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Généralités

Jill ADLER. — **Teaching mathematics in multilingual classrooms.** — Mathematics education library, vol. 26. — Un vol. relié, 16,5 × 24,5, de xiv, 169 p. — ISBN 0-7923-7079-1. — Prix : US\$ 83.00. — Kluwer Academic Publishers, Dordrecht, 2001.

Jill Adler provides a sharp analysis and strong theoretical grounding for her work, pulling together research related to the relationship between language and mathematics, communicating mathematics, and mathematics in bi-/multilingual settings. In so doing, she offers a direct challenge to dominant research on communication in the mathematics classroom that has “othered” the multilingual setting in its normalisation of the monolingual classroom. The “norm” is a multicultural one. Set in contemporary South Africa – a context of linguistic diversity and rapid change – this book offers a spotlight whose beam is wide enough to illuminate dilemmas at work in all mathematics classrooms.

Titu ANDREESCU, Zuming FENG, (Editors). — **Mathematical Olympiads 1998-1999: problems and solutions from around the world.** — MAA problem books series — Un vol. broché, 15 × 23, de xii, 290 p. — ISBN 0-88385-803-7. — Prix : £ 19.95. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2001.

This book is a continuation of *Mathematical Contests 1997-1998: Olympiad problems and solutions from around the world*. It contains solutions to challenging problems from algebra, geometry, combinatorics, and number theory featured in the earlier book, together with selected questions (without solutions) from 30 national and regional Olympiads given during 1999.

Hans BORUCKI. — **Online in die vierte Dimension.** — Un vol. relié, 15,5 × 21,5, de 299 p. — ISBN 3-7614-2102-8. — Prix : DM 38.00. — Aulis Verlag Deubner, Köln, 2000.

Im Internet gesurft, eingenickt, hochgeschreckt – das ist die Ausgangssituation eines spannenden Berichts. Ein spannender Chat beginnt. Vierling aus dem vierdimensionalen Raum weiss... Vieles zu Berichten. Es beginnt eine lange, fesselnde Unterhaltung, die selbstverständlich schriftlich über den Monitor geführt wird... Hans Borucki schildert in seinem neuen Band dieses Gespräch auf eindrucksvolle Art und Weise. Alles ist genau aufgeschrieben, kein Wort verfälscht oder ausgelassen. Beim Lesen will man gar kein Ende finden, so vielfältig sind die Themen, die zwischen Vierling und Dreiling ausgetauscht werden: die Nachbarn aus dem Flachland, die Einlinge und Zweilinge, die Superkugel im Raum, der kürzere Feldweg, das zusammengefaltete Weltall, Vierdimensionale Spiegeleien-neielegeipS elanoisnemidreiV...

David M. BRESSOUD. — **Second year calculus: from celestial mechanics to special relativity.** — Undergraduate texts in mathematics. Readings in mathematics. — Un vol. broché, 15,5 × 23,5, de xi, 386 p. — ISBN 0-387-97606-X. — Prix: DM 69.00. — Springer, New York, 2001.

The book covers multi-variable and vector calculus, emphasizing the historical physical problems which gave rise to the concepts of calculus. The book carries us from the birth of the mechanized view of the world in Isaac Newton's Mathematical Principles of Natural Philosophy in which mathematics becomes the ultimate tool for modelling physical reality, to the dawn of a radically new and often counter-intuitive age in Albert Einstein's Special Theory of Relativity in which it is the mathematical model which suggests new aspects of that reality. The development of this process is discussed from the modern viewpoint of differential forms. Using this concept, the student learns to compute orbits and rocket trajectories, model flows and force fields, and derive the laws of electricity and magnetism.

Eduardo Bayro CORROCHANO, Garret SOBCZYK, (Editors). — **Geometric algebra with applications in science and engineering.** — Un vol. relié, 16 × 24, de xxvi, 592 p. — ISBN 0-8176-4199-8. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

The aim of this book is to present a unified mathematical treatment of diverse problems in mathematics. *Features:* Includes many examples and figures that clarify the application of geometric algebra to problems in signal and image processing, quantum and neural computing, computer vision, robotics and engineering. A collection of new computational tools that have robust and diverse applications. Presents the effective application of geometric algebra to diverse problems in different areas so scientists and engineers are aware of what the methods have to offer them. A thorough discussion presented by leading international authorities, of the problems of signal and image processing, quantum and neurocomputing. A comparison of the different computer software packages available for doing geometric algebra.

Mathematik. — Duden – Basiswissen Schule. — Un vol. relié, 15,5 × 21,5, de 390 p. + 1 CD-ROM. — ISBN 3-411-71501-4. — Prix: DM 39.90. — PAETEC Verlag für Bildungsmedien, Berlin et Dudenverlag – Bibliographisches Institut & F.A. Brockhaus, Mannheim, 2001.

Der Band zur Mathematik aus der Dudenreihen *Basiswissen Schule* informiert grundlegend. In prägnanten Beispielen wird der Wissensstoff eines Schülerlebens erklärt. Das Buch eignet sich hervorragend als Lernhilfe, wenn es darum geht, schnell und präzise mathematische Probleme oder Grundbegriffe zu erörtern. Als zusätzliches wertvolles Hilfs- und Lernmittel erweist sich die beiliegende CD-ROM. Auf der CD findet sich das Programm *Mathcad 8 Explorer*, mit dessen Hilfe Schüler interaktive Rechenbeispiele aus einer Textstelle des Nachschlagewerks heraus starten. Mit dieser Funktionalität werden mathematische Zusammenhänge durchschaubar – eine Lernerfahrung, die ein Buch allein kaum bieten kann.

Dominique FOATA, Guo-Niu HAN, (Editors). — **The Andrews Festschrift: seventeen papers on classical number theory and combinatorics.** — Un vol. broché, 15,5 × 23,5, de x, 426 p. — ISBN 3-540-41491-6. — Prix: DM 169.00. — Springer, Berlin, 2001.

This book contains seventeen contributions made to George Andrews on the occasion of his sixtieth birthday, ranging from classical number theory (the theory of partitions) to classical and algebraic combinatorics. Most of the papers were read at the 42nd session of the Séminaire Lotharingien de Combinatoire that took place at Maratea, Basilicata, in August 1998. This volume contains a long memoir on Ramanujan's Unpublished Manuscript and the Tau functions studied with a contemporary eye, together with several papers dealing with the theory of parti-

tions. There is also a description of a Maple package to deal with general q -calculus. More subjects on algebraic combinatorics are developed, especially the theory of Kostka polynomials, the ice square model, the combinatorial theory of classical numbers, a new approach to determinant calculus.

Martin GARDNER. — A Gardner's workout: training the mind and entertaining the spirit. — Un vol. relié, 16×24, de xi, 319 p. — ISBN 1-56881-120-9. — Prix: US\$35.00. — A. K. Peters, Natick, Mass., 2001.

Truly a treat for Martin Gardner's many fans, the articles span a wide range of topics. They include games of chance (and why a “computer” will always beat a human player), word ladders and mathematical word play games, tiling puzzles, magic squares, computer and calculator “magic” tricks, and other mathematical puzzles. Providing the tools to furnish our all-too-sluggish minds with an athletic workout, Gardner's problems foster an agility of the mind as they entertain.

I. M. GELFAND, M. SAUL. — Trigonometry. — The Gelfand School Outreach Program. — Un vol. broché, 15,5×23, de x, 229 p. — ISBN 0-8176-3914-4. — Prix: SFr. 38.00. — Birkhäuser, Boston, 2001.

Trigonometry covers all the basics on the subject through beautiful illustrations and examples. The definitions of the trigonometric functions are geometrically motivated. Geometric relationships are rewritten in trigonometric form and extended. The text then makes a transition to the study of algebraic and analytic properties of trigonometric functions, in a way that provides a solid foundation for more advanced mathematical discussions. Throughout, the treatment stimulates the reader to think of mathematics as a unified subject.

Roger GODEMENT. — Analyse mathématique I: Convergence, fonctions élémentaires. — 2^e édition corrigée. — Un vol. broché, 15,5×23,5, de xx, 458 p. — ISBN 3-540-42057-6. — Prix: DM 85.49. — Springer, Berlin, 2001.

Ce premier volume ainsi que le deuxième (quatre tomes paraîtront), sont consacrés aux fonctions dans **R** ou **C**, y compris la théorie élémentaire des séries et intégrales de Fourier et une partie de celle des fonctions holomorphes. L'exposé, non strictement linéaire, combine indications historiques et raisonnements rigoureux. Il montre la diversité des voies d'accès aux principaux résultats afin de familiariser le lecteur avec les méthodes de raisonnement et idées fondamentales plutôt qu'avec les techniques de calcul, point de vue utile aussi aux personnes travaillant seules. On reconnaîtra dans ce nouvel ouvrage le style inimitable de l'auteur et pas seulement par son refus de l'écriture condensée en usage dans de nombreux manuels.

François GUÉNARD, Henri LEMBERG. — La méthode expérimentale en mathématiques: exercices corrigés posés à l'oral des concours d'entrée aux grandes écoles d'ingénieurs: partie expérimentale réalisée en MATHEMATICA, MAPLE et TI92-89. — Scopos, vol. 12. — Un vol. broché, 15,5×23,5, de 240 p. — ISBN 2-287-59719-0. — Prix: DM 65.90. — Springer, Paris, 2001.

Savoir analyser un problème, expérimenter sur des exemples, formuler une conjecture, élaborer et mettre en œuvre des concepts et des résultats théoriques, rédiger une solution rigoureuse, contrôler les résultats obtenus et évaluer la pertinence des concepts et des résultats au regard du problème posé... Tel est l'objectif vers lequel doit tendre la formation mathématique. Cet ouvrage rassemble plusieurs questions originales posées à l'oral des concours d'entrée aux grandes écoles scientifiques; pourtant il ne s'agit pas ici d'une nouvelle déclinaison de grands

classiques, mais au contraire, de proposer à l'étudiant une nouvelle façon d'aborder un problème en s'aidant d'un côté des outils de calcul formel et numérique, de l'autre, en sollicitant ses capacités d'analyse, de réflexion et de synthèse, sans oublier la rédaction d'une solution rigoureuse.

Heinz HOPF. — **Collected papers = Gesammelte Abhandlungen.** — Edited by Beno Eckmann. — Un vol. relié, 17×25, de XIII, 1271 p. — ISBN 3-540-57138-8. — Prix: DM 349.00. — Springer, Berlin, 2001.

The work of Heinz Hopf (1894-1971) was in algebraic topology and differential geometry. It was influential world-wide in many fields of mathematics, and it is still of great importance in contemporary research (Hopf algebras, Hopf fibrations, Hopf-Rinow completeness, homological algebra). From global differential geometry, namely the relation between Curvatura Integra and Euler characteristic of a closed Riemannian manifold, Hopf's research went into the theory of mapping degree (due to Brouwer), to singularities of vector fields and fix-point theorems. Hopf's algebraization of topological concepts clarified the Euler-Poincaré formula and the Lefschetz fix-point theorem immensely, and also led to the algebra of mappings of manifolds. Hopf discovered maps of the 3-sphere to the 2-sphere that are not contractible – the starting point for the “Hopf invariant” and for the development of homotopy groups.

Andy LIU, (Editor and translator). — **Hungarian problem book III: based on the Eötvös Competition: 1929-1943.** — Compiled by G. Hájós, G. Neukomm, and J. Surányi. — Anneli Lax new mathematical library, vol. 42. — Un vol. broché, 15×23, de xv, 142 p. — ISBN 0-88385-644-1. — Prix: £20.95. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2001.

The Eötvös Mathematics Competition is the oldest high school mathematics competition in the world, with a tradition dating back to 1894. In 1963, the first two of the Hungarian problem books were published in the Anneli Lax New Mathematical Library by the MAA. This book is a continuation of those volumes taking the competition through 1943. Forty-five problems in all are presented in six chapters. Problems are classified into five groups: combinatorics, number theory, algebra, and geometry (in two parts). Multiple solutions to the problems are presented along with generalizations and remarks. Carefully chosen material that enhances the problems is also included.

Edward M. REINGOLD, Nachum DERSHOWITZ. — **Calendrical calculations: the Millennium edition.** — Un vol broché, de xxxii, 422 p. + 1 CD-ROM. — ISBN 0-521-77167-6. — Prix: £24.95. — Cambridge University Press, Cambridge, 2001.

As interest grows in the impact of seemingly arbitrary calendrical systems upon our daily lives, this book frames the calendars of the world in a completely algorithmic form. The book gives a description of twenty-five calendars and how they relate to one another. Easy conversion among these calendars is a by-product of the approach, as is the determination of secular and religious holidays. *Calendrical Calculations* makes accurate calendrical algorithms readily available for computer use with LISP, *Mathematica*, and Java code for all the algorithms included on the CD, and updates are available on the Web.

Hans J. SCHMIDT. — **Prof. Dr. B. Rainjogger – Lineares Optimieren.** — 2. überarb. Auflage. — Un vol. broché, 21×30, de 120 p. — ISBN 3-7614-2274-1. — Prix: DM 34.00. — Aulis Verlag Deubner, Köln, 2001.

Dieser Band enthält eine Sammlung von Kopievorlagen zur Linearen Optimierung für die Sekundarstufe I. Zu jedem Kapitel wurde ein Einführungstext geschrieben, der – kopiert – den

Schülern und Schülerinnen zur Information dient. Da es sich dabei um den Lösungsweg der jeweils ersten Aufgaben handelt, bleibt es dem Unterrichtenden überlassen, ob er diese Lösungen selbst mit Hilfe von Arbeitstransparenten erarbeitet und den Schülern darbietet (also auf das Kopieren verzichtet) oder Partnerarbeit den Lösungsweg erarbeiten lässt.

Steven SKIENA. — **Calculated bets: computers, gambling, and mathematical modeling to win.** — Un vol. broché, 15×23, de xv, 232 p. — ISBN 0-521-00962-6 (relié: 0-521-80426-4). — Prix: £12.95 (relié: £37.50). — Cambridge University Press, Cambridge, 2001.

Calculated Bets is the story of a gambling system that works. With humor and enthusiasm, the author tells how he used computer simulations and mathematical modeling techniques to predict the outcome of jai alai matches and bet on them successfully — increasing his initial stake by over 500% in one year! His system can work for anyone: at the end of the book he tells how to watch jai alai and how to bet on it. He also shows how his jai alai system is similar to a miniature stock trading system.

James STEWART. — **Analyse: concepts et contextes. Vol. 1: Fonctions d'une variable. Vol. 2: Fonctions de plusieurs variables.** — 2 vol. brochés, 20×25, de xx, xvii, 991 p. — ISBN 2-7445-0118-2 (vol. 1), ISBN 2-7445-0119-0 (vol. 2). — Prix: FB 395.00 (vol. 1), FF 260.00 (vol. 2). — De Boeck Université, Bruxelles, 2001.

La compréhension profonde des concepts, tel est l'objectif majeur de ce manuel. En conséquence, chaque concept est patiemment introduit et formulé verbalement, visuellement, numériquement et algébriquement avant que n'apparaisse sa définition formelle. Des exemples bien choisis préparent souvent l'énoncé des théorèmes pour justifier la pertinence de leurs hypothèses. L'apprentissage au raisonnement est soutenu par les démonstrations (parfois reportées en annexe pour ne pas perdre le fil du discours). L'apprentissage actif, de type exploratoire et heuristique, est favorisé par l'utilisation fréquente et à bon escient des calculatrices graphiques et/ou logiciel de calcul symbolique. Les deux volumes s'adressent aux étudiants de premier cycle universitaire qui, quelle que soit leur orientation, y trouveront des applications, tant sont divers et nombreux les domaines abordés dans les exercices.

James TANTON. — **Solve this: math activities for students and clubs.** — Un vol. broché, 18×25,5, de xiii, 218 p. — ISBN 0-88385-717-0. — Prix: £20.95. — Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2001.

Sophisticated mathematics is accessible to all. This book proves it! It is a collection of intriguing mathematical problems and activities linked by common themes that involve working with objects from our everyday experience. Learn about the mathematical mysteries of a bagel, a checkerboard, and a pile of laundry, for example. Discover for yourself that wheels need not be round, that braids need not have free ends, that it is always best to turn around twice—and more! Mathematics is all around us. We all do mathematics everyday. This book irresistibly tempts the reader to embark on a journey of investigation and discovery. All the activities are immediate, catchy and fun, but upon investigation begin to unfold into surprising layers of depth and new perspectives.

Philippe TONDEUR, (Editor). — **Collected papers of K.-T. Chen.** — Contemporary mathematicians. — Un vol. relié, 19×26, de xxvii, 734 p. — ISBN 0-8176-4005-3. — Prix: SFr. 348.00. — Birkhäuser, Boston, 2001.

Kuo-Tsai Chen (1923-1987) is best known to the mathematics community for his work on iterated integrals and power series connections in conjunction with his research on the cohomology

logy of loop spaces. An outstanding and original mathematician, Chen's work falls naturally into three periods: his early work on group theory and links in the three sphere; his subsequent work on formal differential equations, which gradually developed into his most powerful and important work; and his work on iterated integrals and homotopy theory, which occupied him for the last twenty years of his life. The goal of Chen's iterated integrals program, which is a de Rham theory for path spaces, was to study the interaction of topology and analysis through path integration.

Hans WALSER. — **The golden section.** — Translated from the original German by Peter Hilton, with the assistance of Jean Pedersen. — Un vol. broché, 15 × 23, de xvi, 142 p. — ISBN 0-8835-534-8. — Prix: £17.95. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2001.

Since antiquity, the golden section has played a significant role in many parts of geometry, architecture, music, art, and philosophy. But it also appears in the newer domains of technology and fractals. In this way, the golden section is no isolated phenomenon but rather, in many cases, the first and also the simplest non-trivial example in a sequence of generalizations leading to further developments. It is the purpose of this book, on the one hand, to describe examples of the golden section, and on the other, to show some paths to further extensions. The treatment is informal and the text is enriched by the presence of especially illuminating diagrams.

Analyse combinatoire

Béla BOLLOBÁS. — **Random graphs.** — 2nd edition. — Cambridge studies in advanced mathematics, vol. 73. — Un vol. broché, 15 × 23, de xviii, 498 p. — ISBN 0-521-79722-5 (relié: 0-521-80920-7). — Prix: £29.95 (relié: £75.00). — Cambridge University Press, Cambridge, 2001.

The already extensive treatment given in the first edition has been heavily revised by the author. The addition of two new sections, numerous new results and over 150 references means that this represents an up to date and comprehensive account of random graph theory. One of the aims of the theory is to estimate the number of graphs of a given order that exhibit certain properties. This is achieved with the use of probabilistic ideas as opposed to an exact deterministic approach. This theory not only has numerous combinatorial applications, but also serves as a model for the probabilistic treatment of more complicated random structures.

J.W.P. HIRSCHFELD, (Editor). — **Surveys in combinatorics, 2001.** — London Mathematical Society lecture note series, vol. 288. — Un vol. broché, 15,5 × 23, de x, 301 p. — ISBN 0-521-00270-2. — Prix: £27.95. — Cambridge University Press, Cambridge, 2001.

The British Combinatorial Conference is held every two years and is now a key event for mathematicians world-wide, working in combinatorics. This volume is published on the occasion of the 18th meeting, which was held 1 to 6 July, 2001 at the University of Sussex. The papers contained here are surveys contributed by the invited speakers, and are thus of a quality befitting the event. There is also a tribute to Crispin Nash-Williams, past chairman of the British Combinatorial Committee.

Richard P. STANLEY. — **Enumerative combinatorics, vol. 2.** — Cambridge studies in advanced mathematics, vol. 62. — Un vol. broché, 15 × 23, de xii, 585 p. — ISBN 0-521-78987-7. — Prix: £47.50. — Cambridge University Press, Cambridge, 2001.

This is the second of a two-volume basic introduction to enumerative combinatorics at a level suitable for graduate students and research mathematicians. This volume covers the compo-

sition of generating functions, trees, algebraic generating functions, D-finite generating functions, noncommutative generating functions, and symmetric functions. The chapter on symmetric functions provides the only available treatment of this subject suitable for an introductory graduate course and focusing on combinatorics, especially the Robinson-Schensted-Knuth algorithm. Also covered are connections between symmetric functions and representation theory. An appendix (written by Sergey Fomin) covers some deeper aspects of symmetric function theory, including jeu de taquin and the Littlewood-Richardson rule.

W.D. WALLIS. — **Magic graphs.** — Un vol. broché, $15,5 \times 23,5$, de xiv, 146 p. — ISBN 0-8176-4252-8. — Prix: SFr. 78.00. — Birkhäuser, Boston, 2001.

This concise, self-contained book is unique in its focus on the theory of magic graphs/ labelling and its applications to a number of new areas, e.g., networks, the construction of rulers, and pulse codes. It may serve as a graduate text for a special topics seminar in mathematics or computer science, or as a professional text for the researcher. Some key features: concise exposition from basic topics in graph theory to current research; theorems from graph theory and interesting counting arguments.

Théorie des nombres

Richard CRANDALL, Carl POMERANCE. — **Prime numbers: a computational perspective.** — Un vol. relié, $17 \times 24,5$, de xv, 545 p. — ISBN 0-387-94777-9. — Prix: DM 98.00. — Springer, New York, 2001.

Destined to become a definitive textbook conveying the most modern computational ideas about prime numbers and factoring, this book will stand as an excellent reference for this kind of computation, and thus be of interest to both educators and researchers. It is also a timely book, since primes and factoring have reached a certain vogue, partly because of cryptography. The final chapter focuses on “applications” of prime numbers, incorporating the mathematics of finance, via quasi-Monte Carlo theory. Historical comments are contained in every chapter. — *Contents:* Primes! — Number-theoretical tools. — Recognizing primes and composites. — Primality proving. — Exponential factoring algorithms. — Sub-exponential factoring algorithms. — Elliptic curve arithmetic. — The ubiquity of prime numbers. — Fast algorithms for large-integer arithmetic.

Maruti Ram MURTY. — **Problems in analytic number theory.** — Graduate texts in mathematics, vol. 206. — Un vol. relié, 16×24 , de xvi, 452 p. — ISBN 0-387-95143-1. — Prix: DM 98.00. — Springer, New York, 2001.

This book gives a problem-solving approach to the difficult subject of analytic number theory. It is primarily aimed at graduate and senior undergraduate students. The goal is to give a rapid introduction of how analytic methods are used to study the distribution of prime numbers. The book also includes an introduction to p -adic analytic methods. It is ideal for a first course in analytic number theory. *From the preface:* This book is a collection of about five hundred problems in analytic number theory with the singular purpose of training the beginning graduate student in some of its significant techniques.

Harald NIEDERREITER, Chaoping XING. — **Rational points on curves over finite fields: theory and applications.** — London Mathematical Society lecture note series, vol. 285. — Un vol. broché, 15×23 , de x, 245 p. — ISBN 0-521-66543-4. — Prix: £27.95. — Cambridge University Press, Cambridge, 2001.

Ever since the seminal work of Goppa on algebraic-geometry codes, rational points on algebraic curves over finite fields have been an important research topic for algebraic geometers

and coding theorists. Recently, the authors discovered another important application of algebraic curves over finite fields with many rational points, namely to the construction of low-discrepancy sequences. These sequences are needed for numerical methods in areas as diverse as computational physics and mathematical finance. This has given additional impetus to the theory of, and the search for, algebraic curves over finite fields with many rational points.

Alexei SKOROBOGATOV. — **Torsors and rational points.** — Cambridge tracts in mathematics, vol. 144. — Un vol. relié, 16×24, de VIII, 187 p. — ISBN 0-521-80237-7. — Prix: £35.00. — Cambridge University Press, Cambridge, 2001.

The classical descent on curves of genus one can be interpreted as providing conditions on the set of rational points of an algebraic variety X defined over a number field, viewed as a subset of its adelic points. This is a natural set-up of the Hasse principle and various approximation properties of rational points. This book represents the first detailed exposition of: The general theory of torsors with key examples. — The relation of descent to the Manin obstruction. — Applications of descent to conic bundles, to bielliptic surfaces, and to homogenous spaces of algebraic groups.

Corps et polynômes

Jean-Pierre TIGNOL. — **Galois' theory of algebraic equations.** — Un vol. broché, 15,5×21,5, de XIII, 333 p. — ISBN 981-02-4541-6. — Prix: £26.00. — World Scientific, Singapore, 2001.

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

Géométrie algébrique

Chris GODSIL, Gordon ROYLE. — **Algebraic graph theory.** — Graduate texts in mathematics, vol. 207. — Un vol. relié, 16,5×24, de XIX, 439 p. — ISBN 0-387-95241-1. — Prix: DM 149.00. — Springer, New York, 2001.

Algebraic graph theory is a combination of two strands. The first is the study of algebraic objects associated with graphs. The second is the use of tools from algebra to derive properties of graphs. The authors' goal has been to present and illustrate the main tools and ideas of algebraic graph theory, with an emphasis on current rather than classical topics. While placing a strong emphasis on concrete examples they tried to keep the treatment self-contained. A substan-

tial proportion of the book covers topics that have not appeared in book form before, and as such it provides an accessible introduction to the research literature and to important open questions in modern algebraic graph theory.

V. LAKSHMIBAI, N. GONCIULEA. — **Flag varieties.** — Actualités mathématiques. — Un vol. broché, 17×24 , de 332 p. — ISBN 2-7056-6389-4. — Prix: FF 220.00. — Hermann, Paris, 2001.

Flag varieties constitute an important class of homogeneous spaces. Because of their rich geometry and combinatorics, they represent fundamental objects in the areas of algebraic geometry, algebraic groups and representation theory. This book provides an introduction to the subject, and presents the interplay of flag varieties among geometry, combinatorics and representation theory. The central theme of this book is the theory of Schubert varieties – their geometric properties, ideal theory, singularity theory. This book also presents the relationship between Schubert varieties and certain affine varieties – classical determinantal varieties, ladder determinantal varieties, quiver varieties, varieties of complexes, certain affine toric varieties.

Silvio LEVY, (Editor). — **The eightfold way: the beauty of Klein's quartic curve.** — Mathematical Sciences Research Institute Publications, vol. 35. — Un vol. broché, $16 \times 23,5$, de x, 331 p. — ISBN 0-521-00419-5 (relié: 0-521-66066-1). — Prix: £19.95 (relié: £40.00). — Cambridge University Press, Cambridge, 2001.

The German mathematician Felix Klein discovered in the 1870s that the surface that we now call the Klein quartic has many remarkable properties, including an incredible 336-fold symmetry, the maximum possible degree of symmetry for any surface of its type. Since then, mathematicians have discovered that the same object comes up in different guises in many areas of mathematics, from complex analysis and geometry to number theory. This volume seeks to explore the rich tangle of properties and theories surrounding this multiform object. It includes expository and research articles by renowned mathematicians in different fields. It also includes a beautifully illustrated essay by the mathematical sculptor Helaman Ferguson, who distilled some of the beauty and remarkable properties of this surface into a sculpture entitled ‘The Eightfold Way’. The book closes with the first English translation of Klein’s seminal article on this surface.

Algèbre linéaire et multilinéaire, théorie des matrices

Pertti LOUNESTO. — **Clifford algebras and spinors.** — Second edition. — London Mathematical Society lecture note series, vol. 286. — Un vol. broché, $15,5 \times 23$, de IX, 338 p. — ISBN 0-521-00551-5. — Prix: £29.95. — Cambridge University Press, Cambridge, 2001.

In this book, the author offers a unique introduction to Clifford algebras and spinors. The initial chapters could be read by undergraduates; vectors, complex numbers and quaternions are introduced with an eye on Clifford algebras. The next chapters will also interest physicists, and include treatments of the quantum mechanics of the electron, electromagnetism and special relativity with a flavour of Clifford algebras. This book also gives the first comprehensive survey of recent research on Clifford algebras. A new classification of spinors is introduced, based on bilinear covariants of physical observables. This reveals a new class of spinors, residing between the Weyl, Majorana and Dirac spinors. Scalar products of spinors are classified by involutory anti-automorphisms of Clifford algebras. This leads to the chessboard of automorphism groups of scalar products of spinors.

Anneaux et algèbres

Daniel D. ANDERSON, Ira J. PAPICK, (Editors). — **Ideal theoretic methods in commutative algebra: in honor of James A. Huckaba's retirement.** — Lecture notes in pure and applied mathematics, vol. 220. — Un vol. broché, $18 \times 25,5$ de IX, 358 p. — ISBN 0-8247-0553-X. — Prix: US\$ 165.00. — Marcel Dekker, New York, 2001.

This volume compiles research papers presented at the Conference of Ideal Theoretic Methods in Commutative Algebra held at the University of Missouri, Columbia. These proceedings include current research that illustrates the diversity of thought in the field of commutative algebra, particularly multiplicative ideal theory, and presenting survey articles on abstract ideal theory, going down, stable domains, prime producing polynomials, and integrality properties in rings with zero divisors. Written by leading mathematicians this book is an excellent resource for commutative algebraists, algebraic geometers and number theorists.

Gary F. BIRKENMEIER, Jae Keol PARK, Young Soo PARK, (Editors). — **International Symposium on Ring Theory.** — Trends in mathematics. — Un vol. relié, 16×24 , de XVIII, 445 p. — ISBN 0-8176-4158-0. — Prix: SFr. 188.00. — Birkhäuser, Boston, 2001.

This volume consists of a collection of invited research papers and survey articles, many presented at the 3rd Korea-China-Japan International Symposium on Ring Theory held jointly in Korea with the 2nd Korea-Japan Ring Theory Seminar. The selected papers and articles examine wide-ranging developments and methodologies in various areas, including classical ring theory, representation theory, module theory, abelian group theory, Lie algebras, Hopf algebras, and quantum groups. Also included is a section devoted to open problems to motivate further research.

Jean FRESNEL. — **Anneaux.** — Actualités scientifiques et industrielles, vol. 1447. — Collection formation des enseignants et formation continue. — Un vol. broché, $17,5 \times 24$, de XV, 359 p. — ISBN 2-7056-1447-8. — Prix: FF 160.00. — Hermann, Paris, 2001.

L'ouvrage s'adresse aux étudiants de premier cycle, de licence ou de maîtrise de mathématiques, et constitue un excellent outil pour les candidats aux concours du CAPES et de l'agrégation. Les notions classiques sont abordées de façon élémentaire et rigoureuse: anneau, corps, homomorphisme, idéal, anneau quotient... Les résultats de base sont démontrés: propriétés de l'anneau principal, théorèmes de Galois, théorème de transfert aux anneaux de polynômes... Chaque chapitre se termine par des exercices permettant d'aboutir à des résultats nouveaux: le petit théorème de Fermat, celui de Wilson, les nombres de Mersenne... Au total, 260 exercices qui font l'originalité de l'ouvrage.

Ángel GRANJA, José Ángel HERMIDA, Alain VERSCHOREN, (Editors). — **Ring theory and algebraic geometry: proceedings of the fifth International Conference (SAGA V) in León, Spain.** — Lecture notes in pure and applied mathematics, vol. 221. — Un vol. broché, $18 \times 25,5$, de XV, 339 p. — ISBN 0-8247-0559-9. — Prix: US\$ 165.00. — Marcel Dekker, New York, 2001.

Based on papers presented at the fifth International Conference on Algebra and Algebraic Geometry (SAGA V) held at the University of León, Spain, this book focuses on the interaction between algebra and algebraic geometry, including high-level research papers and surveys contributed by over 40 specialists from more than 15 countries world wide, describing Abelian groups and lattices, algebras and binomial ideals, cones and fans, affine and projective algebraic varieties, simplicial and cellular complexes, polytopes, and arithmetics.

T. Y. LAM. — **A first course in noncommutative rings.** — Second edition. — Graduate texts in mathematics, vol. 131. — Un vol. broché, $15,5 \times 23,5$, de xix, 385 p. — ISBN 0-387-95325-6. — Prix : DM 106.89. — Springer, New York, 2001.

This book, an outgrowth of the author's lectures at the University of California at Berkeley, is intended as a textbook for a one-semester course in basic ring theory. The material covered includes the Wedderburn-Artin theory of semisimple rings, Jacobson's theory of the radical, representation theory of groups and algebras, prime and semiprime rings, primitive and semi-primitive rings, division rings, ordered rings, local and semilocal rings, perfect and semiperfect rings, and so forth. More than 400 exercises testing the understanding of the general theory in the text are included in this new edition.

Günter SCHEJA, Uwe STORCH. — **Regular sequences and resultants.** — Research notes in mathematics, vol. 8. — Un vol. relié, $16 \times 23,5$, de viii, 142 p. — ISBN 1-56881-151-9. — Prix : US\$ 30.00. — A.K. Peters, Natick, Mass., 2001.

This book provides a valuable complement to sparse elimination theory in that it presents, in careful detail, the algebraic difficulties of working over general base rings, which is essential for many applications including arithmetic geometry. In particular, a new approach to the construction and interpretation of resultants and their divisors has been developed using explicit duality for complete intersections. Necessary tools concerning monoids of weights, generic polynomials, and regular sequences are treated independently in the first part of the book. Supplements added to each section provide extra details and insightful examples.

Catégories, algèbre homologique, cohomologie des groupes

Jürgen KOSLOWSKI, Austin MELTON, (Editors). — **Categorical perspectives.** — Trends in mathematics. — Un vol. relié, 16×24 , de x, 281 p. — ISBN 0-8176-4186-6. — Prix : SFr. 148.00. — Birkhäuser, Boston, 2001.

This book consists of introductory surveys as well as articles containing original research and complete proofs devoted mainly to the theoretical and foundational developments of category theory and its applications to other fields. A number of articles in the areas of topology, algebra, and computer science reflect the varied interests of George Strecker to whom this work is dedicated. Notable also are an exposition of the contributions and importance of George Strecker's research and a survey chapter on general category theory.

Théorie des groupes et généralisations

Pierre-Alain CHERIX, Michael COWLING, Paul JOLISSAINT, Pierre JULG, Alain VALETTE. — **Groups with the Haagerup property : Gromov's a-T-menability.** — Progress in mathematics, vol. 197. — Un vol. relié, $16,5 \times 24$, de vii, 126 p. — ISBN 3-7643-6598-6. — Prix : SFr. 78.00. — Birkhäuser, Basel, 2001.

The aim of this book is to cover, for the first time in book form, various aspects of the Haagerup property. New characterisations are brought in, using ergodic theory or operator algebras. Several new examples are given, and new approaches to previously known examples are proposed. Connected Lie groups with the Haagerup property are completely characterized. The book, which ends with a list of open questions, will be of interest to graduate students and researchers in the fields of geometry, group theory, harmonic analysis, ergodic theory, and operator algebras.

Jean DELCOURT. — **Théorie des groupes: rappels de cours, exercices et problèmes corrigés.** — Sciences SUP. Mathématiques. — Un vol. broché, 17×24, de VIII, 216 p. — ISBN 2-10-005400-7. — Prix: FF 160.00. — Dunod, Paris, distribution Vivendi Universal, Fribourg, Suisse, 2001.

Cet ouvrage est un recueil d'exercices et de problèmes corrigés puis commentés, qui permet d'étudier, en plus des théorèmes de base, de nombreux et variés exemples de groupes, en insistant plus particulièrement sur les groupes finis. Mais c'est aussi un livre de «cours par exercices», inspiré des méthodes anglo-saxonnes et russes, qui permet au lecteur, aidé par des rappels de cours, de démontrer lui-même de nombreux théorèmes à travers différents exemples. Destiné aux étudiants de deuxième cycle en mathématiques, cet ouvrage sera également utile aux candidats à l'Agrégation et au Capes de mathématiques.

Jean FRESNEL. — **Groupes.** — Actualités scientifiques et industrielles, vol. 1448. — Collection formation des enseignants et formation continue. — Un vol. broché, 17,5×24, de VII, 154 p. — ISBN 2-7056-1448-6. — Prix: FF 140.00. — Hermann, Paris, 2001.

L'ouvrage s'adresse aux étudiants de premier cycle, de licence ou de maîtrise de mathématiques, et constitue un excellent outil pour les candidats aux concours du CAPES et de l'agrégation. Les notions classiques sont abordées de façon élémentaire et rigoureuse: groupe, sous-groupe, sous-groupe distingué, groupe quotient... Les résultats de base sont démontrés: structure du groupe alterné A_n , célèbres théorèmes de Sylow, suite dérivée, suite centrale descendante en relation avec les groupes résolubles ou nilpotents... Le dernier paragraphe, le plus riche et original, regroupe 75 exercices dont certains, faciles, permettent de se familiariser avec des groupes finis d'ordre «petit». D'autres exercices rencontrent des groupes célèbres provenant de la géométrie, de l'algèbre linéaire et de l'arithmétique...

Gordon JAMES, Martin LIEBECK. — **Representations and characters of groups.** — 2nd edition. — Cambridge mathematical textbooks. — Un vol. broché, 15×23, de VIII, 458 p. — ISBN 0-521-00392-X (relié: 0-521-81205-4). — Prix: £24.95 (relié: £80.00). — Cambridge University Press, Cambridge, 2001.

Now in its second edition, this text provides a modern introduction to the representation theory of finite groups. The authors have revised the popular first edition and added a considerable amount of new material. The theory is developed in terms of modules, since this is appropriate for more advanced work, but considerable emphasis is placed upon constructing characters. The character tables of many groups are given, including all groups of order less than 32, and all simple groups of order less than 1000. Among the applications covered are Burnside's p^aq^b theorem, the use of character theory in studying subgroup structure and permutation groups, and a description of how to use representation theory to investigate molecular vibration.

Franz Georg TIMMESFELD. — **Abstract root subgroups and simple groups of Lie-type.** — Monographs in mathematics, vol. 95. — Un vol. relié, 17,5×24, de XIII, 389 p. — ISBN 3-7643-6532-3. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2001.

The present book is the first to systematically treat the theory of groups generated by a conjugacy class of subgroups, satisfying certain generational properties on pairs of subgroups. For finite groups, this theory has been developed in the 1970s mainly by M. Aschbacher, B. Fischer and the author. It was extended to arbitrary groups in the 1990s by the author. The theory of abstract root subgroups is an important tool to study and classify simple classical and Lie-type groups. It is strongly related to the theory of root groups on buildings developed by J. Tits, which in turn extends the theory of root subgroups of Chevalley groups.

Mesure et intégration

Solomon LEADER. — **The Kurzweil-Henstock integral and the differentials: a unified theory of integration on \mathbf{R} and \mathbf{R}^n** . — Pure and applied mathematics, vol. 242. — Un vol. relié, 16×24 , de viii, 355 p. — ISBN 0-8247-0535-1. — Prix: US\$ 150.00. — Marcel Dekker, New York, 2001.

This reference/text provides a comprehensive review of the Kurzweil-Henstock integration process on the real line and in higher dimensions – presenting a unified theory of integration that highlights Riemann-Stieltjes, and Lebesgue integrals as well as integrals of elementary calculus. Offering current versions of classical theorems in real analysis with new contributions to fundamental aspects of integral calculus, the book covers integration of summants... Riesz spaces of differentials... Archimedean properties and Hahn decomposition for differentials... the fundamental theorem of calculus... Banach's indicatrix theorem and change of variables... Green's theorem... and more.

Fonctions d'une variable complexe

Theodore W. GANELIN. — **Complex analysis**. — Un vol. broché, $15,5 \times 23,5$, de xviii, 478 p. — ISBN 0-387-95069-9. — Prix: DM 69.00. — Springer, New York, 2001.

The book consists of three parts. The first part comprises the basic core of a course in complex analysis for junior and senior undergraduates. The second part includes various more specialized topics as the argument principle, the Schwarz lemma and hyperbolic geometry, the Poisson integral, and the Riemann mapping theorem. The third part consists of a selection of topics designed to complete the coverage of all background necessary for passing PhD qualifying exams in complex analysis. Topics selected include Julia sets and the Mandelbrot set, Dirichlet series and the prime number theorem, and the uniformization theorem for Riemann surfaces. The three geometries, spherical, euclidean, and hyperbolic, are stressed. Exercises range from the very simple to the quite challenging, in all chapters.

David SHOIKHET. — **Semigroups in geometrical function theory**. — Un vol. relié, $16,5 \times 25$, de xii, 222 p. — ISBN 0-7923-7111-9. — Prix: US\$ 76.00. — Kluwer Academic Publishers, Dordrecht, 2001.

This manuscript provides an introduction to the generation theory of nonlinear one-parameter semigroups on a domain of the complex plane in the spirit of the Wolff–Denjoy and Hille–Yoshida theories. Special attention is given to evolution equations reproduced by holomorphic vector fields on the unit disk. A dynamic approach to the study of geometrical properties of univalent functions is emphasized. The book will be of interest to graduate students and research specialists working in the fields of geometrical function theory, iteration theory, fixed point theory, semigroup theory, theory of composition operators and complex dynamical systems.

Équations différentielles ordinaires

Lambertus A. PELETIER, William C. TROY. — **Spatial patterns: higher order models in physics and mechanics**. — Progress in nonlinear differential equations and their applications, vol. 45. — Un vol. relié, 16×24 , de xv, 341 p. — ISBN 0-8176-4110-6. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2001.

This text offers a study of nonlinear fourth order model equations that are central to description and analysis of spatio-temporal pattern formation in the natural sciences. In a unique combination of results obtained by rigorous mathematical analysis, and by computational studies, it

exhibits the principal families of solutions, such as kinks, pulses and periodic solutions, and their dependence on critical eigenvalue parameters. The text points to a rich structure, much of which still awaits to be explored. This book is meant for mathematicians who wish to become acquainted with new areas of partial and ordinary differential equations, for mathematical physicists who wish to learn about the theory developed for a class of well known higher order pattern-forming model equations, and for graduate students who are looking for an exciting and promising field of research.

Équations aux dérivées partielles

Wolfgang ARENDT, Charles J.K. BATTY, Matthias HIEBER, Frank NEUBRANDER. — **Vector-valued Laplace transforms and Cauchy problems.** — Monographs in mathematics, vol. 96. — Un vol. relié, 17,5 × 24, de xi, 523 p. — ISBN 3-7643-6549-8. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

This monograph gives a systematic account of the theory of vector-valued Laplace transforms, ranging from representation theory to Tauberian theorems. In parallel, the theory of linear Cauchy problems and semigroups of operators is developed completely in the spirit of Laplace transforms. Existence and uniqueness, regularity, approximation and above all asymptotic behaviour of solutions are studied. Diverse applications to partial differential equations are given. The book contains an introduction to the Bochner integral and several appendices on background material. It is addressed to students and researchers interested in evolution equations, Laplace and Fourier transforms, and functional analysis.

Ferruccio COLOMBINI, Claude ZUILY, (Editors). — **Carleman estimates and applications to uniqueness and control theory.** — Progress in nonlinear differential equations and their applications, vol. 46. — Un vol. relié, 16,5 × 24, de vi, 211 p. — ISBN 0-8176-4230-7. — Prix: SFr. 178.00. — Birkhäuser, Boston, 2001.

This work consists of expository articles and research papers highlighting new results on Carleman estimates and their applications. The focus throughout is on unique continuation, control theory, and inverse problems. New results on strong uniqueness for second or higher order operators are explored in detail. Also examined are applications of Carleman estimates to stabilization, observability, and exact control for the wave and the Schrödinger equations. A final paper presents open problems on the controllability of linear and semilinear heat equations.

Ellis CUMBERBATCH, Alistair FITT, (Editors). — **Mathematical modeling: case studies from industry.** — Un vol. broché, 15 × 23, de XIII, 299 p. — ISBN 0-521-01173-6 (relié: 0-521-65007-0). — Prix: £23.95 (relié: £65.00). — Cambridge University Press, Cambridge, 2001.

This book deals with real industrial problems from real industries. Presented as a series of case studies by some of the world's most active and successful mathematicians working in industry, this volume shows clearly how the process of mathematical collaboration with industry can not only work successfully for the industrial partner, but also lead to interesting and important mathematics. Thirteen different problems are considered, ranging from cooking of cereal to the analysis of epidemic waves in animal populations.

Cristian E. GUTIÉRREZ. — **The Monge-Ampère equation.** — Progress in nonlinear differential equations and their applications, vol. 44. — Un vol. relié, 16 × 24, de xi, 126 p. — ISBN 3-7643-4177-7. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2001.

The book is an essentially self-contained exposition of the theory of weak solutions, including the regularity results of L.A. Caffarelli. The presentation unfolds systematically from

introductory chapters, and an effort is made to present complete proofs of all theorems. Included are examples, illustrations, bibliographical references at the end of each chapter, and a comprehensive index. *Topics covered include*: Generalized solutions. Non-divergence equations. The cross-sections of Monge-Ampère. Convex solutions of $D^2u = 1$ in \mathbf{R}^n . Regularity theory. $W^{2,p}$ estimates.

Anatoly N. KOCHUBEI. — **Pseudo-differential equations and stochastics over non-Archimedean fields.** — Pure and applied mathematics, vol. 244. — Un vol. relié, 16 × 23,5, de xi, 316 p. — ISBN 0-8247-0655-2. — Prix: US\$ 165.00. — Marcel Dekker, New York, 2001.

This state-of-the-art reference provides comprehensive coverage of the most recent developments in the theory of non-Archimedean pseudo-differential equations and its applications to stochastic and mathematical physics – offering current methods of construction for stochastic processes in the field of p -adic numbers and related structures. The book examines elliptic and hyperbolic equations associated with p -adic quadratic forms... Green functions and their asymptotics... the Cauchy problem for the p -adic Schrödinger equation... spectral theory... Fourier transform, fractional differentiation operators, and analogs of the symmetric stable process... and more.

Victor P. PIKULIN, Stanislav I. POHOZAEV. — **Equations in mathematical physics : a practical course.** — Translated from the Russian by Andrei Iacob. — Un vol. relié, 17 × 24, de viii, 206 p. — ISBN 3-7643-6501-3. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

Many physical processes in fields such as mechanics, thermodynamics, electricity, magnetism or optics are described by means of partial differential equations. The aim of the present book is to demonstrate the basic methods for solving the classical linear problems in mathematical physics of elliptic, parabolic and hyperbolic type. In particular, the methods of conformal mappings, Fourier analysis and Green's functions are considered, as well as the perturbation method and integral transformation method, among others. Every chapter contains concrete examples with a detailed analysis of their solution. The book is intended as a textbook for students in mathematical physics, but will also serve as a handbook for scientists and engineers.

Systèmes dynamiques et théorie ergodique

Jürgen MOSER. — **Stable and random motions in dynamical systems.** — With a new foreword by Philip J. Holmes. — Hermann Weyl Lectures, The Institute for Advanced Study. — Princeton landmarks in mathematics. — Un vol. broché, 15,5 × 23,5, de xii, 198 p. — ISBN 0-691-08910-8. — Prix: US\$14.95. — Princeton University Press, Princeton, 2001.

For centuries, astronomers have been interested in the motions of the planets and in methods to calculate their orbits. Since Newton, mathematicians have been fascinated by the related N -body problem. They seek to find solutions to the equations of motion for N masspoints interacting with an inverse-square-law force and to determine whether there are quasi-periodic orbits or not. Attempts to answer such questions have led to the techniques of nonlinear dynamics and chaos theory. In this classic work, the author presents a succinct account of two pillars of the theory: stable and chaotic behavior. He discusses cases in which N -body motions are stable, covering topics such as Hamiltonian systems, the (Moser) twist theorem, and aspects of Kolmogorov-Arnold-Moser theory. He then explores chaotic orbits, exemplified in a restricted three-body problem, and describes the existence and importance of homoclinic points. This book is indispensable for mathematicians, physicists, and astronomers interested in the dynamics of few- and many-body systems and in fundamental ideas and methods for their analysis.

James C. ROBINSON. — **Infinite-dimensional dynamical systems: from basic concepts to actual calculations: an introduction to dissipative parabolic PDEs and the theory of global attractors.** — Cambridge texts in applied mathematics. — Un vol. broché, 15×23, de XVII, 461 p. — ISBN 0-521-63564-0. — Prix: £24.95. — Cambridge University Press, Cambridge, 2001.

This book develops the theory of global attractors for a class of parabolic PDEs that includes reaction-diffusion equations and the Navier-Stokes equations, two examples that are treated in detail. A lengthy chapter on Sobolev spaces provides the framework that allows a rigorous treatment of existence and uniqueness of solutions for both linear time-independent problems (Poisson's equation) and the nonlinear evolution equations, that generate the infinite-dimensional dynamical systems of the title. Attention then turns to the global attractor, a finite-dimensional subset of the infinite-dimensional phase space that determines the asymptotic dynamics. In particular, the concluding chapters investigate in what sense the dynamics restricted to the attractor are themselves “finite-dimensional”.

Équations aux différences finies, équations fonctionnelles

Martin BOHNER, Allan PETERSON. — **Dynamic equations on time scales: an introduction with applications.** — Un vol. relié, 18,5×26, de x, 358 p. — ISBN 0-8176-4225-0. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2001.

The study of dynamic equations on a measure chain (time scale) goes back to its founder S. Hilger (1988), and is a new area of still fairly theoretical exploration in mathematics. Motivating the subject is the notion that dynamic equations on measure chains can build bridges between continuous and discrete mathematics. Further, the study of measure chain theory has led to several important applications, e.g., in the study of insect population models, neural networks, heat transfer, and epidemic models. Parts of the book may be used in a special topics seminar at the senior undergraduate or beginning graduate levels. Finally, the work may serve as a reference to stimulate the development of new kinds of equations with potentially new applications.

Analyse de Fourier, analyse harmonique abstraite

Lookenath DEBNATH, (Editor). — **Wavelet transforms and time-frequency signal analysis.** — Un vol. relié, 16,5×24, de xx, 423 p. — ISBN 0-8176-4104-1. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

This volume is designed as a new source for modern topics dealing with wavelets, wavelet transforms, time-frequency signal analysis and other applications for future development of this new, important and useful subject for mathematics, science and engineering. Its main features include: A broad coverage of recent material on wavelet analysis, and time-frequency signal analysis and other applications that are not usually covered in other recent reference books. The material presented in this volume brings together a rich variety of ideas that blend most aspects of the subject mentioned above. This volume brings together a detailed account of major recent developments in wavelets, wavelet transforms, time-frequency signal analysis.

Transformations intégrales, calcul opérationnel

R.B. PARIS, D. KAMINSKI. — **Asymptotics and Mellin-Barnes integrals.** — Encyclopedia of mathematics and its applications, vol. 85. — Un vol. relié, 16×24, de XVI, 422 p. — ISBN 0-521-79001-8. — Prix: £65.00. — Cambridge University Press, Cambridge, 2001.

This work is a comprehensive account of the properties of Mellin-Barnes integrals and their application to problems involving special functions, primarily the determination of asymptotic

expansions. An account of the basic analytical properties of Mellin-Barnes integrals and Mellin transforms and their use in applications ranging from number theory to differential and difference equations is followed by a systematic analysis of the asymptotics of Mellin-Barnes representations of many important special functions, including hypergeometric, Bessel and parabolic cylinder functions. An account of the recent developments in the understanding of the Stokes phenomenon and of hyperasymptotics in the setting of Mellin-Barnes integrals ensues. The book concludes with the application of ideas set forth in the earlier parts of the book to higher-dimensional Laplace-type integrals and sophisticated treatments of Euler-Jacobi series, the Riemann zeta function and the Pearcey integral.

Analyse fonctionnelle

Erik M. ALFSEN, Frederic W. SCHULTZ. — **State spaces of operator algebras : basic theory, orientations and C*-products.** — Mathematics: theory & applications. — Un vol. relié, 16×24, de xii, 350 p. — ISBN 0-8176-3890-3. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

This self-contained work, focusing on the theory of state spaces of C*-algebras and von Neumann algebras, explains how the oriented space geometrically determines the algebra. Key feature include: first and only work devoted to state spaces of operator algebras – contains much material not available in existing books; prerequisites are standard graduate courses in real and complex variables, measure theory, and functional analysis; complete proofs of basic results on operator algebras presented so that no previous knowledge in the field is needed; detailed introduction develops basic tools used throughout the text; numerous chapter remarks on advanced topics of independent interest with references to the literature, or discussion of applications to physics.

Ron BLEI. — **Analysis in integer and fractional dimensions.** — Cambridge studies in advanced mathematics, vol. 71. — Un vol. relié, 16×23,5, de xix, 556 p. — ISBN 0-521-65084-4. — Prix: £65.00. — Cambridge University Press, Cambridge, 2001.

The book's focus is on "dimension" as a basic counter of degrees of freedom. This focus leads to precise relations between combinatorial measurement and various indices originating from the classical inequalities of Khintchin, Littlewood and Grothendieck. The basic concepts of fractional Cartesian products and combinatorial dimension are introduced and linked to scales calibrated by harmonic-analytic and stochastic measurements. Topics include the (two-dimensional) Grothendieck inequality and its extensions to higher dimensions, multidimensional measure theory, stochastic models of Brownian motion, degrees of randomness and applications to random walks, and Fréchet measures in stochastic analysis.

A. K. KATSARAS, W. H. SCHIKHOF, L. VAN HAMME, (Editors). — ***p*-adic functional analysis: proceedings of the sixth international conference.** — Lecture notes in pure and applied mathematics, vol. 222. — Un vol. broché, 17,5×25,5, de viii, 322 p. — ISBN 0-8247-0611-0. — Prix: US\$ 150.00. — Marcel Dekker, New York, 2001.

This volume collects lectures presented at the Sixth International Conference held at the University of Ioannina, Greece, on *p*-adic functional analysis with applications in the fields of physics, differential equations, number theory, probability theory, dynamical systems, and algebraic number fields – discussing the communication relation $AB - BA = I$ and its central role in quantum mechanics. The book addresses orthogonal and Schauder bases and approximation of *p*-adic linear forms, describes compact perturbations of *p*-adic operators, vector measures, probabilistic measures, and nonarchimedean inner products... considers Banach-Stone theorems... reviews ultrametric Hopf algebras and embedding in Lebesgue spaces... and more.

Jun KIGAMI. — **Analysis on fractals.** — Cambridge tracts in mathematics, vol. 143. — Un vol. relié, 16×23,5, de VIII, 226 p. — ISBN 0-521-79321-1. — Prix: £35.00. — Cambridge University Press, Cambridge, 2001.

This book covers analysis on fractals, an area of mathematics which focuses on the dynamical aspects of fractals, such as heat diffusion on fractals and the vibration of a material with fractal structure. The book provides a self-contained introduction to the subject, starting from the basic geometry of self-similar sets and going on to discuss recent results, including the properties of eigenvalues and eigenfunctions of the Laplacians, and the asymptotical behavior of heat kernels on self-similar sets. Requiring only a basic knowledge of advanced analysis, general topology and measure theory, this book will be of value to graduate students and researchers in analysis and probability theory. It will also be useful as a supplementary text for graduate courses covering fractals.

Theodore W. PALMER. — **Banach algebras and the general theory of *-algebras, Vol. 2: *-Algebras.** — Encyclopedia of mathematics and its applications, vol. 79. — Un vol. relié, 16×24, de XI, 795-1616 p. — ISBN 0-521-36638-0. — Prix: £75.00. — Cambridge University Press, Cambridge, 2001.

This is the second volume of a two-volume set that provides a modern account of basic Banach algebra theory including all known results on general Banach *-algebras. This second volume deals with *-algebras. Chapter 9 develops the theory of *-algebras without additional restrictions, going well beyond what has been proved in this context previously. Chapter 10 proves nearly all of the results previously known for Banach *-algebras and hermitian Banach *-algebras for *-algebras with various essentially algebraic restrictions. It provides the first detailed, published version of these theories. Chapter 11 restates the previous results in terms of Banach *-algebras and uses them to prove results explicitly involving the complete norm. Chapter 12 is devoted to locally compact groups and the *-algebras related to them. Their classification in terms of properties shared by compact and abelian groups is explored in detail.

Hans TRIEBEL. — **The structure of functions.** — Monographs in mathematics, vol. 97. — Un vol. relié, 17×24, de XII, 425 p. — ISBN 3-7643-6546-3. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

This book deals with the constructive Weierstrassian approach to the theory of function spaces and various applications. The first chapter is devoted to a detailed study of quarkonial (subatomic) decompositions of functions and distributions on Euclidean spaces, domains, manifolds and fractals. This approach combines the advantages of atomic and wavelet representations. It paves the way to sharp inequalities and embeddings in function spaces, spectral theory of fractal elliptic operators, and a regularity theory of some semi-linear equations. The book is self-contained, although some parts may be considered as a continuation of author's book *Fractals and Spectra*.

Théorie des opérateurs

Daniel BELTIȚĂ, Mihai ȘABAC. — **Lie algebras of bounded operators.** — Operator theory: advances and applications, vol. 120. — Un vol. relié, 17×24, de VIII, 217 p. — ISBN 3-7643-6404-1. — Prix: SFr. 128.00. — Birkhäuser, Basel, 2001.

There is a fruitful and fascinating interaction between infinite dimensional operator theory (particularly decomposable, scalar and spectral generalized operator theory due to C. Foias and I. Colojoara) and Lie algebra theory. The present book is the first devoted to this field, ranging from some short historical notes to the most recent developments. Nilpotence criteria, infinite

dimensional variants of Lie's theorem for solvable systems of bounded operators, spectral properties of elements of semisimple Lie algebras and simultaneous triangularisation are expounded. The book is self-contained and features an extensive bibliography. It is aimed at postgraduate students and researchers who are introduced to an interesting recent area of research and will learn some new methods useful for both of the domains – operator theory and Lie algebra theory.

Michael DEMUTH, Bert-Wolfgang SCHULZE, (Editors). — **Partial differential equations and spectral theory: PDE2000 Conference in Clausthal, Germany.** — Operator theory: advances and applications, vol. 126. — Un vol. relié, 17,5 × 24, de x, 353 p. — ISBN 3-7643-6219-7. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

The intention of the international conference PDE2000 was to bring together specialists from different areas of modern analysis, mathematical physics and geometry, to discuss not only the recent progress in their own fields but also the interaction between these fields. The special topics of the conference were spectral and scattering theory, semiclassical and asymptotic analysis, pseudodifferential operators and their relation to geometry, as well as partial differential operators and their connection to stochastic analysis and to the theory of semigroups.

A. DIJKSMA, M. A. KAASHOEK, A. C. M. RAN, (Editors). — **Recent advances in operator theory: the Israel Gohberg anniversary volume.** — International Workshop in Groningen, June 1998. — Operator theory: advances and applications, vol. 124. — Un vol. relié, 17 × 24, de IX, 558 p. — ISBN 3-7643-6573-0. — Prix: SFr. 198.00. — Birkhäuser, Basel, 2001.

This book contains 25 papers, most of which were presented, for the first time, at the International Workshop on Operator Theory and its Applications held in Groningen, The Netherlands, from June 30-July 3, 1998. The topics include dilation and interpolation problems, reproducing kernel spaces, numerical ranges of operators, Riccati equations, harmonic analysis, spectral theory of differential operators and analytic operator functions to scattering of waves. All papers deal with operators and analytic operators in Banach or Hilbert spaces, or in spaces with an indefinite metric. This book also contains the speeches held at the workshop dinner, a review of Israel Gohberg's contributions to mathematics and a complete list of his publications.

Mikhail KAMENSKII, Valeri OBUKHOVSKII, Pietro ZECCA. — **Condensing multivalued maps and semilinear differential inclusions in Banach spaces.** — De Gruyter series in nonlinear analysis and applications, vol. 7. — Un vol. relié, 18 × 24,5, de xi, 231 p. — ISBN 3-11-016989-4. — Prix: DM 196.00. — Walter de Gruyter, Berlin, 2001.

The book is devoted to some directions of contemporary multivalued analysis. It begins with a detailed and elementary exposition of general properties of multivalued maps. Further special attention is paid to the class of condensing multimap, including the construction of topological degree theory, being an efficient machinery for solving operator including, fixed point and optimization problems. In the second part of the book the theory is applied to the investigation of semilinear differential inclusions in Banach spaces. The authors present results concerning the existence of local and global solutions as well as periodic trajectories. They describe qualitative properties of the solution sets and give applications to nonlinear control problems.

Nikolai KARAPETIANTS, Stefan SAMKO. — **Equations with involutive operators.** — Un vol. relié, 16,5 × 24, de xxii, 427 p. — ISBN 0-8176-4157-2. — Prix: SFr. 178.00. — Birkhäuser, Boston, 2001.

This text demonstrates an important interplay between abstract and concrete operator theory. The focus is on the investigation of a number of equations which, while seemingly different, are

all unified by the same idea: they are all realizations of some operator equations in Banach spaces. One permeating theme in these equations involves the role of the Fredholm property. The work is carefully written, is self-contained and covers a broad range of topics and results. Key ideas are developed in a step-by-step approach, beginning with the required background material and culminating in the final chapters with state-of-the art topics.

Nikolay D. KOPACHEVSKI, Selim G. KREIN. — **Operator approach to linear problems of hydrodynamics. Vol. 1: Self-adjoint problems for an ideal fluid.** — Operator theory: advances and applications, vol. 128. — Un vol. relié, 17×24, de xxiv, 384 p. — ISBN 3-7643-5406-2. — Prix: SFr. 248.00. — Birkhäuser, Basel, 2001.

This is the first volume of a set of two devoted to the operator approach to linear problems in hydrodynamics. It presents functional analytic methods applied to the study of small movements and normal oscillations of hydromechanical systems having cavities filled with either ideal or viscous fluids. The work is a sequel to and at the same time substantially extends the volume *Operator methods in linear hydrodynamics: evolution and spectral problems* by N.D. Kopachevsky, S.G. Krein and Ngo Zuy Kan, published in 1989 by Nauka in Moscow. It includes several new problems on the oscillations of partially dissipative hydrosystems and the oscillations of visco-elastic or relaxing fluids. The work relies on the authors' and their students' work of the last 30-40 years.

Carlos S. KUBRUSLY. — **Elements of operator theory.** — Un vol. relié, 16,5×24, de xiii, 527 p. — ISBN 0-8176-4174-2. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

This book is aimed at a new generation of researchers and graduate students who need to apply operator theory to their field. Written in a user-friendly, motivating style, fundamental topics are presented in a systematic fashion, i.e. set theory, algebraic structures, topological structures, Banach spaces, Hilbert spaces, culminating with the spectral theorem, one of the landmarks in the theory of operators on Hilbert spaces. The exposition is concept-driven and as much as possible avoids the formula-computational approach.

Calcul des variations

Arturo LOCATELLI. — **Optimal control: an introduction.** — Un vol. relié, 17,5×24, de viii, 294 p. — ISBN 3-7643-6408-4. — Prix: SFr. 68.00. — Birkhäuser, Basel, 2001.

The book reflects the author's experience of teaching control theory courses at a variety of levels over a span of thirty years. The level of exposition, the choice of topics, the relative weight given to them, the degree of mathematical sophistication, and the nature of the numerous illustrative examples, owe to the author's commitment to effective teaching. The book is suited for undergraduate/graduate students who have already been exposed to basic linear system and control theory and possess the calculus background usually found in any undergraduate curriculum in engineering.

Géométrie

Mauro BILIOTTI, Vikram JHA, Norman L. JOHNSON. — **Foundations of translation planes.** — Monographs and textbooks in pure and applied mathematics, vol. 243. — Un vol. relié, 16×23,5, de xv, 542 p. — ISBN 0-8247-0609-9. — Prix: US\$ 195.00. — Marcel Dekker, New York, 2001.

This book provides a comprehensive coverage of the construction and analysis of translation planes with regard to spreads, partial spreads. It coordinates structures, automorphisms, auto-

topisms, and collineation groups – emphasizing the manipulation of incidence structures by various coordinate systems, including quasifields, spreads, and matrix spreadsets.

E. BUJALANCE, A.F. COSTA, E. MARTÍNEZ, (Editors). — **Topics on Riemann surfaces and Fuchsian groups.** — London Mathematical Society lecture note series, vol. 287. — Un vol. broché, 15×23, de XIII, 177 p. — ISBN 0-521-00350-4. — Prix: £24.95. — Cambridge University Press, Cambridge, 2001.

This book presents a cross-section of different aspects of Riemann surfaces, introducing the reader to the basics as well as highlighting new developments in the field. It provides a mixture of classical material, recent results and some non-mainstream topics. The book is based on lectures from the conference “Topics on Riemann Surfaces and Fuchsian Groups” held in Madrid to mark the twenty-fifth anniversary of the Universidad Nacional de Educación a Distancia. For those wishing to pursue research in this area, this volume offers a valuable summary of contemporary thought and a source of fresh geometric and algebraic insights.

D.L. JOHNSON. — **Symmetries.** — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de XI, 198 p. — ISBN 1-85233-270-0. — Prix: DM 64.09. — Springer, London, 2001.

Written by the author of *Elements of Logic via Numbers and Sets*, the main object of study for this book is geometry, with group theory providing an appropriate language in which to express geometrical ideas. Key features include: An overview of the preliminaries from group theory and geometry; coverage of the discrete subgroups of the Euclidean group; a clear and complete derivation and classification of the 17 plane crystallographic groups; tessellations of various spaces (they are constructed, described and classified); a brief introduction to hyperbolic geometry. Each chapter contains a number of exercises, most with solutions, and suggestions for background, alternative and further reading.

L. Christine KINSEY, Teresa E. MOORE. — **Symmetry, shape, and space: an introduction to mathematics through geometry.** — Un vol. broché, 20×24, de XVIII, 494 p. — ISBN 1-930190-09-3. — Prix: DM 138.99. — Key College Publishing, Emeryville, in cooperation with Springer, New York, 2002.

This book is appropriate for introduction to mathematics and liberal arts mathematics courses and assumes no mathematics beyond the high school level. Geometry is the basis of the text because the visual nature of the subject allows students to use their intuition and imagination while developing the ability to think critically. Varied content within the text, activities, and examples leads students into an investigative process and provides the experience of doing and discovering mathematics as mathematicians do. Many of the exercises in the text require students to express their ideas clearly in writing, while other exercises require drawings or physical models, which help make math a more hands-on experience. The dual geometric and algebraic nature of mathematics is integrated throughout the text.

Burkard POLSTER, Günter STEINKE. — **Geometries on surfaces.** — Encyclopedia of mathematics and its applications, vol. 84. — Un vol. relié, 16×24, de XXII, 490 p. — ISBN 0-521-66058-0. — Prix: £65.00. — Cambridge University Press, Cambridge, 2001.

This book summarizes all known major results and open problems related to these classical geometries and their close (nonclassical) relatives. Topics covered include: classical geometries; methods for constructing nonclassical geometries; classifications and characterisations of geometries. This work is related to a host of other fields including interpolation theory, convexity,

differential geometry, topology, the theory of Lie groups and many more. The authors detail these connections, some of which are well known, but many much less so.

Ensembles convexes et inégalités géométriques

Herbert EDELSBRUNNER. — **Geometry and topology for mesh generation.** — Cambridge monographs on applied and computational mathematics, vol. 6. — Un vol. relié, 16×23,5, de XII, 177 p. — ISBN 0-521-79309-2. — Prix: £29.95. — Cambridge University Press, Cambridge, 2001.

The book combines topics in mathematics (geometry and topology), computer science (algorithms), and engineering (mesh generation). The original motivation for these topics was the difficulty faced (both conceptually and in technical execution) in any attempt to combine elements of combinatorial and numerical algorithms. Mesh generation is a topic in which a meaningful combination of these different approaches to problem solving is inevitable. The book develops methods from both areas that are amenable to combination and explains recent breakthrough solutions to meshing that fit into this category.

Jack E. GRAVER. — **Counting on frameworks: mathematics to aid the design of rigid structures.** — Dolciani mathematical expositions, vol. 25. — Un vol. broché, 15×23, de XII, 180 p. — ISBN 0-8835-331-0. — Prix: £23.95. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2001.

Rigidity theory is a body of mathematics developed to aid in designing structures. Consider scaffolding that is constructed by bolting together rods and beams. The ultimate question is: “Is the scaffolding sturdy enough to hold the workers and their equipment?” There are several features of the structure that have to be considered in answering this question. Just how to design properly braced scaffolding (or the basic skeleton of any structure) is the problem that motivates rigidity theory. The purpose of this book is to develop a mathematical model for rigidity.

Géométrie différentielle

Lawrence CONLON. — **Differentiable manifolds.** — Birkhäuser advanced texts. — Second edition. — Un vol. relié, 17×24, de XII, 418 p. — ISBN 0-8176-4134-3. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2001.

This second edition contains a significant amount of new material, which, in addition to classroom use, will make it a useful reference text. Topics that can be omitted safely in a first course are clearly marked, making this edition easier to use for such a course, as well as for private study by non-specialists wishing to survey the field. The themes of linearization, (re)integration, and global versus local calculus are emphasized throughout. Additional features include a treatment of the elements of multivariable calculus, formulated to adapt readily to the global context, an exploration of bundle theory, and a further (optional) development of Lie theory than is customary in textbooks at this level.

Seán DINEEN. — **Multivariate calculus and geometry.** — Springer undergraduate mathematics series. — Second edition. — Un vol. broché, 17×24, de XII, 254 p. — ISBN 1-85233-472-X. — Prix: DM 59.00. — Springer, London, 2001.

In this revised edition, which includes additional exercises and expanded solutions, Seán Dineen gives a solid description of the basic concepts, via simple familiar examples which are then tested in technically demanding situations. The author recognises the varied backgrounds students bring to the subject and only assumes the minimal prerequisite knowledge necessary for

a comprehensive and unified understanding of the differential, integral and geometric calculus of several variables. On reading this book the student will acquire the confidence and techniques necessary to tackle new problems.

James EELLS, Bent FUGLEDE. — **Harmonic maps between Riemannian polyhedra.** — Cambridge tracts in mathematics, vol. 142. — Un vol. relié, 16 × 24, de XII, 296 p. — ISBN 0-521-77311-3. — Prix : £40.00. — Cambridge University Press, Cambridge, 2001.

Harmonic maps between smooth Riemannian manifolds play a ubiquitous role in differential geometry. This book extends the theory in full detail to harmonic maps between broad classes of singular Riemannian polyhedra, with many examples being given. The analytical foundation is based on existence and regularity results which use the potential theory of Riemannian polyhedral domains viewed as Brelot harmonic spaces and geodesic space targets in the sense of Alexandrov and Busemann. The authors set out much new material on harmonic maps between singular spaces for the first time in book form.

C.G. GIBSON. — **Elementary geometry of differentiable curves: an undergraduate introduction.** — Un vol. broché, 15 × 23, de XVII, 216 p. — ISBN 0-521-01107-8. — Prix : £16.95. — Cambridge University Press, Cambridge, 2001.

The basic concepts of the book are illustrated by named curves, of historical and scientific significance, leading to the central idea of curvature. The singular viewpoint is represented by a study of contact with lines and circles, illuminating the ideas of cusp, inflexion and vertex. There are two major physical applications. Caustics are discussed via the central concepts of evolute and orthotomic. The final chapters introduce the core material of classical kinematics, developing the geometry of trajectories via the ideas of roulettes and centrodes, and culminating in the inflexion circle and cubic of stationary curvature.

Frédéric HÉLEIN. — **Constant mean curvature surfaces, harmonic maps and integrable systems.** — Lectures in mathematics, ETH Zürich. — Un vol. broché, 17 × 24, de 122 p. — ISBN 3-7643-6576-5. — Prix : SFr. 38.00. — Birkhäuser, Basel, 2001.

This book intends to give an introduction to harmonic maps between a surface and a symmetric manifold and constant mean curvature surfaces as completely integrable systems. It is among the first textbooks about integrable systems, their interplay with harmonic maps and the use of loop groups, and it presents the theory, for the first time, from the point of view of a differential geometer. The most important results are exposed with complete proofs. Some proofs have been completely rewritten with the objective, in particular, to clarify the relation between finite mean curvature tori, Wente tori and the loop group approach — an aspect largely neglected in the literature.

Topologie générale

Peter A. FIRBY, Cyril F. GARDINER. — **Surface topology.** — 3rd edition. — Horwood Publishing series in mathematics and applications. — Un vol. relié, 17 × 25, de 242 p. — ISBN 1-898563-77-2. — Prix : £25.00. — Horwood Publishing, Westergate, Chichester, 2001.

The book provides a straightforward treatment of an area particularly important for its richness of applications and variety of interactions with other branches of mathematics, e.g., surface topology, graph theory, group theory, vector field theory, plane Euclidean and non-Euclidean geometry, and knot theory; each topic treated from its beginnings. Significant theory is developed by elementary means, thereby providing understanding and enjoyment of this attractive branch of modern mathematics. — *Contents:* Intuitive ideas. — Plane models of

surfaces. — Surfaces as plane diagrams. — Distinguishing surfaces. — Patterns on surfaces. — Maps and graphs. — Vector fields on surfaces. — Plane tessellation representations of compact surfaces. — Some applications of tessellation representations. — Introducing the fundamental group. — Surfaces with boundaries, with an application to knots. — Graphs and groups, problem exercises, tutorial solutions.

Stephen HUGGETT, David JORDAN. — **A topological aperitif.** — Un vol. broché, 17×24 , de VIII, 166 p. — ISBN 1-85233-377-4. — Prix : DM 49.90. — Springer, London, 2001.

This is a book of elementary geometric topology, in which geometry, frequently illustrated, guides calculation. The book starts with a wealth of examples, often subtle, of how to be mathematically certain whether two objects are the same from the point of view of topology. After introducing surfaces, such as the Klein bottle, the book explores the properties of polyhedra drawn on these surfaces. Even in the simplest case, of spherical polyhedra, there are good questions to be asked. More refined tools are developed in a chapter on winding number, and an appendix gives a glimpse of knot theory.

Topologie algébrique

Jaumé AGUADÉ, Carles BROTO, Carles CASACUBERTA, (Editors) — **Cohomological methods in homotopy theory.** — Barcelona Conference on Algebraic Topology, Bellaterra, Spain, June 4-10, 1998. — Progress in mathematics, vol. 196. — Un vol. relié, 16×24 , de 415 p. — ISBN 3-7643-6588-9. — Prix : SFr. 148.00. — Birkhäuser, Basel, 2001.

This book contains a collection of articles summarizing the state of knowledge in a large portion of modern homotopy theory. A call for articles was made on the occasion of an emphasis semester organized by the Centre de Recerca Matemàtica in Bellaterra (Barcelona) in 1998. The main topics treated in the book include abstract features of stable and unstable homotopy, homotopical localizations, p -compact groups, H -spaces, classifying spaces for proper actions, cohomology of discrete groups, K -theory and other generalized cohomology theories, configuration spaces, and Lusternik-Schnirelmann category.

Topologie des variétés, analyse globale et analyse des variétés

Isaac CHAVEL. — **Isoperimetric inequalities: differential geometric and analytic perspectives.** — Cambridge tracts in mathematics, vol. 145. — Un vol. relié, 16×23 , de XII, 268 p. — ISBN 0-521-80267-9. — Prix : £50.00. — Cambridge University Press, Cambridge, 2001.

This introduction treats the classical isoperimetric inequality in Euclidean space and contrasting rough inequalities in noncompact Riemannian manifolds. The treatment in Euclidean space features a number of proofs of the classical inequality in increasing generality, providing in the process a transition from the methods of classical differential geometry to those of modern geometric measure theory; and the treatment in Riemannian manifolds features discretization techniques and applications to upper bounds of large time heat diffusion in Riemannian manifolds. The result is an introduction to the rich tapestry of ideas in geometry and analysis, a subject that continues to inspire fresh ideas in geometry and analysis to this very day — and beyond.

David N. YETTER. — **Functorial knot theory: categories of tangles, coherence, categorical deformations, and topological invariants.** — Series on knots and everything, vol. 26. — Un vol. relié, 16×23 , de 230 p. — ISBN 981-02-4443-6. — Prix : £40.00. — World Scientific, Singapore, 2001.

This book begins with a detailed exposition of the key ideas in the discovery of monoidal categories of tangles as central objects of study in low-dimensional topology. The focus then

turns to the deformation theory of monoidal categories and the related deformation theory of monoidal functors, which is a proper generalization of Gerstenhaber's deformation theory of associative algebras. These serve as the building blocks for a deformation theory of braided monoidal categories which gives rise to sequences of Vassiliev invariants of framed links, and clarify their interrelations.

Probabilités et processus stochastiques

O.E. BARNDORFF-NIELSEN, T. MIKOSCH, S.I. RESNICK, (Editors). — **Lévy processes: theory and applications.** — Un vol. relié, 19×26, de x, 415 p. — ISBN 0-8176-4167-X. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

A Lévy process is a continuous-time analogue of a random walk, and as such, is at the cradle of modern theories of stochastic processes. Martingales, Markov processes, and diffusions are extensions and generalizations of these processes. In the past, representatives of the Lévy class were considered most useful for applications to either Brownian motion or the Poisson process. Nowadays the need for modeling jumps, bursts, extremes and other irregular behavior of phenomena in nature and society has led to a renaissance of the theory of general Lévy processes. Researchers and practitioners in fields as diverse as physics, meteorology, statistics, insurance, and finance have rediscovered the simplicity of Lévy processes and their enormous flexibility in modeling tails, dependence and path behavior. This volume describes the state-of-the-art of this rapidly evolving subject with special emphasis on the non-Brownian world. Leading experts present surveys of recent developments, or focus on some most promising applications.

Tim BEDFORD, Roger COOKE. — **Probabilistic risk analysis: foundations and methods.** — Un vol. relié, 18×25, de xx, 393 p. — ISBN 0-521-7730-2. — Prix: £37.50. — Cambridge University Press, Cambridge, 2001.

Drawing on extensive experience in the theory and applications of risk analysis, the authors focus on the conceptual and mathematical foundations underlying the quantification, interpretation and management of risk. They cover standard topics as well as important new subjects such as the use of expert judgement and uncertainty propagation. The relationship of risk analysis to decision making is highlighted in chapters on influence diagrams and decision theory. Finally, the difficulties of choosing metrics to quantify risk, and current regulatory frameworks are discussed.

A.B.CRUZEIRO, J.-C. ZAMBRINI, (Editors). — **Stochastic analysis and mathematical physics.** — Progress in probability, vol. 50. — Un vol. relié, 16×24, de 158 p. — ISBN 0-8176-4246-3. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2001.

Nine survey articles in this volume extend concepts from classical probability and stochastic processes to a number of areas of mathematical physics. Key topics covered: nonlinear stochastic wave equations, completely positive maps, Mehler-type semigroups on Hilbert spaces, entropic projections, martingale problem and Markov uniqueness of infinite-dimensional Nelson diffusions, analysis in geometric probability theory, measure-preserving shifts on the Wiener space, cohomology on loop spaces, and stochastic Volterra equations.

Peter IMKELLER, Jin-Song VON STORCH, (Editors). — **Stochastic climate models.** — Progress in probability, vol. 49. — Un vol. relié, 16,5×24, de xxvii, 398 p. — ISBN 3-7643-6520-X. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

This book presents a collection of articles based on a selection of lectures given at the interdisciplinary Workshop on Stochastic Climate Models held in Chorin, Germany, from May 31 to

June 2, 1999. The emphasis is on reduced models tractable with advanced tools from the area of stochastic processes, stochastic analysis and random dynamical systems. They include popular examples such as box models for the thermohaline ocean circulation and simple models for El Niño. Among the main topics addressed are a comprehensive survey of the hierarchy of climate models ranging from general circulation models to simple energy balance models; a discussion of the origin of stochasticity in climate modelling by separation of fast and slow scale processes such as weather phenomena or astronomical events; a review of relevant mathematical tools such as stochastic partial differential equations, aspects of stochastic dynamics, large deviations, and averaging techniques; several concrete reduced models are discussed together with methods for their approach such as stochastic resonance, localization of waves, or tracer transport in stochastic flows.

Michael KOHLMANN, Shanjian TANG, (Editors). — **Mathematical finance.** — Workshop of the Mathematical Finance Research Project, Konstanz, Germany, October 5-7, 2000. — Trends in mathematics. — Un vol. relié, 16 × 24, de 374 p. — ISBN 3-7643-6553-6. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

Apart from contributions to the known discrete, Brownian, and Lévy process models, first attempts to describe a market in a reasonable way by a fractional Brownian motion model are presented. As most dynamical financial problems are stochastic filtering or control problems, many talks presented adaptations of control methods and techniques to the classical financial problems in: portfolio selection, irreversible investment, risk sensitive asset allocation, capital asset pricing, hedging contingent claims, option pricing, interest rate theory. The contributions of practitioners link the theoretical results to the steadily increasing flow of real world problems from financial institutions into mathematical laboratories. The present volume reflects this exchange of theoretical and applied results, methods and techniques that made the workshop a fruitful contribution to the interdisciplinary work in mathematical finance.

N. LIMNIOS, G. OPRIŞAN. — **Semi-Markov processes and reliability.** — Statistics for industry and technology. — Un vol. relié, 18,5 × 26, de XII, 222 p. — ISBN 0-8176-4196-3. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2001.

The theory of stochastic processes, for science and engineering, can be considered as an extension of probability theory allowing modeling of the evolution of systems over time. The modern theory of Markov processes has its origins in the studies of A.A. Markov (1856-1922) on sequences of experiments “connected in a chain” and in the attempts to describe mathematically the physical phenomenon of Brownian motion. The theory of stochastic processes entered in a period of intensive development when the idea of Markov property was brought in. This book is a modern overall view of semi-Markov processes and its applications in reliability. It is accessible to readers with a first course in Probability theory (including the basic notions of Markov chain).

N. BALAKRISHNAN, I.A. IBRAGIMOV, V.B. NEVZOROV, (Editors). — **Asymptotic methods in probability and statistics with applications.** — Statistics for industry and technology. — Un vol. relié, 19 × 26, de XXIII, 549 p. — ISBN 0-8176-4214-5. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2001.

The book is organized into ten thematic parts: probability distributions; characterizations of distributions; probabilities and measures in high-dimensional structures; weak and strong limit theorems; large deviation probabilities; empirical processes; order statistics and records; estimation of parameters and hypotheses testing; random walks; and applications to finance. Written in an accessible style, the book conveys a clear and practical perspective of asymptotic

methods. Features and topics: Recent developments in asymptotic methods. Parametric and non-parametric inference. Distribution theory. Stochastic processes. Order statistics. Record values and characterizations.

Statistique

Elart von COLLANI, Klaus DRÄGER. — **Binomial distribution handbook for scientists and engineers.** — Un vol. relié, 16×24, de xvii, 357 p. + 1 CD-ROM. — ISBN 0-8176-4129-7. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

This book deals with estimating and testing the probability of an event. The purpose of the book is twofold: it aims at providing practitioners with refined and easy to use techniques as well as initiating a new field of research in theoretical statistics. The book contains completely new interval and point estimators that are superior to the traditional ones. This is especially true in the case of small and medium sized samples, which are characteristic for many fields of application. The estimators are tailored to a given situation and take into account that generally one knows the size of the probability to be measured. Thus, according the size of the probability, different estimators should be used, similar to the case of measuring length, where the measurement method depends heavily on the size of the length to be measured. This approach yields more precise estimators and more powerful tests. It may also be applied to other estimation problems.

Ludwig FAHRMEIR, Gerhard TUTZ. — **Multivariate statistical modelling based on generalized linear models.** — Second edition. — Springer series in statistics. — Un vol. relié, 16×24, de xxvi, 517 p. — ISBN 0-387-95187-3. — Prix: DM 169.00. — Springer, New York, 2001.

The primary aim of the new edition is to bring the book up-to-date and to reflect on the major new development over the past years. The authors give a detailed introductory survey of the subject based on the analysis of real data drawn from a variety of subjects, including the biological sciences, economics, and the social sciences. Technical details and proofs are deferred to an appendix in order to provide an accessible account for nonexperts. The appendix serves as a reference or brief tutorial for the concepts of the EM algorithm, numerical integration, MCMC, and others. The topics covered include: models for mult categorial responses, model checking, semi- and nonparametric modelling, time series and longitudinal data, random effects models, state-space models, survival analysis.

Samuel KOTZ, Tomasz J. KOZUBOWSKI, Krzysztof PODGÓRSKI. — **The Laplace distribution and generalizations: a revisit with applications to communications, economics, engineering, and finance.** — Un vol. relié, 18×26, de xviii, 349 p. — ISBN 0-8176-4166-1. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2001.

This monograph focuses on the importance of reviving the Laplace distribution and describes the inferential and modeling advantages that this distribution, together with its generalizations and modifications, offers. After presenting an historical introduction to the subject, the authors cover the univariate Laplace distribution, knowledge of which has until now been scattered in the vast statistical, engineering, and mathematical literature. The multivariate and skewed Laplace distribution are discussed here for the first time in detailed monograph form. Generalizations of Laplace distributions and stochastic processes to which they lead are presented as well. Many results, particularly those on the multivariate and skewed Laplace distribution, appear in print for the first time.

R.-D. REISS, M. THOMAS. — **Statistical analysis of extreme values: with applications to insurance, finance, hydrology and other fields.** — Second edition. — Un vol. broché, 17 × 24, de xviii, 443 p. + 1 CD-ROM. — ISBN 3-7643-6487-4. — Prix: SFr. 88.00. — Birkhäuser, Basel, 2001.

This book provides a self-contained introduction to the parametric modeling, exploratory analysis and statistical inference for extreme values. Besides numerous data-based examples, the book contains special chapters about flood frequency analysis (coauthored by J.R.M. Hosking), insurance (coauthored by M. Radtke) and finance (coauthored by C.G. de Vries and S. Caserta). In addition, five longer case studies are included that replace those presented in the first edition. The assessment of the adequacy of the parametric modeling and the statistical inference is facilitated by the included statistical software Academic Xtremes, an interactive menu-driven system which runs under Windows 95, 98, 2000, NT. The applicability of the system is enhanced by the integrated programming language StatPascal. It is the declared aim of the second extended edition to enforce the characteristic of the book of providing a broad statistical background.

Yves TILLÉ. — **Théorie des sondages: échantillonnage et estimation en population finie, cours et exercices avec solutions.** — Sciences SUP. Mathématiques. — Un vol. broché, 17 × 24, de x, 284 p. — ISBN 2-10-005484-8. — Prix: FF 195.00. — Dunod, Paris, distribution Vivendi Universal. Fribourg, Suisse, 2001.

Ce livre offre un aperçu général et cohérent des méthodes statistiques permettant de réaliser les différentes étapes d'une enquête par sondage. Ces étapes sont essentiellement la planification, l'estimation et le traitement des non-réponses. La théorie des sondages est d'abord située dans son contexte historique puis développée dans le cadre de l'approche s'appuyant sur le plan de sondage. Les différentes techniques de planification sont examinées en détail. Un ensemble d'algorithmes de tirage d'échantillon sont intégralement décrits. Les techniques d'estimation classiques sont ensuite appliquées aux plans simples, puis l'estimateur par la régression et les techniques de calage sont appliqués aux plans complexes pour le cas multivarié.

Luisa TURRIN FERNHOLZ, Stephan MORGENTHALER, Werner STAHEL, (Editors). — **Statistics in genetics and in the environmental sciences.** — Trends in mathematics. — Un vol. relié, 17 × 24, de xiv, 183 p. — ISBN 3-7643-6575-7. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2001.

This book grew out of a Workshop on Statistics in the Sciences held on Monte Verità, Switzerland, in the spring of 1999. It offers a snapshot of the role played by statistics in genetics and in the environmental sciences. A few papers dwell on genetic topics, others deal with risk assessment, in particular involving exposure to chemicals. Pollution is addressed in a survey of problems relating to atmospheric chemistry, and in an article on space debris. The collection finally presents several contributions on modern statistical methods in the sciences. The book will be particularly useful for statisticians who wish to be informed about the use of their methods in the sciences.

David WILLIAMS. — **Weighing the odds: a course in probability and statistics.** — Un vol. broché, 17,5 × 24,5, de x, 547 p. — ISBN 0-521-00618-X. — Prix: £24.95. — Cambridge University Press, Cambridge, 2001.

In this book, probability is treated not only as the foundations for statistics, but also as an important and challenging subject in its own right. The statistics chapters present both the Frequentist and Bayesian approaches, and include Gibbs-sampling techniques for the practical implementation of Bayesian methods. Central to the book is the main chapter on statistics which gives the theory of linear regression and ANOVA, and explains how MCMC methods allow us greater flexibility in modelling. Everywhere in the statistics, the emphasis is on confidence intervals rather than on hypothesis tests. Concepts such as Kullback-Leibler relative entropy are used

to illuminate several topics. CorWinBUGS is provided for a number of computational examples and simulations.

Analyse numérique

Elaine COHEN, Richard F. RIESENFIELD, Gershon ELBER. — **Geometric modeling with splines: an introduction.** — Un vol. relié, 16 × 24, de xxii, 616 p. — ISBN 1-56881-137-3. — Prix : US\$ 59.00. — A.K. Peters, Natick, Mass., 2001.

Written by researchers who have helped found and shape the field, this book is a definitive introduction to geometric modeling. The authors present a broad base of fundamentally important techniques for curve and surface representations in computer-aided modeling with focus on how the techniques can be used in design. This book offers a thorough study of the use of splines in general, and B-splines in particular, applied to the domain of geometric modeling. It offers an in-depth look at topics such as knot insertion, degree raising, multi-resolution decomposition and editing, and trivariate and multivariate functions. Appropriate for readers with a moderate degree of mathematical maturity, this book is suitable as an undergraduate or graduate text, and particularly as a comprehensive resource for self-study.

Ronald A. DEVORE, Arieh ISERLES, Endre SÜLI, (Editors). — London Mathematical Society lecture note series, vol. 284. — **Foundations of computational mathematics.** — Un vol. broché, 15,5 × 23, de viii, 400 p. — ISBN 0-521-00349-0. — Prix : £ 34.95. — Cambridge University Press, Cambridge, 2001.

This book presents thirteen papers written by plenary speakers from the 1999 conference, all of whom are the foremost figures in their respective fields. Topics covered include complexity theory, approximation theory, optimisation, computational geometry, stochastic systems and the computation of partial differential equations. The wide range of topics covered illustrates the diversity of contemporary computational mathematics and the intricate web of its interaction with pure mathematics and application area. This book will be of interest to researchers and graduate students in all areas of mathematics involving numerical and symbolic computations.

N. DYN, D. LEVIATAN, D. LEVIN, A. PINKUS, (Editors). — **Multivariate approximation and applications.** — Un vol. relié, 15,5 × 23,5, de x, 286 p. — ISBN 0-521-80023-4. — Prix : £ 45.00. — Cambridge University Press, Cambridge, 2001.

Multivariate approximation theory is today an increasingly active research area. It encompasses a wide range of tools for multivariate approximation such as multi-dimensional splines and finite elements, shift-invariant spaces and radial-basis functions. The multivariate setting is important since it models many real-world problems. This advanced introduction to multivariate approximation and related topics consists of nine articles written by leading experts surveying many of the new ideas and their applications. Each article introduces a particular topic, takes the reader to the forefront of research and ends with a comprehensive bibliography.

Tian-Xiao HE. — **Dimensionality reducing expansion of multivariate integration.** — Un vol. relié, 16,5 × 24, de ix, 225 p. — ISBN 0-8176-4170-X. — Prix : SFr. 118.00. — Birkhäuser, Boston, 2001.

Multivariate integration has been a fundamental subject in mathematics, with broad connections to a number of areas: numerical integration, partial differential equations and Green's function, harmonic analysis, numerical analysis and approximation theory. In this work the exposition focuses primarily on a powerful tool which has become especially important in our computerized age, namely, dimensionality reducing expansion (DRE). The method of dimensionality reducing expansion (DRE) is a technique for changing a higher dimensional integration to a lower dimensional one with or without remainder.

Heinz-Otto KREISS, Hedwig Ulmer BUSENHART. — **Time-dependent partial differential equations and their numerical solution.** — Lectures in mathematics ETH Zürich. — Un vol. broché, 17 × 24, de vi, 82 p. — ISBN 3-7643-6125-5. — Prix: SFr. 34.00. — Birkhäuser, Basel, 2001.

In these notes the authors study time-dependent partial differential equations and their numerical solution. The analytic and the numerical theory are developed in parallel. For example, they discuss well-posed linear and nonlinear problems, linear and nonlinear stability of difference approximations and error estimates. Special emphasis is given to boundary conditions and their discretization. A rather general theory of admissible boundary conditions based on energy estimates or Laplace transform techniques is developed. These results are fundamental for the mathematical and numerical treatment of large classes of applications like Newtonian and non-Newtonian flows, two-phase flows and geophysical problems.

Arnold NEUMAIER. — **Introduction to numerical analysis.** — Un vol. broché, 15 × 23, de viii, 356 p. — ISBN 0-521-33610-4. — Prix: £23.95. — Cambridge University Press, Cambridge, 2001.

This textbook provides an introduction to the justification and development of constructive methods that provide sufficiently accurate approximations to the solution of numerical problems, and the analysis of the influence that errors in data, finite-precision calculations, and approximation formulas have on results, problem formulation, and the choice of method. It also serves as an introduction to scientific programming MATLAB, including many simple and difficult, theoretical and computational exercises. A unique feature of this book is the consequent development of interval analysis as a tool for rigorous computation and computer-assisted proofs, along with the traditional material.

Victor Y. PAN. — **Structured matrices and polynomials: unified superfast algorithms.** — Un vol. relié, 16,5 × 24, de xxiv, 278 p. — ISBN 0-8176-4240-4. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2001.

Structured matrices serve as a natural bridge between the areas of algebraic computations with polynomials and numerical matrix computations, allowing cross-fertilization of both fields. This book covers most fundamental numerical and algebraic computations with Toeplitz, Hankel, Vandermonde, Cauchy and other popular structured matrices. Throughout the computations, the matrices are represented by their compressed images, called displacements, enabling both a unified treatment of various matrix structures and dramatic saving of computer time and memory. The resulting superfast algorithms allow further parallel acceleration using FFT and fast sine and cosine transforms. Included are specific applications to other fields, in particular, superfast solutions to: various fundamental problems of computer algebra; the tangential Nevanlinna–Pick and matrix Nehari problems.

Informatique

Angewandte Informatik. — Duden – Basiswissen Schule. — Un vol. relié, 15,5 × 21,5, de 276 p. + 1 CD-ROM. — ISBN 3-411-71511-1. — Prix: DM 39.90. — PAETEC Verlag für Bildungsmedien, Berlin et Dudenverlag – Bibliographisches Institut & F.A. Brockhaus, Mannheim, 2001.

Das Buch *Angewandte Informatik* ist absolut praxistauglich. Es vermittelt Fachausdrücke und Wissen, wie es im täglichen Umgang mit dem Computer gebraucht wird. Animationen auf der beiliegenden CD-ROM veranschaulichen Arbeitsschritte am PC auf eine frappierend einleuchtende Art. — *Inhalt:* Themen und Inhalte aus dem Sachbereich der informations-

technischen Grundbildung aller Schulformen. Das Anwenderwissen über Betriebssysteme, Textverarbeitung, Tabellenkalkulation, Datenbanken, Grafikprogramme und Internet. — Das Buch zum schnellen und gezielten Nachschlagen und Wiederholen in der Schule, bei den Hausaufgaben sowie bei der Vorbereitung auf Kontrollarbeiten und Prüfungen. — Die CD-ROM als Grundlage für die Arbeit an Referaten, Belegarbeiten, Projekten und besonderen Problemstellungen. Mit ausführlichen und interaktiven Elementen zu vielen Hundert Themen. — Lauffähig mit allen gängigen Browsern für Windows, Linux- und Macintosh- Computer, Direktzugriff auf www.schuelerlexikon.de

Richard H. ENNS, George C. MCGUIRE. — **Nonlinear physics with Mathematica for scientists and engineers.** — Un vol. relié, 18 × 26, de XIII, 691 p. + 1 CD-ROM. — ISBN 0-8176-4223-4. — Prix : SFr. 158.00. — Birkhäuser, Boston, 2001.

In this text extensive use is made of the *Mathematica* computer algebra system. No prior knowledge of *Mathematica* or programming is assumed. The authors have included a CD-ROM that contains over 130 annotated *Mathematica* files. These files may be used to solve and explore the text's 400 problems. This book includes 33 experimental activities that are designed to deepen and broaden the reader's understanding of nonlinear physics. These activities are correlated with the theoretical framework of the text.

Jürgen GERHARD, Walter OEWEL, Frank POSTEL, Stefan WEHMEIER. — **Introduction à MuPAD: une introduction indépendante de la version et de la plate-forme.** — SciFace, Scientific interfaces. — Un vol. broché, 15,5 × 23,5, de XIII, 361 p. — ISBN 3-540-41453-3. — Prix : SFr. 52.00. — Springer, Berlin, 2001.

Ce didacticiel explique les bases de l'utilisation du programme MuPAD et donne un aperçu de la puissance du système. Les principales caractéristiques et les outils de base en sont présentés au cours d'étapes simples. Beaucoup d'exemples et d'exercices illustrent comment utiliser les fonctions, les méthodes graphiques, et le langage de programmation du système. Ce didacticiel se rapporte aux versions 1.4, 2.0 ou ultérieures de MuPAD. Pour permettre aux lecteurs de ce livre de suivre les changements pouvant survenir par la suite, des additifs et des mises à jour de ce didacticiel peuvent être téléchargés à partir de la page web suivante : <http://www.sciface.com/support/springer>.

Bakhadyr KHOUSSAINOV, Anil NERODE. — **Automata theory and its applications.** — Progress in computer science and applied logic, vol. 21. — Un vol. relié, 16,5 × 24, de XIV, 430 p. — ISBN 0-8176-4207-2. — Prix : SFr. 138.00. — Birkhäuser, Boston, 2001.

The book is a uniform treatment of the theory of finite state machines on finite and infinite strings and trees. Many books deal with automata on finite strings, but there are very few expositions that prove the fundamental results of automata on infinite strings and trees. These results have important applications to modeling parallel computation and concurrency, the specification and verification of sequential and concurrent programs, databases, operating systems, computational complexity, and decision methods in logic and algebra. Thus, this textbook fills an important gap in the literature by exposing early fundamental results in automata theory and its applications.

Herwig MAYR. — **Virtual automation: design, modeling, visualization, simulation.** — Mathematical methods in technology, vol. 1. — Un vol. relié, 18 × 26, de XXII, 275 p. — ISBN 0-8247-0736-2. — Prix : \$ 85.00. — Marcel Dekker, New York, 2002.

This textbook presents concepts underlying virtual automation, highlights geometric and kinematic design and modeling, and traces the gradual evolution from graphic simulation

systems to virtual environments while emphasizing fundamentals that have remained unchanged throughout the transition. It surveys algorithmic manufacturing verification when determining collisions in manufacturing cell... illustrates hidden line and surface removal, rendering methods, and texturing to create realistic images... stresses the importance of time-efficient algorithms that can be visualized on modern, window-oriented raster-graphic displays... presents mathematical problems and solutions of solid modeling... considers trends in factory automation and computer-integrated manufacturing... and more.

Bruno PETTAZZONI. — **Seize problèmes d'informatique.** — Avec corrigés détaillés et programmes en Caml. — Scopos, vol. 8. — Un vol. broché, 15,5×23,5, de xv, 226 p. — ISBN 3-540-67387-3. — Prix : DM 64.00. — Springer, Berlin, 2001.

Cet ouvrage rassemble 16 problèmes corrigés d'informatique. Chaque problème est précédé d'une rapide présentation, et le corrigé est complet: chaque question y trouve une réponse. Des notes historiques et bibliographiques apportent des précisions complémentaires, et donnent au lecteur curieux des pistes vers d'autres sources d'information. Les réponses aux questions de programmation sont données dans le langage de programmation fonctionnelle Caml, à la fois concis et élégant. Ce recueil est destiné aux étudiants qui suivent l'enseignement optionnel d'informatique en filière MPSI/MP (classes préparatoires aux grandes écoles d'ingénieurs). Il intéressera également les étudiants en licence ou en maîtrise d'informatique.

Mécanique des particules et systèmes

Stephanie Frank SINGER. — **Symmetry in mechanics: a gentle, modern introduction.** — Un vol. broché, 15,5×23,5, de xii, 193 p. — ISBN 0-8176-4145-9. — Prix : SFr. 58.00. — Birkhäuser, Boston, 2001.

The monograph was written with two goals in mind: to chip away at the language barrier between physicists and mathematicians and to link the abstract constructions of symplectic mechanics to concrete, explicitly calculated examples. The context is the two-body problem, i.e., the derivation of Kepler's laws of planetary motion from Newton's laws of gravitation. After a straightforward and elementary presentation of this derivation in the language of vector calculus, subsequent chapters slowly and carefully introduce symplectic manifolds, Hamiltonian flows, Lie group actions, Lie algebras, momentum maps and symplectic reduction, with many examples, illustrations and exercises. The work ends with the derivation it started with, but in the more sophisticated language of symplectic and differential geometry.

Mécanique des solides, élasticité et plasticité

Y.B. FU, R.W. OGDEN, (Editors). — **Nonlinear elasticity: theory and applications.** — London Mathematical Society lecture note series, vol. 283. — Un vol. broché, 15,5×23, de xi, 525 p. — ISBN 0-521-79695-4. — Prix : £34.95. — Cambridge University Press, Cambridge, 2001.

Nonlinear elasticity is concerned with nonlinear effects associated with deformations of elastic bodies subjected to external forces or temperature variations. It has important applications in, for example, the aerospace and rubber industries. This book provides an up-to-date and concise account of the fundamentals of the theory of nonlinear elasticity and a comprehensive review of several major current research directions in this important field. It combines the characteristics of coherence and detail found in standard treatises with the strength and freshness of research articles. The emphasis is placed firmly on coverage of modern topics and recent developments rather than on the very theoretical approach often found.

Mécanique des fluides, acoustique

C. FOIAS, O. MANLEY, R. ROSA, R. TEMAM. — **Navier-Stokes equations and turbulence.** — Encyclopedia of mathematics and its applications, vol. 83. — Un vol. relié, 15×24, de xiii, 347 p. — ISBN 0-521-36032-3. — Prix: £60.00. — Cambridge University Press, Cambridge, 2001.

This book aims to bridge the gap between practicing mathematicians and the practitioners of turbulence theory. It presents the mathematical theory of turbulence to engineers and physicists as well as the physical theory of turbulence to mathematicians. The book is the result of many years of research by the authors, who analyse turbulence using Sobolev spaces and functional analysis. In this way the authors have recovered parts of the conventional theory of turbulence, deriving rigorously from the Navier-Stokes equations what had been arrived at earlier by phenomenological arguments. The mathematical technicalities are kept to a minimum within the book, enabling the discussion to be understood by a broad audience.

Thermodynamique classique, propagation de la chaleur

Stephen H. DAVIS. — **Theory of solidification.** — Cambridge monographs on mechanics. — Un vol. relié, 16×23, de xiv, 385 p. — ISBN 0-521-65080-1. — Prix: £50.00. — Cambridge University Press, Cambridge, 2001.

The processes of freezing and melting were present at the beginning of the Earth and continue to affect the natural and industrial worlds. The solidification of a liquid or the melting of a solid involves a complex interplay of many physical effects. This book systematically presents the field of continuum solidification theory based on instability phenomena. An understanding of the physics is developed by using examples of increasing complexity with the object of creating a deep physical insight applicable to more complex problems.

Physique statistique, structure de la matière

Pavel M. BLEHER, Alexander R. ITS, (Editors). — **Random matrix models and their applications.** — Mathematical Sciences Research Institute publications, 40. — Un vol. relié, 16,5×24,5, de x, 438 p. — ISBN 0-521-80209-1. — Prix: £45.00. — Cambridge University Press, Cambridge, 2001.

This volume of surveys and research results, based largely on lectures given at the Spring 1999 MSRI program of the same name, covers broad areas such as topologic and combinatorial aspects of random matrix theory; scaling limits, universalities and phase transitions in matrix models; universalities for random polynomials; and applications to integrable systems. Its stress on the interaction between physics and mathematics will make it a welcome addition to the shelves of graduate students and researchers in both fields, as will its expository emphasis.

Astronomie et astrophysique

Arlie O. PETTERS, Harold LEVINE, Joachim WAMBSGANSS. — **Singularity theory and gravitational lensing.** — Progress in mathematical physics, vol. 21. — Un vol. relié, 19×25, de xxiv, 603 p. — ISBN 3-7643-3668-4. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

This monograph, unique in the literature, is the first to develop a mathematical theory of gravitational lensing. The theory applies to any finite number of deflector planes and highlights the distinctions between single and multiple plane lensing. Introductory material in Parts I and II

present historical highlights and the astrophysical aspects of the subject. Among the lensing topics discussed are multiple quasars, giant luminous arcs, Einstein rings, the detection of dark matter and planets with lensing, time delays and the age of the universe (Hubble's constant), microlensing of stars and quasars. The main part of the book – Part III – employs the ideas and results of singularity theory to put gravitational lensing on a rigorous mathematical foundation and solve certain key lensing problems. Results are published here for the first time.

Économie, recherche opérationnelle, jeux

Karl Heinz BORGWARDT. — **Optimierung, Operations Research, Spieltheorie: mathematische Grundlagen.** — Un vol. broché, 17×24, de xx, 622 p. — ISBN 3-7643-6519-6. — Prix: SFr. 68.00. — Birkhäuser, Basel, 2001.

Das vorliegende Buch gibt eine mathematisch fundierte Einführung in die vier Themenbereiche lineare Optimierung, nichtlineare Optimierung, ganzzahlige und kombinatorische Optimierung sowie Spieltheorie. Es basiert auf Vorlesungen des Autors, die er während vielen Jahren gehalten hat. Das Buch ist gedacht als globale oder partielle Vorlage für Dozenten, die solche Themen lehren, für Studenten als Begleitmaterial für Vorlesungen oder zum Selbststudium, wofür ein elementarer mathematischer Hintergrund in Analysis und linearer Algebra vorausgesetzt wird. Die wesentlichen, grundlegenden Erkenntnisse und Begriffe der vier erwähnten Gebiete werden in einer präzisen, ausführlichen und doch einfachen Weise präsentiert und vollständig bewiesen. Die Darstellung wird unterstützt durch zahlreiche Abbildungen, Übungsaufgaben und vollständig durchgerechnete Beispiele.

Biologie et sciences du comportement

Jianhong WU. — **Introduction to neural dynamics and signal transmission delay.** — De Gruyter series in nonlinear analysis and applications, vol. 6. — Un vol. relié, 18×24,5, de x, 182 p. — ISBN 3-11-016988-6. — Prix: DM 99.90. — Walter de Gruyter, Berlin, 2001.

This book gives an introduction to the mathematical modelling and analysis about the computational performance of neural networks from the viewpoint of dynamical systems. The text starts with a short description about the basic structure of a single neuron and the mechanisms of neural signal transmission. It then derives the general additive and shunting equations and describes popular signal transmission functions and network connection topologies. The focus of the book is on the connection between the convergence and global attractor of the model equations and the important cognitive tasks such as storing, recalling and recognizing neuron activation patterns and content-addressable memory performed by the networks.

Systèmes, contrôle optimal

Jean-Paul GAUTHIER, Ivan KUPKA. — **Deterministic observation theory and applications.** — Un vol. relié, 15,5×23, de x, 226 p. — ISBN 0-521-80593-7. — Prix: £47.50. — Cambridge University Press, Cambridge, 2001.

The book presents a general theory as well as a constructive methodology to solve “observation problems”, that is, reconstructing the full information about a dynamical process on the basis of partial observed data. A general methodology to control processes on the basis of the observations is also developed. Illustrative but also practical applications in the chemical and petroleum industries are shown. This book is intended for use by scientists in the areas of automatic control, mathematics, chemical engineering, and physics.

Information, communication, circuits

Oded GOLDREICH. — **Foundations of cryptography: basic tools.** — Un vol. relié, 18×26, de xix, 372 p. — ISBN 0-521-79172-3. — Prix: £40.00. — Cambridge University Press, Cambridge, 2001.

This book presents a rigorous and systematic treatment of the foundational issues: defining cryptographic tasks and solving new cryptographic problems using existing tools. It focuses on the basic mathematical tools: computational difficulty (one-way functions), pseudorandomness, and zero-knowledge proofs. The emphasis is on the clarification of fundamental concepts and on demonstrating the feasibility of solving cryptographic problems rather than on describing ad hoc approaches. The book is suitable for use in a graduate course on cryptography and as a reference book for experts.

Vyacheslav P. TUZLUKOV. — **Signal detection theory.** — Un vol. relié, 17×24, de xviii, 725 p. — ISBN 0-8176-4152-1. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2001.

The problem of noise immunity is a key problem for complex signal processing systems research in science and engineering. New approaches and problems of such complexity study allows the development of a better quality of signal detection in noise. This book is devoted to a new generalized approach to signal detection theory. The main purpose is to present the basic fundamental concepts of the generalized approach to signal processing in noise and to show how it may be applied in various areas of signal processing. The generalized approach allows extension of the well-known boundaries of the potential noise immunity set up by classical and modern signal detection theories. New approaches for construction of detectors with the amplitude, frequency and phase tracking systems based on the generalized approach are presented.