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## BULLETIN BIBLIOGRAPHIQUE

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### *Généralités*

Stephen ABBOTT. — **Understanding analysis.** — Undergraduate texts in mathematics. — Un vol. relié,  $16,5 \times 24$ , de XII, 257 p. — ISBN 0-387-95060-5. — Prix: €44.95. — Springer, New York, 2001.

*Understanding Analysis* outlines an elementary, one-semester course designed to expose students to the rich rewards inherent in taking a mathematically rigorous approach to the study of functions of a real variable. The aim of a course in real analysis should be to challenge and improve mathematical intuition rather than to verify it. The philosophy of this book is to focus attention on the questions that give analysis its inherent fascination. Does the Cantor set contain any irrational numbers? Can the set of points where a function is discontinuous be arbitrary? Are derivatives continuous? Are derivatives integrable?... In giving these topics center stage, the hard work of a rigorous study is justified by the fact that they are inaccessible without it.

Williams J. ADAMS, with illustrations by Ramuné B. ADAMS. — **Slippery math in public affairs: price tag and defense.** — Un vol. relié,  $16 \times 24$ , de XIII, 247 p. — ISBN 0-8247-0790-X. — Prix: US\$125.00. — Marcel Dekker, New York, 2002.

This pragmatic book examines flawed usage of math in public affairs through actual cases of how mathematical data and conclusions can be distorted and misrepresented to influence public opinion — highlighting how slippery numbers and questionable mathematical conclusions emerge and what can be done to safeguard against them. This book analyses the cost of “slippery math”... offers exemplary self-study programs to improve perspective on the use of math... depicts the development of math models and their use and misuse... and considers proper and improper polling methods.

A.K. AGARWAL, Bruce C. BERNDT, Christian F. KRATTENTHALER, Gary L. MULLEN, K. RAMACHANDRA, Michel WALDSCHMIDT, (Editors). — **Number theory and discrete mathematics.** — Trends in mathematics. — Un vol. relié,  $17 \times 24$ , de XVI, 314 p. — ISBN 3-7643-6720-2. — Prix: SFr. 142.00. — Birkhäuser, Basel, 2002.

The International Conference on Number Theory and Discrete Mathematics in honor of Srinivasa Ramanujan was held at the Centre for Advanced Study in Mathematics, Panjab University, Chandigarh, India, during October 2-6, 2000, as a contribution to the International Year of Mathematics. This volume contains the refereed proceedings of this conference and collects 29 articles written by some of the leading specialists worldwide. Most of the papers provide recent trends, problems and their current status as well as historical backgrounds of their subjects. Some contributions are related to Ramanujan's mathematics, which should stimulate the interest in his work.

Titu ANDREESCU, Zuming FENG, (Editors). — **Mathematical Olympiads 1999-2000: problems and solutions from around the world.** — Un vol. broché, 15 × 23, de xi, 323 p. — ISBN 0-883-85805-3. — Prix: £21.95. — Mathematical Association of America, distributed by Cambridge University Press, Cambridge, 2002.

This book contains solutions to challenging problems from algebra, geometry, combinatorics, and number theory featured in the earlier book *Mathematical Olympiads: Problems and Solutions from Around the World 1998-1999*, together with selected questions (without solutions) from 30 national and regional Olympiads given during 2000. This collection is intended as practice for serious students who wish to improve their performance. Different nations have different mathematical cultures, and readers will find some of these questions extremely difficult, and some rather easy. The authors have included a wide variety of problems, especially from those countries that have often done well at the International Mathematical Olympiad (IMO).

Dominique AZÉ, Guillaume CONSTANS, Jean-Baptiste HIRIART-URRUTY. — **Calcul différentiel et équations différentielles: exercices et problèmes corrigés.** — Sciences Sup. — Un vol. broché, 17 × 24, de xv, 220 p. — ISBN 2-10-006772-9. — Prix: €26.00. — Dunod, Paris, 2002.

Le présent ouvrage s'adresse principalement aux étudiants du module intitulé «Calcul différentiel – Équations différentielles» dispensé dans les formations de mathématiques au niveau de la licence de mathématiques. Il s'agit d'un recueil de 36 devoirs, au sens premier de ce vocable, c'est-à-dire de travaux à effectuer, en temps limité ou chez soi, seul ou à plusieurs. La durée estimée moyenne est de 3 heures pour chaque devoir, lequel comporte généralement deux ou trois exercices indépendants. Les thèmes traités suivent le déroulement standard du module avec, au fur et à mesure du déroulement, un retour sur les chapitres passés, bref une progression en spirale plutôt que linéaire.

V. BENCI, G. CERAMI, M. DEGIOVANNI, D. FORTUNATO, F. GIANNONI, A.M. MICHELETTI, (Editors). — **Variational and topological methods in the study of nonlinear phenomena.** — Progress in nonlinear differential equations and their applications, vol. 49. — Un vol. relié, 16 × 24, de 131 p. — ISBN 0-8176-4278-1. — Prix: SFr. 179.00. — Birkhäuser, Boston, 2002.

This volume covers recent advances in the field of nonlinear functional analysis and its applications to nonlinear partial and ordinary differential equations, with particular emphasis on variational and topological methods. A broad range of topics is covered, including: concentration phenomena in PDEs; variational methods with applications to PDEs and physics; periodic solutions of ODEs; computational aspects in topological methods; mathematical models in biology. Though well-differentiated, the topics covered are unified through a common perspective and approach. Unique to the work are several chapters on computational aspects and applications to biology, not usually found with such basic studies on PDEs and ODEs. The volume is an excellent reference text for researchers and graduate students in the above-mentioned fields.

Peter BOUWKNEGT, Siye WU, (Editors). — **Geometric analysis and applications to quantum field theory.** — Progress in mathematics, vol. 205. — Un vol. relié, 16 × 24, de ix, 203 p. — ISBN 0-8176-4287-0. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2002.

The various chapters in this volume, treating the interface of geometric analysis and mathematical physics, represent current research interests. *Key topics include:* A self-contained derivation of the partition function of Chern-Simons gauge theory in the semiclassical approximation

(D.H.Adams) — Algebraic and geometric aspects of the Knizhnik-Zamoldchikov equations in conformal field theory (P. Bouwknegt) — Application of the representation theory of loop groups to simple models in quantum field theory and to certain integrable systems (A.L. Carey and E. Langmann) — A study of variational methods in Hermitian geometry from the viewpoint of the critical points of action functionals together with physical backgrounds (A. Harris) — A review of monopoles in nonabelian gauge theories (M.K. Murray) — Exciting developments in quantum cohomology (Y. Ruan) — The physics origin of Seiberg-Witten equations in 4-manifold theory (S.Wu).

Claude P. BRUTER, (Editor). — **Mathematics and art: mathematical visualization in art and education.** — Mathematics and visualization. — Un vol. relié, 16×24, de x, 337 p. — ISBN 3-540-43422-4. — Prix: € 64.95. — Springer, New York, 2002.

Recent progress in research, teaching and communication has arisen from the use of new tools in visualization. To be fruitful, visualization needs precision and beauty. This book is a source of mathematical illustrations by mathematicians as well as artists. It offers examples in many basic mathematical fields including polyhedra theory, group theory, solving polynomial equations, dynamical systems and differential topology. For a long time, arts, architecture, music and painting have been the source of new developments in mathematics. And vice versa, artists have often found new techniques, themes and inspiration within mathematics. Here, while mathematicians provide mathematical tools for the analysis of musical creations, the contributions from sculptors emphasize the role of mathematics in their work.

Bernard DACOROGNA, Chiara TANTERI. — **Analyse avancée pour ingénieurs.** — Enseignement des mathématiques. — Un vol. broché, 16×24, de x, 335 p. — ISBN 2-88074-513-6. — Prix: SFr. 62.00. — Presses polytechniques et universitaires romandes, Lausanne, 2002.

La matière traitée dans cet ouvrage comprend l'analyse vectorielle (théorèmes de Green, de la divergence, de Stokes), l'analyse complexe (fonctions holomorphes, équations de Cauchy-Riemann, séries de Laurent, théorème des résidus, applications conformes) ainsi que l'analyse de Fourier (séries de Fourier, transformée de Fourier, transformée de Laplace, applications aux équations différentielles). Les définitions et les théorèmes principaux sont présentés sous forme d'aide-mémoire, ils sont donc énoncés avec clarté et précision mais sans commentaires. Des exemples significatifs sont ensuite discutés en détail. Enfin de nombreux exercices sont proposés et ils sont intégralement corrigés.

Leo DORTS, Chris DORAN, Joan LASENBY, (Editors). — **Applications of geometric algebra in computer science and engineering.** — Un vol. broché, 16×24, de xxiv, 478 p. — ISBN 0-8176-4267-6. — Prix: SFr. 189.00. — Birkhäuser, Boston, 2002.

The articles in this volume, written by experts in various fields, reflect an interdisciplinary approach to the subject, and highlight a range of techniques and applications. Relevant ideas are introduced in a self-contained manner and only a knowledge of linear algebra and calculus is assumed. — *Features and topics:* the mathematical foundations of geometric algebra are explored; applications in computational geometry include models of reflection and ray-tracing and a new and concise characterization of the crystallographic groups; applications in engineering include robotics, image geometry, control-pose estimation, inverse kinematics and dynamics, control and visual navigation; applications in physics include rigid-body dynamics, elasticity, and electromagnetism; chapters dedicated to quantum information theory dealing with multi-particle entanglement, MRI, and relativistic generalizations.

Gail E. FITZSIMONS. — **What counts as mathematics?: technologies of power in adult and vocational education.** — Mathematics education library, vol. 28. — Un vol. relié, 16×24,5, de 213 p. — ISBN 1-4020-0668-3. — Prix: €90.00. — Kluwer, Dordrecht, 2002.

This book is suitable for mathematics and vocational educators, researchers, and research students. Historical, sociological, and practical elements of mathematics within vocational education are set against the emerging impact technology. Differences between the institution and the workplace are raised as sources of tension as well as offering new possibilities for vocational mathematics education, while recognizing that notions of competence and indeed knowledge itself are non-neutral. This is especially important where a commodified view of education poses a key challenge and on-the-job learning is privileged over traditional conceptions of curriculum and pedagogy. The author draws on an extensive literature base, as well as two decades of practical teaching experience, to critique the impact of neoliberal policies upon mathematics education in a sector where adult and vocational students arguably need the highest quality educational experiences in order to benefit national economies and to enable their democratic participation in a globalized world.

Lawrence GOLDMAN. — **Science, reform, and politics in Victorian Britain: the Social Science Association 1857-1886.** — Un vol. relié, 16×23,5, de xv, 430 p. — ISBN 0-521-33053-X. — Prix: £50.00. — Cambridge University Press, Cambridge, 2002.

This book is a study of the relationship between social thought, social policy and politics in Victorian Britain. The author focuses on a remarkable organization, the National Association for the Promotion of Social Science, known as the Social Science Association. For three decades this served as a forum for the discussion of key Victorian social questions and as an influential adviser to governments, and its history discloses how social policy was made in these years.

Gábor HALÁSZ, László LOVÁSZ, Miklós SIMONOVOTIS, Vera T. SÓS, (Editors). — **Paul Erdős and his mathematics.** — Bolyai Society mathematical studies, vol. 11. — Deux volumes reliés, 17×24, de respectivement, 728 p. (vol. 1), 695 p. (vol. 2). — ISBN 3-540-42236-6. — Prix: SFr. 322.00. — Springer, Berlin, 2002.

Since his death in 1996, many scientific meetings have been dedicated to the memory of Paul Erdős. From July 4 to 11, 1999, the Conference *Paul Erdős and his Mathematics* was held in Budapest, with the ambitious goal of showing the whole range of Paul Erdős' work – a difficult task in view of Paul Erdős' versatility and his broad scope of interest in mathematics. According to this goal, the topics of lectures, given by the leading specialists on the subjects, included number theory, combinatorics, analysis, set theory, probability, geometry and areas connecting them like ergodic theory. Our aim with the publication of these two volumes is the same as with the conference itself. These volumes provide a fascinating and impressive picture of Erdős' monumental oeuvre. A glimpse of Paul Erdős the person is given by reminiscences by his old friends about different periods of his life.

Hans LEWY. — **Selecta.** — Edited by David Kinderlehrer. — 2 vol., de respectivement, xxiii, 357 p. et xviii, 446 p. Prix: SFr. 225.00, chaque volume. — ISBN 0-8176-3524-6 (vol. 1), 0-8176-3523-8 (vol. 2). — Birkhäuser, Boston, 2002.

The work of Hans Lewy (1904-1988) has had a profound influence in the direction of applied mathematics and partial differential equations, in particular, from the late 1920s. We are all familiar with two of the particulars. The Courant-Friedrichs-Lewy condition (1928), or CFL condition, was devised to obtain existence and approximation results... His example of a linear equation with no solution (1957), with its attendant consequence that most equations have no

solutions, was not merely an unexpected fact, but changed the viewpoint of the entire field. Lewy made pivotal contributions in many other areas, for example, the regularity theory of elliptic equations and systems, the Monge-Ampère equation, the Minkowski problem, the asymptotic analysis of boundary value problems, and several complex variables. He was among the first to study variational inequalities. In this two volume work, almost all of Lewy's papers are presented, in chronological order (vol. 1: 1925-1951, vol. 2: 1952-1989). They are preceded by several short essays about Lewy himself, prepared by Helen Lewy, Constance Reid, and David Kinderlehrer, and commentaries on his work by Erhard Heinz, Peter Lax, Jean Leray, Richard MacCamy, François Trèves, and Louis Nirenberg. Additionally, there are Lewy's own remarks on the occasion of his honorary degree from the University of Bonn.

David MUMFORD, Caroline SERIES, David WRIGHT. — **Indra's pearls: the vision of Felix Klein.** — Un vol. relié, 19,5 × 24,5, de XIX, 395 p. — ISBN 0-521-35253-3. — Prix: £29.95. — Cambridge University Press, Cambridge, 2002.

Felix Klein discovered in mathematics an idea prefigured in Buddhist mythology: the heaven of Indra contained a net of pearls, each of which was reflected in its neighbor, so that the whole universe was mirrored in each pearl. Klein studied infinitely repeated reflections and was led to forms with multiple co-existing symmetries, each simple in itself, but whose interactions produce fractals on the edge of chaos. For a century these images barely existed outside the imagination of mathematicians. However in the 1980s the authors embarked on the first computer exploration of Klein's vision, and in so doing found further extraordinary images of their own. Join the authors on the path from some basic mathematical ideas to the simple algorithms that create the delicate fractal filigrees, most of which have never appeared in print before. Beginners can learn to understand what the images mean and follow the step-by-step instructions for writing computer programs that generate them.

Clifford A. PICKOVER. — **The mathematics of Oz: mental gymnastics from beyond the edge.** — Un vol. relié, 16 × 23,5, de XVI, 351 p. — ISBN 0-521-01678-9. — Prix: £21.95. — Cambridge University Press, Cambridge, 2002.

Prepare yourself for a shattering odyssey as *The Mathematics of Oz* unlocks the doors of your imagination. The tests devised by enigmatic Dr. Oz to assess human intelligence will tease the brain of even the most avid puzzle fan. Test your wits on a host of mathematical topics: geometry and mazes, sequences, series, sets, arrangements, probability and misdirection, number theory, arithmetic, and even several problems dealing with the physical world. With numerous illustrations, this is an original, fun-filled, and thoroughly unique introduction to numbers and their role in creativity, computers, games, practical research, and absurd adventures that teeter on the edge of logic and insanity. *The Mathematics of Oz* will have you squirming in frustration and begging for more.

Henri-POINCARÉ. — **Scientific opportunism. L'opportunisme scientifique: an anthology.** — Compiled by Louis Rougier. — Edited by Laurent Rollet. — Publications des Archives Henri-Poincaré. — Un vol. relié, 24 × 17, de XXVI, 208 p. — ISBN 3-7643-6539-0. — Prix: SFr. 88.00. — Birkhäuser, Basel, 2002.

Au cours de sa vie, Poincaré publia trois ouvrages philosophiques majeurs qui connurent un grand succès: *La science et l'hypothèse* (1902), *La valeur de la science* (1905) et *Science et méthode* (1908). Après sa mort, un quatrième volume de ses œuvres philosophiques fut publié par ses héritiers sous le titre de *Dernières pensées* (1913). Autour de 1919, Gustave Le Bon écrivait une lettre à la veuve de Poincaré. En tant que directeur de la *Bibliothèque de Philosophie*

*Scientifique* il lui demandait l'autorisation de publier un nouveau volume posthume. Louis Rougier avait élaboré le projet en collaboration avec Gustave Le Bon... *L'Opportunisme scientifique* devait être le cinquième et dernier volume des œuvres philosophiques de Poincaré. En raison des réserves émises par les héritiers du mathématicien ce livre ne fut jamais publié. Le but du présent ouvrage est de restaurer le projet de Rougier tout en apportant un éclairage sur son histoire et sur la postérité de la pensée philosophique de Poincaré.

## **Histoire**

Jean BAUDET. — **Nouvel abrégé d'histoire de mathématiques.** — Un vol. broché, 17 × 24, de iv, 332 p. — ISBN 2-7117-5316-6. — Prix : € 30.00. — Paris, Vuibert, 2002.

Les mathématiques forment un tout que l'on peut décrire et expliquer sans s'appuyer sur d'autres connaissances. C'est assurément ce qui explique la fascination qu'elles exercent sur certains esprits tandis qu'elles rebutent les autres. Les mathématiques ont préoccupé des créateurs aussi différents qu'Euclide, Omar Khayyam, Descartes et Pascal ; elles ont permis à Einstein de bouleverser notre vision du monde. Plus récemment encore, elles ont rendu possible le développement de l'informatique et des télécommunications. Résumant vingt-six siècles de recherches sur les figures et sur les nombres, cette initiation aux mathématiques ne réclame aucune connaissance préalable. Les notions techniques sont présentées ici en respectant l'ordre dans lequel l'humanité les a rencontrées.

Herbert BECKERT. — **Zur Erkenntnis des Unendlichen.** — Abhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig. Mathematisch-naturwissenschaftliche Klasse, Band 59, Heft 3. — Un vol. broché, 21 × 29,5, de 147 p. — ISBN 3-7776-1136-0. — Prix : € 59.00. — Verlag der Sächsischen Akademie der Wissenschaften zu Leipzig, in Kommission bei S. Hirzel, Stuttgart, 2001.

Das potentielle und Aktualunendliche. — Zur Philosophie des Unendlichen. — Über die Zahl und das Zählen. — Die Entwicklungszüge der Mathematik bis zur Zeit der Renaissance. — Der Weltraum. — Die Zeit. — Die Null und das Nichts. — Zahlenfolgen und der Limesbegriff. — Die Erfindung der Infinitesimalrechnung. — Die Konstruktion der reellen Zahlen über Dezimalbrüche. — Zur Mengenlehre von G. Cantor. — Stetigkeit und Kontinuum. — Die Erfindung der Elementargeometrie. — Zur Theorie der Wahrscheinlichkeit. — Die Methode der idealen Elemente in der Mathematik. — Mathematik und Erfahrung. — Über die Erkenntnis des Unendlichen. — Unendlichkeit und belebte Natur.

John STACHEL. — **Einstein from "B" to "Z".** — Einstein studies, vol. 9. — Un vol. relié, 24 × 16, de xi, 556 p. — ISBN 0-8176-4143-2. — Prix : SFr. 158.00. — Birkhäuser, Boston, 2002.

The author of this collection of 37 published and unpublished articles on Albert Einstein, has written about Einstein and his work for over 40 years. Trained as a theoretical physicist specializing in the theory of relativity, he was chosen as the founding editor of *The Collected Papers of Albert Einstein* 25 years ago, and is currently Director of the Boston University Center for Einstein Studies. Based on a detailed study of documentary evidence, much of which was newly discovered in the course of his work, John Stachel debunks many of the old (and some new) myths about Einstein and offers novel insight into his life and work. Throughout the volume, a new, more human picture of Einstein is offered to replace the plaster saint of popular legend. In particular, a youthful Einstein emerges from the obscurity that previously shrouded his early years, and much new light is shed on the origins of the special and general theories of relativity. Also discussed in some detail are Einstein's troubled relationship with his first wife, his friendships with other physicists such as Eddington, Bose and Pauli, and his Jewish identity.

## *Logique et fondements*

Walter A. CARNIELLI, Marcelo E. CONIGLIO, Itala M. LOFFREDO D'OTTAVIANO, (Editors). — **Paraconsistency: the logical way to the inconsistent.** — Proceedings of the World Congress held in São Paulo. — Lecture notes in pure and applied mathematics, vol. 228. — ISBN 0-8247-0805-9. — Prix: US\$ 185.00. — Marcel Dekker, New York, 2002.

This compilation of the material presented at the 2<sup>nd</sup> World Congress on Paraconsistency introduces the logics of formal inconsistency... details several well-known paraconsistent systems and their subclasses, and highlights several new varieties of paraconsistent structures... establishes new relationship between paraconsistent, ambiguous, fuzzy, many-valued, and modal logics... presents innovative approaches to the problem of referential and inferential many valuedness... proposes a logical system to place the study of antinomies in its most general setting... introduces the system  $NCG_w$ , a sequent calculus formulation equivalent to da Costa's system  $C_w$ , and obtains new results on proof theory for this system... evaluates systems of logic such as Inconsistent Default Logic (IDL) and Logic of Epistemic Inconsistency (LEI) well suited to formalize reasoning under incomplete knowledge.

David MARKER. — **Model theory: an introduction.** — Graduate texts in mathematics, vol. 217. — Un vol. relié, 16×24, de VIII, 342 p. — ISBN 0-387-98760-6. — Prix: € 64.95. — Springer, New York, 2002.

This book is a modern introduction to model theory that stresses applications to algebra throughout the text. The first half of the book includes classical material on model construction techniques, types spaces, prime models, saturated models, countable models, and indiscernibles and their applications. The author also includes an introduction to stability theory beginning with Morley's Categoricity Theorem and concentrating on omega-stable theories. One significant aspect of this text is the inclusion of chapters on important topics not covered in other introductory texts, such as omega-stable groups and the geometry of strongly minimal sets. The author then goes on to illustrate how these ingredients are used in Hrushovski's applications to Diophantine geometry.

## *Analyse combinatoire*

Béla BOLLOBAS, (Editor). — **Contemporary combinatorics.** — Bolyai Society mathematical studies, vol. 10. — Un vol. relié, 17×24,5, de 301 p. — ISBN 3-540-4275-2. — Prix: € 69.95. — Springer, Berlin, Janos Bolyai Mathematical Society, Budapest, 2002.

This volume is a collection of survey papers in combinatorics that have grown out of lectures given in the Workshop on Probabilistic Combinatorics at the Paul Erdős Summer Research Center in Mathematics in Budapest. The papers, reflecting the many facets of modern-day combinatorics, will be appreciated by specialists and general mathematicians alike: assuming relatively little background, each paper gives a quick introduction to an active area, enabling the reader to learn about the fundamental results and appreciate some of the latest developments. An important feature of the articles, very much in the spirit of Erdős, is the abundance of open problems.

Alan TUCKER. — **Applied combinatorics.** — Fourth edition. — Un vol. relié, 16×24, de IX, 446 p. — ISBN 0-471-43809-X. — Prix: £ 40.95. — John Wiley, New York, 2002.

*From the preface:* This book teaches students in the mathematical sciences how to reason and model combinatorially. It seeks to develop proficiency in basic discrete math problem solving in the way that a calculus textbook develops proficiency in basic analysis problem solving.

The three principal aspects of combinatorial reasoning emphasized in this book are: the systematic analysis of different possibilities, the exploration of the logical structure of a problem (e. g., finding manageable subpieces or first solving the problem with three objects instead of  $n$ ), and ingenuity. Although important uses of combinatorics in computer science, operation research, and finite probability are mentioned, these applications are often used solely for motivation. Numerical examples involving the same concepts use more interesting settings such as poker probabilities or logical games.

## ***Théorie des nombres***

Nicholas M. KATZ. — **Twisted  $L$ -functions and monodromy.** — Annals of mathematics studies, No. 150. — Un vol. broché,  $15,5 \times 23,5$ , de VIII, 249 p. — ISBN 0-691-09151-X. — Prix: £25.95. — Princeton University Press, Princeton, N.J., distributed by J. Wiley, Chichester, 2002.

The past century has seen huge progress in the study of elliptic curves, from Mordell's theorem in 1922 to the work of Wiles and Taylor-Wiles in 1994. This book explores two of the remaining fundamental questions: What is the average rank of elliptic curves, and how does the rank vary in various kinds of families of elliptic curves? The author answers these questions for families of "big" twists of objects of all sorts, not just of elliptic curves in the function field case. The book explains various advanced topics ranging from recent results in finite group theory to the machinery of 1-adic cohomology and monodromy.

Igor R. SHAFAREVICH. — **Discourses on algebra.** — Universitext. — Un vol. broché,  $15,5 \times 23,5$ , de X, 276 p. — ISBN 3-540-42253-6. — Prix: €29.95. — Springer, Berlin, 2002.

The classic geometry of Euclid has attracted many for its beauty, elegance, and logical cohesion. In this book, the Russian algebraist I.R. Shafarevich argues with examples that algebra is no less beautiful, elegant, and logically cohesive than geometry. It contains an exposition of some rudiments of algebra, number theory, set theory and probability presupposing very limited knowledge of mathematics. The author is known to be one of the leading mathematicians of the 20<sup>th</sup> century, as well as one of the best mathematical writers.

Victor P. SNAITH. — **Algebraic  $K$ -groups as Galois modules.** — Progress in mathematics, vol. 206. — Un vol. relié,  $16 \times 24$ , de X, 309 p. — ISBN 3-7643-6717-2. — Prix: SFr. 146.00. — Birkhäuser, Basel, 2002.

Throughout number theory and arithmetic-algebraic geometry one encounters objects endowed with a natural action by a Galois group. In particular this applies to algebraic  $K$ -groups and étale cohomology groups. This volume is concerned with the construction of algebraic invariants from such Galois actions. Typically these invariants lie in low-dimensional algebraic  $K$ -groups of the integral group-ring of the Galois group. A central theme, predictable from the Lichtenbaum conjecture, is the evaluation of these invariants in terms of special values of the associated  $L$ -functions at a negative integer depending on the algebraic  $K$ -theory dimension. In addition, the "Wiles unit conjecture" is introduced and shown to lead both to an evaluation of the Galois invariants and to explanation of the Brumer-Coates-Sinnott conjecture.

Gisbert WÜSTHOLZ, (Editor). — **A panorama in number theory or the view from Baker's garden.** — Un vol. relié,  $15,5 \times 23,5$  de XV, 356 p. — ISBN 0-521-80799-9. — Prix: £55.00. — Cambridge University Press, Cambridge, 2002.

Alan Baker's 60th birthday in August 1999 offered an ideal opportunity to organize a conference at ETH Zürich with the goal of presenting the state of the art in number theory and

geometry. Many of the leaders in the subject were brought together to present an account of research in the last century as well as speculations for possible further research. The papers in this volume cover a broad spectrum of number theory including geometric, algebrao-geometric and analytic aspects. This volume will appeal to number theorists, algebraic geometers, and geometers with a number theoretic background and to mathematicians (research students) who are interested in being informed in the state of number theory today and in possible developments for the future.

### *Corps et polynômes*

Helmut KOCH. — **Galois theory of  $p$ -extensions.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de XIII, 190 p. — ISBN 3-540-43629-4. — Prix: € 69.95. — Springer, Berlin, 2002.

First published in German in 1970 and translated into Russian in 1973, this classic now becomes available in English. After introducing the theory of pro- $p$  groups and their cohomology, it discusses presentations of the Galois groups  $G_S$  of maximal  $p$ -extensions of number fields that are unramified outside a given set  $S$  of primes. It computes generators and relations as well as the cohomological dimension of some  $G_S$ , and gives applications to infinite class field towers. The book demonstrates that the cohomology of groups is very useful for studying Galois theory of numbers fields; at the same time, it offers a down to earth introduction to the cohomological method.

### *Géométrie algébrique*

M.C. BELTRAMETTI, F. CATANESE, C. CILIBERTO, A. LANTERI, C. PEDRINI. — **Algebraic geometry: a volume in memory of Paolo Francia.** — Un vol. relié, 18×24,5, de x, 355 p. — ISBN 3-11-017180-5. — Prix: € 138.32. — Walter de Gruyter, Berlin, 2002.

The volume consists of invited refereed papers dedicated to the memory of Paolo Francia, who was an outstanding mathematician at the University of Genoa where he held a chair of geometry. The contributions cover a wide spectrum of algebraic geometry, ranging from motives theory to numerical algebraic geometry, and are mainly focused on higher dimensional varieties and minimal model program, and also on surfaces of general type. Partly the articles are based on talks given at a Conference in Memory of Paolo Francia (1951-2000) held in Genoa in September 2001. In addition to algebraic geometers, the volume will be of interest also to researchers working in differential geometry and commutative algebra.

Anatoly LIBGOBER, Mihai TIBĂR, (Editors). — **Trends in singularities.** — Trends in mathematics. — Un vol. relié, 17×24, de IX, 246 p. — ISBN 3-7643-6704-0. — Prix: SFr. 132.00. — Birkhäuser, Basel, 2002.

The collection of papers in this volume represents recent advances in the geometry and topology of singularities. Written by well-known specialists, the articles cover a broad range of topics that provide a focus for ongoing research and investigation. The contributions discuss local as well as global aspects, endowing the reader with an overview on the present state of the art. The volume is intended for a large audience in pure and applied mathematics, including researchers and graduate students working in algebraic geometry, singularity theory, topology and related fields. The reader will find up-to-date information on a wide variety of contemporary problems involving singularities.

Qing LIU. — **Algebraic geometry and arithmetic curves.** — Translated by Reinie Erné. — Oxford graduate texts in mathematics, vol. 6. — Un vol. relié,  $16,5 \times 24$ , de xv, 576 p. — ISBN 0-19-850284-2. — Prix: £45.00. — Cambridge University Press, Cambridge, 2002.

The first part introduces basic objects such as schemes, morphisms, base change, local properties (normality, regularity, Zariski's Main Theorem). This is followed by the more global aspects: coherent sheaves and a finiteness theorem for their cohomology groups. Then follows a chapter on sheaves of differentials, dualizing sheaves, and Grothendieck's duality theory. The first part ends with the theorem of Riemann-Roch and its application to the study of smooth projective curves over a field. Singular curves are treated through a detailed study of the Picard group. The second part starts with blowing-ups and desingularisation (embedded or not) of fibered surfaces over a Dedekind ring that leads on to intersection theory on arithmetic surfaces. Castelnuovo's criterion is proved and also the existence of the minimal regular model. This leads to the study of reduction of algebraic curves. The case of elliptic curves is studied in detail. The book concludes with the fundamental theorem of stable reduction of Deligne-Mumford. The book is essentially self-contained, including the necessary material on commutative algebra.

Emmanuel PEYRE, Yuri TSCHINKEL, (Editors). — **Rational points on algebraic varieties.** — Progress in mathematics, vol. 199. — Un vol. relié,  $16 \times 24$ , de xvi, 446 p. — ISBN 3-7643-6612-5. — Prix: SFr. 128.00. — Birkhäuser, Basel, 2002.

This book is devoted to the study of rational and integral points on higher-dimensional algebraic varieties. It contains carefully selected research papers addressing the arithmetic geometry of varieties which are not of general type, with an emphasis on how rational points are distributed with respect to the classical, Zariski and adelic topologies. The present volume gives a glimpse of the state of the art of this rapidly expanding domain in arithmetic geometry. The techniques involve explicit geometric constructions, ideas from the minimal model program in algebraic geometry as well as analytic number theory and harmonic analysis on adelic groups.

## *Anneaux et algèbres*

Ken A. BROWN, Ken R. GOODEARL. — **Lectures on algebraic quantum groups.** — Advanced courses in mathematics CRM Barcelona. — Un vol. broché,  $17 \times 24$ , de ix, 348 p. — ISBN 3-7643-6714-8. — Prix: SFr. 59.00. — Birkhäuser, Basel, 2002.

This book consists of an expanded set of lectures on algebraic aspects of quantum groups, concentrating particularly on quantized coordinate rings of algebraic groups and spaces and on quantized enveloping algebras of semisimple Lie algebras. The approach, a mixture of introductory textbook, lecture notes, and overview survey, is designed to allow access by graduate students and by researchers new to the areas, as well as by experts, and to provide a basis for further study of the subject. Thus, large parts of the material are developed in full textbook style, with many examples and numerous exercises; other portions are discussed with sketches of proofs, while still other material is quoted without proof. Much associated background material is outlined in a series of appendices. Among the topics covered for the first time in book format are a discussion of the nature of the prime spectrum of a "generic" quantum algebra, and details of how the Hopf algebra structure of the algebra and the Poisson algebra structure of the center carry important consequences for quantized algebras when the quantum parameter is a root of unity. The book is structured in three parts: one introductory part with many examples plus background material, one concentrating on generic quantized coordinate, and one dealing with quantized algebras at roots of unity.

Marco FONTANA, Salah-Eddine KABBAJ, Sylvia WIEGAND, (Editors). — **Commutative ring theory and applications: proceedings of the fourth International Conference.** — Lecture notes in pure and applied mathematics, vol. 231. — Un vol. broché,  $17,5 \times 25$ , de XII, 499 p. — ISBN 0-8247-0855-5. — Prix: US\$ 185.00. — Marcel Dekker, New York, 2002.

Featuring presentations from the fourth International Conference on Commutative Algebra held in Fez, Morocco, this reference presents recent breakthroughs and new trends in the growing area of commutative algebra—emphasizing innovative applications and connections to algebraic number theory and geometry, and homological and computational algebra. This book discusses linear Diophantine equations... going-down and going-up properties... graded modules and analytic spread... Gröbner bases and computational methods... Krull domains and generalizations... prime spectra and dimension theory, and covers algebroïd curves and chain conditions... ideal and modules... integral independence... pullbacks and ultraproducts... tight closure and completions... and power series and polynomial rings.

Susan MONTGOMERY, Hans-Jürgen SCHNEIDER, (Editors). — **New directions in Hopf algebras.** — Mathematical Sciences Research Institute publications, vol. 43. — Un vol. relié,  $16,5 \times 24$ , de X, 485 p. — ISBN 0-521-81512-6. — Prix: £55.00. — Cambridge University Press, Cambridge, 2002.

Hopf algebras have important connections to quantum theory, Lie algebras, knot and braid theory, operator algebras, and other areas of physics and mathematics. The contributors to this volume of expository papers were participants in the Hopf Algebras Workshop held at MSRI as part of the 1999-2000 Year of Noncommutative Algebra. Together the papers give a clear picture of the current trends in this active field, with a focus on what is likely to be important in future research. Among the topics covered are results toward the classification of finite-dimensional Hopf algebras (semisimple and non-semisimple), as well as what is known about the extension theory of Hopf algebras. Some papers consider the Hopf version of classical topics, such as the Brauer group, while others are closer to recent work in quantum groups. The book explores the connections and applications of Hopf algebras to other fields.

## ***K*-théorie**

Bruce A. MAGURN. — **An algebraic introduction to *K*-theory.** — Encyclopedia of mathematics and its applications, vol. 87. — Un vol. relié,  $16,5 \times 24$ , de XIV, 676 p. — ISBN 0-521-80078-1. — Prix: £75.00. — Cambridge University Press, Cambridge, 2002.

This book is an introduction to *K*-theory and a text in algebra. These two roles are entirely compatible. On the one hand, nothing more than the basic algebra of groups, rings, and modules is needed to explain the classical algebraic *K*-theory. On the other hand, *K*-theory is a natural organizing principle for the standard topics of a second course in algebra, and these topics are presented carefully here, with plenty of exercises at the end of each short section. The reader will not only learn algebraic *K*-theory, but also Dedekind domains, classic groups, semisimple rings, character theory, quadratic forms, tensor products, localization, completion, tensor algebras, symmetric algebras, central simple algebras, and Brauer groups.

Alain VALETTE. — **Introduction to the Baum-Connes conjecture.** — From notes taken by Indira Chatterji, with an appendix by Guido Mislin. — Lectures in mathematics, ETH Zürich — Un vol. broché,  $17 \times 24$ , de X, 104 p. — ISBN 3-7643-6706-7. — Prix: SFr. 33.00. — Birkhäuser, Basel, 2002.

The Baum-Connes conjecture can be viewed as a conjectural generalisation of the Atiyah-Singer index theorem, to the equivariant setting (the ambient manifold is not compact, but some

compactness is restored by means of a proper, co-compact action of a group  $\Gamma$ ). Like the Atiyah-Singer theorem, the Baum-Connes conjecture states that a purely topological object coincides with a purely analytical one. For a given group  $\Gamma$ , the topological object is the equivariant  $K$ -homology of classifying space for proper actions of  $\Gamma$ , while the analytical object is the  $K$ -theory of the  $C^*$ -algebra associated with  $\Gamma$  in its regular representation. The Baum-Connes conjecture implies several other classical conjectures, ranging from differential topology to pure algebra. It has also strong connections with geometric group theory, as the proof of the conjecture for a given group  $\Gamma$  usually depends heavily on geometric properties of  $\Gamma$ . This book is intended for graduate students and researchers in geometry (commutative or not), groups theory, algebraic topology, harmonic analysis, and operator algebras. It presents, for the first time in book form, an introduction to the Baum-Connes conjecture.

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

William G. DWYER, Hans-Werner HENN. — **Homotopy theoretic methods in group cohomology**. — Advanced courses in mathematics CRM Barcelona. — Un vol. broché,  $24 \times 17$ , de IX, 98 p. — ISBN 3-7643-6605-2. — Prix: SFr. 34.00. — Birkhäuser, Basel, 2001.

This book looks at group cohomology with tools that come from homotopy theory. These tools give both decomposition theorems (which rely on homotopy colimits to obtain a description of the cohomology of a group in terms of the cohomology of suitable subgroups) and global structure theorems (which exploit the action of the ring of topological cohomology operations). The approach is expository and thus suitable for graduate students and others who would like an introduction to the subject that organizes and adds to the relevant literature and leads to the frontier of current research. The book should also be interesting to anyone who wishes to learn some of the machinery of homotopy theory (simplicial sets, homotopy colimits, Lannes' T-functor, the theory of unstable modules over the Steenrod algebra) by seeing how it is used in a practical setting.

C.R. LEEDHAM-GREEN, S. MCKAY. — **The structure of groups of prime power order**. — London Mathematical Society monographs. New series, vol. 27. — Un vol. relié,  $16 \times 24$ , de XII, 334 p. — Prix: £60.00. — Oxford University Press, Oxford, 2002.

First account of the modern theory of finite  $p$ -groups, this book introduces important material on cohomology of groups, spectral sequences, and representation theory. It develops the theory of pro- $p$  groups. New material on the Nottingham and Grigorchuk groups is presented and exercises are provided throughout. — *Contents*: Preliminaries. New groups from old.  $p$ -groups of maximal class. Finite  $p$ -groups acting uniserially. Using Lie algebra theory to find bounds. The proof of Conjecture A using powerful  $p$ -groups. Pro- $p$ -groups. Constructing finite  $p$ -groups. Homological algebra. Uniserial  $p$ -adic space groups. The structure of finite  $p$ -groups. Beyond coclass.

César Polcino MILIES, Sudarshan K. SEHGAL. — **An introduction to group rings**. — Algebras and applications, vol. 1. — Un vol. relié,  $17 \times 24,5$ , de XI, 371 p. — ISBN 1-4020-0238-6. — Prix: €133.00. — Kluwer, Dordrecht, 2002.

Group rings play a central role in the theory of representations of groups and are very interesting algebraic objects in their own right. In their study, many branches of algebra come to a rich interplay. This book takes the reader from beginning to research level and contains many topics that, so far, were only found in papers published in scientific journals and, whenever possible, offers new proofs of known results. It also includes many historical notes and some applications.

Christopher PARKER, Peter ROWLEY. — **Symplectic amalgams.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de XI, 361 p. — ISBN 1-85233-430-4. — Prix: € 79.95. — Springer, London, 2002.

The latter half of the twentieth century saw dramatic advances in group theory, particularly in finite group theory. During this time, the amalgam method emerged as the most powerful and promising tool and is playing a central role in the revision of the classification of finite simple groups. In this book, the authors chart the rise of the “amalgam method” and aim to classify symplectic amalgams with the intention of providing a complete overview of research in the field that will be accessible to both specialist and non-specialist alike. The aim of this book is the classification of symplectic amalgams – structures which are intimately related to the finite simple groups. In all there are sixteen infinite families of symplectic amalgams together with 62 more exotic examples. The classification touches on many important aspects of modern group theory:  $p$ -local analysis; the amalgam method; representation theory over finite simple groups.

Lluís PUIG. — **Blocks of finite groups: the hyperfocal subalgebra of a block.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de 213 p. — ISBN 3-540-43514-X. — Prix: SFr. 116.50. — Springer, Berlin, 2002.

About sixty years ago, Richard Brauer introduced the blocks in the study of the group algebra  $kG$  of a finite group  $G$  over a field  $k$  of nonzero characteristic. The most remarkable discovery might be the families of infinitely many nonisomorphic groups having a block in common. This book is an introduction to block theory including most of the main results about this discovery. From common knowledge on algebras and elementary knowledge of linear group representations, it starts by doing  $p$ -adic completion and lifting idempotent results, and reaches a complete proof of the existence and uniqueness of the hyperfocal subalgebra of a block.

Jacques TITS, Richard M. WEISS. — **Moufang polygons.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de IX, 535 p. — ISBN 3-540-43714-2. — Prix: € 79.95. — Springer, Berlin, 2002.

This book gives the complete classification of Moufang polygons. It also contains a new proof of the classification of irreducible spherical buildings of rank at least three based on the observation that all the irreducible rank two residues of such a building are Moufang polygons. In an appendix, the connection between spherical buildings and algebraic groups is recalled and used to describe an alternative existence proof for the exceptional Moufang polygons.

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

Ignacio BAJO, Esperanza SANMARTÍN, (Editors). — **Recent advances in Lie theory.** — Research expositions in mathematics, vol. 25. — Un vol. broché, 17×24, de 398 p. — ISBN 3-88538-225-3. — Prix: € 44.00. — Heldermann Verlag, Lemgo, Allemagne, 2002.

Lie theory is known to play a crucial role in many fields of mathematics and physics. Apart from their obvious geometric and algebraic importance, Lie groups and Lie algebras have turned out to be of fundamental significance in differential equations, quantum mechanics, algebraic geometry, topology and the theory of special functions. The aim of this book is to provide the reader with a general view of recent research directions, represented in 23 articles, in most of these topics. The papers collected in this volume are updated versions of selected contributions to the “Colloquium on Lie Theory and Applications”, which took place at the University of Vigo, Spain, in July 2000. The programme of the colloquium included three short courses delivered by Prof. D.V. Alekseevsky, A.T. Fomenko and M. Scheunert. The corresponding papers appear at the beginning of this book.

## *Fonctions de variables réelles*

Emmanuelle DiBENEDETTO. — **Real analysis.** — Birkhäuser advanced texts – Basler Lehrbücher. — Un vol. relié,  $16 \times 24$ , de xxiv, 485 p. — ISBN 0-8176-4231-5. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2002.

The focus of this modern graduate text in real analysis is to prepare the potential researcher to a rigorous “Way of thinking” in applied mathematics and partial differential equations. The book will provide excellent foundations and serve as a solid building block for research in analysis, PDEs, the calculus of variations, probability, and approximation theory. All the core topics of the subject are covered, from a basic introduction to functional analysis, to measure theory, integration and weak differentiation of functions, and in a presentation that is hands-on, with little or no unnecessary abstractions. A number of excellent problems, as well as some remarkable features of the exercises, occur at the end of every chapter, which point to additional theorems and results. Stimulating open problems are proposed.

R.M. DUDLEY. — **Real analysis and probability.** — Cambridge studies in advanced mathematics, vol. 74. — Un vol. broché,  $15,5 \times 23,5$ , de x, 555 p. — ISBN 0-521-00754-2 (relié: 0-521-80972-X). — Prix: £32.95 (relié: £90.00). — Cambridge University Press, Cambridge, 2002.

The first half of the book gives an exposition of real analysis: basic set theory, general topology, measure theory, integration, an introduction to functional analysis in Banach and Hilbert spaces, convex sets and functions, and measure on topological spaces. The second half introduces probability based on measure theory, including laws of large numbers, ergodic theorems, the central limit theorem, conditional expectations, and martingale convergence. A chapter on stochastic processes introduces Brownian motion and the Brownian bridge. The new edition has been made even more self-contained than before; it now includes early in the book a foundation of the real number system and the Stone-Weierstrass theorem on uniform approximation in algebras of functions. Several other sections have been revised and improved, and the extensive historical notes have been further amplified. A number of new exercises, and hints for solution of old and new ones, have been added.

Donald ESTEP. — **Practical analysis in one variable.** — Undergraduate texts in mathematics. — Un vol. relié,  $16 \times 24$ , de xx, 621 p. — ISBN 0-387-95484-8. — Prix: €59.95. — Springer, New York, 2002.

This book attempts to place the basic ideas of real analysis and numerical analysis together in an applied setting that is both accessible and motivational to young students. The essentials of real analysis are presented in the context of a fundamental problem of applied mathematics, which is to approximate the solution of a physical model. The book includes background and review material, numerous examples, visualizations and alternate explanations of some key ideas, and a variety of exercises ranging from simple computations to analysis and estimates to computations on a computer.

## *Fonctions d'une variable complexe*

Jürgen JOST. — **Compact Riemann surfaces: an introduction to contemporary mathematics.** — Second edition. — Universitext. — Un vol. broché,  $15,5 \times 24$ , de xi, 278 p. — ISBN 3-540-43299-X. — Prix: SFr. 68.50. — Springer, Berlin, 2002.

Although Riemann surfaces are a time-honoured field, this book is novel in its broad perspective that systematically explores the connection with other fields of mathematics. It can

serve as an introduction to contemporary mathematics as a whole as it develops background material from algebraic topology, differential geometry, the calculus of variations, elliptic PDE, and algebraic geometry. It is unique among textbooks on Riemann surfaces in including an introduction to Teichmüller theory. The analytic approach is likewise new as it is based on the theory of harmonic maps. For this 2<sup>nd</sup> edition the author has further improved aspects of presentation of various parts of the text.

### ***Fonctions de plusieurs variables complexes***

Ingrid BAUER, Fabrizio CATANESE, Yujiro KAWAMATA, Thomas PETERNELL, Yum-Tong SIU, (Editors). — **Complex geometry: collection of papers dedicated to Hans Grauert.** — Un vol. relié, 16×24, de XXII, 340 p. — ISBN 3-540-43259-0. — Prix: SFr. 133.00. — Springer, Berlin, 2002.

This book is a collection of research articles in algebraic geometry and complex analysis dedicated to Hans Grauert. The contributions of the authors and editors have been put together to honor the distinguished scientist whose inspiration and pioneering fundamental work have left such a widespread and lasting impact on the field. The volume contains important new results, solutions to longstanding conjectures, elegant new proofs and new perspectives for future research. The topics range from surface theory and commutative algebra, linear systems, moduli spaces, classification theory, Kähler geometry to holomorphic dynamical systems.

Klaus FRITZSCHE, Hans GRAUERT. — **From holomorphic functions to complex manifolds.** — Graduate texts in mathematics, vol. 213. — Un vol. relié, 16×24, de xv, 392 p. — ISBN 0-387-95395-7. — Prix: € 64.95. — Springer, New York, 2002.

This book is an introduction to the theory of complex manifolds. The authors' intent is to familiarize the reader with the most important branches and methods in complex analysis of several variables and to do this as simply as possible. Therefore, the abstract concepts involving sheaves, coherence, and higher-dimensional cohomology have been completely avoided. Only elementary methods such as power series, holomorphic vector bundles, and one-dimensional cocycles are used. Nevertheless, deep results can be proved, for example, the Remmert-Stein theorem for analytic sets, finiteness theorems for spaces of cross sections in holomorphic vector bundles, and the solution of the Levi problem. Each chapter is complemented by a variety of examples and exercises. The only prerequisite needed to read this book is a knowledge of real analysis and some basic facts from algebra, topology, and the theory of one complex variable. The book can be used as a first introduction to several complex variables as well as a reference for the expert.

Jeffery D. MCNEAL, (Editor). — **Complex analysis and geometry.** — Proceedings of a conference at the Ohio State University, June 3-6, 1999. — Ohio State University Mathematical Research Institute publications, vol. 9. — Un vol. relié, 17,5×24,5, de 191 p. — ISBN 3-11-016809-X. — Prix: € 98.00. — Walter de Gruyter, Berlin, 2001.

The conference was devoted to some recent developments in complex analysis, with particular emphasis on developments arising from PDE methods and techniques in algebraic and differential geometry. The articles in this volume are written in a more expository style and contain significant, new results which are previously unpublished. — *Contents:* M.S. Baouendi, Linda Preiss Rothschild, Dmitri Zaitsev: Points in general position in real-analytic submanifolds in  $\mathbb{C}^N$ . — David E. Barrett: Holomorphic motion of circles through affine bundles. — Bo Berndtsson: Weighted estimates for the delta bar-equation. — Michael Christ: Hypoellipticity in the infinitely degenerate regime. Spiraling and nonhypoellipticity. — John P. D'Angelo:

Positivity conditions for real-analytic functions. — Peter Ebenfelt, Xiajun Huang: On a generalized reflection principle in  $\mathbb{C}^2$ . — Siqi Fu, Emil J. Straube: Compactness in the delta bar-Neumann problem. — Joseph J. Kohn: Hypocoellipticity at non-subelliptic points. — Yum-Tong Siu: Very ampleness part of Fujita's conjecture and multiplier ideal sheaves of Kohn and Nadel.

Claude SABBAH. — **Déformations isomonodromiques et variétés de Frobenius.** — Collection Mathématiques. — Collection Savoirs Actuels. — Un vol. broché,  $15,5 \times 23$ , de xvi, 289 p. — ISBN 2-86883-534-1 (EDP Sciences), 2-271-05569-0 (CNRS Editions). — Prix: €42.00. — EDP Sciences/CNRS Editions, Paris.

La théorie des déformations isomonodromiques est une machine à produire des systèmes non linéaires d'équations différentielles ou aux dérivées partielles dans le domaine complexe et ce, à partir d'une équation ou d'un système d'équations linéaires d'une variable complexe. La notion de structure de Frobenius sur une variété, apparue d'abord dans la théorie des singularités, puis développée sous l'impulsion de motivations physiques, en est une belle application. Ce texte est issu de plusieurs cours dispensés dans le cadre de la formation doctorale des universités de Paris VI, Bordeaux I et Strasbourg ainsi que lors d'une école sur les variétés de Frobenius au CIRM (Luminy).

## *Équations aux dérivées partielles*

Michel CHIPOT. — *l goes to plus infinity.* — Birkhäuser advanced texts. — Un vol. relié,  $17 \times 24$ , de viii, 180 p. — ISBN 3-7643-6646-X. — Prix: SFr. 78.00. — Birkhäuser, Basel, 2002.

Many physical problems are meaningfully formulated in a cylindrical domain. When the size of the cylinder goes to infinity, the solutions, under certain symmetry conditions, are expected to be identical in every cross-section of the domain. The proof of this, however, is sometimes difficult and almost never given in the literature. The present book partially fills this gap by providing proofs of the asymptotic behavior of solutions to various important cases of linear and nonlinear problems in the theory of elliptic and parabolic partial differential equations.

Giuseppe DA PRATO, Jerzy ZABCZYK. — **Second order partial differential equations in Hilbert spaces.** — London Mathematical Society lecture note series, vol. 293. — Un vol. broché,  $15 \times 23$ , de xvi, 379 p. — ISBN 0-521-77729-1. — Prix: £29.95. — Cambridge University Press, Cambridge, 2002.

Partial differential equations for functions defined on infinite dimensional Hilbert spaces are natural generalizations of well known parabolic and elliptic equations for which the theory is now classical. The main aim of the authors is to present a state of the art treatment of this theory in a unified way. The tools used are the theory of measures on Banach spaces, semigroup and interpolation theories as well as the theory of stochastic evolution equations. The book is divided into three parts devoted respectively to the theory in the spaces of continuous functions, to the theory in Sobolev spaces with respect to Gaussian measures and to applications to control theory. Numerous comments and references in the book point the reader to more specialized results not covered here.

Jürgen JOST. — **Partial differential equations.** — Graduate texts in mathematics, vol. 214. — Un vol. relié,  $16 \times 24,5$ , de xi, 325 p. — ISBN 0-387-95428-7. — Prix: €59.95. — Springer, New York, 2002.

The author focuses on elliptic equations and systematically develops the relevant existence schemes, always with a view toward nonlinear problems. These are maximum principle methods

(particularly important for numerical analysis schemes), parabolic equations, variational methods, and continuity methods. This book develops the main methods for obtaining estimates for solutions of elliptic equations: Sobolev space theory, weak and strong solutions, Schauder estimates, and Moser iteration. Connections between elliptic, parabolic, and hyperbolic equations are explored, as well as the connection with Brownian motion and semigroups. This book can be utilized for a one-year course on partial differential equations.

C. ROGERS, W.K. SCHIEF. — **Bäcklund and Darboux transformations: geometry and modern applications in soliton theory.** — Cambridge texts in applied mathematics. — Un vol. broché, 15×22,5, de xvii, 413 p. — ISBN 0-521-01288-0. — Prix: £24.95. — Cambridge University Press, Cambridge, 2002.

The authors explore the extensive body of literature from the nineteenth and early twentieth centuries by eminent geometers on transformations of privileged classes of surfaces which leave key geometric properties unchanged. Prominent amongst these are Bäcklund-Darboux transformations with their remarkable associated nonlinear superposition principles and importance in soliton theory. It is with these transformations and the links they afford between the classical differential geometry of surfaces and the nonlinear equations of soliton theory that the present text is concerned. In this geometric context, solitonic equations arise out of the Gauss-Mainardi-Codazzi equations for various types of surfaces that admit invariance under Bäcklund-Darboux transformations.

Hermann SOHR. — **The Navier-Stokes equations: an elementary functional analytic approach.** — Birkhäuser advanced texts. — Un vol. relié, 17×24, de x, 367 p. — ISBN 3-7643-6545-5. — Prix: SFr. 74.00. — Birkhäuser, Basel, 2001.

The primary objective of this monograph is to develop an elementary and self-contained approach to the mathematical theory of a viscous, incompressible fluid in a domain of the Euclidean space, described by the equations of Navier-Stokes. Moreover, the theory is presented for completely general domains, in particular, for arbitrary unbounded, nonsmooth domains. Therefore, restriction was necessary to space dimensions two and three, which are also the most significant from a physical point of view. For mathematical generality, however, the linearized theory is expounded for general dimensions higher than one. Although the functional analytic approach developed here is, in principle, known to specialists, the present book fills a gap in the literature by providing a systematic treatment of a subject that has been documented until now only in fragments.

## *Systemes dynamiques et théorie ergodique*

J.M. BLACKLEDGE, A.K. EVANS, M.J. TURNER, (Editors). — **Fractal geometry: mathematical methods, algorithms, applications.** — Horwood Publishing series in mathematics and applications. — Un vol. relié, 16×24, de xii, 232 p. — ISBN 1-904275-00-1. — Prix: £40.00. — Horwood Publishing, Chichester, published on behalf of The Institute of Mathematics and its Applications, 2002.

International authorities from Canada, Denmark, England, Germany, Russia and South Africa focus on up-to-date research on fractal geometry and the best practices in software, theoretical mathematical algorithms, and analysis. — *Contents*: Chaotic dynamics in a simple aeromechanical system. — Random walks with fluctuating step number, scale invariant behaviour, and self-organised criticality. — Fractional integrals, singular measures and epsilon

functions. — Diffusion on fractals: efficient algorithms to compute the random walk dimension. — Why study financial time series? — Analysis of the limitations of fractal dimension texture segmentation for image characterisation. — Fractals basins of attraction in the inversion of gravity and magnetic data. — Properties of fractal compression and use in texture mapping. — Fractal time and nested detectors. — Deterministic chaos in digital cryptography. — The making of fractal geometry in digital imaging.

Janet Whalen KAMMEYER, Daniel J. RUDOLPH. — **Restricted orbit equivalence for actions of discrete amenable groups.** — Cambridge tracts in mathematics, vol. 146. — Un vol. relié, 15,5×23,5, de VI, 201 p. — ISBN 0-521-80795-6. — Prix: £35.00. — Cambridge University Press, Cambridge, 2002.

This monograph offers a broad investigative tool in ergodic theory and measurable dynamics. The motivation for this work is that one may measure how similar two dynamical systems are by asking how much the time structure of orbits of one system must be distorted for it to become the other. Different restrictions on the allowed distortion will lead to different restricted orbit equivalence theories. These include Ornstein's isomorphism theory, the Kakutani equivalence theory and a host of others. By putting such restrictions in an axiomatic framework, a general approach is developed that encompasses all these examples simultaneously and gives insight into how to seek further applications. The work is placed in the context of discrete amenable group actions where time is not required to be one-dimensional, making the results applicable to a much wider range of problems and examples.

Gabriel A. LOSA, Danilo MERLINI, Theo F. NONNENMACHER, Ewald R. WEIBEL, (Editors). — **Fractals in biology and medicine, vol. 3.** — Mathematics and biosciences in interaction. — Un vol. relié, 24×16,5, de VIII, 362 p. — ISBN 3-7643-6474-2. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2002.

This volume contains oral and poster presentations given at the third International Symposium on Fractals in Biology and Medicine held in Centro Seminariale Monte Verità, Ascona, Switzerland, from March 8-11, 2000. This *Volume III* in the MBI series highlights the growing power and efficacy of the fractal geometry in understanding how to analyze living phenomena and complex shapes. Many biological objects, previously considered as hopelessly far from any quantitative description, are now being investigated by means of fractal methods. Researchers currently used fractals both as theoretical tools, to shed light on living systems' self-organization and evolution, and as useful techniques, capable of quantitatively analyzing physiological and pathological cell states and ultrastructures.

E. SALINELLI, F. TOMARELLI. — **Modelli dinamici discreti.** — Unitext. — Un vol. broché, 15,5×23,5, de XIII, 353 p. — ISBN 88-470-0187-0. — Prix: €25.00. — Springer, Milano, 2002.

All'esame di un'ampia serie di esempi, modelli e motivazioni tratti dalla biologia, demografia, ingegneria ed economia, segue la presentazione degli strumenti per lo studio di sistemi dinamici scalari e non lineari, con particolare attenzione all'analisi della stabilità. Si studiano in dettaglio le equazioni alle differenze lineari e si fornisce una introduzione elementare alle trasformate discrete Z e DFT. Un capitolo è dedicato allo studio di biforcazioni e dinamiche caotiche. I sistemi dinamici vettoriali ad un passo e le applicazioni alle catene di Markov sono oggetto di due capitoli. L'aspetto innovativo della presentazione è quello di unificare il punto di vista modellistico con quello delle varie discipline che sviluppano metodi e tecniche: analisi matematica, algebra lineare, analisi numerica, teoria dei sistemi, calcolo delle probabilità.

## *Équations aux différences finies, équations fonctionnelles*

V. LAKSHMIKANTHAM, Donato TRIGIANTE. — **Theory of difference equations: numerical methods and applications.** — Second edition. — Pure and applied mathematics, vol. 251. — Un vol. relié, 26 × 18, de v, 300 p. — ISBN 0-8247-0803-2. — Prix: US\$150.00. — Marcel Dekker, New York, 2002.

This text provides a clear and comprehensive overview of the fundamental theories, numerical methods, and iterative processes encountered in difference calculus and explores classical problems such as orthogonal polynomials, the Euclidean algorithm, roots of polynomials, and well-conditioning — presenting practical applications in fields such as economics, chemistry, population dynamics, and queueing theory. Containing numerous end-of-chapter examples and solved equations to highlight key mathematical concepts, this book demonstrates the versatility of difference equations with numerous models and real-world examples... offers a unified treatment of stability theory using Liapunov functions and comparison techniques... examines the relationships between difference equations and linear algebra, number theory, and population dynamics... summarizes useful methods to solve difference equations with constant coefficients... stresses the importance of difference equations in numerical analysis and combinatorics... discusses the Pascal matrix and its properties... and analyzes the Gaussian arithmetic-geometric mean.

## *Approximations et développements en série*

Q.I. RAHMAN, G. SCHMEISSER. — **Analytic theory of polynomials.** — London Mathematical Society monographs. New series, vol. 26. — Un vol. relié, 16,5 × 24, de XIV, 742 p. — ISBN 0-19-853493-0. — Prix: €90.00. — Clarendon Press, Oxford, 2002.

This book presents easy to understand proofs of some of the most difficult results about polynomials demonstrated by means of applications. Readership: Professional and academic mathematicians of complex analysis, approximation theory and theoretical numerical analysis, graduate students in mathematics, engineers, statisticians and theoretical physicists. — *Contents*: Introduction. — Part 1, Critical points in terms of zeros: Fundamental results on critical points. More sophisticated methods. More specific results on critical points. Applications to compositions of polynomials. Polynomials with real zeros. Conjectures and solutions. — Part 2, Zeros in terms of coefficients: Inclusion of all zeros. Inclusion of some of the zeros. Number of zeros in an interval. Number of zeros in a domain. — Part 3, Extremal properties: Growth estimates. Mean values. Derivative estimates on the unit disc. Derivative estimates on the unit interval. Coefficient estimates.

## *Analyse de Fourier, analyse harmonique abstraite*

Agostino ABBATE, Casimer M. DECUSATIS, Pankaj K. DAS. — **Wavelets and subbands: fundamentals and applications.** — Applied and numerical harmonic analysis. — Un vol. relié, 16 × 24, de XIV, 551 p. — ISBN 0-8176-4136-X (Boston), 3-7643-4136-X (Basel). — Prix: SFr. 158.00. — Birkhäuser, Boston, 2002.

The book is designed to present an understanding of wavelets and their development from a continuous-domain transformation to a frame representation and finally to multiresolution analysis tools such as subband decomposition. — *Topics and features*: provides an understanding of the link between the continuous wavelet transform, the fast wavelet transform, and subband

decomposition; algorithms and numerical examples implemented in MATLAB®; discusses the design of wavelet bases and details how to implement the transform both in hardware and software; covers the fundamentals and the developments of the links between areas such as time-frequency analysis, digital signal processing, image processing, and Fourier and wavelet transforms, both continuous and discrete; offers extended mathematical treatment and numerous examples, with particular emphasis on the transition from the continuous domain to multi-resolution and subband.

Peter BORWEIN. — **Computational excursions in analysis and number theory.** — CMS books in mathematics. — Un vol. relié, 16×24, de x, 220 p. — ISBN 0-387-95444-9. — Prix: € 69.95. — Springer, New York, 2002.

This book is designed for a computationally intensive graduate course based around a collection of classical unsolved extremal problems for polynomials. These problems, all of which lend themselves to extensive computational exploration, live at the interface of analysis, combinatorics, and number theory, so the techniques involved are diverse. A main computational tool used is the LLL algorithm for finding small vectors in a lattice. Many exercises and open research problems are included. Indeed, one aim of the book is to tempt the able reader into the rich possibilities for research in this area.

## *Analyse fonctionnelle*

Boris BUFFONI, John TOLAND. — **Introduction à la théorie globale des bifurcations.** — Cahiers mathématiques de l'Ecole polytechnique fédérale de Lausanne. — Un vol. broché, 15×21, de x, 130 p. — ISBN 2-88074-494-6. — Prix: SFr. 49.50. — Presses polytechniques et universitaires romandes, Lausanne, 2002.

L'ouvrage expose et justifie le *principe de linéarisation*, à savoir que les petites solutions d'une équation différentielle sont bien décrites par les fonctions propres du problème linéarisé. Le cadre abstrait est celui du calcul différentiel dans les espaces de Banach et le résultat principal et le fameux théorème de bifurcation de Crandall-Rabinowitz. Il présente ensuite, dans le langage des analystes, la théorie des germes d'ensembles analytiques, qui a pour objet la structure locale des solutions d'un système d'équations analytiques de plusieurs variables. Grâce à cette structure, le principe de linéarisation peut être étendu aux solutions de grande taille et fournir un théorème global de bifurcation plus précis que celui obtenu par des arguments topologiques.

Michael CWIKEL, Miroslaw ENGIŠ, Alois KUFNER, Lars-Erik PERSSON, Gunnar SPARR, (Editors). — **Function spaces, interpolation theory and related topics.** — Proceedings of the International Conference in honour of Jaak Peetre on his 65<sup>th</sup> birthday, Lund, Sweden, August 17-22, 2000. — Un vol. relié, 18×24,5, de x, 462 p. — ISBN 3-11-017117-1. — Prix: € 128.97. — Walter de Gruyter, Berlin, 2002.

Jaak Peetre is one of the founders of the theory of interpolation spaces and a brilliant contributor to several other areas of mathematics. The articles cover a wide range of topics both from interpolation theory and from other fields where Jaak Peetre's ideas and results have left an indelible mark: the theory of function spaces; Hankel-type and related operators; analysis on bounded symmetric domains; PDEs; and special functions. The book opens with biographical material and a list of Peetre's publications, followed by his paper on the history of the "birth" of the theory of interpolation, and by a paper of the late co-founder of this theory, Jacques-Louis Lions, on reproducing kernels.

Ricardo ESTRADA, Ram P. KANWAL. — **A distributional approach to asymptotics: theory and applications.** — Second edition. — Birkhäuser Advanced Texts. — Un vol. relié, 24×16, de XIV, 451 p. — ISBN 0-8176-4142-4. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2002.

This book is a modern introduction to asymptotic analysis intended not only for mathematicians, but for physicists, engineers, and graduate students as well. Written by two of the leading experts in the field, the text provides readers with a firm grasp of mathematical theory, and at the same time demonstrates applications in areas such as differential equations, quantum mechanics, noncommutative geometry, and number theory. — *Key features of this significantly expanded and revised second edition:* addition of a new chapter and many new sections; wide range of topics covered, including the Cesàro behavior of distributions and their connections to asymptotic analysis, the study of time-domain asymptotics, and the use of series of Dirac delta functions to solve boundary value problems; novel approach detailing the interplay between underlying theories of asymptotic analysis and generalized functions; extensive examples and exercises at the end of each chapter; comprehensive bibliography and index.

Peter D. LAX. — **Functional analysis.** — Pure and applied mathematics. — Un vol. relié, 16×24, de XIX, 580 p. — ISBN 0-471-55604-1. — Prix: £66.95. — J. Wiley, Chichester, 2002.

This book combines theories and applications to demonstrate how the functional analytic point of view helps to clarify and solve mathematical problems. The first part describes Banach spaces and their duals, weak sequential and weak topologies, the Krein-Milman theorem, the Gelfand theory of commutative Banach algebras, compact operators, and invariant subspaces. The second part presents trace formulas, the Fredholm determinant and its generalizations, the spectral resolution and representation of selfadjoint operators, the theory of one-parameter semi-groups, scattering theory, and many other topics. The appendices give a functional analytic proof of the Riesz-Kakutani representation theorem and outline compactly the theory of distributions and some of its applications. Numerous exercises and an extensive bibliography are given.

Eugeny SMIRNOV. — **Hausdorff spectra in functional analysis.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de VIII, 209 p. — ISBN 1-85233-571-8. — Prix: € 89.95. — Springer, London, 2002.

Self-contained and collating for the first time material that has until now only been published in journals – often in Russian – this book will be of interest to functional analysts, especially those with interests in topological vector spaces, and to algebraists concerned with category theory. The text has been revised and expanded in this English translation of the Russian original, including more background material and fewer references to material in journals.

## ***Théorie des opérateurs***

Albrecht BÖTTCHER, Yuri I. KARLOVICH, Ilya M. SPITKOVSKY. — **Convolution operators and factorization of almost periodic matrix functions.** — Operator theory , vol. 131. — Un vol. relié, 17×24, de XI, 462 p. — ISBN 3-7643-6672-9. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2002.

This book is an introduction to convolution operators with matrix-valued almost periodic or semi-almost periodic symbols. The basic tools for the treatment of the operators are Wiener-Hopf factorization and almost periodic factorization. These factorizations are systematically investigated and explicitly constructed for interesting concrete classes of matrix functions. The material covered by the book ranges from classical results through a first comprehensive presentation of the core of the theory of almost periodic factorization up to the latest achievements, such as the construction of factorizations by means of the Portuguese transformation and the solution of corona theorems.

Albrecht BÖTTCHER, Israel GOHBERG, Peter JUNGHANNS, (Editors). — **Toeplitz matrices and singular integral equations: the Bernd Silbermann anniversary volume.** — Operator theory: advances and applications, vol. 135. — Un vol. relié, 17×24, de vi, 328 p. — ISBN 3-7643-6877-2. — Prix: SFr. 169.00. — Birkhäuser, Basel, 2002.

This volume, dedicated to Bernd Silbermann on his sixtieth birthday, collects research articles on Toeplitz matrices and singular integral equations written by leading area experts. The subjects of the contributions include Banach algebraic methods, Toeplitz determinants and random matrix theory, Fredholm theory and numerical analysis for singular integral equations, and efficient algorithms for linear systems with structured matrices, and reflect Bernd Silbermann's broad spectrum of research interests. The volume also contains a biographical essay and a list of publications.

Allan M. KRALL. — **Hilbert space, boundary value problems and orthogonal polynomials.** — Operator theory: advances and applications, vol. 133. — Un vol. relié, 17×24, de xiv, 352 p. — ISBN 3-7643-6701-6. — Prix: SFr. 192.00. — Birkhäuser, Basel, 2002.

This monograph consists of three parts: the abstract theory of Hilbert spaces, leading up to the spectral theory of unbounded self-adjointed operators; the application to linear Hamiltonian systems, giving the details of the spectral resolution; further applications such as to orthogonal polynomials and Sobolev differential operators. Written in textbook style this up-to-date volume is geared towards graduate and postgraduate students and researchers interested in boundary value problems of linear differential equations or in orthogonal polynomials.

M. W. WONG. — **Wavelet transforms and localization operators.** — Operator theory: advances and applications, vol. 136. — Un vol. relié, 17×24, de vi, 156 p. — ISBN 3-7643-6789-X. — Prix: SFr. 144.00. — Birkhäuser, Basel, 2002.

The focus of this book is on the Schatten-von Neumann properties and the product formulas of localization operators defined in terms of infinite-dimensional and square-integrable representations of locally compact and Hausdorff groups. Wavelet transforms, which are the building blocks of localization operators, are also studied in their own right. Daubechies operators on the Weyl-Heisenberg group, localization operators on the affine group, and wavelet multipliers on the Euclidean space are investigated in detail. The study is carried out in the perspective of pseudo-differential operators, quantization and signal analysis. Although the emphasis is put on locally compact and Hausdorff groups, results in the context of homogeneous spaces are given in order to unify the various localization operators into a single theory. Several new spectral results on pseudo-differential operators in the setting of localization operators are presented for the first time.

## *Calcul des variations*

K.-H. HOFFMANN, I. LASIECKA, G. LEUGERING, J. SPREKELS, F. TRÖLTZSCH, (Editors). — **Optimal control of complex structures: International Conference in Oberwolfach, June 4-10, 2000.** — International Series of Numerical Mathematics, vol. 139. — Un vol. relié, 17×24, de viii, 278 p. — ISBN 3-7643-6682-6. — Prix: SFr. 152.00. — Birkhäuser, Basel, 2002.

Interest in the area of control of systems defined by partial differential equations has increased strongly in recent years. A major reason has been the requirement of these systems for sensible continuum mechanical modeling and optimization or control techniques which account for typical physical phenomena. Particular examples of problems on which substantial progress

has been made are the control and stabilization of mechatronic structures, the control of growth of thin films and crystals, the control of laser and semi-conductor devices, and shape optimization problems for turbomachine blades, shells, smart materials and microdiffractive optics.

## *Géométrie*

Boris ASANCHEYEV. — **Épures de géométrie descriptive: concours d'entrée à l'École normale supérieure.** — Un vol. relié, 17,5×24, de 231 p. — ISBN 2 7056 6447 5. — Prix: € 22.00. — Hermann, Paris, 2002.

Durant presque tout le dix-neuvième siècle et la première moitié du vingtième, la géométrie descriptive fait partie de tous les concours aux grandes écoles. Cette technique mathématique, dont Gaspard Monge fut le théoricien, alliait les connaissances de la géométrie à la maîtrise du dessin. Son apparition dans les épreuves d'admission à l'École normale supérieure date de 1858. Elle fut supprimée du concours, suite à une profonde réforme de l'enseignement des mathématiques en général et de la géométrie en particulier, en 1960. Le présent recueil résulte du désir d'exhumer les sujets et leur interprétation, uniquement pour le plaisir des yeux. C'est aussi un témoignage sur un enseignement qui fit partie de la culture de l'ingénieur pendant plus d'un siècle. Ce livre s'adresse à ceux qui ont connu la géométrie descriptive, mais aussi à tous ceux qui aiment voir les coniques sans points d'inflexion et ceux d'une cubique effectivement alignés.

## *Ensembles convexes et inégalités géométriques*

Jiří MATOUŠEK. — **Lectures on discrete geometry.** — Graduate texts in mathematics, vol. 212. — Un vol. broché, 15,5×23,5, de XIII, 481 p. — ISBN 0-387-95374-4. — Prix: € 44.95. — Springer, New York, 2002.

This book is primarily a textbook introduction to various areas of discrete geometry. In each area, it explains several key results and methods, in an accessible and concrete manner. It also contains more advanced material in separate sections, and thus, it can serve as a collection of surveys in several narrower subfields. The main topics include basics on convex sets, convex polytopes, and hyperplane arrangements; combinatorial complexity of geometric configurations; intersection patterns and transversals of convex sets; geometric Ramsey-type results; polyhedral combinatorics and high-dimensional convexity; and lastly, embeddings of finite metric spaces into normed spaces.

## *Géométrie différentielle*

Gilles HALBOUT, (Editor). — **Deformation quantization.** — Proceedings of the Meeting of Theoretical Physicists and Mathematicians, Strasbourg, May 31 – June 2, 2001. — Rencontre entre physiciens théoriciens et mathématiciens, Strasbourg, 31 mai – 2 juin 2001. — IRMA lectures in mathematics and theoretical physics, vol. 1. — Un vol. broché, 17×24, de 236 p. — ISBN 3-11-017247-X. — Prix: € 34.95. — Walter de Gruyter, Berlin, 2002.

This book contains eleven refereed research papers on deformation quantization by leading experts in the respective fields. Topics are: star-products over Poisson manifolds, quantization of Hopf algebras, index theorems, globalization and cohomological problems. Both the mathematical and the physical approach ranging from asymptotic quantum electrodynamics to operads and prop theory will be presented. Historical remarks and surveys set the results presented in perspective.

John M. LEE. — **Introduction to smooth manifolds.** — Graduate texts in mathematics, vol. 218. — Un vol. broché,  $15,5 \times 23,5$ , de xvii, 628 p. — ISBN 0-387-95448-1. — Prix: € 54.95. — Springer, New York, 2003.

The goal of this book is to familiarize students with the tools they will need in order to use manifolds in mathematical or scientific research — smooth structures, tangent vectors and covectors, vector bundles, immersed and embedded submanifolds, tensors, differential forms, de Rham cohomology, vector fields, flows, foliations, Lie derivatives, Lie groups, Lie algebras, and more. The approach is as concrete as possible. Along the way, it introduces the readers to some of the most important examples of geometric structures that manifolds can carry, such as Riemannian metrics, symplectic structures, and foliations. The book is aimed at students who already have a solid acquaintance with general topology, the fundamental group, and covering spaces, as well as basic undergraduate linear algebra and real analysis.

### *Topologie algébrique*

Marcelo AGUILAR, Samuel GITLER, Carlos PRIETO. — **Algebraic topology from a homotopical viewpoint.** — Universitext. — Un vol. relié,  $24 \times 16$ , de xxix, 478 p. — ISBN 0-387-95450-3. — Prix: SFr. 133.00. — Springer, Berlin, 2002.

The purpose of this book is to introduce algebraic topology using the novel approach of homotopy theory, an approach with clear applications in algebraic geometry as understood by Lawson and Voevodsky. This method allows the authors to cover the material more efficiently than the more common method using homological algebra. The basic concepts of homotopy theory, such as fibrations and cofibrations, are used to construct singular homology and cohomology, as well as  $K$ -theory. Throughout the text many other fundamental concepts are introduced, including the construction of the characteristic classes of vector bundles. Although functors appear constantly throughout the book, no previous knowledge about category theory is expected from the reader.

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

Jan CNOPS. — **An introduction to Dirac operators on manifolds.** — Progress in mathematical physics, vol. 24. — Un vol. relié,  $16 \times 24$ , de x, 211 p. — ISBN 0-8176-4298-6. — Prix: SFr. 116.00. — Birkhäuser, Boston, 2002.

In this essentially self-contained work, the basic ideas underlying the concept of Dirac operators are explored. Starting with Clifford algebras and the fundamentals of differential geometry, the text focuses on two main properties, namely, conformal invariance, which determines the local behavior of the operator, and the unique continuation property dominating its global behavior. Spin groups and spinor bundles are covered, as well as the relations with their classical counterparts, orthogonal groups and Clifford bundles. The reader will benefit, however, from some knowledge of complex analysis, which gives the simplest example of a Dirac operator. More advanced readers will appreciate the fresh approach to the theory as well as the new results on boundary value theory.

Frédéric HÉLEIN. — **Harmonic maps, conservation laws and moving frames.** — Second edition. — Cambridge tracts in mathematics, vol. 150. — Un vol. relié,  $16 \times 23$ , de xxi, 264 p. — ISBN 0-521-81160-0. — Prix: £47.50. — Cambridge University Press, Cambridge, 2002.

This book provides an accessible and self-contained introduction to harmonic map theory and its analytical aspects, covering recent developments in the regularity theory of weakly harmonic maps. The book begins by introducing these concepts, stressing the interplay between geometry, the role of symmetries and weak solutions. The reader is then presented with a guided

tour of the theory of completely integrable systems for harmonic maps, followed by two chapters devoted to recent results on the regularity of weak solutions. A self-contained presentation of “exotic” functional spaces from the theory of harmonic analysis is given and these tools are then used for proving regularity results. The importance of conservation laws is stressed and the concept of a “Coulomb moving frame” is explained in detail. The book ends with further applications and illustrations of Coulomb moving frames to the theory of surfaces.

Claus HERTLING. — **Frobenius manifolds and moduli spaces for singularities.** — Cambridge tracts in mathematics, vol. 151. — Un vol. relié, 16×23,5, de IX, 270 p. — ISBN 0-521-81296-8. — Prix: £45.00. — Cambridge University Press, Cambridge, 2002.

For those working in singularity theory or other areas of complex geometry, this book will open the door to the study of Frobenius manifolds. This class of manifolds is now known to be relevant for the study of singularity theory, quantum cohomology, mirror symmetry, symplectic geometry and integrable systems. The first part of the book explains the theory of manifolds with a multiplication on the tangent bundle. The second presents a simplified explanation of the construction of Frobenius manifolds in singularity theory along with all the necessary tools and several applications.

Alan HUCKLEBERRY, Tilmann WURZBACHER, (Editors). — **Infinite dimensional Kähler manifolds.** — DMV Seminar, vol. 31. — Un vol. broché, 24×17, de XIII, 375 p. — ISBN 3-7643-6602-8. — Prix: SFr. 58.00. — Birkhäuser, Basel, 2002.

Infinite dimensional manifolds, Lie groups and algebras arise naturally in many areas of mathematics and physics. Having been used mainly as a tool for the study of finite dimensional objects, the emphasis has changed and they are now frequently studied for their own independent interest. The initial chapters are devoted to a rather self contained introduction to group actions on complex and symplectic manifolds and to Borel-Weil theory in finite dimensions. These are followed by a treatment of the basics of infinite dimensional Lie groups, their actions and their representations. Finally, a number of more specialized and advanced topics are discussed, e.g., Borel-Weil theory for loop groups, aspects of the Virasoro algebra, (gauge) group actions and determinant bundles, and second quantization and the geometry of the infinite dimensional Grassmann manifold.

Gerald W. JOHNSON and Michel L. LAPIDUS. — **The Feynman integral and Feynman’s operational calculus.** — Oxford mathematical monographs. — Un vol. broché, 15,5×23,5, de XVIII, 771 p. — ISBN 0-19-851572-3. — Prix: £40.00. — Clarendon Press, Oxford, 2000.

This book provides the most comprehensive mathematical treatment to date of the mathematically beautiful but difficult subjects of the Feynman path integral and Feynman’s operational calculus. It is accessible to mathematicians, mathematical physicists and theoretical physicists. Including new results and much material previously only available in the research literature, this book discusses both the mathematics and physics background that motivate the study of the Feynman integral and Feynman’s operational calculus, and also provides more detailed proofs of the central results.

Serge LANG. — **Introduction to differentiable manifolds.** — Second edition. — Universitext. — Un vol. relié, 16×24, de XI, 250 p. — ISBN 0-387-95477-5. — Prix: € 59.95. — Springer, Berlin, 2002.

This book gives an introduction to the basic concepts which are used in differential topology, differential geometry, and differential equations. A certain number of concepts are essential for

all three of these areas, and are so basic and elementary that it is worthwhile to collect them together so that more advanced expositions can be given without having to start from the very beginning. The concepts are concerned with the general basic theory of differential manifolds. As a result, this book can be viewed as a prerequisite to *Fundamentals of Differential Geometry*. Since this book is intended as a text to follow advanced calculus, manifolds are assumed finite dimensional. In the new edition, the author has made numerous corrections to the text and he has added a chapter on applications of Stokes' theorem.

Yiming LONG. — **Index theory for symplectic paths with applications.** — Progress in mathematics, vol. 207. — Un vol. relié, 16×24, de XXIV, 380 p. — ISBN 3-7643-647-8. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2002.

This book gives a systematic introduction to the index theory for symplectic matrix paths and its iteration theory, as well as applications to periodic solution problems of nonlinear Hamiltonian systems. Among the topics covered are the algebraic and topological properties of symplectic matrices and groups, the index theory for symplectic paths, relations with other Morse-type index theories, Bott-type iteration formulae, splitting numbers, precise index iteration formulae, various index iteration inequalities, and common index properties of finitely many symplectic paths. The applications of these concepts yield new approaches to some outstanding problems and important progress on their solutions. Particular attention is given to the minimal period solution problem of Hamiltonian systems, the existence of infinitely many periodic points of the Poincaré map of Lagrangian systems on tori, and the multiplicity and stability problems of closed characteristics on convex compact smooth hypersurfaces in  $2n$ -dimensional Euclidean vector space.

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

Klaus BICHTLER. — **Stochastic integration with jumps.** — Encyclopedia of mathematics and its applications, vol. 89. — Un vol. relié, 16×24, de XIII, 501 p. — ISBN 0-521-81129-5. — Prix: £70.00. — Cambridge University Press, Cambridge, 2002.

Stochastic processes with jumps and random measures are gaining importance as drivers in applications like financial mathematics and signal processing. This book develops the stochastic integration theory for both integrators (semimartingales) and random measures from a common point of view. Highlights feature the DCT and Egoroff's theorem, as well as comprehensive analogs to results from ordinary integration theory, for instance, previsible envelopes and an algorithm computing stochastic integrals of càglàd integrands pathwise. Full proofs are given for all results, and motivation is stressed throughout. A large appendix contains most of the analysis that readers will need as a prerequisite. A comprehensive reference list and index of notation are also provided. Extra material is available from the book's Web site at <http://www.ma.utexas.edu/users/cup>.

Erwin BOLTHAUSEN, Alain-Sol SZNITMAN. — **Ten lectures on random media.** — DMV Seminar, vol. 32. — Un vol. broché, 24×17, 116 p. — ISBN 3-7643-6703-2. — Prix: SFr. 42.00. — Birkhäuser, Basel, 2002.

The field of random media has been the object of intensive activity over the last twenty-five years. It gathers a variety of models generally originating from physical sciences, where certain materials or substances have defects or inhomogeneities. This feature can be taken into account by letting the medium be random. Randomness in the medium turns out to cause very unexpected effects, especially in the large-scale behavior of some of these models. What in the beginning was often deemed to be a simple toy-model ended up as a major mathematical

challenge. After more than twenty years of intensive research in this field, certain new paradigms and some general methods have emerged, and the surprising results on the asymptotic behavior of individual models are now better understood in more general frameworks.

Andrei N. BORODIN, Paavo SALMINEN. — **Handbook of Brownian motion: facts and formulae**. — Second edition — Probability and its applications. — Un vol. relié, 24×16, de xv, 672 p. — ISBN 3-7643-6705-9. — Prix: SFr. 198.00. — Birkhäuser, Basel, 2002.

The purpose of this book is to give an easy reference to a large number of facts and formulae associated with Brownian motion. The book consists of two parts. The first one – theory part – is devoted to properties of linear diffusions in general and Brownian motion in particular. Results are given mainly without proofs. The second one – formula part – is a table of distributions of functionals of Brownian motion and related processes. The collection contains more than 2500 numbered formulae. Compared with the first edition published in 1996, this second edition has been revised and considerably expanded. More than 1000 new formulae have been added to the tables and, in particular, geometric Brownian motion is covered both in the theoretical and the formula part of the book.

El-Kébir BOUKAS, Zi-Kuan LIU. — **Deterministic and stochastic time delay systems**. — Control engineering. — Un vol. relié, 24×16, de xvi, 423 p. — ISBN 0-8176-4245-5. — Prix: SFr. 181.00. — Birkhäuser, Boston, 2002.

This book presents recent developments on the class of uncertain deterministic and stochastic dynamical systems with time delay. Problems such as stochastic stability, stabilizability under memory and memoryless state feedback controller and output feedback control,  $H_\infty$  control, and filtering and their robustness are treated. Practical implications of the different methods are considered, and numerical algorithms are provided for implementation. — *Features and topics*: New results in the area of uncertain dynamical systems with time delay are presented; all results use the LMI techniques, which are becoming the standard in control theory; the difference between deterministic dynamical systems with time delay and stochastic dynamical systems with time delay is clarified; both delay-independent and delay-dependent conditions are explained; algorithms are developed to solve different problems in stability and stabilizability.

Robert C. DALANG, Marco DOZZI, Francesco RUSSO, (Editors). — **Seminar on stochastic analysis, random fields and applications III : Centro Stefano Franscini, Ascona, September 1999**. — Progress in probability, vol. 52. — Un vol. relié, 17×24, de xvii, 302 p. — ISBN 3-7643-6721-0. — Prix: SFr. 146.00. — Birkhäuser, Basel, 2002.

This volume contains 20 refereed research or review papers presented at the five-day Third Seminar on Stochastic Analysis, Random Fields and Applications which took place at the Centro Stefano Franscini (Monte Verità) in Ascona, Switzerland, from September 20 to 24, 1999. The seminar focused on three topics: fundamental aspects of stochastic analysis, physical modeling, and applications to financial engineering. The third topic was the subject of a Minisymposium on Stochastic Methods in Financial Models.

Giuseppe DA PRATO, Luciano TUBARO, (Editors). — **Stochastic partial differential equations and applications**. — Lecture notes in pure and applied mathematics, vol. 227. — Un vol. broché, 17,5×25, de ix, 460 p. — ISBN 0-8247-0792-3. — Prix: US\$ 180.00 — Marcel Dekker, New York, 2002.

Based on the proceedings of the 5<sup>th</sup> International Conference on Stochastic Partial Differential Equations and Applications held in Trento, Italy, this reference book offers state of

the art applications in filtering theory, stochastic quantization, quantum probability, and mathematical finance. It analyzes the latest developments in the study of quantum random fields, control theory, white noise and fluid dynamics, and provides precise conditions for nontrivial and well-defined scattering, new Gaussian noise terms, models depicting the asymptotic behavior and evolution equations, and solutions to filtering dilemmas in signal processing.

Dominique FOATA, Aimé FUCHS. — **Processus stochastiques: processus de Poisson, chaînes de Markov et martingales: cours et exercices corrigés.** — Un vol. relié, 17×24, de XIII, 236 p. — ISBN 2 10 006501 7. — Prix: € 25.00. — Dunod, Paris, 2002.

Ce livre s'adresse aux étudiants de maîtrise de mathématiques appliquées et d'informatique (bac+4), ainsi qu'aux élèves des grandes écoles d'ingénieurs, qui s'orientent vers la recherche opérationnelle. Il présuppose la connaissance d'un cours de probabilités de base, comme celui qui est exposé dans le livre *Calcul des probabilités*, écrit par les mêmes auteurs. On y trouve un exposé sur le processus de Poisson, les chaînes de Markov et les martingales à temps discret, ainsi qu'une brève introduction au mouvement brownien. Le livre comporte de nombreux exercices, dont la solution est généralement détaillée et un chapitre d'exemples d'applications, dans lesquels les différents processus sont utilisés.

Hans FÖLLMER, Alexander SCHIED. — **Stochastic finance: an introduction in discrete time.** — De Gruyter studies in mathematics, vol. 27. — Un vol. relié, 17,5×24, de IX, 422 p. — ISBN 3-11-017119-8. — Prix: € 50.47. — Walter de Gruyter, Berlin, 2002.

This book is an introduction to financial mathematics. It is intended for graduate students in mathematics and for researchers working in academia and industry. The focus on stochastic models in discrete time has two immediate benefits. First, the probabilistic machinery is simpler, and one can discuss right away some of the key problems in the theory of pricing and hedging of financial derivatives. Second, the paradigm of a complete financial market, where all derivatives admit a perfect hedge, becomes the exception rather than the rule. Thus, the need to confront the problems arising in incomplete financial market models appears at a very early stage. The first part studies a simple one-period model which serves as a building stone for later developments. In the second part, the idea of dynamic hedging of contingent claims is developed in a multi-period framework. The text captures the interplay between probability theory and functional analysis which has been crucial for recent advances in mathematical finance.

Joseph GLAZ, Joseph NAUS, Sylvan WALLENSTEIN. — **Scan statistics.** — Springer series in statistics. — Un vol. relié, 16×24, de XV, 370 p. — ISBN 0-387-98819-X. — Prix: € 89.95. — Springer, Berlin, 2001.

Scan statistics are used to analyze the occurrence of observed clusters of events in time and space. Scientists seek to determine whether an observed cluster of events has occurred by chance or if it signals a departure from the underlying probability model for the observed data. This book gives broad and up-to-date coverage of exact results, approximations, and bounds for scan statistics with a view towards applications. The first part consists of six chapters and is focused on the use of scan statistics in applications. Each chapter discusses in great detail the methods related to a particular scan statistic, applying them to the area of astronomy, medicine, molecular biology, and quality control. The second part of the book consists of twelve chapters and presents the development of the theory and methods of scan statistics. Both one- and two-dimensional discrete and continuous scan statistics are discussed in great detail. Separate chapters are devoted to exact results, approximations, and bounds for scan statistics.

Olle HÄGGSTRÖM. — **Finite Markov chains and algorithmic applications.** — London Mathematical Society student texts, vol. 52. — Un vol. broché, 15×23, de ix, 114 p. — ISBN 0-521-89001-2. — Prix: £ 14.95. — Cambridge University Press, Cambridge, 2002.

Based on a lecture course given at Chalmers University of Technology, this book is ideal for advanced undergraduate or beginning graduate students. The author first develops the necessary background in probability theory and Markov chains before applying it to study a range of randomized algorithms with important applications in optimization and other problems in computing. Amongst the algorithms covered are the Markov chain, Monte Carlo method, simulated annealing, and the recently developed Propp-Wilson algorithm. This book will appeal not only to mathematicians, but also to students of statistics and computer science.

J. O. RAMSAY, B.W. SILVERMAN. — **Applied functional data analysis: methods and case studies.** — Springer Series in Statistics. — Un vol. broché, 15,5×23,5, de x, 190 p. — ISBN 0-387-95414-7. — Prix: € 59.95. — Springer, New York, 2002.

What do juggling, old bones, criminal careers, and human growth patterns have in common? They all give rise to functional data, which come in the form of curves or functions rather than the numbers, or vectors of numbers, that are considered in conventional statistics. The authors' highly acclaimed book *Functional Data Analysis* (1997) presented a thematic approach to the statistical analysis of such data. By contrast, the present book introduces and explores the ideas of functional data analysis by the consideration of a number of case studies, many of them presented for the first time. The two books are complementary, but neither is a prerequisite for the other. The case studies are accessible to research workers in a wide range of disciplines. Every reader, whether experienced researcher or graduate student, should gain not only a specific understanding of the methods of functional data analysis, but, more importantly, a general insight into the underlying patterns of thought. There is an associated Web site with MATLAB and S-PLUS implementations of the methods discussed, together with all the data sets that are not proprietary.

Rinaldo B. SCHINAZI. — **Probability with statistical applications.** — Un vol. broché, 23,5×15,5, de xii, 2185 p. — ISBN 0-8176-4247-1. — Prix: SFr. 102.00. — Birkhäuser, Boston, 2002.

This concise text is intended for a one-semester course, and offers a practical introduction to probability for undergraduates at all levels with different backgrounds and views towards applications. Only basic calculus is required. However, the book is written so that the calculus difficulties of students do not obscure the probability content in the first six chapters. Thus, the exposition initially focuses on fundamental probability concepts and an easy introduction to statistics. Theory is kept to a minimum here, the striking feature being numerous exercises and examples. Chapters 7 and 8 rely heavily on the calculus of one and several variables to study sums of random variables (via moment generating functions) and transformations of random variables (using distribution functions) and transformations of random vectors. In Chapter 8 a number of facts are proved with respect to expectation, variance and covariance, and normal samples.

Vladas SIDORAVICIUS, (Editor). — **In and out of equilibrium: probability with a physics flavor.** — Progress in Probability, vol. 51. — Un vol. relié, 24×16, de vi, 472 p. — ISBN 0-8176-4289-7. — Prix: SFr. 198.00. — Birkhäuser, Boston, 2002.

The intersection of probability and physics has been a rich and explosive area of growth in the past two decades, specifically covering such subjects as percolation theory, random walks,

interacting particle systems, and various topics related to statistical mechanics. In the last several years, substantial progress has been made in a number of directions: fluctuations of 2-dimensional growth processes, Wulf constructions in higher dimensions for percolation, Potts and Ising models, classification of random walks in random environments, the introduction of the stochastic Loewner equation, the rigorous proof of intersection exponents for planar Brownian motion, and finally the proof of conformal invariance for critical percolation on the triangular lattice. All of the articles are an outgrowth of the fourth Brazilian School of Probability, held in Mambucaba, Brazil, August 2000.

## *Statistique*

C. HUBER-CAROL, N. BALAKRISHNAN, M. S. NIKULIN, M. MESBAH, (Editors). — **Goodness-of-fit tests and model validity**. — Statistics for industry and technology. — Un vol. relié, 18×26, de xxxiii, 507 p. — ISBN 0-8176-4209-9. — Prix: SFr. 198.00. — Birkhäuser, Boston, 2002.

The 37 expository articles in this volume provide broad coverage of important topics relating to the theory, methods, and applications of goodness-of-fit tests and model validity. The book is divided into eight parts, each of which presents topics written by expert researchers in their areas. Key features include: state-of-the-art exposition of modern model validity methods, graphical techniques, and computer-intensive methods; systematic presentation with sufficient history and coverage of the fundamentals of the subject; exposure to recent research and a variety of open problems; many interesting real-life examples for practitioners; extensive bibliography, with special emphasis on recent literature; subject index. This comprehensive reference work will serve the statistical and applied mathematics communities as well as practitioners in the field.

Konstantin PROTASSOV. — **Analyse statistique des données expérimentales**. — Collection Grenoble sciences. — Un vol. broché, 17×25, de 148 p. — ISBN 2-86883-590-2. — Prix: € 13.71. — EDP Sciences, Les Ulis, 2002.

Après une rapide présentation des causes d'incertitudes, les distributions les plus connues sont présentées. Ensuite, des notions plus complexes de statistique sont abordées. Cette partie peut être parcourue rapidement par ceux qui désirent utiliser les résultats sans entrer dans les aspects théoriques. Par contre, une lecture plus attentive permet de comprendre les corrélations qui existent entre les diverses distributions et pourquoi telle distribution est adaptée à telles conditions de mesure. Le lecteur possède ainsi les outils nécessaires à l'analyse des données expérimentales dans différentes situations (petit nombre de mesures, deux mesures, propagation des erreurs, précision de l'incertitude, ajustement de fonction). Des conseils pratiques sont proposés. Ils permettent d'améliorer les mesures des expériences et leur analyse.

Lothar SACHS. — **Angewandte Statistik: Anwendung statistischer Methoden**. — Zehnte, überarbeitete und aktualisierte Auflage. — Un vol. broché, 16,5×24, de xxxvii, 889 p. — ISBN 3-540-42448-2. — Prix: € 49.95. — Springer, Berlin, 2002.

Dieses Buch erläutert statistische Ansätze, ergänzt die Software und gibt leichtfasslich, anschaulich und praxisnah Schülern, Studenten, Praktikern und Dozenten die notwendigen Details, um Daten zu gewinnen, zu beschreiben und zu beurteilen. Es dient zum Lernen, Anwenden und Nachschlagen bei unterschiedlichen Vorkenntnissen und breitgestreuten Interessen in Schulen, Hochschulen und in der Praxis. Neben zahlreichen Hinweisen und Empfehlungen zur Planung und Auswertung von Studien, einer anschaulich und anwenderbezogenen Darstellung von Konzepten, Begriffen, Beziehungen, Fehlerquellen und Fallstricken,

dienen Tips und Querverweise sowie ein sehr ausführliches und strukturiertes Sachverzeichnis mit einer Fülle erläuterter Stichworte auch zur Ergänzung von Statistik-Software-Handbüchern, insbesondere für Mediziner, Ingenieure und Naturwissenschaftler.

Neil H. TIMM. — **Applied multivariate analysis**. — Springer texts in statistics. — Un vol. relié, 18,5×24, de xxiv, 693 p. — ISBN 0-387-95347-7. — Prix: €89.95. — Springer, New York, 2002.

The presentation integrates theory and practice including both the analysis of formal linear multivariate models and exploratory data analysis techniques. Each chapter contains the development of basic theoretical results with numerous applications illustrated using examples from the social and behavioral sciences as well as from other disciplines. All examples are analyzed using SAS. The book includes an overview of vectors, matrices, multivariate distribution theory, and multivariate linear models. Topics discussed include multivariate regression, multivariate analysis of variance for fixed and mixed models, seemingly unrelated regression models, and repeated measurement models. While standard procedures for estimating model parameters and testing multivariate hypotheses, as well as simultaneous test procedures, are discussed, the text also includes tests of multivariate normality with chi-square and beta plots, tests of multivariate non-additivity, tests of covariance structure, tests of nonnested hypotheses, and the assessment of model assumptions. Other topics discussed include discriminant and classification analysis, principal component analysis, canonical correlation analysis, exploratory factor analysis, cluster analysis, multidimensional scaling, and structural equation modeling.

### *Analyse numérique*

H. M. ANTIA. — **Numerical methods for scientists and engineers**. — Second edition. — Un vol. broché, 19×25, de xxii, 842 p. — ISBN 3-7643-6715-6. — Prix: SFr. 79.00. — Birkhäuser, Boston, 2002.

This book presents an exhaustive and in-depth exposition of the various numerical methods used in scientific and engineering computations. It emphasizes the practical aspects of numerical computation and discusses various techniques in sufficient detail to enable their implementation in solving a wide range of problems. — *Features*: techniques for error-estimation in all cases of numerical computation discussed; limitations and pitfalls of various algorithms described; comparative study of different numerical techniques provided; pathological or difficult problems discussed; advanced topics like multiple integration, optimization and integral equations discussed; over 100 worked out examples illustrating numerical algorithms and their limitations/pitfalls; over 500 unsolved problems with answers; over 200 FORTRAN and C programs covering all topics; accompanying CD containing the FORTRAN and C programs and examples of usage.

Tobin A. DRISCOLL and Lloyd N. TREFETHEN. — **Schwarz-Christoffel mapping**. — Cambridge monographs on applied and computational mathematics, vol. 8. — Un vol. relié, 15,5×23,5, de xvi, 132 p. — ISBN 0-521-80726-3. — Prix: £30.00. — Cambridge University Press, Cambridge, 2002.

This book provides a comprehensive look at the Schwarz-Christoffel transformation, including its history and foundations, practical computation, common and less common variations, and many applications in fields such as electromagnetism, fluid flow, design and inverse problems, and the solution of linear systems of equations. The most important theoretical results are stated and proved, but the emphasis throughout remains on concrete understanding and implementation, as evidenced by the 76 figures based on quantitatively correct illustrative examples. There are more than 150 classical and modern reference works cited for readers needing more details.

Prem K. KYTHE, Pratap PURI. — **Computational methods for linear integral equations.** — Un vol. broché, 16×24, de xviii, 508 p. — ISBN 0-8176-4192-0. — Prix: SFr. 190.00. — Birkhäuser, Boston, 2002.

This book presents basic theoretical material that deals with numerical analysis, convergence, error estimates, and accuracy. The unique computational aspect leads the reader from theoretical and practical problems all the way through to computation with hands-on guidance for input files and the execution of computer programs. — *Features:* offers all supporting *Mathematica* files related to the book via the Internet at the authors' web sites: [www.math.uno.edu/fac/pkythe.html](http://www.math.uno.edu/fac/pkythe.html) or [www.math.uno.edu/fac/ppuri.html](http://www.math.uno.edu/fac/ppuri.html); contains identification codes for problems, related methods, and computer programs that are cross-referenced throughout the book to make the connections easy to understand; illustrates a how-to approach to computational work in the development of algorithms, construction of input files, timing, and accuracy analysis; covers linear integral equations of Fredholm and Volterra types of the first and second kinds as well as associated singular integral equations, integro-differential equations, and eigenvalue problems; provides clear, step-by-step guidelines for solving difficult and complex computational problems.

Denis SERRE. — **Matrices: theory and applications.** — Graduate texts in mathematics, vol. 216. — Un vol. relié, 16×24, de xv, 202 p. — ISBN 0-387-95460-0. — Prix: €49.95. — Springer, New York, 2002.

Denis Serre provides a clear and concise introduction to the basic theory of matrices. He discusses many interesting applications of matrices to different aspects of mathematics and provides a detailed analysis of classical algorithms used in large-scale computation. The book combines algebra, analysis, complexity theory, and numerical analysis, and it will provide many scientists, not just mathematicians, with a useful and reliable reference. Based on a course given by the author at the École Normale Supérieure de Lyon, the book is intended for advanced undergraduate and graduate students with either applied or theoretical goals.

## *Informatique*

Joel S. COHEN. — **Computer algebra and symbolic computation: elementary algorithms.** — Un vol. relié, 24×16, de xvii, 323 p. — ISBN 1-56881-158-6. — Prix: US\$50.00. — A.K. Peters, Natick, Massachusetts, 2002.

The author explores the structure and implementation of computer algebra algorithms as well as the mathematical and computational concepts behind them. This book bridges the gap between software manuals, which only explain how to use computer algebra programs such as *Mathematica*, *Maple*, *Derive*, etc., and graduate level texts, which only describe algorithms. For a more advanced look at computer algebra, including the application of algorithms to methods such as automatic simplification, polynomial decomposition, and polynomial factorization, see *Computer Algebra and Symbolic Computation: Mathematical Methods*.

## *Mécanique des fluides, acoustique*

C.I. CHRISTOV, A. GURAN, (Editors). — **Selected topics in nonlinear wave mechanics.** — Un vol. relié, 24×16, de xii, 263 p. — ISBN 0-8176-4059-2. — Prix: SFr. 198.00. — Birkhäuser, Boston, 2002.

This comprehensive reference text gives an overview of the current state of nonlinear wave mechanics in both elastic and fluid media. Consisting of self-contained chapters, the book covers new aspects on strong discontinuities (shock waves) and localized self-preserving (permanent)

shapes (solitary waves and solitons). Special attention is devoted to the kinematics and dynamics of permanent waves when dissipative effects are added to the original balance between non-linearity and dispersion. — *Key features include*: survey chapters written in an accessible style by leading specialists; coverage of emerging topics in the field; interdisciplinary approach integrating mathematical theory and physical applications of nonlinear waves in elastic and fluid media; treatment of the intrinsic mechanisms of propagation of different types of nonlinear waves; presentation of analytical methods for solving wave propagation problems in elastic and fluid media.

P.G. DRAZIN. — **Introduction to hydrodynamic stability**. — Cambridge texts in applied mathematics. — Un vol. broché, 15×23, de xvii, 258 p. — ISBN 0-521-00965-0. — Prix : £21.95. — Cambridge University Press, Cambridge, 2002.

Instability of flows and their transition to turbulence are widespread phenomena in engineering and the natural environment, and are important in applied mathematics, astrophysics, biology, geophysics, meteorology, oceanography and physics as well as engineering. This is a textbook to introduce these phenomena at a level suitable for a graduate course, by modelling them mathematically, and describing numerical simulations and laboratory experiments. The visualization of instabilities is emphasized, with many figures, and in references to more still and moving pictures. The relation of chaos to transition is discussed at length. Many worked examples and exercises for students illustrate the ideas of the text. Readers are assumed to be fluent in linear algebra, advanced calculus, elementary theory of ordinary differential equations, complex variables and the elements of fluid mechanics.

### ***Économie, recherche opérationnelle, jeux***

Yadolah DODGE. — **Mathématiques de base pour économistes**. — Un vol. relié, 16×24, de x, 377 p. — ISBN 2-287-59741-7. — Prix : € 49.24. — Springer, Paris, 2002.

Ce livre contient des éléments fondamentaux de mathématiques. Il est destiné aux étudiants de première année en sciences économiques et sociales. Il peut être considéré à la fois comme un pont reliant les différents types de diplômes d'études secondaires supérieures, mais aussi comme un lien entre les cours élémentaires d'économie et de statistiques. Il est destiné à ceux qui ont peu de connaissances en mathématiques. Le contenu inclut: ensembles, relations et fonctions; représentations graphiques des fonctions, applications économiques des droites et des fonctions; suites, limites et première dérivée, différentielles; applications économiques des dérivées; intégrales: indéfinies et définies avec applications économiques; séries mathématiques; fonctions de plusieurs variables, dérivées partielles, multiplicateurs de Lagrange avec applications économiques; algèbre linéaire: calcul matriciel, système d'équations linéaires, vecteurs, calcul différentiel sous forme matricielle; bref aperçu du logiciel *Mathematica*.

Jean François MAURRAS. — **Programmation linéaire, complexité: séparation et optimisation**. — Mathématiques & applications, vol. 38. — Un vol. broché, 15,5×23,5, de xiv, 221 p. — ISBN 3-540-43671-5. — Prix : € 40.71. — Springer, New York, 2002.

Le but de cet ouvrage est de faire une présentation complète de l'équivalence entre les Oracles *Séparer*, *Optimiser* et *Appartenir* en optimisation polyédrale. Dans ce but le livre commence par une présentation détaillée des problèmes de complexité des algorithmes suivi d'une présentation de la méthode du simplexe. On décrit ensuite l'algorithme de Khachiyan sans éluder les problèmes numériques. Viennent alors une suite d'algorithmes polynomiaux pour *optimiser* à partir de l'oracle *Séparer*. Après quelques transformations, on montre que, par polarité, on peut *Séparer* à partir de l'oracle *Optimiser*. La première équivalence est revue après avoir décrit l'algorithme *LLL*. L'ouvrage se termine par la réduction de *Séparer* à *Appartenir*.

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

Christopher, P. FALL, Eric S. MARLAND, John M. WAGNER, John J. TYSON, (Editors). — **Computational cell biology.** — Interdisciplinary applied mathematics, vol. 20. — Un vol. relié, 18 × 24, de xx, 468 p. — ISBN 0-387-95369-8. — Prix: € 69.50. — Springer, New York, 2002.

This textbook provides an introduction to dynamic modeling in cell biology, emphasizing computational approaches based on realistic molecular mechanisms. It is designed to introduce cell biology and neuroscience students to computational modeling, and applied mathematics students, theoretical biologists, and engineers to many of the problems in dynamical cell biology. This volume was conceived of and begun by Professor Joel Keizer based on his many years of teaching and research together with his colleagues. This project was expanded and finished by his students and friends after his untimely death in 1999.

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

K.T. ARASU, Á. SERESS, (Editors). — **Codes and designs.** — Proceedings of a conference honoring Professor Dijen K. Ray-Chaudhuri on the occasion of his 65<sup>th</sup> birthday, The Ohio State University, May 18-21, 2000. — Ohio State University Mathematical Research Institute publications, vol. 10. — Un vol. relié, 18 × 24,5, de VIII, 322 p. — ISBN 3-11-017396-4. — Prix: € 119.63. — Walter de Gruyter, Berlin, 2002.

Following an initiative of the late Hans Zassenhaus in 1965, the Departments of Mathematics at the Ohio State University and Denison University organize conferences in combinatorics, group theory and ring theory. In May 2000, the 25<sup>th</sup> conference of this series was held with an extended part on combinatorics to honor the 65<sup>th</sup> birthday of Professor Dijen Ray-Chaudhuri. This volume is the proceedings of this extension. Most of the papers are in coding theory and design theory, reflecting the major interest of Professor Ray-Chaudhuri, but there are articles on association schemes, algebraic graph theory, combinatorial geometry, and network flows as well. There are four surveys and seventeen research articles, and all of these went through a refereeing process.