, Wellesley, Massachusetts, 1997.

Already used with great success at a variety of prestigious schools, this concise book would be an excellent foundation for any calculus course, allowing teachers to mold the material to their individual needs. This lean text covers single-variable calculus in less than 300 pages by getting right to the point, and stopping there, introducing some standard preliminary topics, such as trigonometry and limits, by using them in the calculus. This second edition includes a quick introduction to multivariable calculus: partial derivatives, double integrals, maximum-minimum problems. Earlier sections have been improved.

Hans-Heinrich NAEGELI. — **Mathématiques discrètes 1: fondements et arithmétique entière.** — Collection informatique. — Un vol. broché, 16×24, de XVII, 275 p. — ISBN 2-88074-356-7. — Prix: SFr. 69.60. — Presses polytechniques et universitaires romandes, Lausanne, 1998.

Le 1er tome de cet ouvrage traite les fondements des mathématiques discrètes, notamment les nombres naturels et entiers avec leur arithmétique, le mécanisme de l'induction, et il esquisse quelques applications de la matière présentée, comme la cryptographie et les codes utilisés en

télécommunications. L'originalité de ce livre consiste dans le fait qu'il propose d'allier une compréhension guidée par l'intuition à une démarche rigoureuse. Il comprend de nombreux exercices ainsi que des dialogues fictifs entre un étudiant et son professeur permettant de mieux cerner les pièges et les difficultés particulières.

Michael C. REED. — **Fundamental ideas of analysis.** — Un vol. relié, 18,5×26, de XII, 413 p. — ISBN 0-471-15996-4. — Prix: £24.95. — John Wiley, Chichester, 1998.

The ideas and methods of mathematics, long central to the physical sciences, now play an increasingly important role in a wide variety of disciplines. Analysis provides theorems that prove that results are true and provides techniques to estimate the errors in approximate calculations. The ideas and methods of analysis play a fundamental role in ordinary differential equations, probability theory, differential geometry, numerical analysis, complex analysis, partial differential equations, as well as in most areas of applied mathematics. — *Contents*: Sequences. The Riemann Integral. Differentiation. Sequences of Functions. Series of Functions. Differential Equations. Complex Analysis. Fourier Series. Probability Theory.

Joseph G. ROSENSTEIN, Deborah S. FRANZBLAU, Fred S. ROBERTS, (Editors). — **Discrete mathematics in the schools.** — DIMACS series in discrete mathematics and theoretical computer science, vol. 36. — Un vol. relié, 19×26, de XXXIII, 452 p. — ISBN 0-8218-0448-0. — Prix: £21.00. — American Mathematical Society, Providence, distributed by Oxford University Press, Oxford, 1998.

This volume is a collection of articles written by experienced primary, secondary, and collegiate educators. It explains why discrete mathematics should be taught in school classrooms and offers practical guidance on how to do so. Teachers of all levels will find a great deal of valuable material to help them. One main article provides a comprehensive and detailed view of discrete mathematics. Another surveys the resources that are available for teachers. School and district curriculum leaders will find material that addresses how discrete mathematics can be introduced into their curricula. College faculty members will find ideas and topics that can be incorporated into a variety of courses.

Gabor TOTH. — **Glimpses of algebra and geometry.** — Undergraduate texts in mathematics. Readings in mathematics. — Un vol. relié, 18×24, de XVIII, 308 p. — ISBN 0-387-98213-2. — Prix: DM 68.00. — Springer, New York, 1998.

The purpose of this book is to fill a gap between undergraduate and graduate mathematics studies. It is one of the few undergraduate texts to explore the subtle and sometimes puzzling connections between number theory, classical geometry, and modern algebra in a clear and easily understandable style. Over 160 computer-generated images, accessible to readers via the World Wide Web, facilitate an understanding of mathematical concepts and proofs even further.

Thomas TYMOCZKO, (Editor). — **New directions in the philosophy of mathematics: an anthology.** — Revised and expanded edition. — Un vol. broché, 15,5×23,5, de XVII, 436 p. — ISBN 0-691-03498-2. — Prix: US$24.95. — Princeton University Press, Princeton, 1998.

This provocative book goes beyond foundationalist questions to offer what has been called a "postmodern" assessment of the philosophy of mathematics – one that addresses issues of theoretical importance in terms of mathematical experience. By bringing together essays of leading philosophers, mathematicians, logicians, and computer scientists, the author reveals an evolving effort to account for the nature of mathematics in relation to other human activities. These accounts include such topics as the history of mathematics as a field of study, predictions about how computers will influence the future organization of mathematics, and what processes a proof undergoes before it reaches publishable form.

Histoire

Sir Michael ATIYAH, Daniel IAGOLNITZERN, (Editors). — **Fields medallists' lectures.** — World Scientific series in 20th century mathematics, vol. 5. — Un vol. broché, 16,5×25, de X, 632 p. — ISBN 981-02-3117-2. — Prix: £33.00 (relié: £60.00). — World Scientific, Singapore, 1997.

Although the Fields Medal does not have the same public recognition as the Nobel Prizes, they share a similar intellectual standing. A list of Fields Medallists and their contributions provides a bird's eye view of mathematics over the past 60 years. It highlights the areas in which, at various times, greatest progress has been made. This volume does not pretend to be comprehensive, nor is it a historical document. On the other hand, it presents 22 Fields Medallists and so provides a highly interesting and varied picture. The contributions themselves represent the choice of the individual medallists. They are either reproductions of already published works, or are new articles produced for this volume. Some are related to more current interests of the medallists.

Lars GÅRDING. — **Some points of analysis and their history.** — University lecture series, vol. 11. — Un vol. broché, 18×25,5, de VII, 88 p. — ISBN 0-8218-0757-9. — Prix: £10.00. — American Mathematical Society, Providence, distributed by Oxford University Press, Oxford, 1998.

This book is a collection of small essays containing the history and the proofs of some important and interesting theorems of analysis and partial differential operators in this century. Most of the results in the book are associated with Swedish mathematicians. Also included are the Tarski-Seidenberg theorem and Wiener's classical results in harmonic analysis and a delightful essay on the impact of distributions in analysis. All mathematical points are fully explained, but some require a certain mature understanding from the reader.

Jay R. GOLDMAN. — **The queen of mathematics: a historically motivated guide to number theory.** — Un vol. relié, 16,5×23,5, de XXIV, 525 p. — ISBN 1-56881-006-7. — Prix: US$59.95. — A.K. Peters, Wellesley, Massachusetts, 1998.

This book takes the unique approach of examining number theory as it developed from the 17th through 19th centuries. It introduces the reader to diverse mathematical players: Fermat, Euler, Lagrange, Legendre, Dedekind, Hilbert, and more. Gauss and his *Disquisitiones Arithmeticae* receive a particularly intensive treatment. The text then moves on to tackle some advanced themes including arithmetic on curves, geometry of numbers, p-adic numbers and valuations, and the interconnected topics of irrational and transcendental numbers and Diophantine approximation.

Frank SMITHIES. — **Cauchy and the creation of complex function theory.** — Un vol. relié, 16×24, de 216 p. — ISBN 0-521-59278-X. — Prix: £35.00. — Cambridge, Cambridge University Press, 1997.

The author analyses the process whereby Cauchy created the basic structure of complex analysis, describing first the eighteenth-century background before proceeding to examine the stages of Cauchy's own work, culminating in the proof of the residue theorem and his work on expansions in power series. Smithies describes how Cauchy overcame difficulties including false starts and contradictions brought about by over-ambitious assumptions, as well as the improvements that came about as the subject developed in Cauchy's hands. Controversies associated with the birth of complex function theory are described in detail. Throughout, new light is thrown on Cauchy's thinking during this watershed period.

Logique et fondements

Ravi B. Boppana, James F. Lynch, (Editors). — **Logic and random structures.** — DIMACS Workshop, November 5-7, 1995. — DIMACS series in discrete mathematics and theoretical computer science, vol. 33. — Un vol. relié, 18×26, de xii, 130 p. — ISBN 0-8218-0578-9. — Prix: £20.00. — American Mathematical Society, Providence R.I., distributed by Oxford University Press, Oxford, 1997.

The central theme of the DIMACS Workshop on Logic and Random Structures was the relationship between logic and probabilistic techniques in the study of finite structures. In the last several years, this subject has developed into a very active area of mathematical logic with important connections to computer science. The DIMACS workshop was the first of its kind devoted to logic and random structures. Recent work of leaders in the field is contained in the volume, as well as new theoretical developments and applications to computer science.

Bradd T. Hart, Alistair H. Lachlan and Matthew A. Valeriote, (Editors). — **Algebraic model theory.** — NATO ASI series. Series C, Mathematical and physical sciences, vol. 496. — Un vol. relié, 16,5×24,5, de xvii, 277 p. — ISBN 0-7923-4666-1. — Prix: Dfl. 210.00. — Kluwer Academic Publishers, Dordrecht, 1997.

Recent major advances in model theory include connections between model theory and Diophantine and real analytic geometry, permutation groups, and finite algebras. The present book contains lectures on recent results in algebraic model theory, covering topics from the following areas: geometric model theory, the model theory of analytic structures, permutation groups in model theory, the spectra of countable theories, and the structure of finite algebras. The lectures contain sufficient introductory material to be able to grasp the recent results presented.

D.L. Johnson. — **Elements of logic via numbers and sets.** — Springer undergraduate mathematics series. — Un vol. broché, 17×24, de x, 174 p. — ISBN 3-540-76123-3. — Prix: DM 44.00. — Springer, London, 1998.

In pure mathematics we are interested in why a particular formula is true rather than when to apply it. Intuition and statistical evidence are insufficient justification, so we need to construct a formal logical proof. The purpose of this book is to describe why such proofs are important, what they are made of, how to recognize valid ones, how to distinguish different kinds, and how to construct them. The author gives many useful examples and problems, many with fully-worked solutions at the end of the book.

Jacques Zahnd. — **Logique élémentaire: cours de base pour informaticiens.** — Collection informatique. — Un vol. broché, 16×24, de vii, 430 p. + 1 cahier «Formulaire de logique» de 20 p. — ISBN 2-88074-360-5. — Prix: SFr. 78.50. — Presses polytechniques et universitaires romandes, Lausanne, 1998.

Cet ouvrage enseigne les techniques de base pour effectuer les raisonnements de façon formelle sur des objets tels que programmes, structures de données, systèmes, processus, circuits logiques, ... Le raisonnement formel est un genre de calcul qui demande à être étudié, exercé et appliqué. C'est le but principal de ce livre qui fournit une formation de base, ne demande que très peu de connaissances préalables en mathématiques, et ne fait appel qu'à l'expérience générale du lecteur dans ce domaine.

Théorie des ensembles

Iain T. ADAMSON. — **A set theory workbook.** — Un vol. broché, 15,5×23,5, de VIII, 154 p. — ISBN 0-8176-4028-2. — Prix: SFr. 58.00. — Birkhäuser, Boston, 1998.

The plan of the book is unconventional. Part One gives a quick and clear overview of the basic definitions of the subject, interspersed with a large number of problems. Some of them are simple illustrations, others easy exercises, and still others the fundamental theorems of set theory. Part Two contains complete solutions to all the exercises and proofs of the theorems. The main purpose of this approach is to encourage readers, in the well known educational method of R.L. Moore, to try hard to prove results for themselves. Secondarily, it gives an easily accessible reference to the main results of the theory.

Krzysztof CIESIELSKI. — **Set theory for the working mathematician.** — London Mathematical Society student texts, vol. 39. — Un vol. broché, 15×23, de XI, 236 p. — ISBN 0-521-59465-0. — Prix: £13.95 (relié: £37.50). — Cambridge University Press, Cambridge, 1997.

This text presents methods of modern set theory as tools that can be usefully applied to other areas of mathematics. The author describes numerous applications in abstract geometry and real analysis and, in some cases, in topology and algebra. The book begins with a tour of the basics of set theory, culminating in a proof of Zorn's lemma and a discussion of some of its applications. The author then develops the notions of transfinite induction and descriptive set theory, with applications to the theory of real functions. The final part of the book presents the tools of modern set theory: Martin's axiom, the diamond principle, and elements of forcing.

Thomas JECH. — **Set theory.** — Second corrected edition. — Perspectives in mathematical logic. — Un vol. relié, 16,5×24, de XIV, 634 p. — ISBN 3-540-63048-1. — Prix: DM 168.00. — Springer, Berlin, 1997.

The book covers major areas of modern set theory: cardinal arithmetic, constructible sets, forcing and Boolean-valued models, large cardinals and descriptive set theory. It contains results on various topics, including properties of the reals, infinitary combinatorics, ultrapowers, Suslin's problem and Martin's axiom, measurable cardinals, axiom of determinacy and many others. The book is aimed primarily at graduate students and researchers in set theory. It can serve as textbook and reference book.

Analyse combinatoire

François BERGERON, Gilbert LABELLE, Pierre LEROUX. — **Combinatorial species and tree-like structures.** — Encyclopedia of mathematics and its applications, vol. 67. — Un vol. relié, 17×24,5 de XX, 457 p. — ISBN 0-521-57323-8. — Prix: £55.00. — Cambridge University Press, Cambridge, 1998.

This book is the first complete presentation in English of the combinatorial theory of species, introduced by A. Joyal in 1980. It gives a unified understanding of the use of generating functions for both labeled and unlabeled structures and also provides a tool for the specification and analysis of these structures. Of particular importance is the capacity of combinatorial species to transform recursive definitions of tree-like structures into functional or differential equations, and conversely.

Geňa HAHN and Gert SABIDUSSI, (Editors). — **Graph symmetry: algebraic methods and applications.** — NATO ASI series. Series C, Mathematical and physical sciences, vol. 497. — Un vol. relié, 16,5×24,5, de XIX, 418 p. — ISBN 0-7923-4668-8. — Prix: Dfl. 295.00. — Kluwer Academic Publishers, Dordrecht, 1997.

B. Alspach: Isomorphism and Cayley graphs on abelian groups. — P.J. Cameron: Oligomorphic groups and homogeneous graphs. — A. Chan and C.D. Godsil: Symmetry and eigenvectors. — G. Hahn and C. Tardif: Graph homomorphisms: structure and symmetry. — M.-C. Heydemann: Cayley graphs and interconnection networks. — B. Mohar: Some applications of Laplace eigenvalues of graphs. — C.E. Praeger: Finite transitive permutation groups and finite vertex-transitive graphs. — R. Scapellato: Vertex-transitive graphs and digraphs. — M.E: Watkins: Ends and automorphisms of infinite graphs.

Teresa W. HAYNES, Stephen T. HEDETNIEMI, Peter J. SLATER. — **Fundamentals of domination in graphs.** — Pure and applied mathematics, vol. 208. — Un vol. relié, 16×23,5, de XI, 446 p. — ISBN 0-8247-0033-3. — Prix: US$165.00. — Marcel Dekker, New York, 1998.

Appropriate for use at different levels, the book includes chapters on basic results and types of domination, domination algorithms and complexity, and frameworks for domination, as well as a host of pedagogical features, such as basic definitions and preliminary graph theoretic results, end-of-chapter exercises and problems and noteworthy open research problems, real-world applications in fields from social sciences, optimization, and computer and communication networks to computational complexity and algorithm design. Nearly 400 examples, equations, drawings, and tables illustrate complex concepts. It contains a comprehensive bibliography of more than 1400 published papers.

Edward R. SCHEINERMAN, Daniel H. ULLMAN. — **Fractional graph theory: a rational approach to the theory of graphs.** — With a foreword by Claude Berge. — Wiley-Interscience series in discrete mathematics and optimization. — Un vol. relié, 16×24, de XVII, 211 p. — ISBN 0-471-17864-0. — Prix: £39.95. — John Wiley & Sons, New York, 1997.

Professors Scheinerman and Ullman begin by developing a general fractional theory of hypergraphs and move on to provide in-depth coverage of fundamental and advanced topics, including fractional matching, fractional coloring, and fractional edge coloring; fractional arboricity via matroid methods, and fractional isomorphism. The final chapter is devoted to a variety of additional issues, such as fractional topological graph theory, fractional cycle double covers, fractional domination, fractional intersection number, and fractional aspects of partially ordered sets.

Théorie des nombres et théorie algébrique des nombres

Armand BOREL. — **Automorphic forms on $SL_2(R)$.** — Cambridge tracts in mathematics, vol. 130. — Un vol. relié, 16×23,5, de X, 192 p. — ISBN 0-521-58049-8. — Prix: £32.50. — Cambridge University Press, Cambridge, 1997.

The book provides an introduction to some aspects of the analytic theory of automorphic forms on $G=SL_2(R)$ or the upper half-plane X, with respect to a discrete subgroup Γ of G of finite covolume. The point of view is inspired by, but does not assume knowledge of, the theory of infinite dimensional unitary representations of G – until the last sections, whose purpose is to introduce this theory and relate it to automorphic forms. The main prerequisites are some results in functional analysis (reviewed, with references) and some familiarity with the elementary theory of Lie groups and Lie algebras, used only for G and its analytic subgroups.

Gareth A. JONES and J. Mary JONES. — **Elementary number theory.** — Springer undergraduate mathematics series. — Un vol. broché, 17×24, de XIV, 301 p. — ISBN 3-540-76197-7. — Prix: DM 49.00. — Springer, London, 1998.

The first few chapters of the book, covering divisibility, prime numbers and modular arithmetic, assume only basic school algebra. Elementary ideas about groups and rings are then used to study groups of units, quadratic residues and arithmetic functions with applications to enumeration and cryptography. The final part uses ideas from algebra, analysis, calculus and geometry to study more advanced topics such as Dirichlet series and sums of squares; in particular, the last chapter gives a concise account of Fermat's Last Theorem from its origin to its recent proof by Andrew Wiles.

Y. MOTOHASHI, (Editor). — **Analytic number theory.** — London Mathematical Society lecture notes series, vol. 247. — Un vol. broché, 15×23, de VI, 382 p. — ISBN 0-521-62512-2. — Prix: £27.95. — Cambridge University Press, Cambridge, 1997.

This volume presents an authoritative, up-to-date review of analytic number theory. It contains outstanding contributions from leading international figures in this field. Core topics discussed include the theory of zeta functions, spectral theory of automorphic forms, classical problems in additive number theory such as the Goldbach conjecture, and Diophantine approximations and equations. This will be a valuable book for graduates and researchers working in number theory.

M. Ram MURTY, V. Kumar MURTY. — **Non-vanishing of _L_-functions and applications.** — Progress in mathematics, vol. 157. — Un vol. relié, 16×24, de X, 196 p. — ISBN 3-7643-5801-7. — Prix: SFr. 68.00. — Birkhäuser Verlag, Basel, 1997.

This book systematically develops some methods for proving the non-vanishing of certain _L_-functions at points in the critical strip. Researchers in number theory, graduate students who wish to enter into the area and non-specialists who wish to acquire an introduction to the subject will benefit by a study of this book. One of the most attractive features of the monograph is that it begins at a very basic level and quickly develops enough aspects of the theory to bring the reader to a point where the latest discoveries as are presented in the final chapters can be fully appreciated.

Donald J. NEWMAN. — **Analytic number theory.** — Graduate texts in mathematics, vol. 177. — Un vol. relié, 16,5×24,5, de VIII, 76 p. — ISBN 0-387-98308-2. — Prix: DM 59.00. — Springer, New York, 1998.

This book presents some of the central topics in number theory in a simple and concise fashion. It covers an amazing amount of material, despite the leisurely pace and emphasis on readability. The author's heartfelt enthusiasm enables readers to see what is magical about the subject. Topics included are: the partition function, the Erdős-Fuchs theorem, sequences without arithmetic progressions, the Waring problem, a "natural" proof of the non-vanishing of _L_-series, and a simple analytic proof of the prime number theorem.

Jean-Pierre SERRE. — **Abelian _l_-adic representations and elliptic curves.** — Research notes in mathematics, vol. 7. — Un vol. relié, 16×23,5, de XVIII, pagination diverse. — ISBN 1-56881-077-6. — Prix: US$ 32.00. — A.K. Peters, Wellesley, Massachusetts, 1998.

This book contains an introduction to "systems of _l_-adic representations", a topic of increasing importance in number theory and algebraic geometry, as reflected by the spectacular recent developments on the Taniyama-Weil conjecture and Fermat's Last Theorem. The initial

chapters are devoted to the Abelian case (complex multiplication), where one finds a nice correspondence between the *l*-adic representations and the linear representations of some algebraic groups (now called "Taniyama groups"). The last chapter handles the case of elliptic curves with no complex multiplication, the main result of which is that the image of the Galois group (in the corresponding *l*-adic representation) is large.

John STILLWELL. — **Numbers and geometry.** — Undergraduate texts in mathematics. Readings in mathematics. — Un vol. relié, 16×24, de XIV, 337 p. — ISBN 0-387-98289-2. — Prix: DM 68.00. — Springer, New York, 1997.

The book is an elementary account of mathematics where three main fields – algebra, analysis, and geometry – meet. The aim of this book is to give a broad view of these subjects at the level of calculus, without being a calculus (or a pre-calculus) book. Its roots are in arithmetic and geometry, the two opposite poles of mathematics, and the source of historic conceptual conflict. The resolution of this conflict, and its role in the development of mathematics, is one of the main stories in the book. The key is algebra, which brings arithmetic and geometry together, and allows them to flourish and branch out in new directions. The author elegantly combines mathematical history with mathematics.

Corps et polynômes

Mohamed AYAD. — **Théorie de Galois: 122 exercices corrigés, niveau I.** — Un vol. broché, 17,5×26, de VIII, 181 p. — ISBN 2-7298-4796-0. — Prix: FF 120.00. — Ellipses, Paris, 1997.

Ce livre s'adresse aux étudiants de Licence-Maîtrise de mathématiques, ainsi qu'à ceux inscrits à un concours de recrutement de professeurs (CAPES, Agrégation). Il contient 122 exercices corrigés sur la théorie de Galois classique et moderne. La plupart des énoncés proposent de travailler sur des situations concrètes. Beaucoup d'énoncés illustrent le phénomène de séparabilité pour lequel peu d'exercices existent dans la littérature. Pour certaines questions, plusieurs méthodes de résolutions sont données.

Mohamed AYAD. — **Théorie de Galois: 115 exercices corrigés, niveau II.** — Un vol. broché, 17,5×26, de VIII, 245 p. — ISBN 2-7298-6750-3. — Prix: FF 150.00. — Ellipses, Paris, 1997.

Les énoncés proposés dans ce volume s'adressent aux étudiants de Maîtrise, D.E.A. de mathématiques ainsi qu'à ceux préparant l'Agrégation. En plus des exercices classiques, on trouvera des énoncés sur la construction de certaines extensions dont le groupe de Galois est donné, ainsi que l'exposé d'une méthode récente sur le calcul du groupe de Galois d'un polynôme. On trouvera aussi un énoncé sur l'application des bases de Gröbner au calcul du polynôme minimal. Certains énoncés illustrent des applications de la théorie de Galois à l'analyse diophantienne, à la théorie des nombres et aux polynômes à plusieurs indéterminées.

Maureen H. FENRICK. — **Introduction to the Galois correspondence.** — Second edition. — Un vol. relié, 16×24, de IX, 235 p. — ISBN 0-8176-4026-6. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1998.

This monograph is a self-contained text book. The introductory chapter covers such topics as Sylow *p*-subgroups, solvable groups, and the structures of finite, abelian groups, thus providing the student with a firm foundation for the study of Galois correspondence. The Galois

correspondence itself is presented with many well constructed, concrete examples and exercises of varying degrees of difficulty. Some of the diverse applications of the Galois correspondence are presented, including the Fundamental Theorem of Algebra, the unsolvability of the general quintic, classical constructibility problems, etc...

V.V. Ishkhanov, B.B. Lur'e, D.K. Faddeev. — **The embedding problem in Galois theory.** — Translations of mathematical monographs, vol. 165. — Un vol. relié, $18,5 \times 26$, de XI, 182 p. — ISBN 0-8218-4592-6. — Prix: £65.00. — American Mathematical Society, Providence, distributed by Oxford University Press, Oxford, 1997.

The central problem of modern Galois theory involves the inverse problem: given a field k and a group G, construct an extension L/k with Galois group G. The embedding problem for fields generalizes the inverse problem and consists in finding the conditions under which one can construct a field L normal over k, with group G, such that L extends a given normal extension K/k with Galois group G/A. Moreover, the requirements applied to the object L to be found are usually weakened: it is not necessary for L to be a field, but L must be a Galois algebra over the field k, with group G. The embedding problem is a fruitful approach to the solution of the inverse problem in Galois theory.

Géométrie algébrique

Shreeram S. Abhyankar. — **Resolution of singularities of embedded algebraic surfaces.** — Second enlarged edition. — Springer monographs in mathematics. — Un vol. relié, 16×24, de XII, 311 p. — ISBN 3-540-63719-2. — Prix: DM 128.00. — Springer, Berlin, 1998.

This new edition describes the geometric part of the author's 1965 proof of desingularization of algebraic surfaces and solids in nonzero characteristic. The book also provides a self-contained introduction to birational algebraic geometry, based only on basic commutative algebra. In addition, it gives a short proof of analytic desingularization in characteristic zero for any dimension found in 1996 and base on a new avatar of an algorithmic trick employed in the original edition of the book.

M.P. Brodmann & R.Y. Sharp. — **Local cohomology: an algebraic introduction with geometric applications.** — Cambridge studies in advanced mathematics, vol. 60. — Un vol. relié, 16×24, de XV, 416 p. — ISBN 0-521-37286-0. — Prix: £45.00. — Cambridge University Press, Cambridge, 1998.

The book provides a careful and detailed algebraic introduction to Grothendieck's local cohomology theory, and provides many illustrations of applications of the theory in commutative algebra and in the geometry of quasi-affine and quasi-projective varieties. Topics covered include Castelnuovo-Mumford regularity, the Fulton-Hansen connectedness theorem for projective varieties, and connections between local cohomology and both reductions of ideals and sheaf cohomology.

Robert Friedman. — **Algebraic surfaces and holomorphic vector bundles.** — Universitext. — Un vol. relié, 16×24, de IX, 328 p. — ISBN 0-387-98361-9. — Prix: DM 88.00. — Springer, New York, 1998.

A novel feature of the book is its integrated approach to algebraic surface theory and the study of vector bundle theory on both curves and surfaces. While the two subjects remain separate though the first few chapters, and are studied in alternate chapters, they become much

more tightly interconnected as the book progresses. Thus vector bundles over curves are studied to understand ruled surfaces, and then reappear in the proof of Bogomolov's inequality for stable bundles, which is itself applied to study canonical embeddings of surfaces via Reider's method. Similarly, ruled and elliptic surfaces are discussed in detail, and then the geometry of vector bundles over such surfaces is analyzed.

K.H. Kamps, T. Porter. — **Abstract homotopy and simple homotopy theory.** — Un vol. relié, 16,5×22,5, de IX, 462 p. — ISBN 981-02-1602-5. — Prix: £61.00. — World Scientific, Singapore, 1997.

The book is designed to allow entry into a beautifully rich area which can be loosely called abstract homotopy theory. It can also provide a non-conventional approach to ordinary homotopy theory as the authors feel it makes explicit parts of that theory that are obscured by the particularities in the topological setting. The authors have tried to make it reasonably accessible to a beginning graduate student and to make it enjoyable.

Goro Shimura. — **Abelian varieties with complex multiplication and modular functions.** — Princeton mathematical series, vol. 46. — Un vol. relié, 16×24, de XIV, 217 p. — ISBN 0-691-01656-9. — Prix: US$55.00. — Princeton University Press, Princeton, 1998.

Reciprocity laws of various kinds play a central role in number theory. In the easiest case, one obtains a transparent formulation by means of roots of unity, which are special values of exponential functions. A similar theory can be developed for special values of elliptic or elliptic modular functions, and is called complex multiplication of such functions. In this book, the author provides the most comprehensive generalizations of this type by stating several reciprocity laws in terms of abelian varieties, theta functions, and modular functions of several variables, including Siegel modular functions. This subject is closely connected with the zeta function of an abelian variety, which is also covered as a main theme in the book. The third topic explored is the various algebraic relations among the periods of abelian integral.

Kenji Ueno. — **An introduction to algebraic geometry.** — Translated by Katsumi Nomizu. — Translations of mathematical monographs, vol. 166. — Un vol. relié, 18×26, de XII, 246 p. — ISBN 0-8218-0589-4. — Prix: £60.00. — American Mathematical Society, Providence R.I., distributed by Oxford University Press, Oxford, 1997.

This introduction to algebraic geometry allows readers to grasp the fundamentals of the subject with only linear algebra and calculus as prerequisites. After a brief history of the subject, the book introduces projective spaces and projective varieties, and explains plane curves and resolution of their singularities. The volume further develops the geometry of algebraic curves and treats congruence zeta functions of algebraic curves over a finite field. It concludes with a complex analytical discussion of algebraic curves. The author emphasizes computation of concrete examples rather than proofs.

Algèbre linéaire et multilinéaire, théorie des matrices

Sheldon Axler. — **Linear algebra done right.** — Undergraduate texts in mathematics. — Un vol. broché, 19,5×23,5, de XV, 251 p. — ISBN 0-387-98258-2. — Prix: DM 46.00. — Springer, New York, 1997.

The novel approach taken here banishes determinants to the end of the book and focuses on the central goal of linear algebra: understanding the structure of linear operators on vector spaces. The author has taken unusual care to motivate concepts and to simplify proofs. A variety of

interesting exercises in each chapter helps students understand and manipulate the objects of linear algebra. No prerequisites are assumed other than the usual demand for suitable mathematical maturity. This second edition includes a new section on orthogonal projections and minimization problems. The sections on self-adjoint operators, normal operators, and the spectral theorem have been rewritten.

Richard KAYE and Robert WILSON. — **Linear algebra.** — Oxford science publications. — Un vol. relié, 16×24, de XI, 230 p. — Prix: £35.00. — ISBN 0-19-850238-9. — Oxford University Press, Oxford, 1998.

This book provides a complete account of undergraduate linear algebra suitable for students with no prior exposure to abstract algebra. The approach is rigorous, without being unnecessarily abstract. It covers matrices, vector spaces, bases, and dimensions, inner products, bilinear and sesquilinear forms on vector spaces, linear transformations, eigenvalues, eigenvectors, diagonalization, Jordan normal form. Abstract methods are illustrated with concrete examples throughout, and more detailed examples highlight applications of linear algebra to analysis, geometry, differential equations, relativity, and quantum mechanics.

Richard C. PENNEY. — **Linear algebra: ideas and applications.** — Un vol. relié, 19,5×24, de XVI, 382 p. — ISBN 0-471-18179-X. — Prix: £24.50. — John Wiley, Chichester, 1998.

This book explores linear algebra using an approach that introduces abstract concepts only as they are needed to understand the computations. No new concept is introduced without first justifying its importance and relationship to something which is already in the readers' sphere of experience, allowing readers to see immediately why each concept is necessary. This approach ensures that the relation between theory and application is clear and immediate. — *Contents*: Systems of Linear Equations. Linear Independence and Dimension. Linear Transformations. Orthogonality. Determinants. Diagonalization and Matrix Representations. Chapter summary. Answers and Hints to Odd-Numbered Exercises.

Anneaux et algèbres

Bruno BUCHBERGER, Franz WINKLER, (Editors). — **Gröbner bases and applications.** — London Mathematical Society lecture note series, vol. 251. — Un vol. broché, 15×23, de VIII, 552 p. — ISBN 0-521-63298-6. — Prix: £29.95. — Cambridge University Press, Cambridge, 1998.

This book provides a short and easy-to-read account of the theory of Gröbner bases and its applications. It is in two parts, the first consisting of tutorial lectures, beginning with a general introduction. The subject is then developed in a further 12 tutorials, written by leading experts, on the application of Gröbner bases in various fields of mathematics. In the second part are 17 original research papers on Gröbner bases. An appendix contains the English translations of the original German papers of Bruno Buchberger in which Gröbner bases were introduced.

Stefaan CAENEPEEL, Alain VERSCHOREN, (Editors). — **Rings, Hopf algebras, and Brauer groups.** — Proceedings of the fourth week on algebra and algebraic geometry. — Pure and applied mathematics, vol. 197. — Un vol. broché, 18×25,5, de X, 332 p. — ISBN 0-8247-0153-4. — Prix: US$175.00. — Marcel Dekker, New York, 1998.

Based on papers presented at a recent international conference on algebra and algebraic geometry, this book presents both survey and research articles featuring new results from the

intersection of algebra and geometry. It furnishes in-depth discussions on Hopf algebras and quantum groups, Brauer groups, localization theory, K-theory, linear algebra over rings, category theory, noncommutative algebraic geometry, and more. Containing some 900 display equations and over 400 bibliographic citations and illustrations, the book is a valuable resource for algebraists, number theorists, ring theorists, and graduate-level students in these disciplines.

S.K. JAIN, S. Tariq RIZVI, (Editors). — **Advances in ring theory.** — Trends in mathematics. — Un vol. relié, 16×24, de VI, 333 p. — ISBN 0-8176-3969-1 (Boston), 3-7643-3969-1 (Basel). — Prix : SFr. 148.00. — Birkhäuser, Boston, 1997.

This research volume provides a collection of invited research papers, many of which were presented at 23rd Ohio State Denison Math Conference held at Denison University, Granville, in May 1996. The articles give the latest developments and trends in classical ring theory. Containing contributions of over 35 well-known mathematicians, the volume examines wide-ranging developments in ring theory and provides a variety of methodologies which will be useful to any researchers in the field.

Gerhard SAAD and Momme Johs THOMSEN, (Editors). — **Nearrings, nearfields and K-loops.** — Proceedings of the Conference on Nearrings and Nearfields, Hamburg, Germany, July 30-August 6, 1995. — Mathematics and its applications, vol. 426. — Un vol. relié, 16,5×24,5, de XIII, 444 p. — ISBN 0-7923-4799-4. — Prix : Dfl. 340.00. — Kluwer Academic Publishers, Dordrecht, 1997.

The volume contains the written version of five invited lectures concerning the development from nearfields to K-loops, non-zerosymmetric nearrings, nearrings of homogeneous functions, the structure of Ω-groups, and ordered nearfields. They are followed by 30 contributed papers reflecting the diversity of the subject of nearrings and related structures with respect to group theory, combinatorics, geometry, topology as well as the purely algebraic structure theory of these algebraic structures.

Catégories, algèbre homologique, cohomologie des groupes

F. William LAWVERE, Stephen H. SCHANUEL. — **Conceptual mathematics : a first introduction to categories.** — Un vol. broché, 17,5×25, de XII, 358 p. — ISBN 0-521-47817-0. — Prix : £24.95 (relié : £65.00). — Cambridge University Press, Cambridge, 1997.

This book is the first book to serve both as a skeleton key to mathematics for the general reader or beginning student and as an introduction to categories for computer scientists, logicians, physicists, linguists, etc. While the ideas and techniques of basic category theory are useful throughout modern mathematics, this book does not presuppose knowledge of specific fields but rather develops elementary categories such as directed graphs and discrete dynamical systems from the beginning. The fundamental ideas are then illuminated in an engaging way by examples in these categories.

Théorie des groupes et généralisation

Jürgen ELSTRODT, Fritz GRUNEWALD, Jens MENNICKE. — **Groups acting on hyperbolic space : harmonic analysis and number theory.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de XV, 524 p. — ISBN 3-540-63745-6. — Prix : DM 149.00. — Springer, Berlin, 1998.

This book deals with a broad range of topics from the theory of automorphic functions on three-dimensional hyperbolic space and its arithmetic, group-theoretic, and geometric

ramifications. Starting off with several models of hyperbolic space and its group of motions the authors discuss the spectral theory of the Laplacian and Selberg's theory for cofinite groups. The interplay with arithmetic is demonstrated by means of the groups PSL(2) over rings of quadratic integers, their Eisenstein series and their associated Hermitian forms. A comprehensive chapter on concrete examples of arithmetic and non arithmetic cofinite groups enhances the usefulness of this work for a wide audience of mathematicians.

E.I. KHUKHRO. — ***p*-automorphisms of finite *p*-groups.** — London Mathematical Society lecture note series, vol. 246. — Un vol. broché, 15×23, de XVII, 204 p. — ISBN 0-521-59717-X. — Prix: £24.95. — Cambridge University Press, Cambridge, 1998.

This book provides a detailed but concise account of the theory of structure of finite *p*-groups admitting *p*-automorphisms with few fixed points. The relevant preliminary material on Lie rings is introduced and the main theorems of the book on the solubility of finite *p*-groups are then presented. The proofs involve notions such as viewing automorphisms as linear transformations, associated Lie rings, powerful *p*-groups, and the correspondences of A.I. Mal'cev and M. Lazard given by the Baker-Hausdorff formula. Many exercises are included.

Groupes topologiques et groupes et algèbres de Lie

E.A. DE KERF, G.G.A. BÄUERLE, A.P.E. TEN KROODE. — **Lie algebras, Part 2: Finite and infinite dimensional.**

Lie algebras and applications in physics. — Studies in mathematical physics, vol. 7. — Un vol. relié, 16×23, de X, 554 p. — ISBN 0-444-82836-2. — Prix: Dfl. 265.00. — North-Holland, Amsterdam, 1997.

Extensions of Lie algebras. — Explicit construction of affine Kac-Moody algebras. — Representations – enveloping algebra techniques. — The Weyl group and integrable representations. — More on representations. — Characters and multiplicities. — Quarks, leptons and gauge fields. — Lie algebras of infinite matrices. — Representations of loop algebras. — KP-hierarchies. — Conformal symmetry.

Juan TIRAO, David A. VOGAN, Jr., Joseph A. WOLF, (Editors). — **Geometry and representation theory of real and *p*-adic groups.** — Progress in mathematics, vol. 158. — Un vol. relié, 16×24, de X, 323 p. — ISBN 0-8176-3941-4. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1998.

The representation theory of Lie groups plays an important rôle in both classical and recent developments in mathematics and physics. The 14 expository articles in this book provide a fast-paced and thorough introduction to the more active parts of representation theory and to some of its ongoing applications. These expositions contain many interesting conjectures and indications of fruitful future research areas. Some of these directions are filled in by the research articles of Bratten, Burde, Garnica, Galina, Johnson and Levstein-Tiraboshi.

Fonctions de variables réelles

Alan F. BEARDON. — **Limits: a new approach to real analysis.** — Undergraduate text in mathematics. — Un vol. relié, 16×24, de IX, 189 p. — ISBN 0-387-98274-4. — Prix: DM 58.00. — Springer, New York, 1997.

This book includes all the standard material such as sequences, infinite series, continuity, differentiation, and integration, together with worked examples and exercises. By unifying and

simplifying all the various notions of limit, the author has succesfully presented a unique and novel approach to the subject matter that has not previously appeared in book form. The author defines what is meant by a limit just once, and all of the subsequent limiting processes are viewed as special cases of this one definition. In this way the subject matter attains a unity and coherence that is missing in the traditional approach.

Douglas S. BRIDGES. — **Foundations of real and abstract analysis.** — Graduate texts in mathematics, vol. 174. — Un vol. relié, 16×24, de XIV, 322 p. — ISBN 0-387-98239-6. — Prix: DM 79.00. — Springer, New York, 1997.

The core chapters of this volume provide a complete course on metric, normed, and Hilbert spaces, and include many results and exercises seldom found in texts on analysis at this level. The author covers an unusually wide range of material in a clear and concise format, including elementary real analysis, Lebesgue integration on **R**, and an introduction to functional analysis. This makes a versatile text suited for courses on real analysis, metric spaces, and abstract analysis. Of special interest is the unique collection of nearly 750 exercises, many with guidelines for their solutions.

Shouchuan HU and Nikolas S. PAPAGEORGIOU. — **Handbook of multivalued analysis, vol. 1: Theory.** — Mathematics and its applications, vol. 419. — Un vol. relié, 16,5×24,5, de XV, 964 p. — ISBN 0-9723-4682-3. — Prix: Dfl. 695.00. — Kluwer Academic Publishers, Dordrecht, 1997.

Multivalued analysis is a remarkable mixture of many different fields of mathematics, such as topology, measure theory, nonlinear functional analysis and applied mathematics. This two-volume work provides a comprehensive survey of the general theory and applications of set-valued analysis. The existing books on the subject deal with either one particular domain of the subject or present primarily the finite dimensional aspects of the theory. In contrast, this volume gives a complete picture of the subject, including important new developments that occurred in recent years and detailed bibliography. Although the presentation of the subject assumes some knowledge from various areas of mathematical analysis, the authors have made every effort, including the addition of an appendix, to keep the work self-contained.

Mesure et intégration

Gerhard KELLER. — **Equilibrium states in ergodic theory**. — London Mathematical Society student texts, vol. 42. — Un vol. broché, 15×23, de IX, 178 p. — ISBN 0-521-59534-7. — Prix: £13.95 (relié: £37.50). — Cambridge University Press, Cambridge, 1998.

This book provides a detailed introduction to the ergodic theory of equilibrium states giving equal weight to two of its most important applications, namely to equilibrium statistical mechanics on lattices and to (time discrete) dynamical systems. — *Contents:* Elementary examples of equilibrium states. Some basic ergodic theory. Entropy. Equilibrium states and pressure. Gibbs measures. Equilibrium states and derivatives. Appendix, collecting a number a facts from analysis, measure theory and probability theory used throughout the book.

Mark POLLICOTT, Michiko YURI. — **Dynamical systems and ergodic theory.** — London Mathematical Society student texts, vol. 40. — Un vol. broché, 15×23, de XIII, 179 p. — ISBN 0-521-57599-0. — Prix: £14.95 (relié: £40.00). — Cambridge University Press, Cambridge, 1998.

This book is an essentially self-contained introduction to topological dynamics and ergodic theory. It is divided into a number of relatively short chapters with the intention that each may be

used as a component of a lecture course tailored to the particular audience. Parts of the book are suitable for a final year undergraduate course or for a master's level course. A number of applications are given, principally to number theory and arithmetic progressions (through Van der Waerden's theorem and Szemeredi's theorem).

H.A. PRIESTLEY. — **Introduction to integration.** — Oxford science publications. — Un vol. relié, 16,5×24, de X, 306 p. — ISBN 0-19-850124-2. — Prix: £40.00. — Clarendon Press, Oxford, 1997.

The book begins with a simplified Lebesgue-style integral (in lieu of the more traditional Riemann integral), intended for a first course in integration. This suffices for elementary applications, and serves as an introduction to the core of the book. The final chapters present selected applications, mostly drawn from Fourier analysis. The emphasis throughout is on integrable functions rather than on measure. Prerequisites are the rudiments of integral calculus and a first course in real analysis.

Beloslav RIECAN and Tibor NEUBRUNN. — **Integral, measure, and ordering.** — Mathematics and its application, vol. 411. — Un vol. relié, 16,5×24,5, de XIII, 378 p. — ISBN 0-7923-4566-5. — Prix: Dfl. 285.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This book is concerned with three main themes. The first deals with ordering structures such as Riesz spaces and lattice ordered groups and their relation to measure and integration theory. The second is the idea of fuzzy sets, which is quite new, particularly in measure theory. The third subject is the construction of models of quantum mechanical systems, mainly based on fuzzy sets. In this way some recent results are systematically presented. This volume is suitable not only for specialists in measure and integration theory, ordered spaces, probability theory and ergodic theory, but also for students of theoretical and applied mathematics.

Fonctions d'une variable complexe

Srishti D. CHATTERJI. — **Cours d'analyse, vol. 2: Analyse complexe.** — Un vol. broché, 16×24, de XX, 536 p. — ISBN 2-88074-346-X. — Prix: SFr. 89.00. — Presses polytechniques et universitaires romandes, Lausanne, 1997.

L'objectif principal de ce volume est de donner une introduction à la théorie classique des fonctions holomorphes d'une variable complexe. Les fonctions holomorphes sont présentées en utilisant les équations de Cauchy-Riemann et leurs développements en séries entières. Les théorèmes principaux de la théorie de Cauchy ainsi que leur utilisation pour l'étude des séries de Taylor et de Laurent sont présentés en détail. Quelques fonctions spéciales (comme gamma, zêta) sont introduites avec soin. Les applications conformes (y compris le théorème de Riemann) sont traitées en détail. Une introduction à la théorie des fractions continues complexes est donnée comme illustration de différents modes de présentation des fonctions holomorphes. Le livre termine avec une courte introduction rigoureuse aux surfaces de Riemann.

Fonctions de plusieurs variables complexes

Fausto DI BIASE. — **Fatou type theorems: maximal functions and approach regions.** — Progress in mathematics, vol. 147. — Un vol. relié, 16×25, de VIII, 152 p. — ISBN 0-8176-3976-4. — Prix: SFr. 78.00. — Birkhäuser, Boston, 1998.

One of the basic issues involved in the understanding of the boundary behavior of harmonic (holomorphic) functions, defined on domains in real (complex) Euclidean spaces and subject to

certain growth conditions, is the description of the regions of approach to the boundary, along which the functions converge almost everywhere to their boundary values. This fundamental chapter of analysis was reopened in 1984 by A. Nagel and E.M. Stein, with the discovery of approach regions of convergence that are larger than the natural approach regions. This monograph provides an introduction, as well as an exposition of the latest results in an active area of research

Equations aux dérivées partielles

Ferruccio COLOMBINI, Nicolas LERNER. — **Geometrical optics and related topics.** — Progress in nonlinear differential equations and their applications, vol. 32. — Un vol. relié, 16,5×24,5 de VI, 361 p. — ISBN 0-8176-3958-6. — Prix: SFr. 138.00. — Birkhäuser, Boston, 1997.

This volume contains 14 research papers which are expanded versions of conferences given at a meeting held in Cortona, Italy in the fall of 1996. The topics include blowup questions for quasilinear equations in 2–d, time decay of waves in L^p, uniqueness results for systems of conservation laws in 1–d, concentration effects for critical nonlinear wave equations, diffraction of nonlinear waves, propagation of singularities in scattering theory, and caustics for semilinear oscillations. Other topics linked to microlocal analysis are Sobolev spaces in Weyl-Hörmander calculus, local solvability for pseudodifferential equations, and hypoellipticity for highly degenerate operators.

Michael DEMUTH, Bert-Wolfgang SCHULZE, (Editors). — **Differential equations, asymptotic analysis, and mathematical physics.** — Mathematical research, vol. 100. — Un vol. relié, 18,5×24, de 424 p. — ISBN 3-05-501769-2. — Prix: DM 148.00. — Akademie Verlag, Berlin, 1997.

This volume contains a collection of original papers, associated with the International Conference on Partial Differential Equations, held in Potsdam, July 29 to August 2, 1996. This event is connected with the activities of the Max Planck Research Group for Partial Differential Equations at Potsdam. The main topics concern recent progress in partial differential equations, microlocal analysis, pseudo-differential operators on manifolds with singularities, aspects of differential geometry and index theory, operator theory and operators algebras, stochastic spectral analysis, semigroups, Dirichlet forms, Schrödinger operators, semiclassical analysis, and scattering theory.

Michael DEMUTH, Elmar SCHROHE, Bert-Wolfgang SCHULZE, Johannes SJÖSTRAND, (Editors). — **Spectral theory, microlocal analysis, singular manifolds.** — Mathematical topics, vol. 14. — Advances in partial differential equations. — Un vol. relié, 18×24,5, de 366 p. — ISBN 3-05-501776-5. — Prix: DM 148.00. — Akademie Verlag, Berlin, Wiley-VCH, Weinheim 1997.

The first contribution addresses domain perturbations for generalized Schrödinger operators and the influence of the capacity on spectral data. The next topic is the scattering of weakly interacting solitons for nonlinear Schrödinger equations. There follows an article discussing the minimal smoothness assumptions on the domain under which the asymptotics of the counting function for the eigenvalues of elliptic boundary value problems can be determined. Fourier integral operators with degenerate phase function are studied. Further articles are devoted to the regularity and asymptotics of solutions to partial differential equations on singular manifolds.

V.A. KOZLOV, V.G. MAZ'YA, J. ROSSMANN. — **Elliptic boundary value problems in domains with point singularities.** — Mathematical surveys and monographs, vol. 52. — Un vol. relié, 18,5×26, de IX, 414 p. — ISBN 0-8218-0754-4. — Prix: £70.00. — American Mathematical Society, Providence, distributed by Oxford University Press, Oxford, 1998.

This monograph systematically treats a theory of elliptic boundary value problems in domains without singularities and in domains with conical or cuspidal points. This exposition is self-contained and a priori requires only basic knowledge of functional analysis. Restricting to boundary value problems formed by differential operators and avoiding the use of pseudo-differential operators makes the book accessible for a wider readership. The authors concentrate on fundamental results of the theory. A special feature of the book is that the solutions of the boundary value problems are considered in Sobolev spaces of both positive and negative orders.

Maria MASCARELLO, Luigi RODINO. — **Partial differential equations with multiple characteristics.** — Mathematical topics, vol. 13. — Un vol. relié, 17,5×24,5, de 352 p. — ISBN 3-05-501764-1. — Prix: DM 148.00. — Akademie Verlag, Berlin, Wiley-VCH, Weinheim, 1997.

The book is devoted to the general theory of partial differential equations with multiple characteristics. The method of microlocal analysis are reviewed and used to prove recent results on local solvability, hypoellipticity, propagation of singularities in the frame of Sobolev spaces, Schwartz distributions, and Gevrey ultradistributions. The Cauchy problem is also considered.

Peter R. POPIVANOV, Dian K. PALAGACHEV. — **The degenerate oblique derivative problem for elliptic and parabolic equations.** — Mathematical research, vol. 93. — Un vol. broché, 17×24, de 153 p. — ISBN 3-05-501757-9. — Prix: DM 78.00. — Akademie Verlag, Berlin, 1997.

The authors investigate the degenerate (tangential) oblique derivative problem for linear and semilinear second order elliptic and parabolic operators. They propose at first a survey on the linear degenerate oblique derivative problem including central results on the subject, as well as subelliptic estimates in Sobolev and Hölder classes. Theorems on existence, uniqueness and regularity of the classical solutions to the tangential oblique derivative problem for semilinear elliptic and parabolic equations are proved more detailed.

Karen YAGDJIAN. — **The Cauchy problem for hyperbolic operators: multiple characteristics; micro-local approach.** — Mathematical topics, vol. 12. — Un vol. relié, 18×24,5, de 397 p. — ISBN 3-05-501739-0. — Prix: DM 130.00. — Akademie Verlag, Berlin, 1997.

The goal of this book is a construction of the fundamental solution to the Cauchy problem for hyperbolic operators with multiple characteristics. Well-posedness of the problem in various functional spaces as well as a propagation of singularities of the solutions are investigated, too. For operators with multiple characteristics so called Levi conditions play a crucial rôle. Described in the book Levi conditions allow to carry out the construction of fundamental solutions. The approach represented in the book is essentially based on the zeros of the complete symbol of the operator.

Analyse de Fourier, analyse harmonique abstraite

C.E. D'ATTELLIS, E.M. FERNÁNDEZ-BERDAGUER. — **Wavelet theory and harmonic analysis in applied sciences.** — Applied and numerical harmonic analysis. — Un vol. relié, 16,5×24, de XVIII, 345 p. — ISBN 0-8176-3953-5. — Prix: SFr. 138.00. — Birkhäuser, Boston, 1997.

This book contains 12 invited chapters addressing applications and interactions between wavelet theory and scientific, medical and geophysical problems. Topics covered include EGG

signals, spectral analysis, wavelet transform from orthogonal spline wavelets, numerical modeling of Maxwell's equation, wavelet networks and nonlinear processes. It is addressed to an interdisciplinary readership of professional workers in applied mathematics, electrical engineers, physicists and other scientists interested in applying these new ideas and techniques.

Hans G. FEICHTINGER, Thomas STROHMER, (EDITORS). — **Gabor analysis and algorithms: theory and applications.** — Applied and numerical harmonic analysis. — Un vol. relié, 16 × 24, de XVI, 496 p. — ISBN 0-8176-3959-4. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1998.

This book is a definitive survey of the subject showing the connections and interactions between theory, numerical algorithms, and applications. The first part of the book is devoted to the mathematical foundations of Gabor analysis, including Weyl-Heisenberg frames, duality conditions, the uncertainty principle, and the Balian-Low-Theorem as well as a group theoretical approach. The second part presents numerical algorithms and selected applications in signal and image processing.

W. FREEDEN, T. GERVENS, M. SCHREINER. — **Constructive approximation on the sphere: with applications to geomathematics.** — Numerical mathematics and scientific computation. — Un vol. relié, 15,5 × 24,5, de XV, 427 p. — ISBN 0-19-853682-8. — Prix: £65.00. — Clarendon Press, Oxford, 1998.

The subject of geomathematics focuses on the interpretation and classification of data from geoscientific and satellite sources, reducing information to a comprehensible form that allows for the testing of concepts and the solution of problems. The book bridges the existing gap between monographs on the special functions of mathematical physics and constructive approximation in Euclidean spaces. The primary objective is to provide readers with an understanding of aspects of approximation by spherical harmonics, such as spherical splines and wavelets, as well as indicating future directions of research. Scalar, vectorial, and tensorial methods are each considered in turn.

Analyse fonctionnelle et théorie des opérateurs

Daniel ALPAY, Aad DIJKSMA, James ROVNYAK, Hendrik de SNOO. — **Schur functions, operator colligations, and reproducing kernel Pontryagin spaces.** — Operator theory: advances and applications, vol. 96. — Un vol. relié, 17,5 × 24, de XI, 229 p. — ISBN 3-7643-5763-0. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1997.

This book develops the realization theory of generalized Schur functions as characteristic functions of coisometric, isometric, and unitary colligations whose state spaces are reproducing kernel Pontryagin spaces. This provides a modern system theory setting for the relationship between invariant subspaces and factorization, operator models, Krein-Langer factorizations, and other topics. An introductory chapter supplies background material, including reproducing kernel Pontryagin spaces, complementary spaces in the sense of de Branges, and a key result on defining operators as closures of linear relations.

Shavkat AYUPOV, Abdugafur RAKHIMOV and Shukhrat USMANOV. — **Jordan, real and Lie structures in operator algebras.** — Mathematics and its applications, vol. 418. — Un vol. relié, 16,5 × 24,5, de IX, 225 p. — ISBN 0-7923-4684-X. — Prix: Dfl. 340.00. — Kluwer Academic Publishers, Dordrecht, 1997.

The first purpose of the book is to study the deep structure theory for Jordan operator algebras similar to (complex) von Neumann algebras theory, such as type classification, traces,

conjugacy of automorphisms, injectivity, amenability, and semidiscreteness. The second aim is to investigate pure algebraic problems concerning Jordan and Lie structure in prime and simple rings with involution in the framework of operator algebras. These pure algebraic results give additional information on properties of single operators on a Hilbert space.

Albrecht BÖTTCHER, Yuri I. KARLOVICH. — **Carleson curves, Muckenhoupt weights, and Toeplitz operators.** — Progress in mathematics, vol. 154. — Un vol. relié, 16×24, de XV, 397 p. — ISBN 3-7643-5796-7 (Basel), 0-8176-5796-7 (Boston). — Prix: SFr. 98.00. — Birkhäuser Verlag, Basel, 1997.

This book is a self-contained exposition of the spectral theory of Toeplitz operators with piecewise continuous symbols and singular integral operators with piecewise continuous coefficients. It includes an introduction to Carleson curves, Muckenhoupt weights, weighted norm inequalities, local principles, Wiener-Hopf factorization, and Banach algebras generated by idempotents. Some basic phenomena in the field and the techniques for treating them came to be understood only in recent years and are comprehensively presented here for the first time.

M.L. GORBACHUK, V.I. GORBACHUK. — **M.G. Krein's lectures on entire operators.** — Operator theory: advances and applications, vol. 97. — Un vol. relié, 17,5×24, de IX, 220 p. — ISBN 3-7643-5704-5. — Prix: SFr. 118.00. — Birkhäuser Verlag, Basel, 1997.

The theory of entire operators lies at the junction of the spectral theory of Hermitian operators and the theory of analytic functions, harmoniously combining the methods of each. The purpose of the book is to show how various problems of classical and modern analysis can be looked at from the entire operator theory point of view. This is the first systematic presentation of basic concepts of Krein's theory and its applications. The present study of Krein's unpublished lectures and his works gives (over)due recognition to the unique approach he developed - an approach which for many years was not broadly known.

Reinhold MEISE, Dietmar VOGT. — **Introduction to functional analysis.** — Translated by M.S. Ramanujan. — Oxford graduate texts in mathematics, vol. 2. — Un vol. relié, 16×24, de X, 437 p. — ISBN 0-19-851485-9. — Prix: £47.50. — Clarendon Press, Oxford, 1997.

The book is written for students of mathematics and physics who have a basic knowledge of analysis and linear algebra. Starting from metric spaces it proceeds quickly to the central results of the field, including the theorem of Hahn-Banach. An introduction to locally convex spaces and their duality theory provides the basis for a comprehensive treatment of Fréchet spaces and their duals. In particular recent results on sequence spaces, linear topological invariants and short exact sequences of Fréchet spaces and the splitting of such sequences are presented. These results are not contained in any other book in this field.

Sakantha SINGH, Bruce WATSON, Pramila SRIVASTAVA. — **Fixed point theory and best approximation: the KKM-map principle.** — Mathematics and its applications, vol. 424. — Un vol. relié, 16,5×24,5, de X, 220 p. — ISBN 0-7923-4758-7. — Prix: Dfl. 180.00. — Kluwer Academic Publishers, Dordrecht, 1997.

The aim of this volume is to make available to a large audience recent material in nonlinear functional analysis that has not been covered in book format before. Here, several topics of current and growing interest are systematically presented, such as fixed point theory, best approximation, the KKM-map principle, and results related to optimization theory, variational inequalities and complementarity problems. Illustrations of suitable applications are given, the links between results in various fields of research are highlighted, and up-to-date bibliography is included to assist readers in further studies.

Hans TRIEBEL. — **Fractals and spectra: related to Fourier analysis and function spaces.** — Monographs in mathematics, vol. 91. — Un vol. relié, 17,5×24, de VIII, 271 p. — ISBN 3-7643-5776-2. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1997.

This book deals with the symbiotic relationship between the theory of function spaces, fractal geometry, and spectral theory of (fractal) pseudodifferential operators as it as emerged quite recently. Atomic and quarkonial (subatomic) decompositions in scalar and vector valued function spaces on the Euclidean n-space pave the way to study properties (compact embeddings, entropy numbers) of function spaces on and of fractals. On this basis, distributions of eigenvalues of fractal (pseudo)differential operators are investigated. Diverse versions of fractal drums are played.

Calcul des variations

Pablo PEDREGAL. — **Parametrized measures and variational principles.** — Progress in nonlinear differential equations and their applications, vol. 30. — Un vol. relié, 16×24, de VII, 212 p. — ISBN 3-7643-5697-9. — Prix: SFr. 88.00. — Birkhäuser Verlag, Basel, 1997.

The purpose of this book is to present a new approach to fundamental questions concerning the calculus of variations based on a systematic analysis of Young measures. Weak lower semi-continuity and relaxation are main areas of concentration in this work. The unified treatment of scalar and vector cases developed here is suitable also for more general situations. Applications to problems in continuum mechanics and nonlinear elasticity are analyzed in depth.

Géométrie

Albrecht BEUTELSPACHER, Ute ROSENBAUM. — **Projective geometry: from foundations to applications.** — Un vol. broché, 15×23, de X, 258 p. — ISBN 0-521-48364-6. — Prix: £45.00. — Cambridge University Press, Cambridge, 1998.

This book presents the foundations of classical projective and affine geometry as well as its important applications in coding theory and cryptography. It could also serve as a first introduction to diagram geometry. Written in clear and contemporary language with an entertaining style and around 200 exercises, examples and hints, this book is ideally suited for use either as a textbook to accompany courses or for self-study.

David GAY. — **Geometry by discovery.** — Un vol. relié, 19,5×24,5, de XIV, 410 p. — ISBN 0-471-04177-7. — Prix: £24.95. — John Wiley, New York, 1998.

This book is a new approach to geometry. This ground-breaking text taps the pedagogical value of discovery to help students stretch their geometric perspective and hone their geometric intuition. It actively engages students in solving mathematical problems, and empowers them to be successful problem-solvers and discoverers of mathematical ideas.

J.W.P. HIRSCHFELD. — **Projective geometries over finite fields.** — Second edition. — Oxford mathematical monographs. — Un vol. relié, 16,5×24, de XIV, 555 p. — ISBN 0-19-850295-8. — Prix: £65.00. — Clarendon Press, Oxford, 1998.

This is a completely revised edition of the 1979 work with the same title. The original intention that the book be fully self-contained has yielded to the need to include theorems that are intrinsic to the topics but want deeper background results. The prerequisites for reading this book

are still linear algebra, finite field theory, and projective geometry; despite the applicability, the reformulation of many results in terms of coding theory has been eschewed. But links with coding theory are described.

Silvio LEVY, (Editor). — **Flavors of geometry.** — Mathematical Sciences Research Institute publications, vol. 31. — Un vol. broché, 16×23,5, de IX, 194 p. — ISBN 0-521-62962-4. — Prix: £13.95 (relié: £37.50). — Cambridge University Press, Cambridge, 1997.

This book is a volume of lectures on four geometrically influenced fields of mathematics that have experienced great development in recent years. It presents chapters on hyperbolic geometry, dynamics in several complex variables, convex geometry, and volume estimation, by masters in their respective fields. Each lecture begins with a discussion of elementary concepts, examines the highlights of the field, and concludes with a look at more advanced material. The style and presentation of the chapters are clear and accessible, and most of the lectures are illustrated.

George E. MARTIN. — **Geometric constructions.** — Undergraduate texts in mathematics. — Un vol. relié, 16,5×24,5, de XI, 203 p. — ISBN 0-387-98276-0. — Prix: DM 69.00. — Springer, New York, 1998.

The first chapter of this book is informal and starts from scratch, introducing all the geometric constructions from high school that have been forgotten or were never seen. The second chapter formalizes Plato's game and examines problems from antiquity such as the impossible way of trisecting an arbitrary angle. After that, variations on Plato's theme are explored: using only a ruler, using only a compass, using toothpicks, using a ruler and dividers, using a marked rule, using a tomahawk, and ending with a chapter on geometric constructions by paperfolding.

Ensembles convexes et inégalités géométriques

W.A. COPPEL. — **Foundations of convex geometry.** — Australian Mathematical Society lecture series, vol. 12. — Un vol. broché, 15×23, de XIV, 222 p. — ISBN 0-521-63970-0. — Prix: £24.95. — Cambridge University Press, Cambridge, 1998.

This book on the foundations of Euclidean geometry aims to present the subject from the point of view of present day mathematics, taking advantage of all the developments since the appearance of Hilbert's classic work. Here real affine space is characterized by a small number of axioms involving points and line segments, making the treatment self-contained and thorough, many results being established under weaker hypotheses than usual.

Géométrie différentielle

Sorin DRAGOMIR, Liviu ORNEA. — **Locally conformal Kähler geometry.** — Progress in mathematics, vol. 155. — Un vol. relié. 16×25, de XI, 327 p. — ISBN 0-8176-4020-7. — Prix: SFr. 148.00. — Birkhäuser, Boston, 1998.

This monograph covers topics in complex geometry, an area of mathematical growth in recent years. The latest topics are addressed systematically, bringing us to the cutting edge in the mathematics of locally conformal Kähler (l.c.K.) manifold theory. This book is a differential geometric study of l.c.K. manifolds (i.e., manifolds carrying some l.c.K. metric) and their submanifolds. While the latest results on Vaisman's conjectures, spectral geometry of generalized Hopf manifolds, harmonic and holomorphic forms of l.c.K. manifolds, and pseudoharmonic maps of Hermitian surfaces are reviewed throughout mathematics literature, here they are presented in a systematic manner, and many specific examples are discussed from this wider perspective.

Luther Pfahler EISENHART. — **Riemannian geometry.** — Princeton landmarks in mathematics and physics. — Eighth printing. — Un vol. broché, 15,5×23, de IX, 306 p. — ISBN 0-691-02353-0. — Prix: £14.95. — Princeton University Press, Princeton, 1997.

In this book, Eisenhart succinctly surveys the key concepts of Riemannian geometry. He begins with tensor analysis, including the Riemann curvature tensor, the Christoffel symbols, and the Ricci tensor. From here the notion of a metric is introduced, and hence geodesics, parallel displacement, and the Bianchi identity are explored. Other topics include orthogonal ennuples, the geometry of subspaces, subspaces of a flat space, and groups of motions. This clear and concise guide to Riemannian geometry will be of great interest to mathematicians and theoretical physicists alike.

Theodore FRANKEL. — **The geometry of physics: an introduction.** — Un vol. relié, 19×26, de XXII, 654 p. — ISBN 0-521-38334-X. — Prix: £65.00. — Cambridge University Press, Cambridge, 1997.

This book is intended to provide a working knowledge of those parts of exterior differential forms, differential geometry, algebraic and differential topology, Lie groups, vector bundles, and Chern forms that are essential for a deeper understanding of both classical and modern physics and engineering. Included are discussions of analytical and fluid dynamics, electromagnetism (in flat and curved space), thermodynamics, the deformation tensors of elasticity, soap films, special and general relativity, the Dirac operator and spinors, and gauge fields, including Yang-Mills, the Aharonov-Bohm effect, Berry phase, and instanton winding numbers.

Christoph HUMMEL. — **Gromov's compactness theorem for pseudo-holomorphic curves.** — Progress in mathematics, vol. 151. — Un vol. relié, 16×24, de VIII, 131 p. — ISBN 3-7643-5735-5. — Prix: SFr. 48.00. — Birkhäuser Verlag, Basel, 1997.

The aim of this book is to present the original proof of Gromov's compactness for pseudo-holomorphic curves in detail. Local properties of pseudo-holomorphic curves are investigated and proved from a geometric viewpoint. Properties of particular interest are isoperimetric inequalities, a monotonicity formula, gradient bounds and the removal of singularities. A special chapter is devoted to relevant features of hyperbolic surfaces, where pairs of pants decomposition and thick-thin decomposition are described.

John M. LEE. — **Riemannian manifolds: an introduction to curvature.** — Graduate texts in mathematics, vol. 176. — Un vol. relié, 16,5×24, de XV, 224 p. — ISBN 0-387-98271-X. — Prix: DM 118.00. — Springer, New York, 1997.

The book begins with a careful treatment of the machinery of metrics, connections, and geodesics, and then introduces the curvature tensor as a way of measuring whether a Riemannian manifold is locally equivalent to Euclidean space. Submanifold theory is developed next in order to give the curvature tensor a concrete quantitative interpretation. The remainder of the text is devoted to proving the four most fundamental theorems relating curvature and topology: the Gauss-Bonnet Theorem, the Cartan-Hadamard Theorem, Bonnet's Theorem, and the characterization of manifolds of constant curvature.

Topologie des variétés, analyse globale et analyse des variétés

Stig I. ANDERSSON, Michel L. LAPIDUS, (Editors). — **Progress in inverse spectral geometry.** — Trends in mathematics. — Un vol. relié, 17×24, de 196 p. — ISBN 3-7643-5755-X. — Prix: SFr. 88.00. — Birkhäuser Verlag, Basel, 1997.

This is a collection of 10 coherent papers originating from a conference on inverse spectral geometry by leading experts in this field. This book aims at presenting a comprehensive overview

of the research frontline in inverse spectral geometry. The interdisciplinary character of inverse spectral geometry, employing techniques from geometry, global analysis, group theory and so on, is responsible not only for its fertility but also accounts for the wide variety of mathematicians contributing to the field.

Abraham BOYARSKY, Pawel GÓRA. — **Laws of chaos: invariant measures and dynamical systems in one dimension.** — Probability and its applications. — Un vol. relié. 16,5×24, de xv, 399 p. — ISBN 3-7643-4003-7. — Prix: SFr. 108.00. — Birkhäuser Verlag, Basel, 1997.

This book is a pedagogical resource for studying probabilistic concepts in the analysis of one-dimensional chaotic systems. It combines three important areas of modern mathematics, dynamical systems, measure theory, and ergodic theory, making it a truly up-to-date text for a graduate course for students of applied sciences. Chaotic systems arising from piecewise linear transformations are studied in detail since the probability density functions of such transformations can be easily found using linear algebra and provide a useful means to approximate the invariant measures of more complex dynamical systems. This book is rich in examples and graphic illustrations and includes over one hundred pages of problem sets and their solutions.

Thomas E. CECIL, Shiing-shen CHERN, (Editors). — **Tight and taut submanifolds: papers in memory of Nicolaas H. Kuiper.** — Mathematical Sciences Research Institute publications, vol. 32. — Un vol. relié, 16×24, de xvii, 349 p. — ISBN 0-521-62047-3. — Prix: £30.00. — Cambridge University Press, Cambridge, 1997.

This book contains six articles by experts in the field and an extensive bibliography. It is dedicated to the memory of Nicolaas H. Kuiper, and the first paper is an unfinished but insightful exposition of the subject of tight immersions and maps, written by Kuiper. Other papers survey topics such as the smooth and polyhedral portions of the theory of tight immersions: taut, Dupin, and isoparametric submanifolds of Euclidean space: taut submanifolds of arbitrary complete Riemannian manifolds: and real hypersurfaces in complex space forms with constant principal curvature.

Guy DAVID, Stephen SEMMES. — **Fractured fractals and broken dreams: self-similar geometry through metric and measure.** — Oxford lecture series in mathematics and its applications, vol. 7. — Un vol. relié, 16×24, de ix, 212 p. — ISBN 0-19-850166-8. — Prix: £35.00. — Clarendon Press, Oxford, 1997.

The book proposes new notions of coherent geometric structure. Fractal patterns have emerged in many contexts, but there is confusion over exactly what is a "pattern" and what is not. How can the structure lying within objects and the relationships between them be made precise? The foundations laid here provide a fresh approach to a familiar field, with a wide range of open problems given, large and small, and a variety of examples with diverse connections to other branches of mathematics.

A.T. FOMENKO, and S.V. MATVEEV. — **Algorithmic and computer methods for three-manifolds.** — Mathematics and its applications, vol. 425. — Un vol. relié, 16,5×24,5, de xii, 334 p. — ISBN 0-7923-4770-6. — Prix: Dfl. 320.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This monograph presents a comprehensive coverage of three-dimensional topology, as well as exploring some of its frontiers. Many important applied problems of mechanics and theoretical physics can be reduced to algorithmic problems of three-dimensional topology, which can then be solved using computers. Although much progress in this field has been made in recent years, these results have not been readily accessible to a wider audience up to now. This book is based on courses the authors have given over several years, and summarizes the most outstanding achievements of modern computer topology.

Maurice de Gosson. — **Maslov classes, metaplectic representation and Lagrangian quantization.** — Mathematical research, vol. 95. — Un vol. broché, 17×24, de 186 p. — ISBN 3-05-501714-5. — Prix: DM 98.00. — Akademie Verlag, Berlin, 1997.

This book is devoted to the study of various Maslov classes that intervene in theories of geometric quantization. The relationship between these classes and the metaplectic group is thoroughly studied. The construction and the properties of these Maslov classes are applied to define a new concept, that of Lagrangian catalogue, which is a collection of "cohomological wave functions", whose behavior under Hamiltonian flows is studied.

Yi-Zhi Huang. — **Two-dimensional conformal geometry and vertex operator algebras.** — Progress in mathematics, vol. 148. — Un vol. relié, 16×24, de XII, 280 p. — ISBN 0-8176-3829-6. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1997.

The focus of this monograph is to formulate and prove one main theorem: the equivalence between the algebraic and geometric formulations of the notion of vertex operator algebra. The author introduces a geometric notion of vertex operator algebra in terms of complex powers of the determinant line bundles over certain moduli spaces of spheres with punctures and local analytic coordinates, and proves that this notion is precisely equivalent to the algebraic notion of vertex operator algebra. In particular a detailed algebraic and analytic study of the sewing operation in the moduli space is presented. Solutions of exercises are provided.

Jürgen Jost. — **Nonpositive curvature: geometric and analytic aspects.** — Lectures in mathematics ETH Zürich. — Un vol. broché, 17×24, de VIII, 108 p. — ISBN 3-7643-5736-3. — Prix: SFr. 32.00. — Birkhäuser Verlag, Basel, 1997.

This book discusses various geometric and analytic aspects of non-positive curvature, starting with a discussion of Riemannian examples and rigidity theorems. It then treats generalized notions of nonpositive curvature in metric geometry in the sense of Alexandrov and Busemann, as well as the theory of harmonic maps with values in such spaces.

Bruce P. Kitchens. — **Symbolic dynamics: one-sided, two-sided and countable state Markov shifts.** — Universitext. — Un vol. broché, 15,5×23,5, de X, 252 p. — ISBN 3-540-62738-3. — Prix: DM 58.00. — Springer, Berlin, 1998.

This is a thorough introduction to the dynamics of one-sided and two-sided Markov shifts on a finite alphabet and to the basic properties of Markov shifts on a countable alphabet. These are the symbolic dynamical systems defined by a finite transition rule. The basic properties of these systems are established using elementary methods. The connections to other types of dynamical systems, cellular automata and information theory are illustrated with numerous examples.

Y. Kosmann-Schwarzbach, B. Grammaticos, K.M. Tamizhmani, (Editors). — **Integrability of nonlinear systems.** — Proceedings of the CIMPA School, Pondicherry University, India, 8-26 January 1996. — Lecture notes in physics, vol. 495. — ISBN 3-540-63353-7. — Prix: DM 116.00. — Springer-Verlag, Berlin, 1997.

.J. Ablowitz: Nonlinear waves, solitons and IST. — B. Grammaticos and A. Ramani: Integrability - and how to detect it. — J. Hietarinta: Introduction to the Hirota bilinear method. — Y. Kosmann-Schwarzbach: Lie bialgebras, Poisson Lie groups and dressing transformations. — M.D. Kruskal, N. Joshi and R. Halburd: Analytic and asymptotic methods for nonlinear singularity analysis: a review and extensions of tests for the Painlevé property. — M. Lakshmanan: Bifurcations, chaos, controlling and synchronization of certain nonlinear oscillators. — F. Magri: Eight lectures on integrable systems. — J. Satsuma: Bilinear formalism in soliton theory. — M.A. Semenov-Tian-Shansky: Quantum and classical integrable systems.

Valentine S. KULIKOV. — **Mixed Hodge structures and singularities.** — Cambridge tracts in mathematics, vol. 132. — Un vol. relié, 16×24, de XXI, 186 p. — ISBN 0-521-62060-0. — Prix: £30.00. — Cambridge University Press, Cambridge, 1998.

This book is both an introduction to, and a survey of, some topics of singularity theory; in particular the studying of singularities by means of differential forms. Here some ideas and notions that arose in global algebraic geometry, namely mixed Hodge structures and the theory of period maps, are developed in the local situation to study the case of isolated singularities of holomorphic functions. The author introduces the Gauss-Manin connection on the vanishing cohomology of a singularity, that is on the cohomology fibration associated to the Milnor fibration, and draws on the work of Brieskorn and Steenbrink to calculate this connection, and the limit mixed Hodge structure.

W.B. Raymond LICKORISH. — **An introduction to knot theory.** — Graduate texts in mathematics, vol. 175. — Un vol. relié, 16×24, de X, 201 p. — ISBN 0-387-98254-X. — Prix: DM 89.00. — Springer, New York, 1997.

This volume is an introduction to mathematical knot theory — the theory of knots and links of simple closed curves in three-dimensional space. Three distinct techniques are employed: geometric topology manoeuvres; combinatorics; and algebraic topology. Each topic is developed until significant results are achieved, and chapters end with exercises and brief accounts of state-of-the-art research. Readers are assumed to have knowledge of the basic ideas of the fundamental group and simple homology theory, although explanations throughout the text are plentiful.

NGUYEN DINH CONG. — **Topological dynamics of random dynamical systems.** — Oxford mathematical monographs. — Un vol. relié, 16×24, de VIII, 203 p. — ISBN 0-19-850157-9. — Prix: £45.00. — Clarendon Press, Oxford, 1997.

This book is the first to deal with the theory of topological dynamics of random dynamical systems. The book presents in detail the solutions to the most fundamental problems of topological dynamics: the linearization of nonlinear smooth systems, and the classification and structural stability of linear hyperbolic systems. Employing the tools and methods of algebraic ergodic theory, the theory presented here leads to surprisingly beautiful results, showing the richness of random dynamical systems as well as giving a gentle generalization of classical deterministic theory.

Masahiro SHIOTA. — **Geometry of subanalytic and semialgebraic sets.** — Progress in mathematics, vol. 150. — Un vol. relié, 16,5×24,5, de XII, 431 p. — ISBN 3-7643-4000-2. — Prix: SFr. 158.00. — Birkhäuser, Boston, 1997.

Subanalytic and semialgebraic sets were introduced for topological and systematic investigations of real analytic and algebraic sets. One of the author's purposes is to show that almost all (known and unknown) properties of subanalytic and semialgebraic sets follow abstractly from some fundamental axioms. Another is to develop methods of proof that use finite processes instead of integration of vector fields. The proofs are elementary, but the results obtained are new and significant – for example, for singularity theorists and topologists. Further, the new methods and tools developed provide solid foundations for further research by model theorists (logicians) who are interested in applications of model theory to geometry.

S. Suzuki, (Editor). — **Lectures at knots '96.** — International Conference Center, Waseda University, Tokyo, 22-31 July 1996. — Series on knots and everything, vol. 15. — Un vol. relié, 16×22,5, de IX, 290 p. — ISBN 981-02-3094-X. — Prix: £40.00. — World Scientific, Singapore, 1997.

K. Morimoto: Tunnel number and connected sum of knots. — A. Kawauchi: Topological imitations. — S. Kamada: Surfaces in 4-space, a view of normal forms and braidings. — K. Motegi: Knot types of satellite knots and twisted knots. — T. Deguchi, K. Tsurusaki: Random knots and links and applications to polymer physics. — L.H. Kauffman: Knots and diagrams. — K. Taniyama: On spatial graphs. — G. Buck, J. Simon: Energy and length of knots. — T. Kohno: Chern-Simons perturbative invariants. — C. McA. Gordon: Combinatorial methods in Dehn surgery.

Probabilités et processus stochastiques

L. Decreusefond, Jon Gjerde, B. Øksendal, A.S. Üstünel, (Editors). — **Stochastic analysis and related topics VI.** — Proceedings of the sixth Oslo-Silivri workshop, Geilo, 1996. — Progress in probability, vol. 42. — Un vol. relié, 16×25, de VI, 408 p. — ISBN 0-8176-4018-5. — Prix: SFr. 228.00. — Birkhäuser, Boston, 1998.

This workshop features lectures on stochastic differential systems with memory and lectures on backward stochastic differential equations with applications to viscosity solutions of semilinear PDEs. In addition, the contributed lectures present such mathematical topics as stochastic calculus of variations on Lie groups, boundary value problems, linear and nonlinear SDEs and SPDEs, non-Kolmogorov type probabilistic models, and some applications to fluid flow, population growth and economics. The selection of topics demonstrates the principle of the common interest among many researchers in these powerful stochastic techniques.

Hugh Gordon. — **Discrete probability.** — Undergraduate texts in mathematics. — Un vol. relié, 16×24, de XII, 266 p. — ISBN 0-387-98227-2. — Prix: DM 68.00. — Springer, New York, 1997.

This work is a post-calculus-level textbook for a first course in probability. Basic concepts, such as counting, independence, conditional probability, random variables, approximation of probabilities, generating functions, random walks, and Markov chains, are presented with clear explanations and many worked-out exercises. Throughout the book appear various comments on the history of the study of probability. The author presents biographical information about some of the well known contributors to probability, such as Fermat, Pascal, the Bernoullis, de Moivre, Bayes, Laplace, Poisson, Markov, and many others.

D. Jeulin, (Editor). — **Advances in theory and applications of random sets.** — Proceedings of the International Symposium. — Un vol. relié, 16,5×22,5, de X, 326 p. — ISBN 981-02-3001-X. — Prix: £61.00. — World Scientific, Singapore, 1997.

This volume contains the invited lectures given by leading scientists in this field. It shows the applications of the theory of random sets to many practical domains: models issued from this theory, by means of image simulation and analysis by computer, are applied in various fields such as biology or materials. On a different scale, they are used to simulate mineral ore deposits, oil reservoirs, or even astronomical data. Finally they provide sources of textures to encode or to generate artificial images.

Daniel A. K<small>LAIN</small>, Gian-Carlo R<small>OTA</small>. — **Introduction to geometric probability.** — Un vol. broché, 14×22, de XIV, 178 p. — ISBN 0-521-59654-8. — Prix: £12.95 (relié: £35.00). — Cambridge University Press, Cambridge, 1997.

In this book, the theory of intrinsic volumes due to Hadwiger, McMullen, Santaló and others is presented, along with a complete and elementary proof of Hadwiger's characterization theorem of invariant measures in Euclidean n-space. The theory of the Euler characteristic is developed from an integral-geometric point of view. The authors prove the fundamental theorem of integral geometry, namely the kinematic formula. Finally the analogies between invariant measures on polyconvex sets and measures on order ideals of finite partially ordered sets are investigated.

Isi M<small>ITRANI</small>. — **Probabilistic modelling.** — Un vol. broché, 15×23, de X, 223 p. — ISBN 0-521-58530-9. — Prix: £16.95 (relié: £45.00). — Cambridge University Press, Cambridge, 1998.

Probabilistic modelling is the most cost-effective means of performance and reliability evaluation of complex dynamic systems. The necessary fundamentals of probability theory are included, as well as an introduction to renewal, Poisson and Markov processes. Models arising in the fields of manufacturing, computing and communications, involving single or multiple service stations and one or more customer classes, are examined in some detail. Both exact and approximate solution methods are discussed, including recent techniques such as spectral expansion. Special attention is devoted to models of systems subject to breakdowns and repairs.

Statistique

A.C. D<small>AVISON</small>, D.V. H<small>INKLEY</small>. — **Bootstrap methods and their application.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. broché, 18×26, de X, 582 p. + 1 disquette d'accompagnement. — ISBN 0-521-57471-4. — Prix: £24.95 (relié: £70.00). — Cambridge University Press, Cambridge, 1997.

Bootstrap methods are computer-intensive methods of statistical analysis that use simulation to calculate standard errors, confidence intervals and significance tests. This book gives a broad and up-to-date coverage of bootstrap methods with numerous applied examples, together with the underlying general concepts and basic theory without emphasis on mathematical rigour, developed in a coherent way with the necessary theoretical basis. Each chapter includes both practical and theoretical exercises. A valuable supplement is a disk of purpose-written S-plus programs for implementing the methods described in the text.

Ruma F<small>ALK</small>. — **Understanding probability and statistics: a book of problems.** — Un vol. broché, 15,5×23, de XIII, 239 p. — ISBN 1-56881-071-7. — Prix: US$25.00. — A.K. Peters, Wellesley, Massachusetts, 1997.

This is a book of creative statistical problems intended to allay the mathematical fears of the average student through "experiencing the revelation of understanding". The collection encompasses a range of problems from high-school to graduate level and takes the active, hands-on approach to the assimilation of basic concepts. Through the use of humor and the familiar, the author has made an often overwhelming subject less intimidating. Because neither calculus nor other techniques of higher mathematics are required for arriving at solutions, the book is quite appropriate for non-mathematicians.

Bernard FLURY. — **A first course in multivariate statistics.** — Springer texts in statistics. — Un vol. relié, 21,5×24,5, de XIII, 713 p. — ISBN 0-387-98206-X. — Prix: DM 148.00. — Springer, New York, 1997.

The book starts at an elementary level, developing concepts of multivariate distributions from first principles. A chapter on the multivariate normal distribution reviews the classical parametric theory. Methods of estimation are explored using the plus-in principle as well as maximum likelihood. Two chapters on discrimination and classification, including logistic regression, are at the core of the book. Methods of testing hypotheses are developed from heuristic principles, followed by likelihood ratio tests and permutation tests. The powerful self-consistency is used to introduce principal components as a method of approximation. The book concludes with a chapter on finite mixture analysis, a topic of great practical and theoretical importance.

David A. HARVILLE. — **Matrix algebra from a statistician's perspective.** — Un vol. relié, 16,5×24,5, de XVII, 630 p. — ISBN 0-387-94978-X. — Prix: DM 108.00. — Springer, New York, 1997.

This book presents matrix algebra in a way that is well suited for those with an interest in statistics or a related discipline. It provides thorough and unified coverage of the fundamental concepts along with the specialized topics encountered in areas of statistics, such as linear statistical models and multivariate analysis. It includes a number of very useful results that have only been available from relatively obscure sources. Detailed proofs are provided for all results.

C. MALAGUERRA, S. MORGENTHALER, E. RONCHETTI, (Editors). — **Conference on statistical science honouring the bicentennial of Stefano Franscini's birth,** Ascona, November 18-20, 1996. — Monte Verità. — Un vol. relié, 17,5×24, de 245 p. — ISBN 3-7643-5707-X. — Prix: SFr. 88.00. — Birkhäuser Verlag, Basel, 1997.

Franscini was the first Italian-speaking Swiss to become a member of the Swiss Government and he spearheaded the use of statistics in policy fields such as education, economic development and politics. The first part of the book gives a historical appraisal of Stefano Franscini's life and work. The second part comprises papers on the relationship between statistical science and official statistics. The third and final part features a series of studies on new and emerging methodological issues in survey sampling and data analysis, highlighting some key repercussions of applied statistics research on data analysis in general and survey data analysis in particular.

Stephan MORGENTHALER. — **Introduction à la statistique.** — Méthodes mathématiques pour l'ingénieur, vol. 9. — Un vol. broché, 16×24, de X, 317 p. — ISBN 2-88074-372-9. — Prix: SFr. 66.30. — Presses polytechniques et universitaires romandes, Lausanne, 1997.

Première introduction en statistique et en probabilités, cet ouvrage traite les méthodes les plus courantes et donne une base théorique. Le début du livre consiste en une discussion sur les données susceptibles d'être soumises à une analyse statistique, et une initiation concise aux probabilités. Puis sont présentées les approches majeures de la statistique, soit l'estimation et les méthodes inférentielles. Enfin la dernière partie aborde différents outils statistiques. Complété par des exercices, ce livre est conçu comme un support pour un cours de deux semestres.

Julia K. PARRISH, Wiliam M. HAMNER, (Editors). — **Animal groups in three dimensions.** — Un vol. relié, 18,5×26, de XVII, 378 p. — ISBN 0-521-46024-7. — Prix: £60.00. — Cambridge University Press, Cambridge, 1998.

This book is about the ways in which many animals form groups, for instance, schools of fish, flocks of birds, etc... Covering both invertebrate and vertebrate species, the authors investigate

three-dimensional animal aggregations from a variety of disciplines, from physics to mathematics to biology. The first section of the book is devoted to the various methods used to collect three-dimensional data over time. The second section focuses on analytical methods used to quantify pattern, group kinetics, and inter-individual interactions within the group. The section on behavioral ecology and evolution deals with the functions of aggregative behavior from the point of view of an inherently selfish individual member. The final section presents an alternative to the empirical study of animal aggregation by the use of models.

Alvin C. RENCHER. — **Multivariate statistical inference and applications.** — Wiley series in probability and statistics. Texts and reference section. — Un vol. relié, 16×24, de XX, 559 p. + 1 disquette. — ISBN 0-471-57151-2. — Prix: £60.00. — John Wiley & Sons, New York, 1998.

This text is a user-friendly introduction to basic multivariate analysis theory and practice for statistics with little or no background in theoretical statistics. Among the many special features are: Clear, step-by-step explanations of all key concepts and procedures along with original, easy-to-follow proofs, numerous problems, examples and tables of distributions, many real-world data sets drawn from a wide range of disciplines, reviews of univariate procedures that give rise to multivariate techniques, an extensive survey of the world literature on multivariate analysis, an in-depth review of matrix theory, a disk including all the data sets and SAS command files for all examples and numerical problems found in the book.

Analyse numérique

M.D. BUHMANN, A. ISERLES, (Editors). — **Approximation theory and optimization: tributes to M.J.D. Powell.** — Un vol. relié, 15,5×23,5, de XIII, 220 p. — ISBN 0-521-58190-7. — Prix: £35.00. — Cambridge University Press, Cambridge, 1997.

This volume is derived from invited talks given at a meeting celebrating the sixtieth birthday of Professor Powell and, reflecting his own achievements, focuses on innovative work in optimization and in approximation theory. The individual papers have been written by leading authorities in their subjects and are a mix of expository articles and surveys of new work. They have all been reviewed and edited to form a coherent volume that represents the state of the art in an important discipline within mathematics, with highly relevant applications throughout science and engineering.

Werner HAUSSMANN, Kurt JETTER, Manfred REIMER, (Editors). — **Multivariate approximation: recent trends and results.** — Proceedings of the 2nd International Conference on Multivariate Approximation Theory held at Witten-Bommerholz, Germany, September 29-October 4, 1996. — Mathematical research, vol. 101. — Un vol. relié, 18×24, de 320 p. — ISBN 3-05-501770-6. — Prix: DM 138.00. — Akademie Verlag, Berlin, Wiley-VCH, Weinheim, 1997.

This is the presentation of the main results of the 2nd International Conference on Multivariate Approximation. There are contributions to the following topics: interpolation and hyperinterpolation on the sphere, quadrature, discrepancy and spherical designs, multivariate convex spline interpolation, triangular finite element spaces, polar form of splines, refinable spline pairs, local box dimension of fractal functions, symbolic treatment of algebraic systems, harmonic approximation and boundary behaviour... synthesis and analysis with multivariate wavelets and frames.

Jacquez RAPPAZ, Marco PICASSO. — **Introduction à l'analyse numérique.** — Un vol. broché, 16×24, de x, 256 p. — ISBN 2-88074-363-X. — Prix: SFr. 63.20. — Presses polytechniques et universitaires romandes, Lausanne, 1998.

Cet ouvrage, synthétique et pédagogique, a pour but de présenter les notions mathématiques nécessaires à la maîtrise des méthodes numériques utilisées dans les sciences de l'ingénieur. Les outils de base nécessaires à l'analyse numérique y sont présentés et la résolution numérique des équations aux dérivées partielles relatives aux phénomènes d'ordre physique, chimique ou biologique est abordée. Le tout est illustré de nombreux exemples, figures et exercices.

Eugene E. TYRTYSHNIKOV. — **A brief introduction to numerical analysis.** — Un vol. relié, 16×24, de XII, 202 p. — ISBN 0-8176-3916-0. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1997.

Since matrix analysis underlies numerical methods, emphasis in the book is on methods and algorithms of matrix analysis. Also considered are function approximations, methods of solving nonlinear equations and minimization methods. Alongside classical methods, new results and approaches developed over the last few years are discussed - namely those on spectral distribution theory and design and proof of modern preconditioning strategies for large-scale linear algebra problems.

Mécanique des particules et systèmes

J.-M. SOURIAU. — **Structure of dynamical systems: a symplectic view of physics.** — Translated by C.H. Cushman-de Vries, translation edited by R.H. Cushman, G.M. Tuynman. — Progress in mathematics, vol. 149. — Un vol. relié, 16×24, de XXXIV, 406 p. — ISBN 0-8176-3695-1. — Prix: SFr. 158.00. — Birkhäuser, Boston, 1997.

The aim of this book is to treat all three basic theories of physics namely, classical mechanics, statistical mechanics, and quantum mechanics from the same perspective, that of symplectic geometry, thus showing the unifying power of the symplectic geometric approach. In the last chapter of this book the author presents his theory of geometric quantization. Highlights of this chapter are the derivation of the various wave equations and the construction of the Fock space.

Mécanique des solides, élasticité et plasticité

Javier BONET, Richard D. WOOD. — **Nonlinear continuum mechanics for finite element analysis.** — Un vol. relié, 19×26, de XVII, 248 p. — ISBN 0-521-57272-X. — Prix: £32.50. — Cambridge University Press, Cambridge, 1997.

After a gentle introduction and a chapter on mathematical preliminaries, kinematics, stress, and equilibrium are considered. Hyperelasticity for compressible and incompressible materials includes descriptions in principal directions, and a short appendix extends the kinematics to cater for elastoplastic deformation. Linearization of the equilibrium equations naturally leads on to finite element discretization, equation solution and computer implementation. The majority of chapters include worked examples and exercises. In addition the book provides user instructions, program description, and examples for the FLAGSHYP computer implementation for which the source code is available free on the Internet.

Mécanique des fluides, acoustique

A.M. ELIZAROV, N.B. IL'INSKIY, A.V. POTASHEV. — **Mathematical methods of airfoil design: inverse boundary-value problems of aerohydrodynamics.** — Un vol. relié, 17×25, de 292 p. — ISBN 3-05-501701-3. — Prix: DM 148.00. — Akademie Verlag, Berlin, Wiley-VCH, Weinheim, 1997.

This book presents over thirty years of research from Russia as well as new research of the authors. Principal methods and results for solutions of the inverse boundary value problems of aerohydrodynamics for 2D flows are presented. The essence of the problems consists in finding an airfoil shape (isolated, multicomponent or an element of a cascade) by pressure or velocity distributions given on the contour of the airfoil which provide the required aerodynamic characteristics. Mathematical models of ideal liquid, boundary layer and Chaplygin gas are used. Special attention is paid to mathematical aspects of the theory and to optimization problems.

R.S. JOHNSON. — **A modern introduction to the mathematical theory of water waves.** — Cambridge texts in applied mathematics. — Un vol. broché, 15,5×23, de XIV, 445 p. — ISBN 0-521-59832-X. — Prix: £19.95 (relié: £55.00). — Cambridge University Press, Cambridge, 1997.

Beginning with the introduction of the appropriate equations of fluid mechanics, the opening chapters go on to consider some classical problems in linear and non-linear water-wave theory. This sets the scene for a study of more modern aspects, problems that give rise to soliton-type equations. The book closes with an introduction to the effects of viscosity. All the mathematical developments are presented in the most straightforward manner, with worked examples and simple cases carefully explained.

Pierre-Louis LIONS. — **Mathematical topics in fluid mechanics. vol. 2: Compressible models.** — Oxford lecture series in mathematics and its applications, vol. 10. — Oxford science publication. — Un vol. relié, 16,5×24, de XIV, 348 p. — ISBN 0-19-851488-3. — Prix: £39.50. — Clarendon Press, Oxford, 1998.

The main emphasis in the first volume is on the mathematical analysis of incompressible models. The second volume is an attempt to achieve a mathematical understanding of compressible Navier-Stokes equations. It is probably the first reference covering the issue of global solutions in the large. It includes entirely new material on compactness properties of solutions for the Cauchy problem, the existence and regularity of stationary solutions, and the existence of global weak solutions.

Physique statistique, structure de la matière

Charles M. NEWMAN. — **Topics in disordered systems.** — Lectures in mathematics, ETH Zürich. — Un vol. relié, 17×24, de VIII, 88 p. — ISBN 3-7643-5777-0 (Basel), 0-8176-5777-0 (Boston). — Prix: SFr. 28.00. — Birkhäuser Verlag, Basel, 1997.

This lecture notes volume concerns the equilibrium properties of a few carefully chosen examples of disordered Ising models. The two main types of systems considered are disordered ferromagnets and spin glasses. The emphasis is on questions concerning the number of ground states (at zero temperature) or the number of pure Gibbs states (at nonzero temperature). A recurring theme is that these questions are connected to interesting issues concerning percolation and related models of geometric/combinatorial probability.

Economie, recherche opérationnelle, jeux

Jean-Daniel Boissonnat, Mariette Yvinec. — **Algorithmic geometry.** — Translated by Hervé Brönnimann. — Un vol. broché, 17,5 × 24,5, de xx, 519 p. — ISBN 0-521-56529-4 (relié: 0-521-56322-4). — Prix: £24.95 (relié: £70.00). — Cambridge University Press, Cambridge, 1998.

In all areas of computing the optimal design of algorithms is essential for the efficient running of programs. The design and analysis of geometrical algorithms has, in particular, seen remarkable growth in recent years, due to application in, for example, computer vision, graphics, medical imaging and CAD. The subject itself is built on three pillars: geometric data structures, algorithmic techniques and results from combinatorial geometry. The goal of this book is two-fold: first to provide a coherent and systematic treatment of the foundations; second to present algorithmic solutions that are amenable to rigorous analysis and are efficient in practical situations.

G. George Yin, Quing Zhang, (Editors). — **Mathematics of stochastic manufacturing systems.** — AMS-SIAM Summer Seminar in Applied Mathematics, June 17-22, 1996, Williamsburg, Virginia. — Lectures in applied mathematics, vol. 33. — Un vol. broché, 18 × 26, de xii, 399 p. — ISBN 0-8218-0755-2. — Prix: £50.00. — American Mathematical Society, Providence R.I., distributed by Oxford University Press, Oxford, 1997.

In this volume, leading experts in mathematical manufacturing research and related fields review and update recent advances of mathematics in stochastic manufacturing systems and attempt to bridge the gap between theory and applications. The topics covered include scheduling and production planning, modeling of manufacturing systems, hierarchical control for large and complex systems, Markov chains, queueing networks, numerical methods for system approximations, singular perturbed systems, risk sensitive control, stochastic optimization methods, discrete event systems, and statistical quality control.

Biologie et sciences du comportement

Yves Cherruault. — **Modèles et méthodes mathématiques pour les sciences du vivant.** — Collection Mathématiques. — Un vol. broché, 15,5 × 21,5, de x, 299 p. — ISBN 2-13-048978-8. — Prix: FF 168.00. — Presses universitaires de France, Paris, 1998.

On sait l'importance que revêtent actuellement les travaux et recherches pluridisciplinaires dans le cadre de la société civile (cancérologie, Sida, environnement...). L'ouvrage présente les techniques fondamentales permettant l'élaboration de modèles mathématiques associés aux sciences du vivant ainsi que les problèmes mathématiques et numériques issus de cette modélisation. A cette occasion des méthodes mathématiques et numériques nouvelles sont développées pour résoudre les problèmes d'identification de paramètres inconnus dans les modèles (méthode d'optimisation globale Alienor), les problèmes de contrôle optimal et les problèmes liés à la résolution de systèmes d'équations fonctionnelles non linéaires.

F.-L. Krause and G. Seliger, (Editors). — **Life cycle networks.** — Proceedings of the 4th CIRP International Seminar on Life Cycle Engineering, 26-27 June 1997, Berlin, Germany. — Un vol. relié, 16 × 24, de vii, 482 p. — ISBN 0-412-82720-4. — Prix: £95.00. — Chapman & Hall, London, 1997.

In this book the potentials of current information and communication technologies and modern management concepts to meet these requirements are presented and discussed. The scope

of the book includes the following major topics: life cycle management; life cycle design; design for environment and recycling, life cycle assessment; disassembly, IT-networks. This book will be essential reading for engineers, research and development personnel, as well as managerial staff in industry and research organisations.

Systèmes, contrôle optimal

Martino BARDI, Italo CAPUZZO-DOLCETTA. — **Optimal control and viscosity solutions of Hamilton-Jacobi-Bellman equations.** — Systems & control: foundations & applications. — Un vol. relié, 16,5×24, de XVII, 570 p. — ISBN 0-8176-3640-4. — Prix : SFr. 178.00. — Birkhäuser, Boston, 1997.

The book begins with an extensive introduction in which the authors present the main ideas and themes of the book, beginning with the classical derivation of the Hamilton-Jacobi-Bellman equation from the Dynamic Programming Optimality Principle and the characterization of the value function as the unique viscosity solution of this equation. This is then followed by a treatment of the general theory of continuous viscosity solutions and their applications to a number of problems in deterministic optimal control theory (infinite and finite horizon, minimal time, optimal stopping, ...etc.), one of the most important being an approximation scheme for the value function and for optimal feedback controls based on dynamic programming.

Jaoquim António dos Santos GROMICHO. — **Quasiconvex optimization and location theory.** — Applied optimization , vol. 9. — Un vol. relié, 16,5×24,5, de XXI, 218 p. — ISBN 0-7923-4694-7. — Prix : Dfl. 190.00. — Kluwer Academic Publishers, Dordrecht, 1998.

The book includes variants of the ellipsoid method for convex and quasiconvex problems and applies them to very general convex and quasiconvex models in location theory. It starts by describing the adopted notation and provides basic details of convexity and convex optimization. Many techniques in convex optimization rely on the use of separation hyperplanes. The book uses the ellipsoid method as an illustration of such a technique and provides a new and more stable version of this method. The second part of the book generalizes the new algorithm to solve quasiconvex programs.

Jean-Baptiste HIRIART-URRUTY. — **Optimisation et analyse convexe.** — Collection Mathématiques. — Un vol. broché, 15×21,5, de 376 p. — ISBN 2-13-048983-4. — Prix : FF 198.00. — Presses universitaires de France, Paris, 1998.

Ce livre est un recueil d'exercices et problèmes corrigés, de difficulté graduée, accompagnés de commentaires sur l'utilisation du résultat obtenu, sur un prolongement possible, et occasionnellement, placés dans un contexte historique. Le cadre de travail est volontairement simple. L'auteur a voulu insister davantage sur les idées et mécanismes de base, que sur des généralisations possibles ou des techniques particulières à telle ou telle situation. Les connaissances mathématiques pour tirer profit du recueil ont été maintenues minimales, celles normalement acquises après une formation scientifique de deux ou trois années à l'université.

Bronisław JAKUBCZYK, Witold RESPONDEK, (Editors). — **Geometry of feedback and optimal control.** — Pure and applied mathematics, vol. 207. — Un vol. relié, 16,5×23,5, de VII, 564 p. — ISBN 0-8247-9068-5. — Prix : US$165.00. — Marcel Dekker, New York, 1998.

Elucidating complex material and providing new directions for future research, the book discusses the latest applications, illustrating links between topics such as the Pontryagin Maximum Principle, differential geometric and symplectic methods, and the structure of

reachable sets; furnishes the most recent problems, including feedback stabilization, classification, and invariants; covers the optimality of trajectories using the Maslov index; delineates the role of singularity theory in stability theory and feedback equivalence; explores singularities of systems, reachable sets, and stabilizing and optical controls... and more.

Athanasios MIGDALAS, Panos M. PARDALOS, Peter VÄRBRAND, (Editors). — **Multilevel optimization: algorithms and applications.** — Nonconvex optimization and its applications, vol. 20. — Un vol. relié, 16×24,5, de XII, 384 p. — ISBN 0-7923-4693-9. — Prix: Dfl. 320.00. — Kluwer Academic Publishers, Dordrecht, 1998.

The field of multilevel optimization has become a well-known and important research field. Hierarchical structures can be found in scientific disciplines such as environment, ecology, biology, chemical engineering, mechanics, classification theory, databases, network design, transportation, game theory and economics. Moreover, new applications are constantly being introduced. This has stimulated the development of a new theory and efficient algorithms. This volume contains 16 chapters written by various researchers and presents a cohesive authoritative overview of developments and applications in this emerging field of optimization.

Teng-Tiow TAY, Iven MAREELS, John B. MOORE. — **High performance control.** — Systems & control. — Un vol. relié, 16×24, de XVI, 344 p. — ISBN 0-8176-4004-5 (Boston), 3-7643-4404-5 (Basel, pbk). — Prix: SFr. 148.00. — Birkhäuser, Boston,1998.

High performance control deals with guaranteed stability and performance properties in systems that are subject to a variety of uncertainties and external disturbances. It is of particular importance in engineering applications where undesirable physical properties or operating characteristics of the system, such as vibration, noise, and process variations must be overcome to insure proper working of the system. The authors use the tools of optimal control, robust control, and adaptive control to develop the theory and practice of high performance control in a real world environment.

Hoang TUY. — **Convex analysis and global optimization.** — Nonconvex optimization and its applications, vol. 22. — Un vol. relié, 16,5×24,5, de XI, 339 p. — ISBN 0-7923-4818-4. — Prix: Dfl. 240.00. — Kluwer Academic Publishers, Dordrecht, 1998.

Convex analysis plays an essential rôle in the development of global optimization methods. This book develops a coherent and rigorous theory of deterministic global optimization from this point of view. Part I constitutes an introduction to convex analysis, with an emphasis on concepts, properties and results particularly needed for global optimization, including those pertaining to the complementary convex structure. Part II presents the foundations and application of global search principles such as partitioning and cutting, outer and inner approximation, decomposition, to general global optimization problems and to problems with a low rank nonconvex structure as well as quadratic problems.

Information, communication, circuits

John BAYLIS. — **Error-correcting codes: a mathematical introduction.** — Chapman & Hall mathematics series. — Un vol. broché, 16×23,5, de XII, 219 p. — ISBN 0-412-78690-7. — Prix: £24.99. — Chapman & Hall, London, 1998.

Topics covered in the book include optimal codes, linear and non-linear codes, general techniques of decoding errors and erasures, error detection, syndrome decoding, cyclic codes, and Hamming, Golay and Reed-Muller codes. It contains not only straight maths, but also

exercises on more investigational problem solving. Chapters on number theory and polynomial algebra are included to support linear codes and cyclic codes, and an extensive reminder of relevant topics in linear algebra is given.

Oliver PRETZEL. — **Codes and algebraic curves.** — Oxford lecture series in mathematics and its applications, vol. 8. — Un vol. relié, 16,5×24, de XII, 192 p. — ISBN 0-19-850039-4. — Prix: £35.00. — Clarendon Press, Oxford,1998.

This book is an updated and extended version of the last part of the successful book *Error-correcting codes and finite fields*. It provides an elementary introduction to Goppa codes, and includes many examples, calculations, and applications. The book is in two parts with an emphasis on motivation, and applications of the theory take precedence over proofs of theorems. The formal theory is, however, provided in the second part of the book, and several of the concepts and proofs have been simplified without sacrificing rigour.