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## BULLETIN BIBLIOGRAPHIQUE

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### *Généralités*

Herbert AMANN, Joachim ESCHER. — **Analysis II.** — Grundstudium Mathematik. — Un vol. broché,  $17 \times 24$ , de XII, 412 p. — ISBN 3-7643-6133-6. — Prix: SFr. 42.00. — Birkhäuser, Basel, 1999.

Der zweite Band dieser Einführung in die Analysis behandelt die Integrationstheorie von Funktionen einer Variablen, die mehrdimensionale Differentialrechnung und die Theorie der Kurven und Kurvenintegrale. Der im ersten Band begonnene moderne und klare Aufbau wird konsequent fortgesetzt. Dadurch wird ein tragfähiges Fundament geschaffen, das es erlaubt, interessante Anwendungen zu behandeln, die zum Teil weit über den in der üblichen Lehrbuchliteratur behandelten Stoff hinausgehen.

Robert R. BANKS. — **Slicing pizzas, racing turtles, and further adventures in applied mathematics.** — Un vol. relié,  $16,5 \times 24$ , de XI, 286 p. — ISBN 0-691-05947-0. — Prix: US\$24.95. — Princeton University Press, Princeton, 1999.

The author supplies the mathematical know-how to turn such lazy day-to-day dilemmas into problem-solving adventures, in chapters with such enticing titles as "How to Make Mountains out of Molehills" and "How to Get Anywhere in About Forty-Two Minutes". The problems he proposes range from the wondrous to the eminently practical. He explains how to determine the total number of people who have lived on earth and shows how an understanding of mathematical curves can help a thrifty lover, armed with construction paper and scissors, keep expenses down on Valentine's Day. This book offers a collection of amusing and relevant puzzles which can be solved using basic algebra and geometry.

Jean-Michel GHIDAGLIA. — **Petits problèmes d'analyse issus des concours d'entrée à l'Ecole normale supérieure de Cachan.** — Scopos, vol. 4. — Un vol. broché,  $15,5 \times 23,5$ , de VIII, 210 p. — ISBN 3-540-64074-6. — Prix: DM 49.00. — Springer, Berlin, 1999.

Cet ouvrage rassemble 40 petits problèmes et 4 problèmes qui ont été posés au concours d'entrée (à dominante mathématique) à l'Ecole Normale Supérieure de Cachan. Les énoncés sont corrigés de manière très détaillée et surtout de façon totalement indépendante. Les corrections sont suivies de commentaires qui les éclairent. Il ne s'agit pas d'un livre d'exercices mais plutôt d'un manuel pour apprendre des mathématiques. Bien que rangés thématiquement les problèmes (petits et grands) font en général appel simultanément à des connaissances diverses.

Benoit B. MANDELBROT. — **Multifractals and  $1/f$  noise: wild self-affinity in physics (1963-1976): selected works of Benoit B. Mandelbrot.** — Includes contributions by J.M. Berger, J.-P. Kahane, J. Peyrière, and others. — Un vol. relié,  $16 \times 25$ , de VIII, 442 p. — ISBN 0-387-98539-5. — Prix: DM 89.00. — Springer, New York, 1999.

Mildness and locality are the author's terms for the thoroughly-understood form of randomness exemplified by thermal noise. When temporal "volatility" and spatial variability are far



more extreme, they deserve to be called wild and global. This book is a major contribution to an understanding of wild variability and randomness along two wide open frontiers of physics. Specially written introductions provide a new synthesis and historical background, and organize the twenty-odd reprints of works that first appeared from 1962 to 1976.

Jean-Marie MONIER. — **Analyse 1: cours et 300 exercices corrigés, 1<sup>ère</sup> année MPSI, PCSI, PTSI.** — 3<sup>e</sup> édition. — J'intègre. — Un vol. broché, 19,7×27, de x, 275 p. — ISBN 2-10-004442-7. — Prix: FF 160.00 — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Convivialité et lisibilité caractérisent cette nouvelle édition grâce à une nouvelle mise en pages. Chaque chapitre s'ouvre par une introduction signalant les prérequis et dégageant les objectifs à atteindre. Une nouvelle rubrique, intitulée «Du cours aux exercices» regroupe des conseils de méthodologie pour aider l'étudiant dans la résolution des exercices qui suivent. Des questions situées à la limite du programme sont traitées, en fin de chapitre, sous forme de compléments avec solutions détaillées.

Philippe NABONNAND, (Editor). — **La correspondance entre Henri Poincaré et Gösta Mittag-Leffler.** — Avec en annexes les lettres échangées par Poincaré avec Fredholm, Gylden et Phragmén. — Publications des archives Henri-Poincaré. — Un vol. relié, 17×24, de 421 p. — Prix: SFr. 228.00. — Birkhäuser, Basel, 1999.

Ce volume est le premier d'une édition commentée de la correspondance de Henri Poincaré. La correspondance est éditée par les Archives - Centre d'Etudes et de Recherche Henri Poincaré sous la direction de Gerhard Heinzmann et avec le soutien de l'Association pour le Développement des Recherches sur les Sciences et Techniques. Trois tomes sont en cours de préparation: le second sera consacré à la correspondance de Poincaré avec des physiciens, le troisième à celle avec des mathématiciens et le dernier aux échanges administratifs et privés de Poincaré. L'objectif est de rendre la pensée de Henri Poincaré accessible à une audience la plus large possible en montrant ses origines et les traces des tâtonnements qui y ont conduit.

Roland OMNÈS. — **Quantum philosophy: understanding and interpreting contemporary science.** — Translated by Arturo Sangalli. — Un vol. relié, 16×24, de xxiii, 296 p. — ISBN 0-691-02787-0. — Prix: US\$ 29.95. — Princeton University Press, Princeton, 1999.

In this work, the author takes us from the academies of ancient Greece to the laboratories of modern science as he seeks to do no less than rebuild the foundations of the philosophy of knowledge. One of the world's leading quantum physicists, Omnès reviews the history and recent development of mathematics, logic, and the physical sciences to show that current work in quantum theory offers new answers to questions which have puzzled philosophers for centuries. Omnès addresses these profound questions with vigorous arguments and clear, colorful writing, accessible to the general reader, ultimately providing what philosophers have sought through the ages: a sure foundation for human knowledge.

Bernard PARZYSZ, Annie PARZYSZ. — **Fonctions d'une variable: rappels de cours, questions de réflexion, exercices d'entraînement.** — Travaux dirigés. — Un vol. broché, 17×24, de viii, 261 p. — ISBN 2-10-003957-1. — Prix: FF 98.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Les nombres réels. Fonctions d'une variable réelle. Dérivation. Fonctions usuelles. Suites numériques. Intégration. Formules de Taylor. Développements limités. Intégrales généralisées. Fonctions vectorielles. Courbes paramétrées. Equations différentielles. Un dernier chapitre regroupe quelques problèmes de synthèse pour se préparer à l'examen.

Nicolas ROUCHE. — **Pourquoi ont-ils inventé les fractions?** — L'esprit des sciences. — Un vol. broché, 14,5 × 19, de 126 p. — ISBN 2-7298-5824-5 — Prix: FF 49.00. — Ellipses, Paris, 1998.

Les fractions sont un des premiers et principaux terrains où se développe le dégoût des mathématiques... Pourtant, les fractions sont une clé des partages de grandeurs, des rapports et donc des mesures, des proportions, des figures semblables, des probabilités, du calcul des exposants, des notations algébriques. Cet ouvrage s'adresse aux grands élèves, aux parents, aux enseignants, à toutes les personnes qui voudraient, en partant du bon sens et de l'univers quotidien, reconstruire leur savoir en s'appuyant à chaque pas sur le pourquoi des choses. Et reprendre en chemin confiance dans leur capacité à comprendre les mathématiques, à en apprécier la pertinence, le sens et la beauté.

## **Histoire**

Benno ARTMANN. — **Euclid - The creation of mathematics.** — Un vol. relié, 16 × 24, de xvi, 343 p. — ISBN 0-387-98423-2. — Prix: DM 98.00. — Springer, New York, 1999.

Even if the material covered by Euclid may be considered elementary for its most parts, the way in which he presents essential features of mathematics, in a much more general sense, has set the standards for more than 2000 years. He displays the axiomatic foundation of a mathematical theory and its conscious development toward the solution of a specific problem. We see how abstraction works and how it enforces the strictly deductive presentation of a theory. We learn what creative definitions are and how the conceptual grasp leads to the classification of the relevant objects. This is a book for all lovers of mathematics with a solid background in high school geometry, from teachers and students to university professors.

Georges BARTHÉLEMY. — **2500 ans de mathématiques. L'évolution des idées.** — L'esprit des sciences. — Un vol. broché, 14,5 × 19, de 122 p. — ISBN 2-7298-9982-0. — Prix: FF 49.00. — Ellipses, Paris, 1999.

Cette histoire des mathématiques raconte, de l'Antiquité au XX<sup>e</sup> siècle, ce que chaque époque a cherché, inventé et trouvé. Elle évoque le rôle des acteurs célèbres ainsi que les interactions avec les sciences voisines. Mais la visée principale est de permettre une compréhension d'ensemble du développement des mathématiques. Or celui-ci ne s'est pas fait selon un chemin simple et uniforme. Il s'est organisé autour de grandes idées, qui ont connu quelques vicissitudes. C'est donc surtout l'histoire de ces idées majeures qui est ici présentée.

Midhat J. GAZALÉ. — **Gnomon: from pharaohs to fractals.** — Un vol. relié, 16 × 24, de xiv, 259 p. — ISBN 0-691-00514-1. — Prix: US\$29.95. — Princeton University Press, Princeton, 1999.

Every page of *Gnomon* proves the author's passion for numbers, as he combines graceful mathematical explanations with compelling anecdotes and a rich variety of illustrations. He begins by explaining the basic properties of gnomons and tracing the term — which originally meant "that which allows one to know" — to ancient Egyptian and Greek timekeeping. Gazalé examines figurate numbers, which inspired the Greek notions of gnomon and number similarity. He introduces us to continued fractions and guides us through the intricacies of Fibonacci sequences, ladder networks, whorled figures, the famous "golden number", logarithmic spirals, and fractals.

Ioan Mackenzie JAMES, (Editor). — **History of topology.** — Un vol. relié,  $17,5 \times 24,5$ , de ix, 1056 p. — ISBN 0-444-82375-1. — Prix: Dfl. 375.00. — Elsevier, Amsterdam, 1999.

Topology, for many years, has been one of the most exciting and influential fields of research in modern mathematics. Although its origins may be traced back several hundred years, it was Poincaré who “gave topology wings» in a classic series of articles published around the turn of the century. While the earlier history, sometimes called the prehistory, is also considered, this volume is mainly concerned with the more recent history of topology, from Poincaré onwards. The articles cover a wide range of topics. Some are more technical than others, but the reader without a great deal of technical knowledge should still find most of the articles accessible. Some are written by professional historians of mathematics, others by historically-minded mathematicians, who tend to have a different viewpoint. Most of the material has not been published before. Topology is a large subject, with many branches, and it proved quite impossible to cover everything. The emphasis is on what might be called classical topology rather than on general (or point-set) topology. The order in which the articles are arranged is partly chronological and partly according to subject matter. The last part of the book is more concerned with the people who were important in the development of the subject.

Detlef LAUGWITZ. — **Bernhard Riemann 1826-1866: turning points in the conception of mathematics.** — Translated by Abe Shenitzer, with editorial assistance of the author, Hardy Grant, and Sarah Shenitzer. — Un vol. relié,  $16 \times 24$ , de xvi, 357 p. — ISBN 0-8176-4040-1. — Prix: SFr. 148.00. — Birkhäuser, Boston, 1999.

This book, originally written in German, is the first attempt to examine Riemann's scientific work from a single unifying perspective. Laugwitz describes Riemann's development of a conceptual approach to mathematics at a time when conventional algorithmic thinking dictated that formulas and figures, rigid constructs, and transformations of terms were the only legitimate means of studying mathematical objects. David Hilbert gave prominence to the Riemannian principle of utilizing thought, not calculation, to achieve proofs. Hermann Weyl interpreted the Riemann principle-for mathematics and physics alike-to be a matter of “understanding the world through its behavior in the infinitely small”.

Ronald MERMOD. — **De l'électron aux quarks: une physique particulière.** — Un vol. broché,  $15 \times 21$ , de xi, 123 p. — ISBN 2-88074-406-7. — Prix: SFr. 39.00. — Presses polytechniques et universitaires romandes, Lausanne, 1999.

La physique des particules est la plus fondamentale des sciences expérimentales puisqu'elle étudie dans ses limites les plus reculées la composition de la matière et les forces qui la gouvernent. Cet ouvrage se propose de présenter l'évolution chronologique de cette discipline depuis le XIX<sup>e</sup> siècle avec, pour fil conducteur, la succession des découvertes et des inventions qui ont jalonné la connaissance de la composition de la matière. Avec un minimum de développements mathématiques afin de rendre l'ouvrage plus accessible, l'auteur retrace le chemin qui mène des premières observations de spectres lumineux des gaz aux tentatives récentes d'unification des théories sur les interactions faibles et fortes. Il s'adresse à toute personne disposant d'une formation scientifique de base, aux ingénieurs en formation continue ou étudiants de premier cycle.

Michael MONASTYRSKY. — **Riemann, topology, and physics.** — Second edition. — With a foreword by Freeman J. Dyson. — Translated by Roger Cooke, James King, Victoria King. — Un vol. relié,  $16 \times 24$ , de xiii, 215 p. — ISBN 0-8176-3789-3. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1999.

This significantly expanded second edition of this title combines a fascinating account of the life and work of Bernhard Riemann with a lucid discussion of current interaction between

topology and physics. The author takes into account his own research at the Riemann archives of Göttingen University and developments over the last decade that connect Riemann with numerous significant ideas and methods reflected throughout contemporary mathematics and physics. Special attention is paid to new results on the Riemann-Hilbert problem and to recent discoveries in field theory and condensed matter such as the quantum Hall effect, quasicrystals, membranes with nontrivial topology, “fake” differential structures on 4-dimensional Euclidean space, new invariants of knots, and more.

Reviel NETZ. — **The shaping of deduction in Greek mathematics: a study in cognitive history.** — Ideas in context. — Un vol. relié, 16×23,5, de xvii, 327 p. — ISBN 0-521-62279-4. — Prix: £40.00. — Cambridge University Press, Cambridge, 1999.

The aim of this book is to explain the shape of Greek mathematical thinking. It can be read on three levels: first as a description of the practices of Greek mathematics; second as a theory of the emergence of the deductive method; and the third as a case-study for a general view on the history of science. The starting-point for the enquiry is geometry and the lettered diagram. Reviel Netz exploits the mathematicians' practices in the construction and lettering of their diagrams, and the continuing interaction between text and diagram in their proofs, to illuminate the underlying cognitive processes. Two crucial chapters set out to show how mathematical proofs are structured and explain why Greek mathematical practice manages to be so satisfactory. A final chapter looks into the broader historical setting of Greek mathematical practice.

Jacques SESIANO. — **Une introduction à l'histoire de l'algèbre: résolution des équations des Mésopotamiens à la Renaissance.** — Un vol. broché, 15,5×22,5, de viii, 168 p. — ISBN 2-88074-394-X. — Prix: SFr. 39.00. — Presses polytechniques et universitaires romandes, Lausanne, 1999.

L'auteur retrace l'histoire de la résolution des équations et montre comment la résolution d'équations de degrés croissants conduit aux extensions successives du domaine des nombres: négatifs, irrationnels, complexes. Il amène ainsi le lecteur à comprendre quels types de problèmes ont causé les diverses extensions du domaine des nombres. La traduction littérale de problèmes et la reproduction des originaux grecs, latins, arabes et italiens sont données en appendice. Ce livre intéressera les enseignants en mathématiques, les étudiants en sciences et les personnes intéressées par l'histoire des sciences.

## **Logique et fondements**

S. Barry COOPER, John K. TRUSS, (Editors). — **Models and computability.** — Invited papers from Logic Colloquium '97 - European Meeting of the Association for Symbolic Logic, Leeds, July 1997. — London Mathematical Society lecture note series, vol. 259. — Un vol. broché, 15,5×23, de ix, 419 p. — ISBN 0-521-63550-0. — Prix: £29.95. — Cambridge University Press, Cambridge, 1999.

Together, *Models and Computability*, and its sister volume *Sets and Proofs* will provide readers with a comprehensive guide to the current state of mathematical logic. All the authors are leaders in their fields and are drawn from the invited speakers at “Logic Colloquium '97” (the major international meeting of the Association of Symbolic Logic). It is expected that the breadth and timeliness of these two volumes will prove an invaluable and unique resource for specialists, post-graduate researchers, and the informed and interested nonspecialist.

S. Barry COOPER, John K. TRUSS, (Editors). — **Sets and proofs.** — Invited papers from Logic Colloquium '97 - European Meeting of the Association for Symbolic Logic, Leeds, July 1997. — London Mathematical Society lecture note series, vol. 258. — Un vol. broché, 15,5×23, de IX, 436 p. — ISBN 0-521-63549-7. — Prix: £29.95. — Cambridge University Press, Cambridge, 1999.

From the preface: "Together, we hope that *Sets and Proofs*, and *Models and Computability* will provide readers with a comprehensive guide to the current state of mathematical logic, and while not pretending to the definitiveness of a handbook, perhaps communicating more of the excitement of a subject in flight. All the authors are leaders in their fields, some articles pushing forward the technical boundaries of the subject, others providing readable and authoritative overviews of particular important topics... a number of papers can be expected to become classics, essential to any good library (individual or institutional)."

Paul TAYLOR. — **Practical foundations of mathematics.** — Cambridge studies in advanced mathematics, vol. 59. — Un vol. relié, 16×23,5, de XI, 572 p. — ISBN 0-521-63107-6. — Prix: £50.00. — Cambridge University Press, Cambridge, 1999.

This book collects the methods of construction of the objects of twentieth century mathematics. Although it is mainly concerned with a framework essentially equivalent to intuitionistic ZF, the book looks forward to more subtle bases in categorical type theory and the machine representation of mathematics. Each idea is illustrated by wide-ranging examples, and followed critically along its natural path, transcending disciplinary boundaries between universal algebra, type theory, category theory, set theory, sheaf theory, topology and programming.

## *Analyse combinatoire*

Andreas BRANDSTÄDT, Van Bang LE, Jeremy P. SPINRAD. — **Graph classes: a survey.** — SIAM monographs on discrete mathematics and applications. — Un vol. broché, 18×25,5, de XI, 304 p. — ISBN 0-89871-432-X. — Prix: US\$54.40. — Society for Industrial and Applied Mathematics, Philadelphia, 1999.

This well-organized reference is a definitive encyclopedia for the literature on graph classes. It contains a survey of more than 200 classes of graphs, organized by types of properties used to define and characterize the classes, citing key theorems and literature references for each. The authors state results without proof, providing readers with easy access to far more key theorems than are commonly found in other mathematical texts. Interconnections between graph classes are also provided to make the book useful to a variety of readers.

Fan CHUNG, Ron GRAHAM. — **Erdős on graphs: his legacy of unsolved problems.** — Un vol. broché, 19×23,5, de XIII, 142 p. — ISBN 1-56881-111-X. — Prix: US\$25.00. — A.K. Peters, Natick, Massachusetts, 1999.

This book is a tribute to Paul Erdős, the wandering mathematician once described as "the prince of problem solvers and the absolute monarch of problem posers". It examines - within the context of his unique personality and lifestyle - the legacy of open problems he left to the world of mathematics after his death in 1996. By cataloguing the unsolved problems of Erdős in a comprehensive and well-documented volume, the authors hope to continue the work of an unusual and special man who fundamentally influenced the field of mathematics.



Charles J. COLBOURN, Alexander ROSA. — **Triple systems.** — Oxford mathematical monographs. — Un vol. relié,  $16 \times 24$ , de XVI, 560 p. — ISBN 0-19-853576-7. — Prix: £80.00. — Clarendon Press, Oxford, 1999.

Chapter 0 provides an historical background, while Chapters 1, 2, and 3 detail the central material on constructions and existence that is used throughout the book. Chapters 4-8 describe topics which are principally concerned with triple systems themselves: isomorphism, enumeration, subsystems, and automorphisms. Chapters 9-23 treat a number of challenging problems on triple systems in some detail. Often these problems are motivated by questions in related disciplines, and often the techniques borrow heavily from other disciplines. Chapters 24 and 25 provide a guide to two related classes of triple systems in which the triples contain ordered pairs. A comprehensive bibliography on triple systems is provided.

Fred C. HOLROYD, Kathleen A.S. QUINN, Chris ROWLEY, Bridget S. WEBB, (Editors). — **Combinatorial designs and their applications.** — Chapman & Hall/CRC Research notes in mathematics, vol. 403. — Un vol. broché,  $15,5 \times 23,5$ , de VII, 152 p. — ISBN 0-8493-0659-0. — Prix: US\$69.95. — Chapman & Hall/CRC, Boca Raton, 1999.

This selection of papers arose out of a Conference on Combinatorial Design Theory organized by members of the Department of Pure Mathematics at the Open University. The papers cover recent developments in seven different areas of design theory and its applications, with the emphasis on non-geometrical topics. The areas covered are all of much current interest, and include statistical design theory, tournaments, difference sets, configurations in designs, infinite designs, linear codes and applications of designs to cryptography. The text will serve as a useful overview of the non-geometrical aspects of design theory, and should be of interest to research mathematicians or anyone with an interest in combinatorial designs.

Donald L. KREHER, Douglas R. STINSON. — **Combinatorial algorithms: generation, enumeration, and search.** — CRC Press series on discrete mathematics and its applications. — Un vol. relié,  $16,5 \times 24,5$ , de 329 p. — ISBN 0-8493-3988-X. — Prix: US\$74.95. — CRC Press, Boca Raton, 1999, distributed by Springer, Berlin.

This textbook thoroughly outlines combinatorial algorithms for generation, enumeration, and search. Topics include backtracking and heuristic search methods, applied to various combinatorial structures, such as: combinatorics, permutations, graphs, designs. Many classical areas are covered as well as new research topics not included in most existing texts, such as: group algorithms, graph isomorphism, hill-climbing, heuristic search algorithms. This work serves as a textbook for a modern course in combinatorial algorithms, providing a unified and focused collection of recent topics of interest in the area.

J.D. LAMB, D.A. PREECE, (Editors). — **Surveys in combinatorics, 1999.** — London Mathematical Society lecture note series, vol. 267. — Un vol. broché,  $15,5 \times 23$ , de VII, 298 p. — ISBN 0-521-65376-2. — Prix: £24.95. — Cambridge University Press, Cambridge, 1999.

The British Combinatorial Conference is one of the most well known meetings for combinatorialists. This volume collects the invited talks from the 1999 conference held at the University of Kent and together these span a broad range of combinatorial topics. The nine talks are from: S. Ball, J. Dinitz, M. Dyer, K. Metsch, J. Pach, R. Thomas, C. Thomassen, N. Wormald, and a special contribution from W.T. Tutte. All researchers into combinatorics will find that this volume is an outstanding and up-to-date resource.

L. LOVÁSZ, A. GYÁRFÁS, G. KATONA, A. RECSKI, L. SZÉKELY, (Editors). — **Graph theory and combinatorial biology**. — Bolyai Society mathematical studies, vol. 7. — Un vol. relié, 17,5×24,5, de 413 p. — ISBN 963-8022-90-6. — János Bolyai Mathematical Society, Budapest, 1999.

*Graph theory*: R. Faudree: Forbidden subgraphs, closure and Hamiltonian properties - recent results. — H. van der Holst, L. Lovász, A. Schrijver: The Colin de Verdière graph parameter. — A.V. Kostochka, M. Stiebitz: Excess in colour-critical graphs. — J. Kratochvíl, J. Nešetřil, M. Rosenfeld: Graph designs, Hadamard matrices and geometric configurations. — M. Molloy, B. Reed: Graph colouring via the probabilistic method. — *Extremal sets*: S.L. Bezrukov: Edge isoperimetric problems on graphs. — K. Engel, U. Leck: Optimal antichains and ideals in Macaulay posets. — J.R. Griggs: Database security and the distribution of subset sums in  $\mathbf{R}^m$ . — *Combinatorial optimization*: K. Murota: Discrete convex analysis - exposition on conjugacy and duality. — J. Oxley: Unavoidable minors in graphs and matroids. — *Combinatorics, molecules, and biology*: A. von Haeseler: Model based phylogenetic inference. — P.G. Mezey: Combinatorial aspects of biomolecular shape analysis. — F.S. Roberts: Competition graphs and phylogeny graphs. — T. Warnow: Some combinatorial optimization problems in phylogenetics.

Terry A. MCKEE, F.R. MCMORRIS. — **Topics in intersection graph theory**. — SIAM monographs on discrete mathematics and applications. — Un vol. broché, 18×25, de VIII, 205 p. — ISBN 0-89871-430-3. — Prix: US\$55.00. — Society for Industrial and Applied Mathematics, Philadelphia, 1999.

Finally there is a book that presents real applications of graph theory in a unified format. This book is the only source for an extended, concentrated focus on the theory and techniques common to various types of intersection graphs. It is a concise treatment of the aspects of intersection graphs that interconnect many standard concepts and form the foundation of a surprising array of applications to biology, computing, psychology, matrices, and statistics. The authors emphasize the underlying tools and techniques and demonstrate how this approach constitutes a definite theory within graph theory. Some of the applications are not widely known or available in the graph theoretic literature and are presented here for the first time. The book also includes a detailed literature guide for many specialized and related areas, a current bibliography, and more than 100 exercises.

Kenneth H. ROSEN, John G. MICHAELS, Jonathan L. GROSS, Jerrold W. GROSSMAN, Douglas R. SHIER, (Editors). — **Handbook of discrete and combinatorial mathematics**. — Un vol. relié, 18,5×26, de 1232 p. — ISBN 0-8493-0149-1. — Prix: US\$99.95. — CRC Press, Boca Raton, 2000, distributed by Springer, Berlin.

This book presents a comprehensive collection of ready reference material for all of the important areas of discrete mathematics, including those essential to its applications in computer science and engineering. Its topics include: logic and foundations, counting, number theory, abstract and linear algebra, discrete probability, graph theory, networks and optimization, cryptography and coding, combinatorial designs, computational geometry, theoretical computer science. The handbook presents material in a simple, uniform way, and emphasizes what is useful and practical. Key elements of the text include extensive glossaries of important terms, lists of important theorems and formulas, numerous examples that illustrate terms and concepts, helpful descriptions of algorithms, summary tables, links to web pages and pointers to printed resources.

Kar-Ping SHUM, Earl J. TAFT, Zhe-Xian WAN, (Editors). — **Algebras and combinatorics.** — International Congress, ICAC'97, Hong Kong. — Un vol. broché,  $15,5 \times 23,5$ , de xx, 527 p. — ISBN 981-4012-31-8. — Prix: DM 139.00. — Springer, Singapore, 1999.

From the contents: Semiretracts and the intersection of retracts (J.A. Anderson). — Some inequalities for linear extensions of posets and ideals (T. Bier). — Gröbner-Shirshov bases for relations of a Lie algebra and its enveloping algebra (L. Bokut & P. Malcolmson). — Constructing tree lattices (L.J. Carbone). — Regular-solid varieties of commutative and idempotent groupoids (K. Denecke & P. Jampachon). —  $l_1$ -embeddable bifaced polyhedra (M. Deza & V. Grishukhin). — Nonstandard representation of the Malcev clone of a strong variety (H.J. Hoehnke). — On rings with inverse adjoint semigroups (A.V. Kelarev). — On Hamilton cycles in Cayley graphs of order  $pqr$  (Li Dengxin). — Implicative identities in groups (B.H. Neumann). — Isomorphism theorem, embedding theorem and replacement techniques for primitive rings (K.P. Shum, Xu Yonghua). — On morphisms between partial algebras (H.J. Vogel). — Geometry of matrices revisited (Zhe-Xian Wan). — Semiperfect coalgebras over rings (R. Wisbauer). — ... and other papers.

Manfred STERN. — **Semimodular lattices: theory and applications.** — Encyclopedia of mathematics and its applications, vol. 73. — Un vol. relié,  $16 \times 24$ , de xiv, 370 p. — ISBN 0-521-46105-7. — Prix: £50.00. — Cambridge University Press, Cambridge, 1999.

In this book, the author uses successive generalizations of distributive and modular lattices to outline the development of semimodular lattices from Boolean algebras. He focuses on the theory of semimodularity, its many ramifications, and its applications in discrete mathematics, combinatorics, and algebra. The author surveys and analyzes Garrett Birkhoff's concept of semimodularity and the various related concepts in lattice theory, and he presents theoretical results as well as applications in discrete mathematics, group theory, and universal algebra. Special emphasis is given to the combinatorial aspects of finite semimodular lattices. The book also deals with lattices that are "close" to semimodularity or can be combined with semimodularity, for example, supersolvable, admissible, consistent, strong, and balanced lattices.

## ***Théorie des nombres***

Joseph B. DENCE, Thomas P. DENCE. — **Elements of the theory of numbers.** — Un vol. relié,  $16 \times 23,5$ , de xvii, 517 p. — ISBN 0-12-209130-2. — Prix: US\$59.95. — Academic Press, San Diego, 1999.

This book offers a wealth of topics in two parts. Part I consists of fundamental or core material. It includes primes, congruences, primitive roots, residues, and multiplicative functions. Part II is a collection of more specialized topics, such as a brief look at number fields, recurrence relations, and additive number theory. Throughout the text, the authors offer historical references and introduce topics in their historical context. Over 900 exercises are included.

Jody ESMONDE, M. Ram MURTY. — **Problems in algebraic number theory.** — Graduate texts in mathematics, vol. 190. — Un vol. relié,  $16,5 \times 24$ , de xiv, 314 p. — ISBN 0-387-98617-0. — Prix: DM 98.00. — Springer, New York, 1999.

This book is a collection of about 500 problems in algebraic number theory, all systematically arranged to reveal ideas and concepts in the evolution of the subject. While some problems are easy and straight-forward, others are more difficult. The text is suitable for a first course in algebraic number theory with minimal supervision by the instructor. The exposition facilitates



independent study, and students having taken a basic course in calculus, linear algebra, and abstract algebra will find these problems interesting and challenging. For the same reasons, it is ideal for non-specialists in acquiring a quick introduction to the subject.

Graham EVEREST, Thomas WARD. — **Heights of polynomials and entropy in algebraic dynamics.** — Universitext. — Un vol. relié,  $16 \times 24$ , de XII, 211 p. — ISBN 1-85233-125-9. — Prix: DM 99.00. — Springer, London, 1999.

This book covers an exciting interplay between arithmetic and dynamical systems. The fulcrum is a natural measure of height of a polynomial, known as Mahler's measure. In dynamical systems, this same measure arises as the entropy - a measure of orbit complexity - of a map associated to the polynomial. The book concludes with a study of some primitive "elliptic" dynamical systems. In these, the idea is to show that the elliptic analogues of the original arithmetic constructions arise also as dynamical data. The book provides an ideal introduction to the field for advanced undergraduate and postgraduate students.

Pierre EYMARD, Jean-Pierre LAFON. — **Autour du nombre  $\pi$ .** — Actualités scientifiques et industrielles, vol. 1443. — Un vol. broché,  $18 \times 24$ , de IX, 318 p. — ISBN 2-7056-1443-5. — Prix: FF 148.00. — Hermann, Paris, 1999.

Ce livre est l'occasion pour les étudiants d'université et des classes préparatoires, ainsi que pour les professeurs de mathématiques, de revoir des notions introduites dans les programmes en suivant le fil directeur de ce nombre privilégié. L'ouvrage s'attache plus au sens mathématique qu'à l'aspect anecdotique, mais néanmoins l'ordre historique et sa complexité s'accroît au fil des chapitres. Une centaine d'exercices sont insérés dans le texte, les solutions en sont rassemblées dans un dernier chapitre.

Kálmán GYÖRY, Henryk IWANIEC, Jerzy URBANOWICZ, (Editors). — **Number theory in progress, vol. 1: Diophantine problems and polynomials, vol. 2: Elementary and analytic number theory.** — Proceedings of the International Conference on Number Theory organized by the Stefan Banach International Mathematical Center in honor of the 60<sup>th</sup> birthday of Andrzej Schinzel, Zakopane, Poland, June 30-July 9, 1997. — 2 vol. reliés,  $18 \times 24,5$ , de XVI, VI, 1185 p. — ISBN 3-11-015715-2. — Prix: DM 398.00. — Walter de Gruyter, Berlin, 1999.

These proceedings contain 71 selected and refereed contributions arising from this conference. The material is divided into two volumes according to the conference program: Diophantine problems and polynomials, and elementary and analytic number theory. The first volume covers diophantine equations, diophantine approximation, transcendental number theory and polynomials. The second volume contains papers on sieve methods, automorphic forms, Hecke operators, estimates on exponential and character sums,  $L$ -functions and other topics. The two volume work containing articles from leading experts in the world encompasses an account of the state of research in a wide variety of topics. It will prove invaluable to anyone working in number theory.

Yoshiyuki KITAOKA. — **Arithmetic of quadratic forms.** — Cambridge tracts in mathematics, vol. 106. — Un vol. broché,  $15,5 \times 22,5$ , de X, 270 p. — ISBN 0-521-64996-X. — Prix: £18.95. — Cambridge University Press, Cambridge, 1999.

The aim of this book is to provide an introduction to quadratic forms that builds from basics up to the most recent results. The author is well known for his work in this area, and in this book he covers many aspects of the subject, including lattice theory, Siegel's formula, and some results involving tensor products of positive definite quadratic forms. The reader is required to

have only an elementary knowledge of algebraic number fields, making this book ideal for graduate students and researchers wishing for an insight into quadratic forms.

Sergei KONYAGIN, Igor SHPARLINSKI. — **Character sums with exponential functions and their applications.** — Cambridge tracts in mathematics, vol 136. — Un vol. relié,  $16 \times 23,5$ , de VIII, 163 p. — ISBN 0-521-64263-9. — Prix: £30.00. — Cambridge University Press, Cambridge, 1999.

The theme of this book is the study of the distribution of integer powers modulo a prime number. It provides numerous new, sometimes quite unexpected, links between number theory and computer science as well as other areas of mathematics. Possible applications include (but are not limited to) complexity theory, random number generation, cryptography, and coding theory. The main method discussed is based on bounds of exponential sums. Accordingly, the book contains many estimates of such sums, including new estimates of classical Gaussian sums. It also contains many open questions and proposals for further research.

## *Corps et polynômes*

Bruno DESCHAMPS. — **Problèmes d'arithmétique des corps et de théorie de Galois.** — Collection méthodes. — Un vol. broché,  $15 \times 22$ , de 247 p. — ISBN 2-7056-6379-7. — Prix: FF 180.00. — Hermann, Paris, 1998.

L'ouvrage poursuit un double objectif: présentation des notions classiques: corps finis, polynômes cyclotomiques, symbole de Legendre, etc.; présentation de notions plus sophistiquées: corps pythagoriciens, arithmétique des corps ordonnables, corps gauches, corps hilbertiens, niveau de corps, etc., ainsi que des résultats frappants d'arithmétique tels que l'impossibilité de la quadrature du cercle ou le fait qu'un élément de torsion dans un groupe de Galois absolu est une involution. Ce livre s'adresse principalement aux étudiants qui passent un certificat d'algèbre commutative et/ou d'arithmétique, et plus encore à ceux qui, parmi eux, se destinent à un troisième cycle universitaire.

Paulo RIBENBOIM. — **The theory of classical valuations.** — Springer monographs in mathematics. — Un vol. relié,  $16 \times 24$ , de IX, 403 p. — ISBN 0-387-98525-5. — Prix: DM 129.00. — Springer, New York, 1999.

In the second half of the last century, Kummer introduced "local" methods in his study of Fermat's theorem. Hensel constructed the  $p$ -adic numbers and proved the so-called "Hensel lemma". Kürschak formally introduced the concept of a valuation of a field, and Ostrowski, Hasse, Schmidt, Krull, and others developed the theory. These classical valuations play a role in the study of number fields and algebraic functions of one variable. The present book is one of the first texts in English devoted to the theory of classical valuations. The book is self-contained and up-to-date, and proofs are given in full detail.

Helmut VÖLKLEIN, David HARBATER, Peter MÜLLER, J.G. THOMPSON, (Editors). — **Aspects of Galois theory.** — London Mathematical Society lecture note series, vol. 256. — Un vol. broché,  $15,5 \times 23$ , de VIII, 282 p. — ISBN 0-521-63747-3. — Prix: £27.95. — Cambridge University Press, Cambridge, 1999.

Galois theory is a central part of algebra, dealing with symmetries between solutions of algebraic equations in one variable. This is a collection of papers from the participants of a conference on Galois theory, and brings together articles from some of the world's leading experts in this field. Topics are centred around the inverse Galois problem, comprising the full range of methods and approaches in this area, making this an invaluable resource for all those whose research involves Galois theory.

## ***Géométrie algébrique***

David EISENBUD, (Editor). — **Commutative algebra, algebraic geometry, and computational methods.** — Un vol. broché,  $15,5 \times 23,5$ , de xvii, 320 p. — ISBN 981-4021-50-4. — Prix: DM 109.00. — Springer, Singapore, 1999.

This volume contains papers presented at the International Conference on Commutative Algebra, Algebraic Geometry, and Computational Methods held in Hanoi in 1996, and papers written subsequently. It features both expository articles as well as research papers on a range of currently active areas in commutative algebra, algebraic geometry (particularly surveys on intersection theory) and combinatorics. A special feature is a section on the life and work of Wolfgang Vogel, who was an organizer of the conference.

Klaus HULEK, Fabrizio CATANESE, Chris PETERS, Miles REID, (Editors). — **New trends in algebraic geometry.** — EuroConference on Algebraic Geometry, Warwick, July 1996. — London Mathematical Society lecture note series, vol. 264. — Un vol. broché,  $15,5 \times 23$ , de x, 484 p. — ISBN 0-521-64659-6. — Prix: £29.95. — Cambridge University Press, Cambridge, 1999.

Several articles from this book are expository: among these a beautiful short exposition by Paranjape of the new and very simple approach to the resolution of singularities; a detailed essay by Ito and Nakamura on the ubiquitous  $A$ ,  $D$ ,  $E$  classification, centred around simple surface singularities; a discussion by Morrison of the new special Lagrangian approach to giving geometric foundations to mirror symmetry; and two deep, informative surveys by Siebert and Behrend on Gromow-Witten invariants treating them from the point of view of both algebraic and symplectic geometry.

Silvio LEVY, (Editor). — **The eightfold way: the beauty of Klein's quartic curve.** — Mathematical Sciences Research Institute publications, vol. 35. — Un vol. relié,  $16 \times 24$ , de x, 331 p. — ISBN 0-521-66066-1. — Prix: £35.00. — Cambridge University Press, Cambridge, 1999.

Felix Klein discovered in the 1870s that the simple equation  $x^3y+y^3z+z^3x=0$  (in complex projective coordinates) describes a surface having many remarkable properties, including 336-fold symmetry - the maximum possible for any surface of this genus. The mathematical sculptor Helaman Ferguson has tried to distill some of the beauty and remarkable properties of this surface in the form of a sculpture that he entitled *The Eightfold Way*. This volume seeks to explore the rich tangle of properties and theories surrounding this object. It contains a text written by W. Thurston to explain the sculpture, a broad overview of the position of the Klein quartic in mathematics, a historical overview, a richly illustrated essay by Helaman Ferguson, an exploration of related curves, the first English translation of Klein's seminal article "On the order-seven transformation of elliptic functions".

Freddy VAN OYSTAEYEN, (Editor). — **Commutative algebra and algebraic geometry.** — Proceedings of the Ferrara Meeting in honor of Mario Fiorentini. — Lecture notes in pure and applied mathematics, vol. 206. — Un vol. broché,  $18 \times 25,5$ , de xviii, 312 p. — ISBN 0-8247-1990-5. — Prix: US\$ 150.00. — Marcel Dekker, New York, 1999.

Presenting recent developments and new results based upon, and inspired by the work of Fiorentini, the book contains contributions by over 25 leading international mathematicians in the areas of commutative algebra and algebraic geometry. This book thoroughly discusses almost numerical invariants of algebraic curves, monomial curves, cohomology of surfaces,

Gorenstein algebras, space curves, Nagata's theorem, Betti numbers, canonical curves, Green's theorem, Cohen-Macaulay rings, closed subschemes, deformations of projective subschemes..., etc.

## *Algèbre linéaire et multilinéaire, théorie des matrices*

Jean FRESNEL. — **Espaces quadratiques, euclidiens, hermitiens.** — Actualités scientifiques et industrielles, vol. 1445. — Collection Formation des enseignants et formation continue. — Un vol. broché,  $17,5 \times 24$ , de xi, 315 p. — Prix: FF 160.00. — Hermann, Paris, 1999.

Cet ouvrage traite de l'algèbre bilinéaire et propose 150 exercices. L'objectif essentiel est l'étude des espaces vectoriels munis d'une forme bilinéaire symétrique, ainsi que l'étude du groupe des automorphismes préservant cette structure. La partie la plus conséquente de l'ouvrage est consacrée aux espaces vectoriels euclidiens. Les exercices fournis permettent d'aboutir avec des moyens élémentaires, à des résultats réputés délicats. Cet ouvrage est né du contact permanent de l'auteur avec les candidats à l'Agrégation externe et interne de mathématiques.

Fuzhen ZHANG. — **Matrix theory: basic results and techniques.** — Universitext. — Un vol. relié,  $16 \times 24$ , de xiii, 277 p. — ISBN 0-387-98696-0. — Prix: DM 89.50. — Springer, New York, 1999.

The aim of this book is to present concisely fundamental ideas, results, and techniques in linear algebra and mainly matrix theory. The book contains eight chapters covering various topics ranging from similarity and special types of matrices to Schur complements and matrix normality. Each chapter focuses on the results, techniques, and methods that are beautiful, interesting, and representative, followed by carefully selected problems. Many theorems are given several different proofs. The book can be used as a text or a supplement for a linear algebra and matrix theory class or seminar for advanced undergraduate or graduate students.

## *Anneaux et algèbres*

John A. BEACHY. — **Introductory lectures on rings and modules.** — London Mathematical Society student texts, vol. 47. — Un vol. broché,  $15,5 \times 23$ , de viii, 238 p. — ISBN 0-521-64407-0. — Prix: £15.95. — Cambridge University Press, Cambridge, 1999.

The focus of this book is the study of the noncommutative aspects of rings and modules, and the style will make it accessible to anyone with a background in basic abstract algebra. Features of interest include an early introduction of projective and injective modules; a module theoretic approach to the Jacobson radical and the Artin-Wedderburn theorem; the use of Baer's criterion for injectivity to prove the structure theorem for finitely generated modules over a principal ideal domain; and applications of the general theory to the representation theory of finite groups. Optional material includes a section on modules over the Weyl algebras and a section on Goldie's theorem.

David E. DOBBS, Marco FONTANA, Salah-Eddine KABBAJ, (Editors). — **Advances in commutative ring theory.** — Proceedings of the third International Conference on Commutative Ring Theory in Fez, Morocco. — Lecture notes in pure and applied mathematics, vol. 205. — Un vol. broché,  $18 \times 25,5$ , de xi, 555 p. — ISBN 0-8247-7147-8. — Prix: US\$195.00. — Marcel Dekker, New York, 1999.

The book covers monoid rings and the  $n$ -generator property... factorization and irreducibility criteria, class group, integer-valued polynomials, Skolem properties, and normsets... Koszul

algebras, primary decomposition, Noetherian domains, and the Krull-Schmidt property...  $\pi$ -domains, Prüfer domains, GCD-domains, pullbacks,  $A + XB[X]$  domains, pseudo-valuation rings, Hermite rings, and semi-Steinitz rings... Krull and projective dimensions,  $n$ -coherence, Kaplansky ideal transform, trace properties, polynomial rings, formal power series rings, semi-normality, and root closure... plane cubic curves, spectral topology, and completions.

### ***Théorie des groupes et généralisations***

John COSSEY, Charles F. MILLER III, Walter D. NEUMANN, Michael SHAPIRO, (Editors). — **Geometric group theory down under.** — Proceedings of a Special Year in Geometric Group Theory, Canberra, Australia, 1996. — Un vol. relié,  $18 \times 24,5$ , de XII, 332 p. — ISBN 3-11-016366-7. — Prix: DM 248.00. — Walter de Gruyter, Berlin, 1999.

This volume contains the fully refereed proceedings of a Special Year held at the Australian National University and Melbourne University. The high point of the year was an International Conference from 14-19 July 1996 held at the ANU in Canberra. The contributions to this volume present an overall picture of current research in the area, including such topics as theory of algebraic groups, theory of automatic and hyperbolic groups, convergence groups, distortion of subgroups, Artin groups and braid groups, amenable groups, combinatorial approaches to conformal structure, algebraic and geometric automorphism groups, and geometric invariants of groups.

Benjamin FINE, Gerhard ROSENBERGER. — **Algebraic generalizations of discrete groups: a path to combinatorial group theory through one-relator products.** — Pure and applied mathematics, vol. 223. — Un vol. relié,  $16 \times 24$ , de IX, 316 p. — ISBN 0-8247-0319-7. — Prix: US\$ 150.00. — Marcel Dekker, New York, 1999.

As the first full-length monograph on one-relator products of cyclics, this book analyzes generalizations of discrete groups that share linearity properties such as the Tits alternative, virtual torsion-freeness, and amalgam structures with discrete groups... introduces the concept of essential representations as a major tool in the study of infinite discrete groups and their linearity properties... investigates the Magnus method and its geometric version, cyclically pinched and conjugacy pinched one-relator groups, Bass-Serre theory, the techniques of Nielsen reduction, and geometric group theory... and more.

A.A. IVANOV. — **Geometry of sporadic groups I: Petersen and tilde geometries.** — Encyclopedia of mathematics and its applications, vol. 76. — Un vol. relié,  $16 \times 23,5$ , de XIII, 408 p. — ISBN 0-521-41362-1. — Prix: £45.00. — Cambridge University Press, Cambridge, 1999.

This book is the first volume in two-volume set, which will provide the complete proof of classification of two important classes of geometries, closely related to each other: Petersen and tilde geometries. There is an infinite family of tilde geometries associated with non-split extensions of symplectic groups over a field of two elements. Besides that there are 12 exceptional Petersen and tilde geometries. These exceptional geometries are related to sporadic simple groups, including the famous Monster group, and this volume gives a construction for each of the Petersen and tilde geometries which provides an independent existence proof for the corresponding automorphisms group.

Shoon K. KIM. — **Group theoretical methods and applications to molecules and crystals.** — Un vol. relié,  $18 \times 25$ , de XVI, 492 p. — ISBN 0-521-64062-8. — Prix: £95.00. — Cambridge University Press, Cambridge, 1999.

The book explains the basic aspects of symmetry groups as applied to problems in physics and chemistry using an approach pioneered and developed by the author. The symmetry groups and their representations are worked out explicitly, eliminating the unduly abstract nature of



group theoretical methods. The author has systematized the wealth of knowledge on symmetry groups that has accumulated during the century since Fedrov discovered the 230 space groups. All space groups, unitary as well as anti-unitary, are reconstructed from the algebraic defining relations of the point groups. The book assumes only an elementary knowledge of quantum mechanics. Numerous applications of the theorems are described to aid understanding.

Mario PETRICH, Norman R. REILLY. — **Completely regular semigroups.** — Canadian Mathematical Society series of monographs and advanced texts, vol. 23. — Un vol. relié,  $17 \times 24,5$ , de x, 481 p. — ISBN 0-471-19571-5. — Prix: £74.50. — John Wiley, New York, 1999.

Sushkevich's book *The Theory of Generalized Groups* (1937) may be considered the grandfather of successive generations of texts on the theory of semigroups. The present book is one of the proud grandchildren of Sushkevich's book. It treats completely regular semigroups that were conceived in the fertile imagination of A.H. Clifford and nurtured by many who showed not only ingenuity but a genuine affection. It is hoped that the theory will profit from this book as has the book itself profited from the theory, thus continuing a development that shows promise of greater things to come as well as intellectual challenge and esthetic perfection.

Lluís PUIG. — **On the local structure of Morita and Rickard equivalences between Brauer blocks.** — Progress in mathematics, vol. 178. — Un vol. relié,  $16,5 \times 24$ , de 260 p. — ISBN 3-7643-6156-5. — Prix: SFr. 128.00. — Birkhäuser, Basel, 1999.

The book gives a complete description of the source algebra of a Brauer block which has been discovered by the author. An effort has been made to make the book accessible to post-graduate students interested in finite groups or noncommutative algebras. This book describes the source algebra of a block from the source algebra of a Rickard equivalent block and the source of the Rickard equivalence. This description requires a new induction procedure and the introduction of suitable graded differential algebras. It leads to strong consequences such as the facts that the nilpotent blocks form a union of classes and that the basic Rickard equivalences preserve defect groups and Brauer categories.

Audrey TERRAS. — **Fourier analysis on finite groups and applications.** — London Mathematical Society student texts, vol. 43. — Un vol. relié,  $15 \times 23$ , de x, 442 p. — ISBN 0-521-45718-1. — Prix: £18.95. — Cambridge University Press, Cambridge, 1999.

This book gives a friendly introduction to Fourier analysis on finite groups, both commutative and noncommutative. The author divides the book in two parts. In the first part, she parallels the development of Fourier analysis on the real line and the circle, and then moves on to analogues of higher dimensional Euclidean space. The second part emphasizes matrix groups, such as the Heisenberg group of upper triangular  $3 \times 3$  matrices with 1s down the diagonal and entries in a finite field, and it also includes a comparison of the finite and infinite versions of Selberg's trace formula. The book concludes with an introduction to zeta functions on finite graphs via the trace formula.

## ***Groupes topologiques ; groupes et algèbres de Lie***

J.D. DIXON, M.P.F. DU SAUTOY, A. MANN & D. SEGAL. — **Analytic pro- $p$  groups.** — 2<sup>nd</sup> edition. — Revised and enlarged by Marcus du Sautoy & Dan Segal. — Cambridge studies in mathematics, vol. 61. — Un vol. relié,  $15,5 \times 23,5$ , de xviii, 368 p. — ISBN 0-521-65011-9. — Prix: £37.50. — Cambridge University Press, Cambridge, 1999.

The theory of  $p$ -adic analytic pro- $p$  groups has undergone significant development since the seminal work of Lazard in 1965. This book presents a complete and self-contained account of

this theory, which has many applications in both group theory and number theory. The first part of the book is group theoretic. It develops the theory of pro- $p$  groups of finite rank, starting from the first principles and using elementary methods. Part II introduces  $p$ -adic analytic groups. Part III, consisting of material new to the second edition, takes the theory further. Among those topics dealt with are the theory of pro- $p$  groups of finite coclass, the dimension subgroup series, and its associated graded Lie algebra.

V.S. VARADARAJAN. — **An introduction to harmonic analysis on semisimple Lie groups.** — Cambridge studies in advanced mathematics, vol. 16. — Un vol. broché,  $15 \times 23$ , de x, 316 p. — ISBN 0-521-66362-8. — Prix: £24.95. — Cambridge University Press, Cambridge, 1999.

This graduate-level textbook is an introduction to the representation theory of semisimple Lie groups. As such, it will be suitable for research students in algebra and analysis, and for research mathematicians requiring a readable account of the topic. The author emphasizes the development of the central themes of the subject in the context of special examples, without losing sight of its general flow and structure. The author begins with an account of compact groups and discusses the Harish Chandra modules. Then he introduces the Plancherel formula and theory of Eisenstein integrals. The final sections are devoted to considering the irreducible characters of semisimple Lie groups, including explicit calculations of  $SL_2(\mathbf{R})$ .

## *Mesure et intégration*

Daniel W. STROOCK. — **A concise introduction to the theory of integration.** — Third edition. — Un vol. relié,  $18,5 \times 26$ , de xiv, 253 p. — ISBN 0-8176-4073-8. — Prix: SFr. 50.00. — Birkhäuser, Boston, 1999.

The major new feature of this third edition is the inclusion of a new chapter which introduces the Fourier transform. Since Hermite functions play a central role in his treatment of Parseval's identity and the inversion formula, Stroock's approach bears greater resemblance to that adopted by Norbert Wiener than it does to that used in most modern introductory texts. An additional feature of this edition is that solutions to all problems are provided. As a self-contained text, this book is excellent for both self-study and the classroom.

## *Fonctions de plusieurs variables complexes*

Kichoon YANG. — **Meromorphic functions and projective curves.** — Mathematics and its applications, vol. 464. — Un vol. relié,  $16 \times 25$ , de vii, 201 p. — ISBN 0-7923-5505-9. — Prix: Dfl. 175.00. — Kluwer Academic Publishers, Dordrecht, 1999.

The main purpose of this volume is to give an exposition of various aspects of meromorphic functions and linear series on algebraic curves, with some emphasis on families of meromorphic functions. It is written in such a way as to facilitate their applications in other areas of mathematics. Meromorphic functions on a compact Riemann surface, or, more generally, holomorphic curves and linear series, have numerous applications in many different areas of mathematics. This work gives a concise survey of results in the elementary theory of meromorphic functions and divisors on curves, and makes these results more accessible to students and non-experts, in particular differential geometers.

## *Fonctions spéciales*

Adhemar BULTHEEL, Pablo GONZALEZ-VERA, Erik HENDRIKSEN, Olav NJASTAD. — **Orthogonal rational functions.** — Cambridge monographs on applied and computational mathematics, vol. 5. — Un vol. relié,  $15,5 \times 23,5$ , de xiv, 403 p. — ISBN 0-521-65006-2. — Prix: £37.50. — Cambridge University Press, Cambridge, 1999.

This book generalizes the classical theory of orthogonal polynomials on the complex unit circle or on the real line to orthogonal rational functions whose poles are among a prescribed set of complex numbers. The first part treats the case where these poles are all outside the unit disk or in the lower half plane. Classical topics such as recurrence relations, numerical quadrature, interpolation properties, Favard theorems, convergence, asymptotics, and moment problems are generalized and treated in detail. The same topics are discussed for the different situation where the poles are located on the unit circle or on the extended real line. In the last chapter, several applications are mentioned including linear prediction, Pisarenko modeling, lossless inverse scattering, and network synthesis.

P.A. DEIFT. — **Orthogonal polynomials and random matrices: a Riemann-Hilbert approach.** — Courant lecture notes in mathematics, vol. 3. — Un vol. broché,  $15 \times 22,5$ , de 273 p. — ISBN 0-9658703-2-4. — Prix: US\$20.00. — Courant Institute of Mathematical Sciences, New York, 1999.

Riemann-Hilbert problems. — Jacobi operators. — Orthogonal polynomials. — Continued fractions. — Random matrix theory. — Equilibrium measures. — Asymptotics for orthogonal polynomials. — Universality.

## *Equations différentielles ordinaires*

D.W. JORDAN, P. SMITH. — **Nonlinear ordinary differential equations: an introduction to dynamical systems.** — Third edition. — Oxford applied and engineering mathematics, vol. 2. Un vol. broché,  $15,5 \times 23,5$ , de x, 550 p. — ISBN 0-19-856562-3. — Prix: £21.95. — Oxford University Press, Oxford, 1999.

The text of this third edition has been completely revised to bring it into line with current interest and research in the subject, including an expansion of the material on bifurcation and chaos. The book is directed towards practical application of the theory, with several hundred examples and problems covering a wide variety of applications. Prerequisites are kept to a minimum. Further topics covered include phase plane analysis, nonlinear damping, small parameter expansions and singular perturbations, subharmonic responses, stability, Liapunov methods, existence theory of limit cycles, Poincaré sequences and homoclinic bifurcation.

## *Equations aux dérivées partielles*

Heinrich G.W. BEGEHR, Robert P. GILBERT, Guo-Chen WEN, (Editors). — **Partial differential and integral equations.** — International Society for Analysis, Applications and Computation, vol. 2. — Un vol. relié,  $17 \times 24,5$ , de x, 369 p. — ISBN 0-7923-5482-6. — Prix: Dfl. 280.00. — Kluwer Academic Publishers, Dordrecht, 1999.

Recent results on partial differential equations as well as with complex analytic methods, on singular integral equations and on related subjects are presented. Many of the contributions are survey articles. Topics ranging from elliptic, parabolic, hyperbolic, mixed-type equations and



systems to hyper-complex and quaternionic analysis, M-analytic, bianalytic, polyharmonic and functions of several complex variables are covered. Applications to mathematical physics are also included.

Mouez DIMASSI, Johannes SJÖSTRAND. — **Spectral asymptotics in the semi-classical limit.** — London Mathematical Society lecture note series, vol. 268. — Un vol. broché,  $15 \times 23$ , de XI, 227 p. — ISBN 0-521-66544-2. — Prix: £24.95. — Cambridge University Press, Cambridge, 1999.

In recent years there has been a very strong development in the mathematical theory, mainly thanks to methods of microlocal analysis. This book develops the basic methods, including the WKB-method, stationary phase and  $h$ -pseudodifferential operators. The applications include recent results on the tunnel effect, the asymptotics of eigenvalues in relation to classical trajectories and normal forms, plus slow perturbations of periodic Schrödinger operators appearing in solid state physics. No previous specialized knowledge in quantum mechanics or microlocal analysis is assumed, and only general facts about spectral theory in Hilbert space, distributions, Fourier transforms and some differential geometry are prerequisites.

Goro KATO, Daniele C. STRUPPA. — **Fundamentals of algebraic microlocal analysis.** — Pure and applied mathematics. A series of monographs and textbooks, vol. 217. — 1 vol. relié,  $16 \times 23,5$ , de x, 296 p. — ISBN 0-8247-9327-7. — Prix: US\$145.00. — Marcel Dekker, New York, 1999.

Striking the perfect balance between analytic and algebraic aspects, this book features a complete review of hyperfunction-microfunction theory and the theory of D-modules, traces developments leading from the creation of hyperfunctions to the modern algebraic treatment of microlocal analysis, examines microfunctions and hyperfunctions in one variable and several variables, both function theoretically and sheaf theoretically, defines hyperfunctions using sheaf cohomology, analyzes the differentiable case of microfunctions, describes hyperfunctions as the sums of boundary values of holomorphic functions, covers the fundamental Sato structure theorem for systems of differential equations, proves most of the relevant work of Sato, Kawai, and Kashiwara.

Dumitru MOTREANU, Nicolae H. PAVEL. — **Tangency, flow invariance for differential equations, and optimization problems.** — Pure and applied mathematics, vol. 219. — Un vol. relié,  $16 \times 23$ , de x, 479 p. — ISBN 0-8247-7341-1. — Prix: US\$195.00. — Marcel Dekker, New York, 1999.

Featuring many results that are exclusive to the authors, the book discusses basic results of the flow invariance of a closed or locally closed set  $S$  of a Banach space (or manifold) with respect to differential equations... describes the unifying effects and geometric significance of the theory... examines the integral surface of a quasi-linear partial differential equation... covers classical theory that demonstrates the equivalence of the theorems of Brouwer and Miranda in terms of Bouligand-Nagumo fields... explores the multidisciplinary applications of nonlinear analysis... explains optimal control via tangential cones and closed-range operators... etc.

John OCKENDON, Sam HOWISON, Andrew LACEY, Alexander MOVCHAN. — **Applied partial differential equations.** — Un vol. broché,  $15,5 \times 23,5$ , de XI, 425 p. — ISBN 0-19-853243-1. — Prix: £25.00. — Oxford University Press, Oxford, 1999.

This is a clearly written guide to the theory and applications of PDEs. Its central aim is to set out, in an informal yet logical manner, a mathematical framework within which to assess any given PDE. Space is devoted as much to explicit methods of solution as to more general qualitative ideas, the most important of which is the concept of well-posedness. This attribute is vital in

deciding the accuracy to which the problem can be solved numerically, and it becomes increasingly important as the power of computer software grows.

David L. POWERS. — **Boundary value problems.** — Fourth edition. — Un vol. relié, 16,5 × 23,5, de XI, 528 p. — ISBN 0-12-563734-9. — Prix: US\$69.95. — Academic Press, San Diego, 1999.

This new edition achieves two objectives. The main goal is solving boundary value problems involving partial differential equations. Separation of variables provides a uniform method for attacking important cases of the heat, wave, and potential equations. D'Alembert's solution of the wave equation and the distributed-source solution for the heat equation illustrate other techniques. In addition, there is a chapter on Laplace transform and one on numerical methods, including use of spreadsheets. The second objective is to tie together the mathematics developed and the learner's physical intuition. This is accomplished by deriving several of the mathematical models, by using some physical reasoning in the mathematical development, by interpreting mathematical results in physical terms, and by studying the heat, wave, and potential equations separately.

Jean-Emile RAKOTOSON, Jean-Michel RAKOTOSON. — **Analyse fonctionnelle appliquée aux équations aux dérivées partielles.** — Mathématiques. — Un vol. broché, 15 × 22, de 230 p. — ISBN 2-13-049838-8. — Prix: FF 178.00. — Presses Universitaires de France, Paris, 1999.

Les auteurs ont mis l'accent sur le côté pédagogique en détaillant autant que possible les démonstrations des théorèmes, en utilisant pour ces preuves des procédés simples basés en général sur l'usage des suites (exemple: le procédé diagonal de Cantor, la méthode de Galerkin), en illustrant par des exemples détaillés l'application des théorèmes principaux (théorème de Lax-Milgram, théorèmes de compacité, théorème de J.-L. Lions), en motivant autant que possible l'introduction de certains chapitres, sans oublier l'introduction de certaines méthodes de résolutions numériques (méthode des éléments finis, méthodes spectrales). Enfin, le tout est complété par des exercices variés dont certains comportent des corrections détaillées.

Bert-Wolfgang SCHULZE, Boris STERNIN, Victor SHATALOV. — **Differential equations on singular manifolds: semiclassical theory and operator algebras.** — Mathematical topics, vol. 15 — Un vol. relié, 18 × 24, de 376 p. — ISBN 3-527-40086-9. — Prix: DM 198.00. — Wiley-VCH, Berlin, 1998.

In this book, new methods in the theory of differential equations on manifolds with singularities are presented. The semiclassical theory in quantum mechanics is employed, adapted to operators that degenerate in a typical way. The degeneracies may be induced by singular geometries, e.g. conical or cuspidal ones. A large variety of non-standard degenerate operators is also discussed. The semiclassical approach yields new results and unexpected effects, also in classical situations. For instance, full asymptotic expansions for cuspidal singularities are constructed, and nonstationary problems on singular manifolds are treated. Moreover, finiteness theorems are obtained by using operator algebra methods in a unified framework. Finally, the method of characteristics for general elliptic equations on manifolds with singularities is developed in the book.

Alwyn SCOTT. — **Nonlinear science: emergence & dynamics of coherent structures.** — With contributions from Mads Peter SØRENSEN and Peter Leth CHRISTIANSEN. — Oxford applied and engineering mathematics, vol. 1. — Un vol. relié, 17 × 24, de XVII, 474 p. — ISBN 0-19-850107-2. — Prix: £39.95. — Oxford University Press, Oxford, 1999.

The study of nonlinear systems has quietly revolutionized the realm of science over recent years. It is now known that for nonlinear systems new structures emerge that have their own

features, lifetimes, and peculiar ways of interacting. This book provides an introduction to this complex area of study. It covers a variety of topics, including soliton theory, nonlinear lattices, excitable media, perturbation theory, and the theory of quantum lattices, with a strong emphasis on the applications to experimental reality. It is designed to serve as both a textbook and as a general reference for students and researchers of nonlinear dynamics.

Dennis SERRE. — **Systems of conservation laws, 1: Hyperbolicity, entropies, shock waves.** — Translated by I.N. Sneddon. — Un vol. relié, 18×25,5, de xxii, 263 p. — ISBN 0-521-58233-4. — Prix: £40.00. — Cambridge University Press, Cambridge, 1999.

This book sets up the foundations of the modern theory of conservation laws describing the physical models and mathematical methods, leading to the Glimm scheme. Building on this the author then takes the reader to the current state of knowledge in the subject. In particular, he studies in detail viscous approximations, paying special attention to viscous profiles of shock waves. The maximum principle is considered from the viewpoint of numerical schemes and also in terms of viscous approximation. Small waves are studied using geometrical optics methods. Finally, the initial-boundary problem is considered in depth.

### ***Systèmes dynamiques et théorie ergodique***

Clark ROBINSON. — **Dynamical systems: stability, symbolic dynamics, and chaos.** — Second edition. — Studies in advanced mathematics. — Un vol. relié, 19×26, de 506 p. — ISBN 0-8493-8495-8. — Prix: DM 165.00. — CRC Press, Boca Raton, 1999, distributed by Springer, Berlin.

The book treats the dynamics of both iteration of functions and solutions of ordinary differential equations. This second edition provides a revised discussion of the saddle node bifurcation, a new section on the horseshoe for a flow with a transverse homoclinic point, material on horseshoes for nontransverse homoclinic points, indicating recent extensions to the understanding of how horseshoes arise, information proving the ergodicity of a hyperbolic toral automorphism, a new chapter on Hamiltonian systems.

### ***Approximations et développements en série***

Gheorghe MICULA and Sanda MICULA. — **Handbook of splines.** — Mathematics and its applications, vol. 462. — Un vol. relié, 16,5×24,5, de xvi, 604 p. — ISBN 0-7923-5503-2. — Prix: Dfl. 495.00. — Kluwer Academic Publishers, Dordrecht, 1999.

The purpose of this book is to give a comprehensive approach to the theory of spline functions, from the introduction of the phrase “spline” by I.J. Schoenberg in 1946 to the newest theories of spline-wavelets or spline-fractals, emphasizing the significance of the relationship between the general theory and its applications. In addition, it provides new material on spline function theory, as well as a fresh look at basic methods in spline functions. An extensive reference section is provided.

### ***Analyse de Fourier, analyse harmonique abstraite***

Michael W. FRAZIER. — **An introduction to wavelets through linear algebra.** — Undergraduate texts in mathematics. — Un vol. relié, 16,5×24,5, de xvi, 501 p. — ISBN 0-387-98639-1. — Prix: DM 98.00. — Springer, New York, 1999.

This introduction to wavelets assumes a basic background in linear algebra (reviewed in Chapter 1) and real analysis at the undergraduate level. Fourier and wavelet analyses are first

presented in the finite-dimensional context, using only linear algebra. Then Fourier series are introduced in order to develop wavelets in the infinite-dimensional, but discrete context. Finally, the text discusses Fourier transform and wavelet theory on the real line. The computation of the wavelet transform via filter banks is emphasized, and applications to signal compression and numerical differential equations are given.

## *Transformations intégrales, calcul opérationnel*

Sigurdur HELGASON. — **The Radon transform.** — Second revised and extended edition. — Progress in mathematics, vol. 5. — Un vol. relié,  $16 \times 24$ , de xii, 188 p. — ISBN 3-7643-4109-2. — Prix: SFr. 74.00. — Birkhäuser, Boston, 1999.

This second edition, significantly expanded and updated, presents new material taking into account some of the progress made in the field since 1980. The first chapter introduces the Radon transform and presents new material on the  $d$ -plane transform and applications to the wave equation. Chapter 2 places the Radon transform in a general framework of integral geometry known as a double fibration of a homogeneous space. Several significant examples are developed in detail. Two subsequent chapters treat some specific examples of generalized Radon transforms, for example, antipodal manifolds in compact 2-point homogeneous spaces, and orbital integrals in isotropic Lorentzian manifolds. A final chapter deals with Fourier transforms and distributions, developing all the tools needed in the work.

## *Analyse fonctionnelle et théorie des opérateurs*

Richard BECKER. — **Cônes convexes en analyse.** — Postface de Gustave Choquet. — Travaux en cours, vol. 59. — Un vol. broché,  $17,5 \times 24,5$ , de 245 p. — ISBN 2-7056-6384-3. — Prix: FF 180.00. — Hermann, Paris, 1999.

Cette monographie expose la théorie de la représentation intégrale dans les cônes convexes, due à G. Choquet, et plusieurs de ses applications à l'analyse: théorèmes classiques de Bochner-Weil et de Bernstein, théorème de Choquet-Deny, axiomatiques de Brelot et Bauer en théorie du potentiel, résultats de Talagrand sur les mesures et capacités invariantes, et de Royer et Yor sur les mesures quasi-invariantes en théorie des champs. Cette théorie est étudiée également pour son intérêt propre, et ses liens avec des disciplines voisines de l'analyse: étude des zonoformes et des mesures vectorielles, théorie de la décision statistique, cônes biréticulés et structure des cônes normaux dans un Banach. Une maîtrise d'université orientée vers l'analyse suffit pour aborder cette monographie.

William O. BRAY, Časlav V. STANOJEVIĆ, (Editors). — **Analysis of divergence: control and management of divergent processes.** — Applied and numerical harmonic analysis. — Un vol. relié,  $16,5 \times 24,5$ , de xx, 567 p. — ISBN 0-8176-4058-4. — Prix: SFr. 138.00. — Birkhäuser, Boston, 1999.

Divergent processes are at the core of classical and modern mathematical analysis and the careful control and management of these processes are essential. This new book is a comprehensive survey of new results, analysis, and applications for the study of divergent processes. It covers a broad range of topics including summability, Fourier series, wavelet transform, singular integrals, spectral theory and asymptotics. It is an essential resource for pure and applied mathematicians working in the areas of functional analysis, singular integrals, variational problems, signal analysis and wavelet analysis.

Jaroslav DITTRICH, Pavel EXNER, Miloš TATER, (Editors). — **Mathematical results in quantum mechanics.** — QMath7 Conference, Prague, June 22-26, 1998. — Operator theory advances and applications, vol. 108. — Un vol. relié, 17,5×24, de x, 393 p. — ISBN 3-7643-6097-6. — Prix: SFr. 158.00. — Birkhäuser, Basel, 1999.

This book contains the proceedings of the QMath7 Conference on Mathematical Results in Quantum Mechanics held in Prague, Czech Republic, from June 22 to 26, 1998. The purpose is to draw attention to recent developments in quantum mechanics stemming from its numerous applications, and to related mathematical problems and techniques. This volume is addressed to the broad audience of mathematicians and physicists interested in contemporary quantum physics and associated mathematical questions. The reader will find new results on Schrödinger and Pauli operators with regular, fractal or random potentials, scattering theory, adiabatic analysis, as well as on interesting new physical systems such as photonic crystals, quantum dots and wires.

Francis HIRSCH, Gilles LACOMBE. — **Elements of functional analysis.** — Graduate texts in mathematics, vol. 192. — Un vol. relié, 16×24, de xiv, 393 p. — ISBN 0-387-98524-7. — Prix: DM 98.00 — Springer, New York, 1999.

This is a graduate text on functional analysis. After presenting the fundamental function spaces and their duals, the authors study topics in operator theory and finally develop the theory of distributions up to significant applications such as Sobolev spaces and Dirichlet problems. Along the way, the reader is presented with a truly remarkable assortment of well-formulated and interesting exercises, which test the understanding as well as point out many related topics. The answers and hints that are not already contained in the statements of the exercises are collected at the end of the book.

J. KĄKOL, N. DE GRANDE-DE KIMPE, C. PEREZ-GARCIA, (Eds.). —  **$p$ -adic functional analysis.** — Lecture notes in pure and applied mathematics, vol. 207. — Un vol. broché, 17×25,5, de viii, 331 p. — ISBN 0-8247-8254-2. — Prix: US\$ 165.00. — Marcel Dekker, New York, 1999.

Presenting the proceedings of the Fifth International Conference on  $p$ -adic Functional Analysis held recently in Poznań, Poland, the book analyzes zero-dimensional Hausdorff spaces and certain locally convex (or strict) topologies... covers analytic functions and their properties in regard to Fourier transforms and the classical Paley-Wiener theorem... examines applications of the class of norm Hilbert spaces (Banach spaces for which closed subspaces admit projections of norm  $< 1$ )... demonstrates generalizations to spherically complete fields from results proved in locally compact fields... and more

Gilles PISIER. — **The volume of convex bodies and Banach space geometry.** — Cambridge tracts in mathematics, vol. 94. — Un vol. broché, 15,5×23, de xv, 250 p. — ISBN 0-521-66635-X. — Prix: £ 17.95. — Cambridge University Press, Cambridge, 1999.

Now in paperback, this book aims to give a self-contained presentation of a number of recent results, which relate the volume of convex bodies in  $n$ -dimensional Euclidean space and the geometry of the corresponding finite-dimensional normed spaces. The methods employ classical ideas from the theory of convex sets, probability theory, approximation theory and the local theory of Banach spaces. The book is in two parts. The first presents self-contained proofs of the quotient of the subspace theorem, the inverse Santaló inequality and the inverse Brunn-Minkowski inequality. The second part gives a detailed exposition of the recently introduced classes of Banach spaces of weak cotype 2 or weak type 2, and the intersection of the classes (weak Hilbert space). The book is based on course given in Paris and in Texas.



## **Calcul des variations**

George Xian-Zhi YUAN. — **KKM theory and applications in nonlinear analysis.** — Pure and applied mathematics, vol. 218. — Un vol. relié, 16×23,5, de xii, 621 p. — ISBN 0-8247-0031-7. — Prix: US\$ 195.00. — Marcel Dekker, New York, 1999.

This reference provides an introduction to the principles and applications of Knaster-Kuratowski-Mazurkiewicz (KKM) theory and explores related topics in nonlinear set-valued analysis. The book highlights the generic method for analyzing stability and uniqueness... develops a general topological fixed point theory for set-valued analysis... generalizes abstract convex structures... details a general topological minimax theory... investigates the structure of set-valued mappings... studies the existence, algorithms, and solutions for variational and quasivariational inequalities... gives applications of Browder-Fan and Fan-Glicksberg fixed-point theorems..., etc.

## **Géométrie**

David A. BRANNAN, Matthew F. ESPLIN, Jeremy J. GRAY. — **Geometry.** — Un vol. broché, 19×24,5, de xi, 497 p. — ISBN 0-521-59787-0. — Prix: £18.95. — Cambridge University Press, Cambridge, 1999.

This is a textbook that demonstrates the excitement and beauty of geometry. The approach is that of Klein in his Erlangen programme: a geometry is a space together with a set of transformations of that space. The authors explore various geometries: affine, projective, inversive, non-Euclidean and spherical. In each case the key results are explained carefully, and the relationships between the geometries are discussed. This richly illustrated and clearly written text includes full solutions to over 200 problems.

Gerald E. FARIN. — **NURBS: from projective geometry to practical use.** — Second edition. — Un vol. relié, 15,5×23,5, de xv, 267 p. — ISBN 1-56881-084-9. — Prix: US\$44.00. — A.K. Peters, Natick, Massachusetts, 1999.

NURBS (Non-Uniform Rational B-Splines) have become the de facto standard for geometric definition in CAD/CAM and computer graphics. This well-known book covers NURBS from their geometric beginnings to their industrial applications. The second edition incorporates new research results and a chapter on Pythagorean curves, a development that shows promise in applications such as NC machining or robot motion control.

Peter W. HALLINAN, Gaile G. GORDON, A.L. YUILLE, Peter GIBLIN, David MUMFORD. — **Two- and three- dimensional patterns of the face.** — Un vol. relié, 16×24, de viii, 262 p. — ISBN 1-56881-087-3. — Prix: US\$48.00. — A.K. Peters, Natick, Massachusetts, 1999.

The human face is perhaps the most familiar and easily recognized object in the world, yet both its three-dimensional shape and its two-dimensional images are complex and hard to characterize. This book ties together applied mathematics, applied statistics, and engineering by applying general theories and concepts to the specific and familiar example of the human face. The authors include fully worked out examples of two approaches to face recognition, demonstrating the power of pattern theory and suggesting interesting new mathematics in the two- and three-dimensional aspects of the face.

Heinz LÜNEBURG. — **Die euklidische Ebene und ihre Verwandten.** — Un vol. broché, 17×24, de viii, 207 p. — ISBN 3-7643-5685-5. — Prix: SFr. 44.00. — Birkhäuser, Basel, 1999.

Unter Verzicht auf alles Räumliche wird hier die ebene euklidische Geometrie aufgebaut, indem mit der Untersuchung von beliebigen projektiven und affinen Ebenen begonnen, dann

aber sehr rasch zu Ebenen übergegangen wird, die von kommutativen Körpern koordinatisiert werden. In affinen Ebenen werden die Mittelpunktsrelation studiert, die erstaunliche Konsequenzen hat, sowie Orthogonalitätsrelationen und das Winkelhalbieren. Ist das Winkelhalbieren immer möglich, trägt der Koordinatenkörper eine Anordnung, so dass man schon sehr nahe bei der euklidischen Ebene ist. Zum Schluss, im siebten Kapitel, wird dann gezeigt, welche geometrischen Eigenschaften dazu dienen können, die reelle Ebene unter allen übrigen affinen Ebenen auszuzeichnen.

## ***Ensembles convexes et inégalités géométriques***

Keith M. BALL, Vitali MILMAN, (Editors). — **Convex geometric analysis**. — Mathematical Sciences Research Institute publications, vol. 34. — Un vol. relié, 16×24, de xx, 236 p. — ISBN 0-521-64259-0. — Prix: £ 30.00. — Cambridge University Press, Cambridge, 1999.

This collection of research and expository articles on convex geometry and probability reflects the work done at the program in convex geometry and geometric analysis that took place at MSRI in 1996, emphasizing the links between the geometry of convex bodies, probability theory, harmonic analysis, and recent probabilistic methods in computation. It includes contributions from C. Borell, J. Bourgain, E.D. Gluskin, W.T. Gowers, G. Kalai, G. Kuperberg, B. Maurey, V. Milman, A. Pajor, G. Schechtman, M. Schmuckenschlager, C. Schütt, G. Zang, and several of the most promising representatives of the new generation.

Chuanming ZONG. — **Sphere packings**. — Universitext. — Un vol. relié, 16,5×24,5, de XIII, 241 p. — ISBN 0-387-98794-0. — Prix: DM 79.00. — Springer, New York, 1999.

Sphere packings is one of the most fascinating and challenging subjects in mathematics. In addition to the classical sphere packing problems, this book also deals with the contemporary ones; such as, blocking light rays, the holes in sphere packings, and finite sphere packings. Not only are the main results of the subject presented, but also its creative methods from areas such as geometry, number theory, and linear programming are described. The book also contains short biographies of several masters of this discipline and many open problems.

## ***Géométrie différentielle***

Tobias H. COLDING, William P. MINICOZZI II. — **Minimal surfaces**. — Courant lecture notes, vol. 4. — Un vol. broché, 15,5×22,5, de VIII, 124 p. — ISBN 0-9658703-3-2. — Prix: US\$20.00. — Courant Institute of Mathematical Sciences, New York, 1999.

These notes are an expanded version of a one-semester course taught at Courant in 1998. Chapter 1 will first derive the minimal surface equation as the Euler-Lagrange equation for the area functional on graphs. The focus of this chapter is on the basic properties of minimal surfaces, including the monotonicity formula for area and the Bernstein theorem. Chapter 2 deals with generalizations of the Bernstein theorem discussed in Chapter 1. Chapter 3 starts by introducing stationary varifolds as a generalization of classical minimal surfaces. A proof of a generalization of the Bernstein problem is given. Chapter 4 discusses the solution to the classical Plateau problem, focusing primarily on its regularity. Finally, in Chapter 5, the authors discuss the theory of minimal surfaces in three-manifolds.

Theodore FRANKEL. — **The geometry of physics: an introduction**. — Un vol. broché, 18×25, de XXII, 654 p. — ISBN 0-521-38753-1. — Prix: £22.95. — Cambridge University Press, Cambridge, 1998.

This book is intended to provide 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.

## ***Topologie générale***

Alejandro ILLANES, Sam B. NADLER, Jr. — **Hyperspaces: fundamentals and recent advances.** — Un vol. relié, 16,5×23,5, de xvii, 512 p. — ISBN 0-8247-1982-4. — Prix: USS 175.00. — Marcel Dekker, New York, 1999.

This book presents both solved and unsolved problems in hyperspaces - including a number that appear in print for the first time, emphasizes the hyperspaces  $2^X$  and  $C(X)$ , where  $X$  is a continuum, discusses symmetric products, containment hyperspaces, selections, spaces of segments, and spaces of Whitney levels... incorporates basic material on absolute retracts, infinite-dimensional topology,  $\mathbf{Z}$ -sets, Peano continua, boundary bumping, and the fixed point property, offers complete details for the solution of the dimension problem, the  $n$ -od problem, the product problem, and the characteristics of Class (W), covers results on Whitney properties, Whitney-reversible properties, and their relations.

Ioan M. JAMES. — **Topologies and uniformities.** — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de xv, 230 p. — ISBN 1-85233-061-9. — Prix: DM 56.00 — Springer, London, 1999.

This book provides the reader with a modern account of the basic concepts of topological and uniform spaces, with an emphasis on the relation between the two. The material divides naturally into three sections; six chapters on topological theory, two chapters devoted to uniform theory and the final four chapters which draw on ideas from the first two sections. Based on the author's earlier book *Topological and Uniform Spaces*, the text has been thoroughly revised and expanded.

Hervé QUEFFELEC. — **Topologie: cours et exercices corrigés.** — Enseignement des mathématiques. — Un vol. broché, 16×24, de xiii, 211 p. — ISBN 2-225-83140-8. — Prix: FF 185.00. — Masson, Paris, 1998, diffusé par Dunod, Paris et en Suisse par Havas Services Suisse, Fribourg.

Ce livre est constitué de six chapitres: nombres réels, espaces topologiques et métriques, espaces compacts, espaces connexes, espaces complets, espaces ayant localement une propriété topologique. De nombreuses figures facilitent la compréhension du texte. Chaque chapitre est suivi d'exercices corrigés et commentés en détail. Le chapitre V contient un long problème sur la dimension de Hausdorff des compacts auto-similaires.

## ***Topologie algébrique***

Hans-Joachim BAUES. — **Combinatorial foundation of homology and homotopy.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de xv, 363 p. — ISBN 3-540-64984-0. — Prix: DM 159.00. — Springer, Berlin, 1999.

This book considers deep and classical results of homotopy theory like the homological Whitehead theorem, the Hurewicz theorem, the finiteness obstruction theorem of Wall, the



theorems on Whitehead torsion and simple homotopy equivalences, and characterizes axiomatically the assumptions under which such results hold. This leads to a new combinatorial foundation of homology and homotopy. Numerous explicit examples and applications in various fields of topology and algebra are given.

### ***Topologie des variétés, analyse globale et analyse des variétés***

Peter L. ANTONELLI, Bradley C. LACKEY, (Editors). — **The theory of Finslerian Laplacians and applications.** — Mathematics and its applications, vol. 459. — Un vol. relié,  $16,5 \times 24,5$ , de xxix, 282 p. — ISBN 0-7923-5313-7. — Prix: Dfl. 270.00. — Kluwer Academic Publishers, Dordrecht, 1998.

The text proper begins with a brief introduction to stochastically derived Finslerian Laplacians, facilitated by applications in ecology, epidemiology and evolutionary biology. The mathematical ideas are then fully presented in section II, with generalizations to Lagrange geometry following in section III. With section IV, the focus abruptly shifts to the local mean-value approach to Finslerian Laplacians and a Hodge-de Rham theory is developed for the representation on real cohomology classes by harmonic forms on the base manifold. Similar results are proved in sections II and IV, each from different perspectives.

Bill BRUCE, David MOND, (Editors). — **Singularity theory.** — Proceedings of the European Singularities Conference, Liverpool, August 1996. — London Mathematical Society lecture note series, vol. 263. — Un vol. broché,  $15,5 \times 23$ , de xxiv, 440 p. — ISBN 0-521-65888-8. — Prix: £29.95. — Cambridge University Press, Cambridge, 1999.

Singularity theory is a broad subject with vague boundaries. It draws on many other areas of mathematics, and in turn has contributed to many areas both within and outside mathematics, in particular differential and algebraic geometry, knot theory, differential equations, bifurcation theory, Hamiltonian mechanics, optics, robotics and computer vision. This volume consists of two dozen articles from some of the best known figures in singularity theory, and it presents an up-to-date survey of research in this area.

William M. GOLDMAN. — **Complex hyperbolic geometry.** — Oxford mathematical monographs. — Un vol. relié,  $16 \times 24$ , de xx, 316 p. — ISBN 0-19-853793-X. — Prix: £65.00. — Clarendon Press, Oxford, 1999.

*From the preface:* This book attempts a fairly comprehensive treatment of the geometry of complex hyperbolic space and its boundary. This subject's richness is enhanced by the confluence of many fields of mathematics: Riemannian geometry, complex analysis, symplectic and contact geometry, Lie theory, harmonic analysis and ergodic theory. The boundary of complex hyperbolic geometry is spherical CR geometry or *Heisenberg geometry*... Largely motivated by applications to geometric structures, moduli spaces and discrete groups, this book does not attempt a thorough discussion of any of these topics. Nor does it attempt a thorough treatment of the analytic aspects listed above. Instead, this book is a user's guide to complex hyperbolic geometry...

Emmanuel HEBEY. — **Nonlinear analysis on manifolds: Sobolev spaces and inequalities.** — Courant lecture notes, vol. 5. — Un vol. broché,  $15 \times 22,5$ , de 309 p. — ISBN 0-9658703-4-0. — Prix: US\$20.00. — Courant Institute of Mathematical Sciences, New York, 1999.

These notes deal with the theory of Sobolev spaces on Riemannian manifolds. The present notes are organized into nine chapters. Chapter 1 is a quick introduction to differential and

Riemannian geometry. Chapter 2 deals with the general theory of Sobolev spaces for compact manifolds, while Chapter 3 deals with the general theory of Sobolev spaces for complete, non-compact manifolds. Best constants problems for compact manifolds are discussed in Chapters 4 and 5, while Chapter 6 deals with some special type of Sobolev inequalities under constraints. Best constants problems for complete noncompact manifolds are discussed in Chapter 7. Chapter 8 deals with Euclidean-type Sobolev inequalities. The influence of symmetries on Sobolev embeddings is discussed in Chapter 9.

N.J. HITCHIN, G.B. SEGAL, R.S. WARD. — **Integrable systems: twistors, loop groups, and Riemann surfaces.** — Based on lectures given at a conference on Integrable Systems organized by N.M.J. Woodhouse and held at the Mathematical Institute, University of Oxford, in September 1997. — Un vol. relié, 16×24, de VIII, 136 p. — ISBN 0-19-850421-7. — Prix: £25.00. — Clarendon Press, Oxford, 1999.

The introduction by N. Hitchin addresses the meaning of integrability: how do we recognize an integrable system? His own contribution then develops connections with algebraic geometry, and includes an introduction to Riemann surfaces, sheaves, and line bundles. G. Segal takes the Korteweg-de Vries and nonlinear Schrödinger equations as central examples, and explores the mathematical structures underlying the inverse scattering transform. He explains the roles of loop groups, the Grassmannian, and algebraic curves. R. Ward explores the connection between integrability and the self dual Yang-Mills equations, and describes the correspondence between solutions to integrable equations and holomorphic vector bundles over twistor space.

Serge LANG. — **Fundamentals of differential geometry.** — Graduate texts in mathematics, vol. 191. — Un vol. relié, 16,5×24, de XVII, 535 p. — ISBN 0-387-98593-X. — Prix: DM 109.00. — Springer, New York, 1999.

This is the new edition of Serge Lang's *Differential and Riemannian Manifolds*. It provides an introduction to basic concepts in differential topology, differential geometry, and differential equations, and some of the main basic theorems in all three areas: for instance, the existence, uniqueness, and smoothness theorems for differential equations and the flow of a vector field; the basic theory of vector bundles including the existence of tubular neighborhoods for a submanifold; the calculus of differential forms; basic notions of symplectic manifolds, including the canonical 2-form; sprays and covariant derivatives for Riemannian and pseudo-Riemannian manifolds; applications to the exponential map, including the Cartan-Hadamard theorem and the first basic theorem of calculus of variations.

John MADORE. — **An introduction to noncommutative differential geometry and its physical applications.** — Second edition. — London Mathematical Society lecture note series, vol. 257. — Un vol. broché, 15,5×23, de VI, 321 p. — ISBN 0-521-65991-4. — Prix: £24.95. — Cambridge University Press, Cambridge, 1999.

A significant amount of the differential structure of a smooth manifold can be encoded in the algebra of smooth functions defined on it. A noncommutative geometry is what one obtains when one replaces this algebra by a noncommutative associative algebra. A more or less complete survey of this geometry is given as well as some possible applications to elementary particle physics and field theory. The first edition of this book arose from the 1994 LMS invited lectures. This second edition is thoroughly revised and includes new material on reality conditions and linear connections plus examples from Jordanian deformations and quantum Euclidean spaces and assumes only some familiarity with ordinary differential geometry and the theory of fibre bundles.

Andrei MARSHAKOV. — **Seiberg-Witten theory and integrable systems.** — Un vol. broché,  $15,5 \times 22$ , de 253 p. — ISBN 981-02-3637-9. — Prix: £ 16.00. — World Scientific, Singapore, 1999.

SUSY Yang-Mills theories. — Integrable systems. — Integrable equations in 2D topological string theories. — The Seiberg-Witten Ansatz. Generating differential and Whitham hierarchy. — Prepotential of the Seiberg-Witten theory. — Seiberg-Witten theory from strings. — Appendices: Riemann surfaces and theta-functions. KP hierarchy and theory of free fermions. Residue formula for the  $N = 2$  Calogero-Moser system. Algebra of differentials for the Calogero-Moser system. Explicit derivation in elliptic case.

A. STASIAK, V. KATRITCH, L.H. KAUFFMAN, (Editors). — **Ideal knots.** — Series on knots and everything, vol. 19. — Un vol. relié,  $16 \times 22,5$ , de x, 414 p. — ISBN 981-02-3530-5. — Prix: £ 31.00. — World Scientific, Singapore, 1998.

In this book, experts in different fields of mathematics, physics, chemistry and biology present unique forms of knots which satisfy certain preassigned criteria relevant to a given field. They discuss the shapes of knotted magnetic flux lines, the forms of knotted arrangements of bistable chemical systems, the trajectories of knotted solitons, and the shapes of knots which can be tied using the shortest piece of elastic rope with a constant diameter. — *Contents*: Ideal knots and their relation to the physics of real knots (A. Stasiak et al.), Knots with minimal energies (Y. Diao et al.), The writhe of knots and links (E. J. Janse van Rensburg et al.), Entropy of a knot: simple arguments about difficult problem (A. Yu. Grosberg), Knots and fluid dynamics (H. K. Moffatt), Möbius-invariant knot energies (R. B. Kusner & J. M. Sullivan), Fourier knots (L. H. Kauffman), and other papers.

## ***Probabilités et processus stochastiques***

Rodrigo BAÑUELOS, Charles N. MOORE. — **Probabilistic behavior of harmonic functions.** — Progress in mathematics, vol. 175. — Un vol. relié,  $16 \times 24$ , de xiv, 204 p. — ISBN 3-7643-60602-3. — Prix: SFr. 98.00. — Birkhäuser, Basel, 1999.

The primary focus of the text is the nontangential maximal function and the area function of a harmonic function and their probabilistic analogues in martingale theory. The text first gives the requisite background material from harmonic analysis and discusses known results concerning the nontangential maximal function and area function, as well as the central and essential role these have played in the development of the field. The book next discusses further refinements of traditional results: among these are sharp good-lambda inequalities and laws of the iterated logarithm involving nontangential maximal functions and area functions. Many applications of these results are given.

Hans CRAUEL, Matthias GUNDLACH, (Editors). — **Stochastic dynamics.** — Un vol. relié,  $16 \times 24$ , de xvii, 440 p. — ISBN 0-387-98512-3. — Prix: DM 129.00. — Springer, New York, 1999.

This volume gives an account of new and recent developments in the theory of random and, in particular, stochastic dynamical systems. Its purpose is to document and, to some extent, summarize the current state of the field of random dynamical systems beyond the recent monograph *Random Dynamical Systems* by Ludwig Arnold. Recent results on stochastic bifurcation, hyperbolic systems, numerics and asymptotics, more general driving processes for stochastic differential equations, and stochastic analysis on infinite-dimensional manifolds are presented in a comprehensible manner. Several new and exciting insights into the unexpected variety of dynamical behaviors resulting from influence of stochastic perturbations are conveyed to the reader.

G. LATOUCHE, V. RAMASWAMI. — **Introduction to matrix analytic methods in stochastic modeling.** — Un vol. broché, 18×25, de xiv, 334 p. — ISBN 0-89871-425-7. — Prix: US\$49.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1999.

The authors begin by describing several examples of quasi-birth-and-death (QBD) processes. The second part of the book deals with phase-type distributions and related-point processes, which provide a versatile set of tractable models for applied probability. Part three reviews birth-and-death processes, and points out that the arguments for these processes carry over to more general processes in a parallel manner and are based on Markov renewal theory. Part four covers material where algorithmic and probabilistic reasoning are most intimately connected. The final part goes beyond simple QBDs with a sequence of short chapters where the authors discuss various extensions to the analyzed processes.

Jean-Philippe RÉAU, Gérard CHAUVAT. — **Probabilités et statistiques: résumé des cours, exercices et problèmes corrigés, QCM.** — 4<sup>e</sup> édition. — Cursus Economie. — Un vol. broché, 16×24, de 207 p. — ISBN 2-200-25076-2. — Prix: FF 94.00. — Armand Colin, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

L'exposition du contenu de cet ouvrage est méthodique et progressive pour assurer au lecteur un entraînement personnel tout au long de l'année, une révision systématique du programme, et une préparation optimale aux examens et concours. La présentation pédagogique et pratique comprend des résumés de cours et des rappels de notions de base, des exercices d'application suivis de leurs solutions complètes, des problèmes avec des solutions commentées, des thèmes de récapitulation inspirés de sujets récents d'examens.

Aris SPANOS. — **Probability theory and statistical inference: econometric modeling with observational data.** — Un vol. broché, 17,5×25, de xxvii, 815 p. — ISBN 0-521-42408-9 (relié: 0-521-41354-0). — Prix: £24.95 (relié: £60.00). — Cambridge University Press, Cambridge, 1999.

The primary objective of this book is to establish the framework for the empirical modeling of observational (non-experimental) data. This framework known as probabilistic reduction is formulated with a view to accommodating the peculiarities of observational (as opposed to experimental) data in a unifying and logically coherent way. This book differs from traditional textbooks in so far as it emphasizes concepts, ideas, notions, and procedures which are appropriate for modeling observational data. No prior knowledge other than a basic familiarity with descriptive statistics is assumed. Aimed primarily at students studying econometrics and economics, this textbook will also be useful for students in other disciplines which make extensive use of observational data.

David STIRZAKER. — **Probability and random variables: a beginner's guide.** — Un vol. broché, 17,5×25, de xii, 368 p. — ISBN 0-521-64445-3. — Prix: £16.95. — Cambridge University Press, Cambridge, 1999.

After an elementary discussion of chance, the central and crucial rules and ideas of probability including independence and conditioning are set out. Counting, combinatorics and the ideas of probability distributions and densities are then introduced. Later chapters present random variables and examine independence, conditioning, covariance and functions of random variables, both discrete and continuous. The final chapter considers generating functions and applies this concept to practical problems including branching processes, random walks and the central limit theorem. Examples, demonstrations and exercises are used throughout to explore the ways in which probability is motivated by, and applied to, real-life problems in science, medicine, gaming and other subjects of interest. Essential proofs of important results are included.

## **Statistique**

Yadolah DODGE. — **Analyse de régression appliquée: manuel et exercices corrigés.** — Avec la collaboration de Valentin ROUSSON — Collection Eco sup. — Un vol. broché,  $15,5 \times 24$ , de x, 278 p. — ISBN 2-10-004284-X. — Prix: FF 188.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage propose une présentation complète des concepts et techniques de base de l'analyse de régression et de la méthode d'estimation des paramètres. La méthode des moindres carrés y est présentée en détail dans les premiers chapitres, pour l'analyse de régression simple et multiple, mais l'ouvrage s'ouvre également sur d'autres méthodes. S'appuyant sur l'expérience de son enseignement, l'auteur présente de façon très pédagogique, l'analyse de régression linéaire, la régression linéaire simple, la régression multiple, la corrélation, les diagnostics, le choix du modèle, l'analyse de variance et régression, la régression ridge, la régression LAD. Chaque chapitre est illustré de nombreux exemples et comporte des exercices dont les corrigés sont fournis en fin d'ouvrage.

Subir GHOSH, (Editor). — **Asymptotics, nonparametrics, and time series.** — Statistics: textbooks and monographs, vol. 158. — Un vol. relié,  $16,5 \times 23,5$ , de xviii, 833 p. — ISBN 0-8247-0051-1. — Prix: US\$225.00. — Marcel Dekker, New York, 1999.

This book illustrates uses of Fourier analysis in scientific problems, discusses lead-time-dependent model selection and parameter estimation for multistep prediction, explicates modeling and interference problems for periodically correlated time series, highlights parameter- and observation-driven Poisson regression models, elucidates modelling and interference problems for Seasonal/Cyclical Long Memory (SCLM) processes, outlines linearity tests, significant lags, asymptotics, and tests of independence for time series, provides efficient estimates of the finite dimensional parameters in semiparametric additive regression models, examines efficient estimation of stationary distribution of Markov chains of autoregression parameters and innovative distributions in AR- and ARCH models and general time series... etc..

Phillip I. GOOD. — **Resampling methods: a practical guide to data analysis.** — Un vol. relié,  $16,5 \times 24$ , de xii, 269 p. — ISBN 0-8176-4091-6. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1999.

This new book is a practical guide to data analysis using the bootstrap, cross-validation, and permutation tests. It is an essential resource for industrial statisticians, statistical consultants, and research professionals in science, engineering, and technology. Requiring only minimal mathematics beyond algebra, it provides a table-free introduction to data analysis utilizing numerous exercises, practical data sets, and freely available statistical shareware.

D.C. IONESCU, N. LIMNIOS, (Editors). — **Statistical and probabilistic models in reliability.** — Statistics for industry and technology. — Un vol. relié,  $19 \times 26$ , de xxxvi, 352 p. — ISBN 0-8176-4068-1. — Prix: SFr. 148.00 — Birkhäuser, Boston, 1999.

This book presents twenty-four carefully edited chapters providing an up-to-date survey of new models and methods for reliability analysis and applications in science, engineering, and technology. The chapters contain broad coverage of relevant statistical methods, probabilistic methods and new, innovative techniques. Written in an accessible style, they employ many tables, data sets, and graphs to convey a clear and practical perspective for the methods. Topics and features: glossary of key technical terms, extensive examples and real data sets, latest reliability techniques, stress reliability, semi-Markov stochastic processes, tests and accelerated tests, asymptotic reliability.



Michel JANVIER. — **Statistique descriptive avec ou sans tableur: cours et exercices corrigés.** — Collection Sciences sup. — Un vol. broché, 17×24, de x, 276 p. — ISBN 2-10-004317-X. — Prix: FF 180.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Ce cours destiné en priorité aux étudiants de DEUG MASS, pourra également intéresser les étudiants du premier cycle universitaire en sciences économiques, géographie, sociologie ainsi que les auditeurs de la formation continue. Les thèmes abordés sont les suivants: organisation des données, étude d'une variable statistique: représentation graphique et paramètres de position et de dispersion, concentration, étude de distributions statistiques à deux caractères: décomposition des variances, corrélation, ajustements. L'ouvrage insiste sur le choix coordonné des différents paramètres. Il fournit les représentations graphiques les plus récentes à l'aide du logiciel Excel. De nombreux exercices entièrement corrigés permettent de mettre en œuvre les concepts et méthodes de la statistique descriptive dans des situations concrètes.

Samuel KOTZ, Campbell B. READ, David L. BANKS, (Editors). — **Encyclopedia of statistical sciences, Update volume 3.** — Un vol. relié, 18,5×26, de xvii, 898 p. — ISBN 0-471-23883-X. — Prix: US\$235.00. — John Wiley & Sons, New York, 1999.

*Encyclopedia of Statistical Sciences* is the number one source of information on statistical theory, methods, and applications for researchers and clinicians. This new volume is the last of three updates designed to bring the *Encyclopedia* in line with new and emerging topics and important advances in statistical science made over the past decade. Each self-contained entry is written by a leader in the field and easily understood by readers with a modest statistical background. Up-to-date bibliographies, thorough cross-referencing, and extensive indexing facilitate quick access to specific information and provide an indispensable platform for further study and research. A cumulative index and listing of all entries in the 13 volumes of the *Encyclopedia*, together with the corresponding authors, are included.

E.L. LEHMANN. — **Elements of large-sample theory.** — Springer texts in statistics. — Un vol. relié, 16,5×24,5 de xii, 631 p. — ISBN 0-387-98595-6. — Prix: DM 159.00. — Springer, New York, 1999.

This book provides a unified treatment of first-order large-sample theory. It discusses a broad range of applications including introductions to density estimation, the bootstrap, and the asymptotics of survey methodology. The book is written at an elementary level and is suitable for students at the master's level in statistics and in applied fields who have a background of two years of calculus.

Thomas LEONARD, John S.J. HSU. — **Bayesian methods: an analysis for statisticians and interdisciplinary researchers.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5×26 cm, de xiv, 333 p. — ISBN 0-521-59417-0. — Prix: £40.00. — Cambridge University Press, Cambridge, 1999.

A Bayesian "posterior distribution" or "predictive distribution" summarizes everything you need to know about an unknown parameter, or future observations. This unique book shows how to use Bayesian statistics in a sound and practically relevant manner. It will guide the reader on inferring scientific, medical, and social conclusions from numerical data. The authors explain the subtle assumptions needed for Bayesian methodology and show how to use them to obtain good-quality conclusions. The methods also perform remarkably well in terms of computer-simulated frequency properties. The book contains numerous worked examples, self-study exercises, and

practical applications. It provides essential reading for final-year undergraduates, Masters-degree and graduate students, statisticians, and other interdisciplinary researchers wishing to develop good-quality conclusions from their data and to pursue the notion of scientific truth.

Clive LOADER. — **Local regression and likelihood.** — Statistics and computing. — Un vol. relié, 16,5 × 24, de XIII, 290 p. — ISBN 0-387-98775-4. — Prix: DM 129.00. — Springer, New York, 1999.

This book provides an overview of the theory, methods, and application of local regression and likelihood. The first five chapters introduce the problems, first in the local regression setting, followed by extensions to likelihood-based regression models and density estimation. The remaining chapters cover a range of advanced topics and applications, including robust smoothing, survival analysis, classification, and model selection issues. The book emphasizes local regression as a generalization of standard least squares and likelihood methods. The most important tools used in the analysis of local regression are direct generalizations of those used in parametric analysis. Throughout, the book emphasizes understanding of methods, and in particular, what they do, and do not, imply.

John O. RAWLINGS, Sastry G. PANTULA, David A. DICKEY. — **Applied regression analysis: a research tool.** — Second edition. — Springer texts in statistics. — Un vol. relié, 19 × 24,5, de XVIII, 657 p. — ISBN 0-387-98454-2. — Prix: DM 168.00. — Springer, New York, 1998.

The book emphasizes the concepts and the analysis of data sets. It provides a review of the key concepts in simple linear regression, matrix operations, and multiple regression. Methods and criteria for selecting regression variables and geometric interpretations, as well as polynomial, trigonometric, analysis of variance, nonlinear, time series, logistic, random effects, and mixed effects models, are discussed. Several chapters are dedicated to problem areas in regression: Collinearity, non-normality, influential points, correlated errors, and heteroscedastic errors. Appropriate remedies, such as transformations and biased regression, are also covered. Detailed case studies and exercises based on real data sets are used to reinforce the concepts. The data sets used in the book are available on the Internet.

Lothar SACHS. — **Angewandte Statistik: Anwendung statistischer Methoden.** — Neunte, überarbeitete Aufl. — Un vol. broché, 16,5 × 24,5, de XXXIV, 881 p. — ISBN 3-540-65371-6. — Prix: DM 98.00. — Springer, Berlin, 1999.

Neben zahlreichen Hinweisen und Empfehlungen zur Planung und Auswertung von Studien, einer anschaulich und anwenderbezogenen Darstellung von Konzepten, Begriffen, Beziehungen, Fehlerquellen und Fallstricken, dienen Tips und Querverweise sowie ein sehr ausführliches und strukturiertes Sachverzeichnis mit einer Fülle erläuterter Stichworte auch zur Ergänzung von Statistik-Software-Handbüchern, insbesondere für Mediziner, Ingenieure und Naturwissenschaftler. Weiterführende Studien ermöglicht ein ausführliches Literaturverzeichnis.

## *Analyse numérique*

Thierry DUBOIS, François JAUBERTEAU, Roger TEMAM. — **Dynamic multilevel methods and the numerical simulation of turbulence.** — Un vol. relié, 16,5 × 24, de XIX, 289 p. — ISBN 0-521-62165-8. — Prix: £37.50. — Cambridge University Press, Cambridge, 1999.

This book describes the implementation of multilevel methods in a dynamical context, with application to the numerical simulation of turbulent flows. The general ideas for the algorithms presented stem from dynamical systems theory and are based on the decomposition of the

unknown function into two or more arrays corresponding to different scales in the Fourier space. Before describing in detail the numerical algorithm, survey chapters, on the mathematical theory of the Navier-Stokes equations and on the physics of the conventional theory of turbulence, are included. The multilevel methods are applied here to the simulation of homogeneous isotropic turbulent flows as well as turbulent channel flows. The implementation issues are discussed in detail, and numerical simulations of the flows cited above are presented and analyzed.

Michael FEY, Rolf JELTSCH, (Editors). — **Hyperbolic problems: theory, numerics, applications.** — Seventh International Conference in Zürich, February 1998. — Deux vol. reliés,  $17,5 \times 24$ , de XII, 1011 p. au total. — ISBN 3-7643-6123-9 (pour l'ensemble des deux vol.). — Prix: SFr. 328.00 (pour l'ensemble des deux vol.). — Birkhäuser, Basel, 1999.

These proceedings contain, in two volumes, approximately one hundred papers presented at the conference on hyperbolic problems, which has focused to a large extent on the laws of non-linear hyperbolic conservation. Two-fifths of the papers are devoted to mathematical aspects such as global existence, uniqueness, asymptotic behavior such as large time stability, stability and instabilities of waves and structures, various limits of the solution, the Riemann problem and so on. Roughly the same number of articles are devoted to numerical analysis, for example stability and convergence of numerical schemes, as well as schemes with special desired properties such as shock capturing, interface fitting and high-order approximations to multidimensional systems. The results in these contributions, both theoretical and numerical, encompass a wide range of applications such as nonlinear waves in solids, various computational fluid dynamics from small-scale combustion to relativistic astrophysical problems, multiphase phenomena and geometrical optics.

W. GAUTSCHI, G.H. GOLUB, G. OPFER, (Editors). — **Applications and computation of orthogonal polynomials.** — Conference at the Mathematical Research Institute Oberwolfach, Germany, March 22-28, 1998. — International series of numerical mathematics, vol. 131. — Un vol. relié,  $17,5 \times 24$ , de XII, 268 p. — ISBN 3-7643-6137-9. — Prix: SFr. 148.00. — Birkhäuser, Basel, 1999.

This volume contains a collection of papers dealing with applications of orthogonal polynomials and methods for their computation. The applications address problems in applied mathematics as well as problems in engineering and the sciences. Prominent among the former are least-squares approximations, Gauss and related quadrature, iterative methods in linear algebra, the detection of singularities, and integral equations. Applications of the latter kind include the use of wavelets in medical diagnostics and the relevance of orthogonal polynomials in optimal control, dynamical systems, and gas dynamics. Computational methods relate to numerical and symbolic computation and include, in particular, matrix interpretation and convergence, perturbation, and stability analyses of relevant algorithms. Generalizations of orthogonal polynomials are also considered, for example, *s*-orthogonal, matrix- and tensor valued, Müntz-type, and complex orthogonal polynomials.

A. ISERLES, (Editor). — **Acta numerica, vol. 8, 1999.** — Un vol. relié,  $18 \times 25,5$ , de 295 p. — ISBN 0-521-77088-2. — Prix: £42.00. — Cambridge University Press, Cambridge, 1999.

*Contents:* Gregory B. Cook and Saul A. Teukolsky: Numerical relativity: challenges for computational science. — Thomas Hagstrom: Radiation boundary conditions for the numerical simulation of waves. — Frank Natterer: Numerical methods in tomography. — Allan Pinkus: Approximation theory of the MLP model in neural networks. — Eckhard Platen: An introduction to numerical methods for stochastic differential equations. — Lloyd N. Trefethen: Computation of pseudospectra.



Prem K. KYTHE. — **Computational conformal mapping.** — Un vol. relié,  $16,5 \times 24$ , de xiv, 462 p. — ISBN 0-8176-3996-9. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1998.

This book provides a self-contained and systematic introduction to the theory and computation of conformal mappings of simply- or multiply- connected regions onto the unit disk or canonical regions. It provides a comprehensive and systematic coverage of the concepts and related numerical analysis with applications to different areas in applied math, physics and engineering. The style and presentation are readily accessible to graduates and researchers.

Alfio QUARTERONI, Alberto VALLI. — **Domain decomposition methods for partial differential equations.** — Numerical mathematics and scientific computation. — Un vol. relié,  $16 \times 24$ , de xv, 360 p. — ISBN 0-19-850178-1. — Prix: £55.00. — Clarendon Press, Oxford, 1999.

Domain decomposition methods are designed to allow the effective numerical solution of partial differential equations on parallel computer architectures. They comprise a relatively new field of study, but have already found applications in many branches of physics and engineering. In this book the authors illustrate the basic mathematical concepts behind domain decomposition, looking at a large variety of boundary value problems. Contents include: symmetric elliptic equations; advection-diffusion equations; the elasticity problem; the Stokes problem for incompressible and compressible fluids; the time-harmonic Maxwell equations; parabolic and hyperbolic equations; and suitable couplings of heterogeneous equations.

J.A. SETHIAN. — **Level set methods and fast marching methods: evolving interfaces in computational geometry, fluid mechanics, computer vision, and material science.** — Cambridge monographs on applied and computational mathematics, vol. 3. — Un vol. broché,  $15 \times 23$ , de xx, 378 p. — ISBN 0-521-64557-3. — Prix: £18.95. — Cambridge University Press, Cambridge, 1999.

The book begins with an introduction to the dynamics of moving curves and surfaces. Next, efficient computational techniques for approximating viscosity solutions to partial differential equations are developed, using the numerical technology from hyperbolic conservation laws. A large collection of applications are given, including examples from physics, chemistry, fluid mechanics, combustion, image processing, material science, fabrication of microelectronic components, computer vision, computer-aided design, and optimal control theory.

## ***Informatique***

Michael TROTT. — **Graphica 1: The imaginary made real: the art of Michael Trott.** — Un vol. relié,  $26 \times 26$ , de xiii, 89 p. — ISBN 1-57955-009-6. — Prix: US\$34.95. — Wolfram Media, Champaign, IL, 1999.

Two worlds merge in this volume of breathtaking *Mathematica*-generated images. With an artist's eye and a mathematician's tools, Michael Trott has produced a collection of dazzling, surprising images, ranging from the playful to the enthralling. He uses a palette of new tools and techniques to create a mesmerizing new kind of art form, residing in the strange middle ground between the artificial and the natural. Some images are playful geometric explorations; others are directly inspired by the work of such artists as Escher and Vasarely; still others make use of sophisticated mathematical methods borrowed from sciences such as electrodynamics and solid state physics.

Igor BAKSHEE. — **Graphica 2: The pattern of beauty: the art of Igor Bakshee.** — Un vol. relié, 26×26, de XII, 86 p. — ISBN 1-57955-010-X. — Prix: US\$34.95. — Wolfram Media, Champaign, IL, 1999.

The remarkable images in this volume dwell on the border between order and chaos. In each one, the artist and physicist Igor Bakshee balances strict geometry against carefully controlled randomness, producing a unique computer-generated design. By mixing the opposing forces of order and disorder in just the right proportion, Bakshee's mathematical alchemy brings the images to life.

Ke CHEN, Peter GIBLIN, Alan IRVING. — **Mathematical explorations with MATLAB.** — Un vol. broché, 15×22,5, de XIV, 306 p. — ISBN 0-521-63920-4. — Prix: £15.95. — Cambridge University Press, Cambridge, 1999.

The emphasis is on understanding and investigating the mathematics usually encountered in first year university courses, and putting it into practice in a wide variety of modelling situations. In the process, the reader will gain some fluency with MATLAB, no starting knowledge of the package being assumed. The range of material is wide: matrices, whole numbers, complex numbers, geometry of curves and families of lines, data analysis, random numbers and simulations, and differential equations form the basic mathematics. All extras to the standard MATLAB package are supplied on the World Wide Web.

Claude GOMEZ, Carey BUNKS, Jean-Philippe CHANCELIER, François DELEBECQUE, Maurice GOURSAT, Ramine NIKOUKHAH, Serge STEER, (Editors). — **Engineering and scientific computing with Scilab.** — Un vol. relié, 18,5×26, de XXIII, 491 p. + 1 CD-ROM. — ISBN 0-8176-4009-6. — Prix: SFr. 138.00. — Birkhäuser, Boston, 1999.

Scilab is a powerful, open computing environment designed for engineering and scientific applications. The first part includes an introductory description of Scilab's programming language, syntax, useful functions, and graphics. Also described is how users can extend the functionality of Scilab by integrating custom Fortran and C programs as new Scilab primitives. Finally, the creation of abstract data types is discussed as well as the use of operators for these new data types. The second part of the book discusses topics of signal processing, nonlinear simulation (including hybrid system builder) and optimization, classical and robust control, mixed symbolic/numeric computations, and graph/network manipulation. Finally, a specific real life industrial menu-driven application is presented. The book comes with a CD-ROM containing the entire source code of Scilab as well as binary executables for a variety of operating systems. This CD-ROM also contains Scilab programs illustrating many of the examples in the book.

Stephan KAUFMANN. — **A crash course in Mathematica.** — Un vol. broché, 17×24, de 200 p + 1 CD-ROM. — ISBN 3-7643-6127-1. — Prix: SFr. 42.00. — Birkhäuser, Basel, 1999.

This book is a compact introduction to the program *Mathematica*, which is widely used in mathematics, as well as in the natural and engineering sciences. The essential basics of *Mathematica* Versions 3 and 4 (front end, kernel and the most important standard packages) are explained with simple, non-field-specific examples and exercises. After working through the book, readers will be able to solve problems from their own specialties by themselves and find additional support in the online documentation. The included CD-ROM contains the entire book in the form of *Mathematica* notebooks, with color versions of the graphics and animations. Hyperlinks built into the notebooks serve as internal references and point to the program's online documentation and to resources on the Internet. The Win95/98/NT-, Mac- and Unix-compatible CD-ROM contains the program *MathReader*, with which the notebooks can be viewed without a complete installation of *Mathematica*.

Lionel PORCHERON. — **Maple : cours et applications : 1<sup>ère</sup> et 2<sup>e</sup> années toutes filières.** — Collection J'intègre. — Préface de Jean-Michel Ferrard. — Un vol. broché, 17×24, de XVIII, 340 p. — ISBN 2-10-004321-3. — Prix: FF 140.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Il s'agit d'un cours d'utilisation du logiciel Maple, qui intègre des applications en mathématiques, physique et chimie, ces deux derniers domaines n'étant que peu présents dans les ouvrages actuels. Le but de l'auteur est de réaliser une présentation aussi complète que possible de ce logiciel, et de permettre ainsi aux étudiants d'acquérir les bases essentielles requises pour une utilisation optimale de Maple. Très pédagogique, cet ouvrage a été spécialement étudié pour correspondre aux besoins immédiats d'un élève de classes préparatoires. *Sommaire:* Présentation. Les objets Maple. Analyse. Algèbre linéaire. Affectation, évaluation, simplification. Structures Maple. Résolution d'équations. Le graphisme. La programmation. Applications. Annexes. Bibliographie. Index.

## ***Mécanique des fluides, acoustique***

Grzegorz LUKASZEWICZ. — **Micropolar fluids: theory and applications.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16×24, de xv, 253 p. — ISBN 0-8176-4008-8. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1999.

The goal of this book is to provide a comprehensive exposition of the principles and methods of micropolar fluids for a broad readership in the science and engineering of fluid mechanics. The book is organized into three parts. The first presenting the basic model of micropolar fluids, with necessary background information. The second development presents the analysis of the mathematics of motion in micropolar fluids with many detailed examples. The third part presents some select and important applications in the topics of lubrication theory and porous media.

Rita MEYER-SPASCHE. — **Pattern formation in viscous flows: the Taylor-Couette problem and Rayleigh-Bénard convection.** — International series of numerical mathematics, vol. 128. — Un vol. relié, 17,5×24, de xi, 209 p. — ISBN 3-7643-6047-X. — Prix: SFr. 98.00. — Birkhäuser, Basel, 1999.

Topics and questions addressed are: Mathematical modeling. Numerical modeling. What kinds of flow patterns do the equations allow in the nonlinear regime? How many solutions exist for given values of the control parameters? Are they stable? How do spatial patterns and the number of solutions vary with the parameters? For some parameter values many more solutions were found than previously expected (up to 21), in other parameter regimes not even those solutions could be found whose existence had been taken for granted. These «experimental» numerical results led to conjectures on the global structure of secondary bifurcations in the Taylor system and thus to possible explanations for existence and non-existence of solutions.

Lev A. OSTROVSKY, Alexander S. POTAPOV. — **Modulated waves: theory and applications.** — Johns Hopkins studies in the mathematical sciences. — Un vol. relié, 16×23,5, de xv, 369 p. — ISBN 0-8018-5870-4. — Prix: US\$72.00. — The Johns Hopkins University Press, Baltimore, 1999.

The book may be divided into three parts: the first one (Chapters 1-4) contains general information about waves, their kinematic and dynamic properties, energy and momentum, and variational methods in wave theory. The second part (Chapters 5-8) is devoted to linear modulated

waves and asymptotic properties of the waves, time analogs of geometrical optics and quasi optics, and waves in nonstationary media. Finally, the third part (Chapters 9-12) is concerned with nonlinear waves and different forms of their modulation.

## ***Mécanique quantique***

David I. OLIVE, Peter C. WEST, (Editors). — **Duality and supersymmetric theories.** — Publications of the Newton Institute. — Un vol. relié,  $16 \times 23,5$ , de vii, 473 p. — ISBN 0-521-64158-6. — Prix: £45.00. — Cambridge University Press, Cambridge, 1999.

This book is the first systematic introduction to electromagnetic duality and its generalizations. The authors are the leading figures in this exciting new area of mathematical physics, and their lectures have been organized not only to link with each other but also to describe the fundamental ideas, the latest developments, and some earlier work whose significance has only recently become apparent. This will be essential reading for all those working in mathematical physics.

Roland OMNÈS. — **Understanding quantum mechanics.** — Un vol. relié,  $16,5 \times 24$ , de xiii, 307 p. — ISBN 0-691-00435-8. — Prix: US\$35.00. — Princeton University Press, Princeton, 1999.

This book presents a more streamlined version of the Copenhagen interpretation, showing its logical consistency and completeness. The problem of measurement is a major area of inquiry, with the author surveying its history from Planck to Heisenberg before describing the consistent-histories interpretation. He draws upon the most recent research on the decoherence effect (related to the modern resolution of the famous Schrödinger's cat problem) and an exact formulation of the correspondence between quantum and particle physics (implying a derivation of classical determinism from quantum probabilism).

Robin TICCIATI. — **Quantum field theory for mathematicians.** — Encyclopedia of mathematics and its applications, vol. 72. — Un vol. relié,  $16 \times 24$ , de xii, 699 p. — ISBN 0-521-63265-X. — Prix: £70.00. — Cambridge University Press, Cambridge, 1999.

The approach to quantum field theory in this book is part way between building a mathematical model of the subject and presenting the mathematics that physicists actually use. It starts with the need to combine special relativity and quantum mechanics and culminates in a basic understanding of the standard model of electroweak and strong interactions. The book is divided into five parts: canonical quantization of scalar fields; Weyl, Dirac and vector fields; functional integral quantization; the standard model of the electroweak and strong interactions; renormalization.

## ***Physique statistique, structure de la matière***

Y.M. GUTTMANN. — **The concept of probability in statistical physics.** — Cambridge studies in probability, induction, and decision theory. — Un vol. relié,  $16 \times 24$ , de xi, 267 p. — ISBN 0-521-62128-3. — Prix: £35.00. — Cambridge University Press, Cambridge, 1999.

This book fills an important gap in the literature by providing the most systematic study to date of how to interpret probabilistic assertions in the context of statistical mechanics. The book explores both subjectivist and objectivist accounts of probability, and takes full measure of recent work in the foundations of probability theory in statistical mechanics and mathematical theory. The book will be of particular interest to philosophers of science, physicists, and mathematicians interested in foundational issues, and also to historians of science.

## ***Economie, recherche opérationnelle, jeux***

Martino BARDI, T.E.S. RAGHAVAN, T. PARTHASARATHY, (Editors). — **Stochastic and differential games: theory and numerical methods.** — Annals of the International Society of Dynamic Games, vol. 4. — Un vol. relié, 16×24, de xvi, 380 p. — ISBN 0-8176-4029-0. — Prix: SFr. 168.00. — Birkhäuser, Boston, 1999.

This new book is aimed at control engineers, applied mathematicians, operations research specialists, and research workers. It contains survey papers on such diverse topics as pursuit-evasion games, viscosity solutions, gambling theory, discounted stochastic games, optimal routing, numerical methods, and others. The volume consists of two parts, the first dealing with zero-sum differential games and numerical methods, the second with stochastic and nonzero-sum games and applications.

Ding-Zhu DU, Panos M. PARDALOS, (Editors). — **Handbook of combinatorial optimization.** — 3 vol. reliés, 17×25, de viii, 785 p., viii, 753 p. et viii, 865 p. — ISBN 0-7923-5019-7 (set). — Prix: Dfl. 2'450.00 (les 3 vol.). — Kluwer Academic Publishers, Boston, 1998.

*Contents of vol. 1:* Mixed-integer nonlinear optimization in process synthesis. — Approximate algorithms and heuristics for MAX-SAT. — Connections between nonlinear programming and discrete optimization. — Interior point methods for combinatorial optimization. — Knapsack problems. — Fractional combinatorial optimization. — Reformulation-linearization techniques for discrete optimization problems. — Gröbner bases in integer programming. — Applications of set covering, set packing and set partitioning models: a survey. — *Contents of vol. 2:* Efficient algorithms for geometric shortest path query problems. — Computing distances between evolutionary trees. — Combinatorial optimization and coalition games. — Steiner minimal trees: an introduction, parallel computation, and future work. — Resource allocation problems. — Combinatorial optimization in clustering. — The graph coloring problem: a bibliographic survey. — Steiner minimal trees in  $E^3$ : theory, algorithms, and applications. — Dynamical system approaches to combinatorial optimization. — On-line dominating set problems for graphs. — Optimization problems in optical networks. — Shortest networks on surfaces. — Minimum weight triangulation. — Optimization applications in the airline industry. — *Contents of vol. 3:* Semidefinite relaxations, multivariate normal distributions, and order statistics. — A review of machine scheduling: complexity, algorithms and approximability. — Routing and topology embedding in lightwave networks. — The quadratic assignment problem. — Algorithmic aspects of domination in graphs. — Selected algorithmic techniques for parallel optimization. — Multispace search for combinatorial optimization. — The equitable coloring of graphs. — Randomized parallel algorithms for combinatorial optimization. — Tabu search.

Michael PATRIKSSON. — **Nonlinear programming and variational inequality problems: a unified approach.** — Applied optimization, vol. 23. — Un vol. relié, 16,5×24,5, de xiv, 334 p. — ISBN 0-7923-5455-9. — Prix: Dfl. 280.00. — Kluwer Academic Publishers, Dordrecht, 1999.

The framework of algorithms presented in this book is called Cost Approximation. It describes, for a given formulation of a variational inequality or nonlinear programming problem, an algorithm by means of approximating mappings and problems, a principle for the update of the iteration points, and a merit function which guides and monitors the convergence of the algorithm. One purpose of the book is to offer this framework as an intuitively appealing tool for describing an algorithm. Another purpose is to provide a convergence analysis of the algorithms in the framework.



## ***Biologie et sciences du comportement***

J. MAZUMDAR. — **An introduction to mathematical physiology and biology.** — 2<sup>nd</sup> edition. — Cambridge studies in mathematical biology. — Un vol. broché, 15×23, de xiv, 226 p. — ISBN 0-521-64675-8. — Prix : £ 18.95. — Cambridge University Press, Cambridge, 1999.

This textbook is concerned with the mathematical modelling of biological and physiological phenomena for mathematically sophisticated students. A range of topics are discussed: diffusion, population dynamics, autonomous differential equations and the stability of ecosystems, biogeography, pharmacokinetics, epidemiology, HIV immunology, biofluid mechanics, cardiac mechanics, the spectral analysis of heart sounds using FFT techniques. The last chapter deals with a wide variety of commonly used medical devices.

## ***Systèmes, contrôle optimal***

V. BOLTYANSKI, H. MARTINI, V. SOLTAN. — **Geometric methods and optimization problems.** — Combinatorial optimization, vol. 4. — Un vol. relié, 16,5×24,5, de viii, 429 p. — ISBN 0-7923-5454-0. — Prix : Dfl. 340.00. — Kluwer Academic Publishers, Dordrecht, 1999.

The work focuses on three disciplines of applied mathematics: control theory, location science and computational geometry. The authors show how methods and tools from convex geometry in a wider sense can help solve various problems from these disciplines. More precisely they mainly consider the tent method (as an application of a generalized separation theory of convex cones) in nonclassical variational calculus, various median problems in Euclidean and other Minkowski spaces (including a detailed discussion of the Fermat-Torricelli problem) and different types of partitionings of topologically complicated polygonal domains into a minimum number of convex pieces.

Yves CHERRUAULT. — **Optimisation : méthodes locales et globales.** — Mathématiques. — Un vol. broché, 15×22, de 98 p. — ISBN 2-13-049910-4. — Prix : FF 148.00. — Presses Universitaires de France, Paris, 1999.

L'auteur a mis au point une technique d'optimisation globale, baptisée ALIENOR, qui permet de ramener la minimisation d'une fonction multivariables à celle d'une fonction d'une seule variable. Les derniers développements associés à ces méthodes sont décrits. Des classes très générales de transformations réductrices sont proposées et l'on montre comment les méthodes d'optimisation peuvent servir à la résolution d'équations fonctionnelles de tous types. Deux applications fondamentales de l'optimisation sont également traitées, à savoir: l'identification de modèles mathématiques, le contrôle optimal de systèmes. Cet ouvrage sera un précieux outil pour les chercheurs et ingénieurs utilisant les méthodes d'optimisation ainsi que pour les étudiants scientifiques désireux de s'initier à ces techniques.

Hector O. FATTORINI. — **Infinite dimensional optimization and control theory.** — Encyclopedia of mathematics and its applications, vol. 62. — Un vol. relié, 16×24, de xv, 793 p. — ISBN 0-521-45125-6. — Prix : £70.00. — Cambridge University Press, Cambridge, 1999.

This book is on existence and necessary conditions, such as Pontryagin's maximum principle, for optimal control problems described by ordinary and partial differential equations. These necessary conditions are obtained from Kuhn-Tucker theorems for nonlinear programming problems in infinite dimensional spaces. The optimal control problems include control constraints, state constraints and target conditions. Evolution partial differential equations are studied using

semigroup theory, abstract differential equations in linear spaces, integral equations and interpolation theory. Existence of optimal controls is established for arbitrary control sets by means of a general theory of relaxed controls.

Giorgio PICCI, David S. GILLIAM, (Editors). — **Dynamical systems, control, coding computer vision: new trends, interfaces, and interplay.** — Progress in systems and control theory, vol. 25. — Un vol. relié, 16 × 24, de vi, 493 p. — ISBN 3-7643-6060-7. — Prix: SFr. 168.00. — Birkhäuser, Basel, 1999.

This volume contains expanded versions of talks delivered by leading experts at the Mathematical Theory of Networks and Systems Symposium (MTNS 98) in Padova, Italy, in July 1998. Systems, control, and network theory have permeated the development of much of present-day technology. The theory has developed from the early phase of its history when the basic tools were elementary complex analysis, Laplace transform, and linear differential equations, to the present day, where the mathematics ranges widely from functional analysis, PDEs, abstract algebra, stochastic processes and differential geometry. This book is a collection of essays devoted in part to the growing interaction of these disciplines with coding, computer vision, and hybrid systems.

Martin SCHECHTER. — **Linking methods in critical point theory.** — Un vol. relié, 16,5 × 24,5, de xvi, 294 p. — ISBN 0-8176-4095-9. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1999.

Many non-linear problems in the physical and social sciences can be reduced to finding critical points (minima, maxima, and minimax points) of functionals (real-valued functions on various spaces). Much of the activity in the calculus of variations is devoted to finding such points, although a more difficult problem is finding critical points that are neither maxima nor minima. Until recently there was no organized procedure for producing such points. In this work, Schechter briefly reviews the issue of critical points from the old "linking" viewpoint and then studies the theory in light of a new concept of "linking subsets" which he helped introduce. New theorems are proved and applied to the solution of subcritical problems on bounded domains.

Ian S. SHAW. — **Fuzzy control of industrial systems: theory and applications.** — Un vol. relié, 16,5 × 24,5, de xxiii, 192 p. — ISBN 0-7923-8249-8. — Prix: Dfl. 260.00. — Kluwer Academic Publishers, Dordrecht, 1998.

This volume has been planned as an introductory textbook on intelligent control systems such as fuzzy logic and neurofuzzy systems. The objective was to create a linkage between an undergraduate text and a practical guide for experienced engineers wishing to upgrade their knowledge. To this end, both theoretical as well as practical design aspects are presented. Included are generic aspects of fuzzy systems with an emphasis on the many degrees of freedom and its practical design implications, modeling and systems identification techniques based on fuzzy rules, parametrized rules and relational equations... etc.

### ***Information, communication, circuits***

Ian F. BLAKE, Gadiel SEROUSSI & Nigel P. SMART. — **Elliptic curves in cryptography.** — London Mathematical Society lecture note series, vol. 265. — Un vol. broché, 15 × 23, de xv, 204 p. — ISBN 0-521-65374-6. — Prix: £24.95. — Cambridge University Press, Cambridge, 1999.

In the past few years elliptic curve cryptography has moved from a fringe activity to a major challenger to the dominant RSA/DSA systems. Elliptic curves offer major advances on older

systems such as increased speed, less memory and smaller key sizes. As digital signatures become more and more important in the commercial world the use of elliptic-curve-based signatures will become all pervasive. This book summarizes knowledge built up within Hewlett-Packard over a numbers of years, and explains the mathematics behind practical implementations of elliptic curve systems.

S.C. COUTINHO. — **The mathematics of ciphers: number theory and RSA cryptography.** — Un vol. relié, 16×24, de xv, 196 p. — ISBN 1-56881-082-2. — Prix: US\$30.00. — A.K. Peters, Natick, Massachusetts, 1999.

Revised and updated since its publication in Portuguese in 1997, this highly accessible book is an introduction to the algorithmic aspects of number theory and its applications to cryptography. Accompanied by historical anecdotes, the familiar topics of number theory are defined and explored. The author takes the reader on a leisurely journey through this fascinating field, culminating in a visit to the RSA cryptosystem, the best known and one of the most widely used public key cryptosystems invented in 1978.