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BULLETIN BIBLIOGRAPHIQUE

Généralités

Martin AIGNER, Günter M. ZIEGLER. — **Das BUCH der Beweise.** — Un vol. relié, $24,5 \times 19,5$, de VI, 247 p. — ISBN 3-540-42535-7. — Prix: € 29.95. — Springer, Berlin, 2002.

Paul Erdős galt unter Mathematikern schon zum Lebzeiten als Legende. Er vagabundierte von einer wissenschaftlichen Tagung zur anderen, irdische Güter bedeuteten ihm wenig und am liebsten sprach er von dem BUCH, in dem Gott die perfekten Beweise für mathematische Sätze aufbewahrt. Diese himmlische Idee des weltabgewandten Mathematikers haben die beiden Berliner Mathematikprofessoren Martin Aigner und Günter Ziegler aufgegriffen und in dem *BUCH der Beweise* verwirklicht. Es erschien 1997 im Wissenschaftsverlag Springer auf Englisch und liegt nun als erweiterte Ausgabe auf Deutsch vor. Die englische Ausgabe, inzwischen in zweiter Auflage erschienen, wurde von der internationalen Presse als einzigartige Sammlung eleganter mathematischer Beweise gefeiert, das selbst Mathematikern noch überraschende Problemlösungen bietet.

Herbert AMANN, Joachim ESCHER. — **Analysis III.** — Grundstudium Mathematik, vol. 3. — Un vol. broché, 17×24 , de XII, 480 p. — ISBN 3-7643-6613-3. — Prix: SFr. 42.00. — Birkhäuser, Basel, 2001.

Der dritte und letzte Band dieser Reihe ist der Integrationstheorie und den Grundlagen der globalen Analysis gewidmet. Es wird wiederum viel Wert auf einen modernen und klaren Aufbau gelegt, der nicht nur eine wohlstrukturierte schöne Theorie liefert, sondern dem Leser auch schlagkräftige Werkzeuge für seine weitere Beschäftigung mit der Mathematik in die Hand gibt. Aus diesem Grund wird beispielsweise konsequent das Bochner-Lebesguesche Integral entwickelt, welches ein unverzichtbares Hilfsmittel für die moderne Theorie der partiellen Differentialgleichungen darstellt. Ebenso wird eine Version des Stokesschen Satzes bewiesen, welche den praktischen Bedürfnissen der Mathematik und theoretischen Physik weitgehend Rechnung trägt.

Ken BINMORE and Joan DAVIES. — **Calculus: concepts and methods.** — Un vol. broché, $19 \times 24,5$, de XIII, 554 p. — ISBN 0-521-77541-8. — Prix: £25.95. — Cambridge University Press, Cambridge, 2001.

This book is a no-nonsense introduction to the subject, with an emphasis on practical problem solving as well as a clear explanation of the underlying concepts. Starting almost from scratch, readers are gently led from single to multivariate calculus and simple differential and difference equations. Throughout the book, new concepts are carefully motivated and lucidly developed. Ideas from univariate calculus and linear algebra are rehearsed, often from a new

perspective, as and when needed. Although there are no theorems or formal proofs, conceptual issues are never dodged, but explained carefully using a variety of geometric devices and illustrations of the techniques. The book is also unusual in offering a range of applications in economics, as well as more conventional scientific examples.

John L. CASTI. — **Mathematical mountaintops: the five most famous problems of all time.** — Un vol. relié, 16×24 , de 177 p. — ISBN 0-19-514171-7. — Prix: £19.95. — Oxford University Press, Oxford, 2001.

In this book, John Casti writes a highly accessible account of the five most famous solved mathematical problems of all time: the four-color map problem, Fermat's last theorem, the continuum hypothesis, Kepler's conjecture, and Hilbert's tenth problem. The book is as much about the human element behind the mathematical solutions as about the actual mathematics, but also contains real mathematics and explanations of mathematical thinking, and not just philosophy of mathematics and the personalities of the mathematicians.

H. GIANELLA, R. KRUST, F. TAIEB, N. TOSEL. — **Problèmes choisis de mathématiques supérieures.** — Scopus, vol. 14. — Un vol. broché, 16×24 , de VIII, 267 p. — ISBN 3-540-42335-4. — Prix: € 26.49. — Berlin, Springer, 2001.

Ce livre rassemble des énoncés de problèmes de mathématiques proposés par les auteurs à leurs étudiants en classe préparatoire MPSI au Lycée Louis-le-Grand à Paris. Il se divise en sept chapitres, correspondant aux principaux thèmes généralement abordés dans une première année d'études scientifiques. Les problèmes sont de difficulté progressive, pour la plupart originaux, et établissent parfois des résultats mathématiques récents. Une brève introduction permet de les situer dans un contexte mathématique plus vaste. Tous les énoncés sont suivis de corrigés détaillés, et complétés s'il y a lieu d'indications bibliographiques permettant d'engager une étude plus poussée du sujet.

Peter HILTON, Derek HOLTON, Jean PEDERSEN. — **Mathematical vistas: from a room with many windows.** — Undergraduate texts in mathematics. — Un vol. relié, 19×24 , de XIV, 335 p. — ISBN 0-387-95064-8. — Prix: € 69.95. — Springer, New York, 2002.

The goal of "Mathematical Vistas" is to stimulate the interest of bright people in mathematics. The book consists of nine related mathematical essays which will intrigue and inform the curious reader. In order to offer a broad spectrum of exciting developments in mathematics, topics are treated at different levels of depth and thoroughness. Some chapters can be understood completely with little background, others can be thought of as appetizers for further study. A number of BREAKS are included in each chapter. These are problems designed to test the reader's understanding of the material thus far in the chapter. This book is a sequel to the authors's popular book "Mathematical Reflections" and can be read independently.

Derek HOLTON, (Editor). — **The teaching and learning of mathematics at university level.** — New ICMI study series, vol. 7. — Un vol. relié, 17×25 , de VIII, 560 p. — ISBN 0-7923-7191-7. — Prix: € 206.00. — Kluwer Academic Publishers, Dordrecht, 2001.

This book arose from the ICMI Study into the teaching and learning of mathematics at university level that began with a conference in Singapore in 1998. The book looks at tertiary mathematics and its teaching from a number of aspects including practice, research, mathematics and other disciplines, technology, assessment, and teacher education. Over 50 authors, all international experts in their field, combined to produce a text that contains the latest in thinking and the best in practice. It therefore provides in one book a state-of-the-art statement on tertiary teaching from a multi-perspective standpoint. No previous book has attempted to take such a wide view of the topic. The book will be of special interest to academic mathematicians, mathematics educators, and educational researchers.

Alain LICHNEWSKY, (Editor). — **Modélisation mathématique: un autre regard.** — Scopus, vol. 16. — Un vol. broché, 24×16, de xv, 267 p. — ISBN 3-540-43136-5. — Prix: € 42.61. — Springer, Berlin, 2002.

Cet ouvrage rassemble plusieurs textes qui ont été soumis aux candidats de l'épreuve de modélisation du concours d'agrégation de mathématiques. Il s'agit d'un ouvrage collectif écrit par des membres du jury. Les textes sont complétés par une présentation de l'auteur, et plusieurs propositions d'exploitation convenant soit à cette épreuve, soit au contexte des T.I.P.E. et T.P.E. sont proposés. Ce livre sera utile aussi bien aux étudiants préparant le concours qu'aux enseignants qui souhaitent développer la modélisation mathématique à travers des projets de T.I.P.E. et de T.P.E.

Charles Chapman PUGH. — **Real mathematical analysis.** — Undergraduate texts in mathematics. — Un vol. relié, 16×24, de xi, 437 p. — ISBN 0-387-95297-7. — Prix: € 59.95. — Springer, New York, 2002.

In this new introduction to undergraduate real analysis, the author takes a different approach from past presentations of the subject by stressing the importance of pictures in mathematics and hard problems. The exposition is informal and relaxed, with many helpful asides, examples, and occasional comments from mathematicians such as Dieudonné, Littlewood, and Osserman. This book is based on the honors version of a course that the author has taught many times, over the last thirty-five years, at the University of California, Berkeley.

Micheál Ó SEARCÓID. — **Elements of abstract analysis.** — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de xii, 298 p. — ISBN 1-85233-424-X. — Prix: € 34.95. — Springer, London, 2002.

The book is written specifically for final-year undergraduate students who should already be familiar with most of the mathematical structures discussed – for example, rings, linear spaces, and metric spaces – and with many of the principal analytical concepts – convergence, connectedness, continuity, compactness and completeness. It reviews the concepts at a slightly greater level of abstraction and enables students to understand their place within the broad framework of set-based mathematics. This book is a rigorous, self-contained introduction to functional analysis that will also serve as a text on abstract mathematics.

David WOLFE, Tom RODGERS, (Editors). — **Puzzlers' tribute: a feast for the mind.** — Un vol. relié, 16×23,5, de xiii, 420 p. — ISBN 1-56881-121-7. — Prix: US\$ 35.00. — A. K. Peters, Natick, Mass., 2002.

Mathematicians, puzzle aficionados, and magicians are experts in the unsolvable, the undoable, and the unbelievable. Their currency is paradox. Martin Gardner stands at the nexus of these communities, and this collection brings together offerings in tribute to him. The list of contributors reads like a *Who's Who* in science and the world of puzzles. The breadth of contributions in form and content, ranging from puzzles to poems, from brainteasers to brief biographical accounts of the greatest puzzler of all, is sure to appeal to a wide variety of readers and the fan club of Martin Gardner.

Histoire

Robert CHURCHHOUSE. — **Codes and ciphers: Julius Caesar, the Enigma, and the internet.** — Un vol. broché, 15×23, de x, 240 p. — ISBN 0-521-00890-5 (relié: 0-521-81054-X). — Prix: £ 14.95 (relié: £ 40.00). — Cambridge University Press, Cambridge, 2001.

The design of code and cipher systems has undergone major changes in modern times. Powerful personal computers have resulted in an explosion of e-banking, e-commerce and

e-mail, and as a consequence the encryption of communications to ensure security has become a matter of public interest and importance. This book describes and analyses many cipher systems ranging from the earliest and most elementary to the most recent and sophisticated, such as RSA and DES, as well as wartime machines such as the Enigma and Hagelin, and ciphers used by spies. Security issues and possible methods of attack are discussed and illustrated by examples. The design of many systems involves advanced mathematical concepts and these are explained in detail in a major appendix.

C. C. HEYDE, S. E. FIENBERG, J. GANI, (Editors). — **Statisticians of the centuries.** — Un vol. broché, 15,5 × 23,5, de XII, 500 p. — ISBN 0-387-95283-7. — Prix: € 44.95. — Springer, New York, 2001.

This work aims to demonstrate the achievements of statistics to a broad audience, and to commemorate the work of celebrated statisticians. This is done through short bibliographies that put the statistical work in its historical and sociological context, emphasizing contributions to science and society in the broadest terms rather than narrow technical achievements. The discipline is treated from its earliest times, and only individuals born prior to the 20th century are included.

Jens HØYRUP. — **Lengths, widths, surfaces: a portrait of old Babylonian algebra and its kin.** — Sources and studies in the history of mathematics and physical sciences. — Un vol. relié, 24 × 16, de XIV, 459 p. — ISBN 0-387-95303-5. — Prix: € 99.95. — Springer, New York, 2002.

In this new examination of the texts of Babylonian cuneiform tablets, the author proposes an interpretation, based on a detailed investigation of the terminology and discursive organization of the texts. The texts turn out to speak not of pure numbers, but of the dimensions and areas of rectangles and other measurable geometrical magnitudes, often serving as representatives of other magnitudes (prices, workdays, etc...), much as pure numbers represent concrete magnitudes in modern applied algebra. The texts show why the procedures are correct, but do not aim at creating theory, nor are their second-degree “equations” of any practical use. Høyrup argues that we should focus on the function of the texts within the schools and within Babylonian culture at large. The book provides a detailed reading of many tablets and a careful examination of the context in which they were produced.

Benjamin H. YANDELL. — **The Honors Class: Hilbert’s problems and their solvers.** — Un vol. relié, 16 × 24, de IX, 486 p. — ISBN 1-56881-141-1. — Prix: US\$39.00. — A. K. Peters, Natick, Mass., 2002.

This very readable book focuses on the people of mathematics and draws the reader into their fascinating world. Hilbert’s problems have become a guiding inspiration to many mathematicians. Those who have succeeded in solving these problems or advancing their solutions form an *Honors Class* among research mathematicians of this century. Yandell presents vivid portraits of the people who devoted their lives to meet Hilbert’s challenge. This book connects mathematicians to their history. It is a wonderful opportunity to acquaint others with the culture of mathematics and its people.

Logique et fondements

Egon BÖRGER, Erich GRÄDEL, Yuri GUREVICH. — **The classical decision problem.** — Universitext. — Un vol. broché, 16 × 24, de X, 482 p. — ISBN 3-540-42324-9. — Prix: € 44.95. — Springer, Berlin, 2001.

This is the most comprehensive treatment available in book form of the classical decision problem of mathematical logic and of the role of the classical decision problem in modern com-

puter science. A revealing analysis of the natural order of decidable and undecidable cases is given. The complete classification of the solvable and unsolvable standard cases of the classical decision problem will be of particular interest to the reader. The classification comes complete with the complexity analysis of the solvable cases, with the comprehensive treatment of the reduction method, and with the model-theoretical analysis of solvable cases. Many cases are treated here for the first time, and a great number of simple proofs and exercises have been included.

Rod DOWNEY, Denis HIRSCHFELDT, (Editors). — **Aspects of complexity: minicourses in algorithmics, complexity and computational algebra.** — Mathematics Workshop, Kaikoura, January 7-15, 2000. — De Gruyter series in logic and its applications, vol. 4. — Un vol. relié, 18×25 , de vi, 172 p. — ISBN 3-11-016810-3. — Prix : € 98.00. — Walter de Gruyter, Berlin, 2001.

The book contains eight detailed expositions of the lectures given at the Kaikoura 2000 Workshop on Computability, Complexity, and Computational Algebra. Topics covered include basic models and questions of complexity theory, the Blum–Shub–Smale model of computation, probability theory applied to algorithmics (randomized algorithms), parametric complexity, Kolmogorov complexity of finite strings, computational group theory, counting problems, and canonical models of ZFC providing a solution to the continuum hypothesis. The text addresses students in computer science or mathematics, and professionals in these areas who seek a complete, but gentle introduction to a wide range of techniques, concepts, and research horizons in the area of computational complexity in a broad sense.

Martin ZEMAN. — **Inner models and large cardinals.** — De Gruyter series in logic and its applications, vol. 5. — Un vol. relié, 18×25 , de xi, 369 p. — ISBN 3-11-016368-3. — Prix : € 138.00. — Walter de Gruyter, Berlin, 2002.

This volume is an introduction to inner model theory, an area of set theory which is concerned with fine structural inner models reflecting large cardinal properties of the set theoretic universe. The monograph contains a detailed presentation of general fine structure theory as well as a modern approach to the construction of small core models, namely those models containing at most one strong cardinal, together with some of their applications. The final part of the book is devoted to a new approach encompassing large inner models which admit many Woodin cardinals. The exposition is self-contained and does not assume any special prerequisites, which should make the text comprehensible not only to specialists but also to advanced students in mathematical logic and set theory.

Analyse combinatoire

Louis FRÉCON. — **Éléments de mathématiques discrètes.** — Informatique INSA Lyon 2^e cycle. — Collection des sciences appliquées de l'INSA de Lyon. — Un vol. broché, 16×24 , de xiv, 378 p. — ISBN 2-88074-479-2. — Prix : SFr. 71.00. — Presses polytechniques et universitaires romandes, Lausanne, 2002.

Indissociables du monde des ordinateurs et indispensables à tout processus de modélisation informatique, les mathématiques discrètes fédèrent diverses disciplines ardues telles que l'algèbre, la logique et la théorie des langages. C'est cependant de manière simple et didactique que l'auteur de cet ouvrage traite de cet univers mathématique. Organisé en trois parties (fondements, graphes et algèbre), exposé sous la forme de deux niveaux de lecture et complété de nombreux exercices, problèmes et thèmes de réflexion, l'ouvrage se pose en synthèse exhaustive des mathématiques discrètes, à la convergence entre théorie et applications. Un ouvrage clair, précis, rigoureux et pédagogique, et une nouvelle référence en la matière.

M. LOTHAIRE. — **Algebraic combinatorics on words.** — Encyclopedia of mathematics and its applications, vol. 90. — Un vol. relié, 16×23,5, de XIII, 504 p. — ISBN 0-521-81220-8. — Prix: £60.00. — Cambridge University Press, Cambridge, 2002.

Combinatorics on words has arisen independently within several branches of mathematics, for instance number theory, group theory and probability, and appears frequently in problems related to theoretical computer science. The first unified treatment of the area was given in Lothaire's book *Combinatorics on Words*. Since its publication, the area has developed and the author now aims to present several more topics as well giving deeper insights into subjects that were discussed in the previous volume. This book is both a comprehensive introduction to the subject and a valuable reference source for researchers. There are numerous examples, full proofs whenever possible and note sections discussing further developments in the area.

J.H. VAN LINT, R. M. WILSON. — **A course in combinatorics.** — Second edition. — Un vol. broché, 18×25, de XIV, 602 p. — ISBN 0-521-00601-5. — Prix: £24.95. — Cambridge University Press, Cambridge, 2001.

This is the second edition of a popular book on combinatorics, a subject dealing with ways of arranging and distributing objects, and which involves ideas from geometry, algebra and analysis. The breadth of the theory is matched by that of its applications, which include topics as diverse as codes, circuit design and algorithm complexity. It has thus become essential for workers in many scientific fields to have some familiarity with the subject. The authors have tried to be as comprehensive as possible, dealing in a unified manner with, for example, graph theory, extremal problems, designs, colorings and codes. The depth and breadth of the coverage make the book a unique guide to the whole of the subject.

Ordre, treillis

B. A. DAVEY, H. A. PRIESTLEY. — **Introduction to lattices and order.** — Second edition. — Un vol. broché, 23×15, de XII, 298 p. — ISBN 0-521-78451-4. — Prix: £19.95. — Cambridge University Press, Cambridge, 2002.

This new edition presents a radical reorganization and updating of the content of the successful first (1990) edition. The primary aim of the original – to serve as a textbook devoted to ordered sets and lattices and to their contemporary applications – is unchanged. The explosive development of theoretical computer science in recent years has, in particular, influenced the book's evolution: a fresh treatment of fixpoint theorems testifies to this and Galois connections now feature prominently. Concept analysis, a methodology for data analysis, has been moved forward, so as to allow an early presentation of both a concrete foundation for the subsequent theory of complete lattices and an application of order theory which is of commercial value in social science.

Théorie des nombres

Michal KRÍŽEK, Florian LUCA, Lawrence SOMER. — **17 lectures on Fermat numbers: from number theory to geometry.** — With foreword by Alena Šolcová. — CMS books in mathematics. Ouvrages de mathématiques de la SMC, vol. 9. — Un vol. relié, 24×16, de XXIV, 257 p. — ISBN 0-387-95332-9. — Prix: € 69.95. — Springer, New York, 2001.

The purpose of this book is to provide readers with an overview of the many properties of Fermat numbers and to demonstrate their numerous appearances and applications in areas such as number theory, probability theory, geometry, and signal processing. This book introduces a general mathematical audience to basic mathematical ideas and algebraic methods connected with the Fermat numbers and provides invaluable reading for amateur and professional alike.

Michael ROSEN. — **Number theory in function fields.** — Graduate texts in mathematics, vol. 210. — Un vol. relié, 16×24, de XII, 358 p. — ISBN 1-85233-437-1. — Prix: € 54.95. — Springer, New York, 2002.

Elementary number theory is concerned with arithmetic properties of the ring of integers. Early in the development of number theory, it was noticed that the ring of integers has many properties in common with the ring of polynomials over a finite field. The first part of this book illustrates this relationship by presenting analogues of the theorems of Fermat and Euler, Wilson's theorem, quadratic (and higher) reciprocity, the prime number theorem, and Dirichlet's theorem on primes in an arithmetic progression. After presenting the required foundational material on function fields, the later chapters explore the analogy between global function fields and algebraic number fields. A variety of topics are presented, including the ABC-conjecture, Artin's conjecture on primitive roots, the Brumer-Stark conjecture, Drinfeld modules, class number formulae, and average value theorems.

Corps et polynômes

Ian STEWART, David TALL. — **Algebraic number theory and Fermat's last theorem.** — 3rd edition. — Un vol. relié, 15×23,5, de XIX, 313 p. — ISBN 1-56881-119-5. — Prix: US\$38.00. — A. K. Peters, Natick, Mass., 2002.

This new, completely revised edition of a classic text introduces all elements necessary for understanding Wiles' proof, as well as new developments and unsolved problems. Written by two distinguished mathematicians, this book weaves together the historical development of the subject with a presentation of mathematical techniques. The result is a solid introduction to one of the most active research areas of mathematics for serious math buffs and a textbook accessible to undergraduates.

Géométrie algébrique

Olivier DEBARRE. — **Higher-dimensional algebraic geometry.** — Universitext. — Un vol. relié, 17×24, de XIII, 233 p. — ISBN 0-387-95227-6. — Prix: € 44.95. — Springer, New York, 2001.

The book studies the classification theory of algebraic varieties. This very active area of research is still developing, but an amazing quantity of knowledge has accumulated over the past twenty years. The author's goal is to provide an easily accessible introduction to the subject. The book begins with preparatory and standard definitions and results, moves on to discuss various aspects of the geometry of smooth projective varieties with many rational curves, and finishes in taking the first steps towards Mori's minimal model program of classification of algebraic varieties by proving the cone and contraction theorems.

Gennady LYUBEZNIK, (Editor). — **Local cohomology and its applications.** — Lecture notes in pure and applied mathematics, vol. 226. — Un vol. broché, 18×26, de IX, 342 p. — ISBN 0-8247-0741-9. — Prix: US\$150.00. — Marcel Dekker, New York, 2002.

This volume collects presentations from the International Workshop on Local Cohomology held in Guanajuato, Mexico, including expanded lectures notes of two minicourses on applications in equivariant topology and foundations of duality theory, and chapters on finiteness properties, D -modules, monomial ideals, combinatorial analysis, and related topics – providing survey articles of interest to experts and novices on recent developments in local cohomology and cohomology of projective schemes. The book discusses the Greenlees-May duality, algorithmic methods, cohomological Hilbert functions, equivariant K -theory, associated primes, squarefree modules, the Čech hull, residue methods... and more.

Kenji MATSUKI. — **Introduction to the Mori Program.** — Universitext. — Un vol. relié, 16×24, de XXIII, 478 p. — ISBN 0-387-98465-8. — Prix: € 74.95. — Springer, New York, 2002.

The purpose of this book is to give a comprehensible account of what is called the Mori Program, a fusion of the so-called Minimal Model Program and the Iitaka Program toward the biregular and/or birational classification of higher-dimensional algebraic varieties. The author presents this theory in an easy and understandable way with lots of background motivation: the Enriques classification of algebraic surfaces is given in the framework of the Mori Program. Prerequisites are those covered in Robin Hartshorne's book, *Algebraic Geometry*. It is the first "friendly" book in this extremely important and active area of research and will become a key resource for graduate students wanting to enter this area.

Algèbre linéaire et multilinéaire, théorie des matrices

T. S. BLYTH, E. F. ROBERSTON. — **Further linear algebra.** — Springer undergraduate mathematics series. — Un vol. broché, 17×24, de 230 p. — ISBN 1-85233-425-8. — Prix: € 34.95. — Springer, London, 2002.

Further Linear Algebra is a natural sequel to the authors' highly acclaimed SUMS volume *Basic Linear Algebra*. The more advanced topics covered here take the reader to the very heart of the subject, and include inner product spaces, direct sums of subspaces, the primary decomposition theorem and various canonical forms for matrices. Furthermore, the authors provide a brief introduction to the use of MAPLE in linear algebra calculations, and biographical profiles of eminent mathematicians associated with the subject. An introductory chapter recaps the prerequisites (for those readers unfamiliar with the first volume), and a wide range of worked examples and exercises (with solutions) are strategically placed throughout the text to consolidate understanding.

Robert C. DALANG, Amel CHAABOUNI. — **Algèbre linéaire: aide-mémoire, exercices et applications.** — Enseignement des mathématiques. — Un vol. broché, 16×24, de XII, 319 p. — ISBN 2-88074-483-0. — Prix: SFr. 93.90. — Presses polytechniques et universitaires romandes, Lausanne, 2001.

Ce volume présente d'abord les notions d'algèbre linéaire indispensables aux étudiants ingénieurs et généralement abordées au cours de la première année du cycle universitaire. Chaque chapitre est accompagné d'une grande variété d'exercices et de leur corrigé. Cette matière est ensuite illustrée par cinq applications de l'algèbre linéaire à des thèmes qui sont de nature à montrer à l'étudiant l'utilité de la théorie. Comment dessiner une fractale ou réaliser un stéréogramme? Que sont les codes correcteurs d'erreurs, ou les premières techniques de cryptographie? Qu'est-ce qu'une chaîne de Markov? Ces sujets, qui utilisent de près les notions d'algèbre linéaire, sont abordés de manière accessible et sont également accompagnés d'exercices.

Anneaux et algèbres

Flávio Ulhoa COELHO, Héctor A. MERKLEN, (Editors). — **Representations of algebras.** — Proceedings of the conference held in São Paulo. — Lecture notes in pure and applied mathematics, vol. 224. — Un vol. broché, 18×26, de XVII, 282 p. — ISBN 0-8247-0733-8. — Prix: US\$ 150.00. — Marcel Dekker, New York, 2002.

Containing papers selected from over 70 participants representing 17 countries, *Representations of Algebras* considers the existence of almost split morphisms and sequences... describes strongly simply connected derived tubular algebras... explores relationships between Koszul algebras and the Gorenstein condition... characterizes hereditary Noetherian categories

containing simple objects... details coil algebras whose repetitive algebra is tame... analyzes Hopf algebras... and more.

Shahn MAJID. — **A quantum groups primer.** — London Mathematical Society lecture note series, vol. 292. — Un vol. relié, 23 × 15, de x, 169 p. — ISBN 0-521-01041-1. — Prix: £ 24.95. — Cambridge University Press, Cambridge, 2002.

This book provides a self-contained introduction to quantum groups as algebraic objects. Based on the author's lecture notes for a Part III pure mathematics course at Cambridge University, it is suitable for use as a textbook for graduate courses in quantum groups or as a supplement to modern courses in advanced algebra. The book assumes a background knowledge of basic algebra and linear algebra. Some familiarity with semisimple Lie algebras would also be helpful. The book is aimed as a primer for mathematicians interested in quantum groups, algebraic groups, knot theory and noncommutative geometry, but will also be useful for mathematical physicists.

Théorie des groupes et généralisations

Michael J. COLLINS, Brian J. PARSHALL, Leonard L. SCOTT, (Editors). — **Modular representation theory of finite groups.** — Proceedings of a Symposium held at the University of Virginia, Charlottesville, Virginia, May 8-15, 1998. — Un vol. relié, 18 × 25, de XII, 262 p. — ISBN 3-11-016367-5. — Prix: € 108.00. — Walter de Gruyter, Berlin, 2001.

The thrust of the book is towards the q -Schur algebra methods and the functorial methods that have been developed in recent years both for the study of representations of finite groups of Lie type in nondefining characteristic and for the abstract study of blocks of group algebras, the two predominant themes of the Symposium. Some results, and all references, have been updated since the Symposium so that this book, through its own content and with its extensive bibliographies, will serve as an invaluable resource both for established researchers and for graduate students who wish to gain a wide general knowledge of the subject starting from a single source.

A. A. IVANOV and S. V. SHPECTOROV. — **Geometry of sporadic groups II: representations and amalgams.** — Encyclopedia of mathematics and its applications, vol. 91. — Un vol. relié, 16 × 23,5, de XVIII, 286 p. — ISBN 0-521-62349-9. — Prix: £ 50.00. — Cambridge University Press, Cambridge, 2002.

The two-volume set of this work provides a complete self-contained proof of the classification of geometries associated with sporadic simple groups: Petersen and tilde geometries. This volume contains a study of the representations of the geometries under consideration in $GF(2)$ -vector spaces as well as in some non-Abelian groups. The central part is the classification of the amalgam of maximal parabolics, associated with a flag transitive action on a Petersen or tilde geometry. The classification is based on the method of group amalgams, the most promising tool in modern finite group theory. Through systematic treatment of group amalgams, the authors establish a deep and important mathematical result.

Péter T. NAGY, Karl STRAMBACH. — **Loops in group theory and Lie theory.** — De Gruyter expositions in mathematics, vol. 35. — Un vol. relié, 25 × 18, de XI, 361 p. — ISBN 3-11-017010-8. — Prix: € 148.00. — Walter de Gruyter, Berlin, 2002.

In this book the theory of binary systems is considered as a part of group theory and, in particular, within the framework of Lie groups. The novelty is the consequent treatment of topological and differentiable loops as topological and differentiable sections in Lie groups. The interplay of methods and tools from group theory, differential geometry, and the theory of foliations is what gives a special flavour to the results presented in this book. It is the first monograph

devoted to the study of global loops. So far books on differentiable loops deal with local loops, and in contrast to Lie groups for non-associative local structures there are, in general, no global forms.

Groupes topologiques; groupes et algèbres de Lie

Andrew BAKER. — **Matrix groups: an introduction to Lie group theory.** — Springer undergraduate mathematics series. — Un vol. broché, 17×24 , de XI, 330 p. — ISBN 1-85233-470-3. — Prix: € 34.95. — Springer, London, 2002.

The main focus is on matrix groups, i.e., closed subgroups of real and complex general linear groups. The first part studies examples and describes the classical families of simply connected compact groups. The second part introduces the idea of a Lie group and studies the associated notion of a homogeneous space using orbits of smooth actions. Throughout, the emphasis is on providing an approach that is accessible to readers equipped with a standard undergraduate toolkit of algebra and analysis.

Andrew PRESSLEY, (Editor). — **Quantum groups and Lie theory.** — London Mathematical Society lecture notes series, vol. 290. — Un vol. broché, $15 \times 22,5$, de VIII, 234 p. — ISBN 0-521-01040-3. — Prix: £ 27.95. — Cambridge University Press, Cambridge, 2001.

To discuss the most fruitful directions for future research, many of the world's leading figures in the area of quantum groups met at the Durham Symposium on Quantum Groups in the summer of 1999, and this volumes provides an excellent overview of the material presented there. It includes important surveys of both cyclotomic Hecke algebras and the dynamical Yang-Baxter equation. Plus contributions that treat the construction and classification of quantum groups of the associated solutions of the quantum Yang-Baxter equation. The representation theory of quantum groups is discussed, as is the function algebra approach to quantum groups, and there is a new look at the origins of quantum groups in the theory of integrable systems.

Fonctions de variables réelles

Piotr MIKUSIŃSKI, Michael D. TAYLOR. — **An introduction to multivariable analysis from vector to manifold.** — Un vol. relié, 24×16 , de X, 295 p. — ISBN 0-8176-4234-X. — Prix: SFr. 136.00. — Birkhäuser, Boston, 2002.

The main topics of the book are: systematic exposition supported by numerous examples and exercises from the computational to the theoretical; brief development of linear algebra in \mathbf{R}^N ; review of the elements of metric space theory; treatment of standard multivariable material: differentials as linear transformations, the inverse and implicit function theorems; Taylor's theorem, the change of variables for multiple integrals; Lebesgue integration introduced in a concrete way rather than via measure theory; later chapters move beyond \mathbf{R}^N to manifolds and analysis on manifolds, covering the wedge product, differential forms, and the generalized Stokes' theorem.

Fonctions d'une variable complexe

Roger GODEMENT. — **Analyse mathématique III: fonctions analytiques, différentielles et variétés, surfaces de Riemann.** — Un vol. broché, $15,5 \times 23,5$, de IX, 338 p. — ISBN 3-540-66142-5. — Prix: € 42.61. — Springer, Berlin, 2002.

Les volumes 3 et 4 de cet ouvrage traitent principalement des fonctions analytiques (théorie de Cauchy, théorie analytique des nombres et fonctions modulaires), ainsi que du calcul différentiel sur les variétés, avec un exposé de l'intégrale de Lebesgue, en suivant d'assez près le célèbre cours donné longtemps par l'auteur à l'Université Paris VII. 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.

Yue Kuen KWOK. — **Applied complex variables for scientists and engineers.** — Un vol. broché, 15×23, de xi, 392 p. — ISBN 0-521-00462-4. — Prix: £19.95. — Cambridge University Press, Cambridge, 2002.

This is an introduction to complex variable methods for scientists and engineers. It begins by carefully defining complex numbers and analytic functions, and proceeds to give accounts of complex integration, Taylor series, singularities, residues and mappings. Both algebraic and geometric tools are employed to provide the greatest understanding, with many diagrams illustrating the concepts introduced. The emphasis is laid on understanding the use of methods, rather than on rigorous proofs. One feature that will appeal to scientists is the high proportion of the book devoted to applications of the material to physical problems. These include detailed treatments of potential theory, hydrodynamics, electrostatics, gravitation and the uses of the Laplace transform for partial differential equations. The text contains some 300 stimulating exercises of high quality, with solutions given to many of them.

Équations différentielles ordinaires

A. A. MARTYNYUK. — **Qualitative methods in nonlinear dynamics: Novel approaches to Liapunov's matrix functions.** — Pure and applied mathematics, vol. 246. — Un vol. relié, 16×24, de x, 301 p. — ISBN 0-8247-0735-4. — Prix: US\$150.00. — New York, Marcel Dekker, 2002.

This monograph presents new approaches to qualitative analysis of continuous, discrete-time, and impulsive nonlinear systems via Liapunov matrix-valued functions that introduce more effective tests for solving problems of estimating the domains of asymptotic stability. The book discusses innovative methods of initial system decomposition... focuses on exponential polystability of separable motions as well as integral and Lipschitz stabilities... considers problems of dynamics of nonlinear systems in the presence of impulsive perturbations... outlines the comparison principle and advantages of cone-valued Liapunov functions... and more.

Équations aux dérivées partielles

S.N. ANTONTSEV, J.I. DÍAZ, S. SHMAREV. — **Energy methods for free boundary problems: applications to nonlinear PDEs and fluid mechanics.** — Progress in nonlinear differential equations and their applications, vol. 48. — Un vol. relié, 17×24, de xi, 329 p. — ISBN 0-8176-4123-8. — Prix: SFr. 178.00. — Birkhäuser, Boston, 2002.

The theory presented has particular relevance to a number of physical applications, including heat conduction, surface and underground water flow, gas flow, and gas filtration with absorption. The work can be divided into two parts. The first part is an exposition of the methods of several general classes of nonlinear stationary equations and systems, and the second part presents applications to the theory. *Energy Methods for Free Boundary Problems* will appeal to applied mathematicians and graduate students whose research is in partial differential equations, nonlinear analysis, and continuum mechanics. Applications to a number of different problems arising in continuum mechanics (fluid dynamics) are presented making this book of equal interest to physicists and engineers as well.

André MARTINEZ. — **An introduction to semiclassical and microlocal analysis.** — Universitext. — Un vol. relié, 16×24, de viii, 190 p. — ISBN 0-387-95344-2. — Prix: € 69.95. — Springer, New York, 2002.

This book presents most of the techniques used in the microlocal treatment of semiclassical problems coming from quantum physics. Both the standard C^∞ pseudodifferential calculus and the analytic microlocal analysis are developed in a context that remains intentionally global so that only the relevant difficulties of the theory are encountered. The originality lies in the fact

that the main features of analytic microlocal analysis are derived from a single and elementary a priori estimate. Various exercises illustrate the chief results of each chapter while introducing the reader to further developments of the theory. Applications to the study of the Schrödinger operator are also discussed, to further the understanding of new notions or general results by placing them in the context of quantum mechanics.

Graeme W. MILTON. — **The theory of composites.** — Cambridge monographs on applied and computational mathematics, vol. 6. — Un vol. relié, 25×18, de xxviii, 719 p. — ISBN 0-521-78125-6. — Prix: £60.00. — Cambridge University Press, Cambridge, 2002.

The theory of composite materials is mathematically the study of partial differential equations with rapid oscillations in their coefficients. An explosion of ideas in the last four decades has dramatically increased our understanding of the relationship between the properties of the constituent materials, the underlying microstructure of a composite, and the overall effective moduli that govern the macroscopic behavior. This renaissance has been fueled by the technological need for improving our knowledge base of composites, by the advance of the underlying mathematical theory of homogenization, by the discovery of new variational principles, by the recognition of how important the subject is to solving structural optimization problems, and by the realization of the connection with the mathematical problem of quasiconvexification. This book surveys these exciting developments at the frontier of mathematics and presents many new results.

Systemes dynamiques et théorie ergodique

Arno BERGER. — **Chaos and chance: an introduction to stochastic aspects of dynamics.** — De Gruyter textbook. — Un vol. relié, 18×25, de x, 245 p. — ISBN 3-11-016991-6. — Prix: € 49.95. — Walter de Gruyter, Berlin, 2001.

The book introduces the topologically oriented approach by discussing bifurcations, full and transient chaos, and symbolic dynamics. The statistical point of view is taken via ergodic and mixing properties, entropy, and a thorough discussion of the Frobenius-Perron operator. Markov chains serve as a means of bringing together both viewpoints, and basic concepts of the general dynamics of measures are presented as a concluding outlook. Theory is developed along a host of illustrative examples, with a few prominent examples like billiards serving as navigation beacons throughout. It is also by a number of challenging exercises that the interplay of chaos and chance will be experienced hands-on.

Équations aux différences finies, équations fonctionnelles

B.G. PACHPATTE. — **Inequalities for finite difference equations.** — Pure and applied mathematics, vol. 247. — Un vol. relié, 16×24, de viii, 514 p. — ISBN 0-8247-0657-9. — Prix: US\$ 195.00. — Marcel Dekker, New York, 2002.

Featuring more than 200 references, *Inequalities for Finite Difference Equations* introduces a variety of new finite difference inequalities... discusses perturbations... describes applications to various types of finite difference and sum-difference equations... focuses on stability of finite difference systems... considers inequalities involving iterated sums... examines basic multidimensional finite difference inequalities... identifies bounds on the solutions of difference equations... and more.

Analyse de Fourier, analyse harmonique abstraite

Lokenath DEBNATH. — **Wavelet transforms and their applications.** — Un vol. relié, 17×24, de xv, 565 p. — ISBN 0-8176-4204-8. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2002.

This book presents a systematic exposition of the basic ideas and results of wavelet transforms and their applications in time-frequency signal analysis and turbulence. Wavelets allow

complex information such as music, speech, images and patterns to be decomposed into elementary forms and subsequently reconstructed with high precision. With an increased demand for mathematical tools to provide theory and applications for science and engineering, the interest in wavelet analysis is intense and pervasive in all disciplines. The major emphasis here is on the logical development of fundamental ideas and the systematic treatment of wavelet analysis and its applications to a wide variety of problems as encountered in various interdisciplinary areas.

Anton DEITMAR. — **A first course in harmonic analysis.** — Universitext. — Un vol. relié, 16×24, de XI, 151 p. — ISBN 0-387-95375-2. — Prix: € 44.95. — Springer, New York, 2002.

In contrast to other books on the topic, this work is entirely based on the Riemann integral and metric spaces instead of the more demanding Lebesgue integral and abstract topology. Nevertheless, almost all proofs are given in full and all central concepts are presented clearly. The first aim of this book is to provide an introduction to Fourier analysis, leading up to the Poisson summation formula. The second aim is to make the reader aware of the fact that both principal incarnations of Fourier theory, the Fourier series and the Fourier transform, are special cases of a more general theory arising in the context of locally compact Abelian groups. The third goal of this book is to introduce the reader to the techniques used in harmonic analysis of noncommutative groups. These techniques are explained in the context of matrix groups as a principal example.

Palle E. T. JORGENSEN. — **Ruelle operators: functions which are harmonic with respect to a transfer operator.** — Memoirs of the American Mathematical Society, no. 720. — Un vol. broché, 18×26, de VIII, 60 p. — ISBN 0-8218-2688-3. — Prix: £28.00. — American Mathematical Society, Providence RI, distributed by Oxford University Press, Oxford, 2001.

Contents: Introduction. — A discrete $ax + b$ group. — Proof of Theorem. — Wavelet filters. — Cocycle equivalence of filter functions. — The transfer operator of Keane. — A representation theorem for R -harmonic functions. — Signed solutions to $R(f) = f$. — Bibliography.

Analyse fonctionnelle

William ARVESON. — **A short course on spectral theory.** — Graduate texts in mathematics, vol. 209. — Un vol. relié, 16×24, de X, 135 p. — ISBN 0-387-95300-0. — Prix: € 49.95. — Springer, New York, 2002.

This book presents the basic tools of modern analysis within the context of the fundamental problem of operator theory: to calculate spectra of specific operators on infinite dimensional spaces, especially operators on Hilbert spaces. The tools are diverse, and they provide the basis for more refined methods that allow one to approach problems that go well beyond the computation of spectra: the mathematical foundations of quantum physics, noncommutative K -theory, and the classification of simple C^* -algebras being three areas of current research activity which require mastery of the material presented here.

Ward CHENEY. — **Analysis for applied mathematics.** — Graduate texts in mathematics, vol. 208. — Un vol. relié, 16×24, de VIII, 444 p. — ISBN 0-387-95279-9. — Prix: € 54.95. — Springer, New York, 2001.

The book begins with a gentle introduction to normed linear spaces and Hilbert spaces, taking the reader as far as the Spectral Theorem for compact normal operators on a Hilbert space. Next, the book treats various practical methods for solving problems that arise in applied mathematics, such as differential equations, boundary value problems, and integral equations. To prepare the reader for work in the modern theory of partial differential equations, the subject of distributions is taken up next. A chapter on the Fourier transform and its applications follows,

and includes a section on Sobolev spaces. Another chapter discusses topics that are related to those in the earlier parts of the book but are more specialized, such as separation theorems, selection theorems, Fredholm theory, and linear topological spaces. The final chapter provides a concise account of measure theory and integration.

M.M. RAO, Z.D. REN. — **Applications of Orlicz spaces.** — Pure and applied mathematics, vol. 250. — Un vol. relié, $15,5 \times 23,5$, de xi, 464 p. — ISBN 0-8247-0730-3. — Prix: US\$185.00. — M. Dekker, New York, 2002.

Presenting previously unpublished material on the fundamental properties of Orlicz sequence and function spaces, this reference/text examines new perspectives and results from geometric, Fourier, stochastic, nonlinear partial differential equations (PDE), composition operator, and metric function space analysis. Applications of Orlicz spaces provides practical applications in statistics and probability... identifies the geometric properties of Banach spaces... considers the martingale concept for vector and operator functions... explores Beurling-Orlicz algebras... discusses embedding theorems for Orlicz-Sobolev spaces... studies the sample path behavior of stochastic processes... and includes other applications.

Raymond A. RYAN. — **Introduction to tensor products of Banach spaces.** — Springer monographs in mathematics. — Un vol. relié, $16,5 \times 24$, de xiv, 225 p. — ISBN 0-387-95335-3. — Prix: € 74.95. — Springer, London, 2002.

This volume provides a self-contained introduction to the theory of tensor products of Banach spaces. The only prerequisites are a basic knowledge of functional analysis and measure theory. Features of particular interest include: A full treatment of the Grothendieck theory of tensor norms. — Coverage of the Chevet-Saphar norms and their duals, along with the associated classes of nuclear, integral and summing operators. — Chapters on the approximation property and the Radon-Nikodým property. — Topics such as the Bochner and Pettis integrals, the principle of local reflexivity and the Grothendieck inequality placed in a natural setting. — The classes of operators generated by a tensor norm and connections with the theory of operator ideals.

Karen SAXE. — **Beginning functional analysis.** — Un vol. relié, 16×24 , de xi, 197 p. — ISBN 0-387-95224-1. — Prix: € 44.95. — Springer, New York, 2002.

The unifying approach of functional analysis is to view functions as points in some abstract vector space and the differential and integral operators relating these points as linear transformations on these spaces. The author presents the basics of functional analysis with attention paid to both expository style and technical detail, while getting to interesting results as quickly as possible. The book is accessible to students who have completed first courses in linear algebra and real analysis. Topics are developed in their historical context, with accounts of the past — including biographies — appearing throughout the text. The book offers suggestions and references for further study, and many exercises.

Peter SCHNEIDER. — **Nonarchimedean functional analysis.** — Springer monographs in mathematics. — Un vol. relié, 17×24 , de 156 p. — ISBN 3-540-42533-0. — Prix: € 39.95. — Springer, Berlin, 2002.

The present book is a self-contained text which leads the reader through all the important aspects of the theory of locally convex vector spaces over nonarchimedean fields. One can observe an increasing interest in methods from nonarchimedean functional analysis, particularly in number theory and in the representation theory of p -adic reductive groups. The book gives a concise and clear account of this theory, it carefully lays the foundations and also develops the

more advanced topics. Although the book will be a valuable reference work for experts in the field, it is mainly intended as a streamlined but detailed introduction for researchers and graduate students who wish to apply these methods in different areas.

Akihito UCHIYAMA. — **Hardy spaces on the Euclidean space.** — Springer monographs in mathematics. — Un vol. relié, 17 × 24, de XIII, 305 p. — ISBN 4-431-70319-5. — Prix: € 79.95. — Springer, Berlin, 2001.

Prof. Peter W. Jones says in his special contribution to this book that Uchiyama's decomposition of BMO functions is considered the Mount Everest of Hardy space theory. This book is based on the draft, which the author Akihito Uchiyama had completed by 1990. It deals with the theory of real Hardy spaces on the n -dimensional Euclidean space. Here the author explains scrupulously some important results on Hardy spaces by real-variable methods, in particular, the atomic decomposition of elements in Hardy spaces and the author's constructive proof of the Fefferman-Stein decomposition of BMO functions into the sum of a bounded function and Riesz transforms of bounded functions.

Théorie des opérateurs

Alexander A. BORICHEV, Nikolai K. NIKOLSKI, (Editors). — **Systems, approximation, singular integral operators, and related topics.** — International Workshop on Operator Theory and Applications, IWOTA 2000. — Operator theory: advances and applications, vol. 129. — Un vol. relié, 18 × 24, de XVIII, 527 p. — ISBN 3-7643-6645-1. — Prix: SFr. 228.00. — Birkhäuser, Basel, 2001.

This book is devoted to some topical problems and applications of operator theory and its interplay with modern complex analysis. It consists of 20 selected survey papers that represent updated (mainly plenary) addresses to the IWOTA 2000 Conference held at Bordeaux from June 13 to 16, 2000. The main subjects of the volume include: Spectral analysis of periodic differential operators and delay equations, stabilizing controllers, Fourier multipliers. — Multivariable operator theory, model theory, commutant lifting theorems, coisometric realizations. — Hankel operators and forms. — Operator algebras. — The Bellman function approach in singular integrals and harmonic analysis, singular integral operators and integral representations. — Approximation in holomorphic spaces. These subjects are unified by the common "operator theoretic approach" and the systematic use of modern function theory techniques.

Israel GOHBERG, Heinz LANGER, (Editors). — **Linear operators and matrices: the Peter Lancaster anniversary volume.** — Operator theory: advances and applications, vol. 130. — Un vol. relié, 17 × 23,5, de VI, 281 p. — ISBN 3-7643-6655-9. — Prix: SFr. 201.50. — Birkhäuser, Basel, 2002.

This volume is dedicated to Peter Lancaster, an outstanding expert in operator and matrix theory, numerical analysis and applications, on the occasion of his seventieth birthday. The book contains a selection of recent original research papers in linear algebra and analysis, areas in which Peter Lancaster was very active. The articles are complemented by biographical data and a list of publications.

László KÉRCHY, Ciprian FOIAS, Israel GOHBERG, Heinz LANGER, (Editors). — **Recent advances in operator theory and related topics: the Béla Szőkefalvi-Nagy memorial volume.** — Operator theory: advances and applications, vol. 127. — Un vol. relié, 18 × 24, de XLIX, 669 p. — ISBN 3-7643-6607-9. — Prix: SFr. 248.00. — Birkhäuser, Basel, 2001.

In August 1999, an international conference was held in Szeged, Hungary, in honor of Béla Szőkefalvi-Nagy, one of the founders and main contributors of modern operator theory. This

volume contains some of the papers presented at the meeting, complemented by several papers of experts who were unable to attend. These 35 refereed articles report on recent and original results in various areas of operator theory and connected fields, many of them strongly related to contributions of Szőkefalvi-Nagy. The scientific part of the book is preceded by fifty pages of biographical material, including several photos.

Calcul des variations

Sergiu AIZICOVICI, Nicolae H. PAVEL, (Editors). — **Differential equations and control theory.** — Lecture notes in pure and applied mathematics, vol. 225. — Un vol. broché, 18×26 , de VIII, 328 p. — ISBN 0-8247-0681-1. — Prix: US\$150.00. — Marcel Dekker, New York, 2002.

Based on papers presented at the International Workshop on Differential Equations and Optimal Control held recently at Ohio University, Athens, this current reference contains new applied, deterministic, stochastic, and theoretical methods. *Differential Equations and Control Theory* details nonlinear programming and control with closed range operators... numerical approximation of the Riccati equation... Wentzell boundary conditions... impulse control for stochastic Navier-Stokes equations... current discoveries on the Lavrentiev phenomenon... least action for N -body problems... and more.

Jean-Baptiste HIRIART-URRUTY, Claude LEMARÉCHAL. — **Fundamentals of convex analysis.** — Grundlehren text editions. — Un vol. broché, 16×24 , de x, 259 p. — ISBN 3-540-42205-6. — Prix: € 44.95. — Springer, Berlin, 2001.

This book is an abridged version of the two volumes *Convex Analysis and Minimization Algorithms I and II* (Grundlehren der mathematischen Wissenschaften Vol. 305 and 306), which presented an introduction to the basic concepts in convex analysis and a study of convex minimization problems. The “backbone” of both volumes was extracted, some material deleted that was deemed too advanced for an introduction, or too closely related to numerical algorithms. Some exercises were included and finally the index has been considerably enriched. The main motivation of the authors was to “light the entrance” of the monument Convex Analysis.

Géométrie

Audun HOLME. — **Geometry: our cultural heritage.** — Un vol. relié, 16×24 , de XVI, 378 p. — ISBN 3-540-41949-7. — Prix: € 34.95. — Springer, Berlin, 2002.

This book contains selected topics from the history of geometry, with “modern proofs” of some of the results, as well as a fully modern treatment of selected basic issues in geometry. The book aims at future teachers of mathematics. All too often the geometry which goes into the syllabus for teacher-students presents the material as pedantic and formalistic, suppressing its dynamic character and its role as part of the foundation for our common cultural heritage. The motivation for the book is to open up these aspects of the field. Another motivation is to provide an invitation to mathematics in general. Thus the book also aims at an informed public interested in making a new beginning in mathematics.

Géométrie différentielle

Scot ADAMS. — **Dynamics on Lorentz manifolds.** — Un vol. relié, 17×23 , de XIII, 402 p. — ISBN 981-02-4382-0. — Prix: £29.00. — World Scientific, Singapore, 2001.

Within the general framework of the dynamics of “large” groups on geometric spaces, the focus is on the types of groups that can act in complicated ways on Lorentz manifolds, and on

the structure of the resulting manifolds and actions. This particular area of dynamics is an active one, and not all the results are in their final form. However, at this point, a great deal can be said about the particular Lie groups that come up in this context. It is impressive that, even assuming very weak recurrence of the action, the list of possible groups is quite restricted. For the most complicated of these groups, one can also describe reasonably well the local structure of the actions that arise.

David E. BLAIR. — **Riemannian geometry of contact and symplectic manifolds.** — Progress in mathematics, vol. 203. — Un vol. relié, 16×24, de XII, 260 p. — ISBN 0-8176-4261-7. — Prix: SFr. 136.50. — Birkhäuser, Boston, 2002.

The first part of the book examines the general theory of symplectic manifolds. Principal circle bundles are then discussed as a prelude to the Boothby-Wang fibration of a compact regular contact manifold in a chapter which deals with the general theory of contact manifolds. The next chapter focuses on the general setting of Riemannian metrics associated with both symplectic and contact structures. Topics treated in the subsequent chapters include integral submanifolds of the contact subbundle, Sasakian manifolds, the important study of the curvature of contact metric manifolds, submanifold theory in both the Kähler and Sasakian settings, tangent sphere bundles, curvature functionals, complex contact manifolds and 3-Sasakian manifolds.

Jürgen JOST. — **Riemannian geometry and geometric analysis.** — Third edition. — Universitext. — Un vol. broché, 24×16, de XIII, 532 p. — ISBN 3-540-42627-2. — Prix: € 44.95. — Springer, Berlin, 2002.

This third edition gives a new presentation of Morse theory and Floer homology that emphasizes the geometric aspects and integrates it into the context of Riemannian geometry and geometric analysis. It also gives a new presentation of the geometric aspects of harmonic maps. This uses geometric methods from the theory of geometric spaces of nonpositive curvature and, at the same time, sheds light on these, as an excellent example of the integration of deep geometric insights and powerful analytical tools.

Stefano MARCHIAFAVA, Paolo PICCINI, Massimiliano PONTECORVO, (Editors). — **Proceedings of the second Meeting “Quaternionic Structures in Mathematics and Physics”.** — Rome, Italy, 6-10 September 1999. — Un vol. relié, 18×26, de xv, 469 p. — ISBN 981-02-4630-7. — Prix: £ 101.00. — World Scientific, Singapore, 2001.

During the last five years, after the first Meeting on “Quaternionic Structures in Mathematics and Physics”, interest in quaternionic geometry and its applications has continued to increase. Progress has been made in constructing new classes of manifolds with quaternionic structures (quaternionic Kähler, hyper-Kähler, hyper-complex, etc.), studying the differential geometry of special classes of such manifolds and their submanifolds, understanding relations between the quaternionic structure and other differential-geometric structures, and also in physical applications of quaternionic geometry. Some generalizations of classical quaternion-like structures (like HKT structures and hyper-Kähler manifolds with singularities) appeared naturally and were studied. Some of those results are published in this book.

Ian R. PORTEOUS. — **Geometric differentiation: for the intelligence of curves and surfaces.** — Second edition. — Un vol. broché, 15,5×23, de xv, 333 p. — ISBN 0-521-00264-8 (relié: 0-521-81040-X). — Prix: £24.95 (relié: £70.00). — Cambridge University Press, Cambridge, 2001.

This is a revised and extended version of the popular first edition, inspired by the work of Thom and Arnol'd on singularity theory. Such topics as umbilics, ridges and subparabolic lines,

all robust features of a smooth surface, which are rarely treated in elementary courses on differential geometry, are considered here in detail. These features are of immediate relevance in modern areas of application such as interpretation of range data from curved surfaces and the processing of magnetic resonance and cat-scan images. The text is based on extensive teaching at Liverpool University to audiences of advanced undergraduate and beginning postgraduate students in mathematics.

Gabor TOTH. — **Finite Möbius groups, minimal immersions of spheres, and moduli.** — Universitext. — Un vol. relié, 16×24 , de xvi, 317 p. — ISBN 0-387-95323-X. — Prix: € 74.95. — Springer, New York, 2002.

In this book, the author traces the development of the study of spherical minimal immersions over the past 30-plus years, including Takahashi's 1966 proof regarding the existence of isometric minimal immersions, DoCarmo and Wallach's study of the uniqueness of the standard minimal immersions that have been obtained by the equivariant construction as $SU(2)$ -orbits, first used by Mashimo in 1984 and then later by DeTurck and Ziller in 1992. In trying to make this monograph accessible not just to research mathematicians but to mathematics graduate students as well, the author included sizeable pieces of material from upper-level undergraduate courses, additional graduate level topics such as Felix Klein's classic treatise of the icosahedron, and a valuable selection of exercises.

Topologie algébrique

Allen HATCHER. — **Algebraic topology.** — Un vol. broché, $17,5 \times 25,5$, de xii, 544 p. — ISBN 0-521-79540-0 (relié: 0-521-79160X). — Prix: £20.95 (relié: £60.00). — Cambridge University Press, Cambridge, 2002.

This geometrically flavored introduction to algebraic topology has the dual goals of serving as a textbook for a standard graduate-level course and as a background reference for many additional topics that do not usually fit into such a course. The broad coverage includes both the homological and homotopical sides of the subject. Care has been taken to present a readable, self-contained exposition, with many examples and exercises, aimed at the student or the researcher from another area of mathematics seeing the subject for the first time.

Topologie des variétés, analyse globale et analyse des variétés

Stancho DIMIEV, Kouei SEKIGAWA, (Editors). — **Perspectives of complex analysis, differential geometry and mathematical physics.** — Proceedings of the 5th International Workshop on Complex Structures and Vector Fields, St. Konstantin, Bulgaria, 3-9 September 2000. — Un vol. relié, 16×23 , de x, 208 p. — ISBN 981-02-4597-1. — Prix: £58.00. — World Scientific, Singapore, 2001.

This workshop brought together specialists in complex analysis, differential geometry, mathematical physics and applications for stimulating cross-disciplinary discussions. The lectures presented ranged over various current topics in those fields. The proceedings will be of value to graduate students and researchers in complex analysis, differential geometry and theoretical physics, and also related fields. 18 papers by V.P. Kostov, L.N. Apostolova, M.S. Marinov, K.P. Petrov, A.M. Kytmanov, S.G. Myslivets, S. Dimiev, J. Ławrynówicz, L.M. Tovar, Y. Hashimoto, K. Ohba, K. Kikuchi, S. Nagami, T. Adachi, H. Hashimoto, K. Mashimo, G. Ganchev, V. Mihova, V. Milousheva, M. Hristov, M. Manev, B.G. Dimitrov, I.B. Pestov, S. Manoff, G. Zlatanov.

S. K. DONALDSON. — **Floer homology groups in Yang-Mills theory.** — Cambridge tracts in mathematics, vol. 147. — Un vol. relié, 16×24 , de VII, 236 p. — ISBN 0-521-80803-0. — Prix: £ 50.00. — Cambridge University Press, Cambridge, 2002.

The concept of Floer homology has been one of the most striking developments in differential geometry over the past 20 years. It yields rigorously defined invariants which can be viewed as homology groups of infinite-dimensional cycles. The ideas have led to great advances in the areas of low-dimensional topology and symplectic geometry and are intimately related to developments in Quantum Field Theory. The first half of this book gives a thorough account of Floer's construction in the context of gauge theory over 3- and 4-dimensional manifolds. The second half works out some further technical developments of the theory, and the final chapter outlines some research developments for the future – including a discussion of the appearance of modular forms in the theory.

Laurent SALOFF-COSTE. — **Aspects of Sobolev-type inequalities.** — London Mathematical Society lecture note series, vol. 289. — Un vol. broché, 16×23 , de X, 190 p. — ISBN 0-521-00607-4. — Prix: £ 25.95. — Cambridge University Press, Cambridge, 2002.

This book focuses on Poincaré, Nash and other Sobolev-type inequalities and their applications to the Laplace and heat diffusion equations on Riemannian manifolds. Applications covered include the ultracontractivity of the heat diffusion semi-group, Gaussian heat kernel bounds, the Rozenblum-Lieb-Cwikel inequality and elliptic and parabolic Harnack inequalities. Emphasis is placed on the role of families of local Poincaré and Sobolev inequalities. The text provides the first self-contained account of the equivalence between the uniform parabolic Harnack inequality, on the one hand, and the conjunction of the doubling volume property and Poincaré's inequality on the other.

Jeffrey R. WEEKS. — **The shape of space.** — Second edition. — Pure and applied mathematics, vol. 249. — Un vol. relié, 16×24 , de XII, 382 p. — ISBN 0-8247-0709-5. — Prix: US\$ 35.00. — Marcel Dekker, New York, 2002.

Maintaining the standard of excellence set by the previous edition, this lighthearted textbook surveys the basic geometry of two- and three-dimensional spaces — stretching students' minds as they learn to visualize new possibilities for the shape of our universe. This book is profusely illustrated with examples and engaging exercises... offers three new chapters that apply topology to cosmology... illustrates the connection between geometry and the behaviour of the physical universe... seeks patterns in the arrangement of galaxies... explains how radiations remaining from the big bang may reveal the actual shape of the universe.

Weiping ZHANG. — **Lectures on Chern-Weil theory and Witten deformations.** — Nankai tracts in mathematics, vol. 4. — Un vol. relié, 16×23 , de XI, 117 p. — ISBN 981-02-4685-4. — Prix: £ 19.00. — World Scientific, Singapore, 2001.

This book is based on the notes of a graduate course on differential geometry which the author gave at the Nankai Institute of Mathematics. It consists of two parts: the first part contains an introduction to the geometric theory of characteristic classes due to Shiing-shen Chern and André Weil, as well as a proof of the Gauss-Bonnet-Chern theorem based on the Mathai-Quillen construction of Thom forms; the second part presents analytic proofs of the Poincaré-Hopf index formula, as well as the Morse inequalities based on deformations introduced by Edward Witten.

Probabilités et processus stochastiques

Sasha CYGANOWSKI, Peter KLOEDEN, Jerzy OMBACH. — **From elementary probability to stochastic differential equations with MAPLE®**. — Universitext. — Un vol. broché, 15,5 × 23,5, de XVI, 310 p. — ISBN 3-540-42666-3. — Prix: € 39.95. — Springer, Berlin, 2002.

The book is based on measure theory which is introduced as smoothly as possible. It is intended for advanced undergraduate students or graduates, not necessarily in mathematics, providing an overview and intuitive background for more advanced studies as well as some practical skills in the use of MAPLE in the context of probability and applications. Although this book contains definitions and theorems, it differs from conventional mathematics books in its use of MAPLE worksheets instead of formal proofs to enable the reader to gain an intuitive understanding of the ideas under concern. As prerequisites the authors assume a familiarity with basic calculus and linear algebra, as well as with elementary ordinary differential equations and, in the final chapter, simple numerical methods for such ODEs.

John HAIGH. — **Probability models**. — Springer undergraduate mathematics series. — Un vol. broché, 23,5 × 17, de VIII, 256 p. — ISBN 1-85233-431-2. — Prix: € 29.95. — Springer, London, 2002.

The book is designed to aid students studying probability as part of an undergraduate course on mathematics or mathematics and statistics. It describes how to set up and analyze models of real-life phenomena that involve elements of chance. Motivation comes from everyday experiences of probability via dice and cards, the idea of fairness in games of chance, and the random ways in which, say, birthdays are shared or particular events arise. Applications include branching processes, random walks, Markov chains, queues, renewal theory, and Brownian motion.

David POLLARD. — **A user's guide to measure theoretic probability**. — Cambridge series in statistical and probabilistic mathematics. — Un vol. broché, 18 × 25,5, de XIII, 351 p. — ISBN 0-521-00289-3 (relié: 0-521-80242-3). — Prix: £20.95 (relié: £60.00). — Cambridge University Press, Cambridge, 2002.

This book grew from a need to teach a rigorous probability course to a mixed audience – statisticians, mathematically inclined biostatisticians, economists, and students of finance – at the advanced undergraduate/introductory graduate level, without the luxury of a course in measure theory as a prerequisite. The core of the book covers the basic topics of independence, conditioning, martingales, convergence in distribution, and Fourier transforms. In a further break with tradition, the necessary measure theory is developed via the identification of integrals with linear functionals on spaces of measurable functions, allowing quicker access to the full power of the measure theoretic methods.

Kazimierz SOBCZYK, David J. KIRKNER. — **Stochastic modeling of microstructures**. — Modeling and simulation in science. Engineering and technology. — Un vol. relié, 16 × 24, de VIII, 270 p. — ISBN 0-8176-4233-1. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2001.

This book presents the language of random field theory and the principles of stochastic geometry in order to give the systematic and concise knowledge necessary for modeling real random heterogeneous media. — *Features*: First comprehensive introduction to the comparatively new field of stochastic modeling of material microstructures. – Presentation of basic tools required from the diverse subjects of random field theory, stochastic geometry and spatial statistics. – Provides background concepts from probability theory and stochastic processes. –

Applications from various fields are discussed, including stochastic wave propagation and the mechanics of porous media flow. — Clear and integrated exposition guides the reader from the basics through problems of contemporary interest.

Statistique

Joseph G. IBRAHIM, Ming-Hui CHEN, Debajyoti SINHA. — **Bayesian survival analysis.** — Springer series in statistics. — Un vol. relié, 17×24, de XIV, 479 p. — ISBN 0-387-95277-2. — Prix: € 79.95. — Springer, New York, 2001.

This book provides a comprehensive treatment of Bayesian survival analysis. Several topics are addressed, including parametric models, semiparametric models based on prior processes, proportional and non-proportional hazards models, frailty models, cure rate models, model selection and comparison, joint models for longitudinal and survival data, models with time varying covariates, missing covariate data... etc. Also various censoring schemes are examined including right and interval censored data. Several additional topics are discussed, including noninformative and informative prior specifications, computing posterior quantities of interest, Bayesian hypothesis testing, variable selection, model selection with nonnested models... etc. The book presents a balance between theory and applications, and for each class of models discussed, detailed examples and analyses from case studies are presented whenever possible.

Analyse numérique

James F. BLOWEY, John P. COLEMAN, Alan W. CRAIG, (Editors). — **Theory and numerics of differential equations: Durham 2000.** — Universitext. — Un vol. relié, 17×24, de x, 280 p. — ISBN 3-540-41846-6. — Prix: € 49.95. — Springer, Berlin, 2001.

This book contains detailed lecture notes on five topics at the forefront of current research in numerical analysis and applied mathematics. Each set of notes presents a self-contained guide to a current research area and has an extensive bibliography. In addition, most of the notes contain detailed proofs of the key results. Current (unsolved) problems are also described and directions for future research are given. The book is suitable for first year graduate students in applied mathematics and for professional mathematicians.

P.G. CIARLET, J.L. LIONS, (Editors). — **Handbook of numerical analysis, vol. 8: Solution of equations in \mathbf{R}^n (part 4), Techniques of scientific computing (part 4), Numerical methods for fluids (part 2).** — Un vol. relié, 17×24,5 de XII, 661 p. — ISBN 0-444-50906-2. — Prix: € 125.00. — North-Holland, Elsevier, Amsterdam, 2002.

Solution of equations in \mathbf{R}^n (part 4): Computational methods for large eigenvalue problems (H. A. van der Vorst). — Techniques of scientific computing (part 4): Theoretical and numerical analysis of differential-algebraic equations (P.J. Rabier, W.C. Reinboldt). — Numerical methods for fluids (part 2): Mathematical modeling and analysis of viscoelastic fluids of the Oldroyd kind (E. Fernández-Cara, F. Guillén, R. R. Ortega).

Alexandre ERN, Jean-Luc GUERMOND. — **Éléments finis: théorie, applications, mise en œuvre.** — Mathématiques & applications, vol. 36. — Un vol. broché, 23 × 15,5, de IX, 430 p. — ISBN 3-540-42615-9. — Prix: € 71.04. — Springer, Paris, 2002.

Ces notes de cours (École Nationale des Ponts et Chaussées, DEA de Mécanique de Paris VI) présentent la méthode des éléments finis dans un cadre mathématique rigoureux. Le contenu

de ce livre fait sortir les techniques d'éléments finis du cadre réducteur Lax-Milgram/Galerkin standard, l'élargissement de la perspective se fondant sur le théorème de Nečas. Il couvre un spectre d'applications relativement large, les résultats théoriques étant systématiquement étayés par des illustrations numériques. Trois plans de lecture sont proposés: le premier conçu pour un lecteur intéressé par les aspect mathématiques, le deuxième s'adressant aux ingénieurs et le troisième limité aux aspects élémentaires. Les pré-requis mathématiques, de niveau 2^e cycle universitaire, sont rappelés dans deux annexes.

Ernst HAIRER, Christian LUBICH, Gerhard WANNER. — **Geometric numerical integration: structure-preserving algorithms for ordinary differential equations.** — Springer series in computational mathematics, vol. 31. — Un vol. relié, 16,5×24, de XIII, 515 p. — ISBN 3-540-43003-2. — Prix: € 79.95. — Springer, Berlin, 2002.

The subject of this book is numerical methods that preserve geometric properties of the flow of a differential equation: symplectic integrators for Hamiltonian systems, symmetric integrators for reversible systems, methods preserving first integrals and numerical methods on manifolds, including Lie group methods and integrators for constrained mechanical systems, and methods for problems with highly oscillatory solutions. A complete theory of symplectic and symmetric Runge-Kutta, composition, splitting, multistep and various specially designed integrators is presented, and their construction and practical merits are discussed. The long-time behavior of the numerical solutions is studied using a backward error analysis (modified equations) combined with KAM theory and related perturbation theories. The book is illustrated by many figures, it treats applications from physics and astronomy and contains many numerical experiments and comparisons of different approaches.

Rodolfo SALVI, (Editor). — **The Navier-Stokes equations: theory and numerical methods.** — Lecture notes in pure and applied mathematics, vol. 223. — Un vol. broché, 18×26, de VIII, 293 p. — ISBN 0-8247-0672-2. — Prix: US\$ 150.00. — Marcel Dekker, New York, 2002.

This volume contains proceedings of the International Conference on the Navier-Stokes Equations: Theory and Numerical Methods, held in Villa Monastero in Varenna, Lecco, Italy, surveying a wide range of topics in fluid mechanics that includes compressible, incompressible, and non Newtonian fluids, the free boundary problem, and hydrodynamic potential theory – presenting original results and the latest findings in numerical experiments and the qualitative behavior of solutions.

Informatique

E. BADOUEL, S. BOUCHERON, A. DICKY, A. PETIT, M. SANTHA, P. WEIL, M. ZEITOUN. — **Problèmes d'informatique fondamentale: voyages au pays de l'informatique fondamentale au gré de problèmes de concours.** — Scopos, vol. 13. — Un vol. broché, 16×24, de 168 p. — ISBN 3-540-42341-9. — Prix: DM 53.39. — Springer, Berlin, 2001.

Ce recueil de problèmes corrigés vise à proposer des voyages initiatiques à quelques domaines de la science informatique. Ces problèmes ont tous été posés au concours d'entrée en troisième année de l'ENS de Cachan, section informatique, ou à l'ancienne option mathématiques de l'informatique de l'agrégation de mathématiques. Ils ont été conçus par des enseignants chercheurs en informatique du CNRS ou de l'Université, et ont pour but principal de tester la capacité des étudiants à comprendre des concepts nouveaux pour eux et à raisonner sur ces concepts. Il s'agit par là de tenter de les mettre dans la situation d'un chercheur et d'évaluer ainsi leur aptitude.

Guy CAPLAT. — **Modélisation cognitive et résolution de problèmes.** — Informatique INSA Lyon 2^e cycle. — Collection des sciences appliquées de l'INSA de Lyon. — Un vol. broché, 16×24, de xv, 199 p. — ISBN 2-88074-495-4. — Prix: SFr. 46.00. — Presses polytechniques et universitaires romandes, Lausanne, 2002.

L'automatisation totale ou partielle d'un processus de résolution de problèmes nécessite une analyse, une modélisation puis une traduction en un programme informatique des connaissances mobilisées par l'être humain lors de cette résolution. En désignant les objets qui nous entourent, en les organisant en structures signifiantes, la connaissance possède un rôle de médiation entre une réalité perçue et des interprétations rationnelles. Mais quelles sont la nature et le rôle des connaissances mobilisées par l'humain dans le cadre d'une activité de résolution de problèmes? Dans quelle mesure ces connaissances sont-elles modélisables? Quelle méthodologie adopter pour traduire des connaissances humaines en programmes informatiques? C'est à ces questions fondamentales que répond cette excellente introduction à la modélisation cognitive.

William H. PRESS, Saul A. TEUKOLSKY, William T. VETTERLING, Brian P. FLANNERY. — **Numerical recipes in C++: the art of scientific computing.** — Second edition. — Un vol. relié, de 18,5×26, de xxviii, 1002 p. — ISBN 0-521-75033-4. — Prix: £45.00. — Cambridge University Press, Cambridge, 2002.

Now the acclaimed second edition of *Numerical Recipes: the Art of Scientific Computing* is available in the C++ object-oriented programming language. Including and updating the full mathematical and explanatory contents of *Numerical Recipes in C*, this new version incorporates completely new C++ versions of the more than 300 routines that are widely recognized as the most accessible and practical basis for scientific computing. In a self contained manner this text proceeds from mathematical and theoretical considerations to actual practical computer routines. Highlights include linear algebra, interpolation, special functions, random numbers, nonlinear sets of equations, optimization, eigensystems, Fourier methods and wavelets, statistical tests, ODEs and PDEs, integral equations and inverse theory.

James A. STORER. — **An introduction to data structures and algorithms.** — Un vol. relié, 19×26, de xvii, 599 p. — ISBN 0-8176-4253-6. — Prix: SFr. 112.00. — Birkhäuser, Boston, 2002.

Data structures and algorithms are presented at the college level in a way that is unique in content and presentation from current available texts. A highly accessible format presents algorithms with one page displays that will appeal to both students and teachers of computer science. The thirteen chapters systematically and comprehensively cover models of computation, lists, induction and recursion, trees, algorithms design, hashing, heaps, balanced trees, sets over a small universe, discrete Fourier transform, strings, graphs, parallel models of computation.

Mécanique des solides, élasticité et plasticité

John G. HARRIS. — **Linear elastic waves.** — Cambridge texts in applied mathematics. — Un vol. broché, 16×23, de xv, 162 p. — ISBN 0-521-64383-X. — Prix: £17.95. — Cambridge University Press, Cambridge, 2001.

Wave propagation and scattering are among the most fundamental processes that we use to comprehend the world around us. While these processes are often very complex, one way to begin to understand them is to study wave propagation in the linear approximation. This is a book describing such propagation using, as a context, the equations of elasticity. Two unifying themes are used. The first is that an understanding of plane wave interactions is fundamental to understanding more complex wave interactions. The second is that waves are best understood in an asymptotic approximation where they are free of the complications of their excitation and are

governed primarily by their propagation environments. The topics covered include reflection, refraction, the propagation of interfacial waves, integral representations, radiation and diffraction, and propagation in closed and open waveguides.

Mécanique des fluides, acoustique

B. E. LAUNDER, N. D. SANDHAM, (Editors). — **Closure strategies for turbulent and transitional flows.** — Un vol. relié, 18,5×25, de XIII, 754 p. — ISBN 0-521-79208-8. — Prix: £85.00. — Cambridge University Press, Cambridge, 2002.

Turbulence modelling is a critically important area in any industry dealing with fluid flow, having many implications for computational fluid dynamics (CFD) codes. The work, which has grown out of a two-week instructional conference at the Newton Institute in Cambridge, is designed to serve as a graduate-level textbook and, equally, as a reference book for research workers in industry or academia. It is structured in three parts: physical and numerical techniques, flow types and processes, future directions.

Thermodynamique classique, propagation de la chaleur

Glenn R. FULFORD, Philip BROADBRIDGE. — **Industrial mathematics: case studies in the diffusion of heat and matter.** — Australian Mathematical Society lecture series, vol. 16. — Un vol. broche, 15×23, de XII, 202 p. — ISBN 0-521-00181-1. — Prix: £17.95 (relié: £47.50). — Cambridge University Press, Cambridge, 2001.

The focus in this text is on mathematical modelling stimulated by contemporary industrial problems involving heat conduction and mass diffusion. These include continuous metal casting, laser drilling, spontaneous combustion of industrial waste, water filtration and crop irrigation. The industrial problems prove to be an excellent setting for the introduction and reinforcement of modelling skills, equation solving techniques, qualitative understanding of partial differential equations and their dynamical properties. Mathematical topics include setting up partial differential equations and boundary conditions, dimensional analysis, scaling, perturbation expansions, boundary value problems, Fourier series, symmetry reductions, Stefan problems and bifurcations.

Mécanique quantique

Victor KAC, Pokman CHEUNG. — **Quantum calculus.** — Universitext. — Un vol. broché, 15,5×23,5, de IX, 112 p. — ISBN 0-387-95341-8. — Prix: € 34.95. — Springer, New York, 2002.

Simply put, quantum calculus is ordinary calculus without taking limits. This undergraduate text develops two types of quantum calculi, the q -calculus and the h -calculus. As this book develops quantum calculus along the lines of traditional calculus, the reader discovers, with a remarkable inevitability, many important notions and results of classical mathematics. This book is based on lectures and seminars given by Professor Kac over the last few years at MIT.

Astronomie et astrophysique

Mikhail Ya. MAROV, Aleksander V. KOLESNICHENKO. — **Mechanics of turbulence of multi-component gases.** — Astrophysics and space science library, vol. 269. — Un vol. relié, 16,5×24,5, de XIII, 375 p. — ISBN 1-4020-0103-7. — Prix: € 144.00. — Kluwer Academic Publishers, Dordrecht, 2002.

This book develops a new mathematical approach for modeling multicomponent gas turbulence that adequately describes the combined processes of dynamics and heat and mass

transfer when chemical kinetics and turbulent mixing are equally important. The developed models include the evolutionary transfer equations for the single-point second correlation moments of turbulent fluctuations of thermohydrodynamical parameters. As compared to previously published books on the problem of turbulence, this book deals, for the first time, with the complicated models of reacting gas mixtures. It is intended for graduate and postgraduate students in the fields of fluid gas dynamics, astrophysics, space physics, planetary sciences, and aeronomy, and especially for those dealing with computer modelling of the processes in such natural media. The book may also be of interest to specialists in the relevant fields of ecology, engineering, and material processing.

Économie, recherche opérationnelle, jeux

Maïtine BERGOUNIOUX. — **Optimisation et contrôle des systèmes linéaires: cours et exercices avec solutions.** — Sciences sup, cours 2^e cycle. — Un vol. broché, 17×24, de IX, 260 p. — ISBN 2-10-005626-3. — Prix: € 25.90. — Dunod, Paris, distribution Vivendi Universal, Fribourg, Suisse, 2001.

Cet ouvrage présente une introduction à la théorie du contrôle optimal des équations différentielles ordinaires ainsi que les fondements de l'optimisation en dimension finie et les algorithmes de base. Une première partie évoque l'optimisation en dimension finie en abordant les notions de convexité, de minimisation sans contraintes et avec contraintes et les principales méthodes de résolution numérique. En seconde partie, les résultats obtenus sont appliqués au contrôle optimal des systèmes différentiels linéaires; quelques notions de calcul différentiel y sont également rappelées.

Gerard SIERKSMA. — **Linear and integer programming: theory and practice.** — Second edition. — Monographs and textbooks in pure and applied mathematics, vol. 245. — Un vol. relié, 19×26, de XIV, 633 p. + 1 disquette. — ISBN 0-8247-0673-0. — Prix: US\$ 175.00. — New York, Marcel Dekker, 2002.

Thoroughly reorganized throughout to provide enhanced logical and clear presentation of the topics discussed, this second edition of *Linear and Integer Programming* offers theory and solutions for in-depth analyses... covers duality, degeneracy, and multiplicity from a geometrical viewpoint... considers branch-and-bound, simplex, revised simplex, and network simplex techniques... examines sensitivity analysis... details the Gilmore–Gomory and Bender decomposition methods... highlights the interior path version of Karmarkar's method... examines mixed-integer programming and the theory of logical variables... demonstrates the theory of totally unimodular and network matrices... outlines linear algebra, convexity, and graph theory... displays flow diagrams for composing courses... contains software for the interior path method and more.

Biologie et sciences du comportement

Martin BENISTON, (Editor). — **Climatic change: implications for the hydrological cycle and for water management.** — Advances in global change research, vol. 10. — Un vol. relié, 16,5×24,5, de XX, 501 p. — ISBN 1-4020-0444-3. — Prix: € 140.00. — Kluwer Academic Publishers, Dordrecht, 2002.

The material presented in this book covers such diverse areas as shifts in precipitation patterns in a changing global climate, the implications of floods or drought, and considerations of managing water resources stressed by poor management practices, overexploitation, and climatic change. In this sense, bringing together, under one cover, issues that are often otherwise dealt with in a mono-disciplinary manner, i.e. either through the physical sciences or through

economic or social considerations, is what constitutes the originality of this work. By presenting the interdisciplinary nature of these topics, the book has added value for scientists who wish to broaden their horizons and avenues of research.

Information, communication, circuits

Kazimierz ALSTER, Jerzy URBANOWICZ, Hugh C. WILLIAMS, (Editors). — **Public-key cryptography and computational number theory.** — Proceedings of the International Conference organized by the Stefan Banach International Mathematical Center Warsaw, Poland, September 11-15, 2000. — Un vol. relié, 18×25, de XII, 331 p. — ISBN 3-11-017046-9. — Prix: DM 256.00. — Walter de Gruyter, Berlin, 2001.

This volume contains articles from leading experts in the world on cryptography and computational number theory, providing an account of the state of research in a wide variety of topics related to the conference theme. It contains fifteen articles on public-key cryptography which are concerned with efficiency and security of DL-cryptosystems, DL-cryptosystems based on elliptic curves, the Jacobian of a hyperelliptic curve, algebraic groups and class groups of imaginary and real quadratic orders, connections between cryptography and error correcting codes, new cryptosystems (NTRU and XTR) and other new ideas in cryptography.

R.J. McELIECE. — **The theory of information and coding.** — Second edition. — Encyclopedia of mathematics and its applications, vol. 86. — Un vol. relié, 16×23,5, de XII, 397 p. — ISBN 0-521-00095-5. — Prix: £60.00. — Cambridge University Press, Cambridge, 2002.

This volume is a self-contained introduction to all basic results in the theory of information and coding. This theory was developed to deal with the fundamental problem of communication, that of reproducing at one point, either exactly or approximately, a message selected at another point. First there is a short and elementary overview that introduces the reader to the concept of coding. Following that part 1 is devoted to Shannon's main results, the channel and source coding theorems, and part 2 is devoted to a study of specific coding schemes which can be used for channel and source coding. The main changes in this edition are in part 2 which has been revised and expanded.

Annette WERNER. — **Elliptische Kurven in der Kryptographie.** — Un vol. broché, 15,5×23,5, de X, 142 p. — ISBN 3-540-42518-7. — Prix: € 22.95. — Springer, Berlin, 2002.

Dieses Lehrbuch bietet eine elementare Einführung in ein mathematisch anspruchsvolles Gebiet der modernen Kryptographie, das zunehmend an praktischer Bedeutung gewinnt. Die relevanten Tatsachen über elliptische Kurven und Public-Key-Kryptographie werden ausführlich erläutert. Dabei werden nur geringe Vorkenntnisse vorausgesetzt, um den Text für Studierende der Mathematik und Informatik ab dem fünften Semester sowie für Praktiker zugänglich zu machen.