BULLETIN BIBLIOGRAPHIQUE

Généralités

Herbert AMANN, Joachim ESCHER. — **Analysis I.** — Translated from the German by Gary Brookfield. — Un vol. broché, 17×24, de xv, 426 p. — ISBN 3-7643-7153-6. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2005.

This book is the first of a three volume introduction to analysis. It is distinguished by its modern and clear presentation, concentrating always on the essential concepts. In contrast to most other textbooks, there is no artificial separation between the theory of one variable and that of many variables. Emphasis is placed on the early development of a solid foundation in topology. As well, the basics of complex analysis are covered. This book is directed primarily to the students and instructors of beginning courses in analysis. But, with the many examples, exercises and the supplementary material, it is also suitable for self-study, as preparation for advanced study, and as a basis for other research in mathematics and physics.

Jörg BEWERSDORFF. — **Luck, logic, and white lies: the mathematics of games.** — Translated by David KRAMER. — Un vol. broché, 15,5×23,5, de xvII, 486 p. — ISBN 1-56881-210-8. — Prix: US$49.00. — A. K. Peters, Wellesley, Mass., 2004.

The mathematical underpinnings of games, whether they are strategic or games of chance, have been known for centuries, but are usually only understood by players and aficionados who have a background in mathematics. The author has succeeded in making that knowledge accessible, entertaining, and useful to everyone who likes to play and win. The information applies to such diverse and popular games as Roulette, Monopoly™, Chess, Go, numerous card games, and many more. He reviews the mathematical foundations, probability, combinatorics, and mathematical game theory, and emphasizes the implementation of these techniques so that players can put them to work immediately. An extensive bibliography and sections describing the historical developments are welcome features to put the subject in a broader context.

Robert L. BRABENEC. — **Resources for the study of real analysis.** — Un vol. relié, 19×26, de xII, 231 p. — ISBN 0-88385-737-5. — Prix: £28.00. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2004.

This book is a collection of materials gathered by the author while teaching real analysis over a period of years. It is intended for use as a supplement to a traditional analysis textbook, or to provide material for seminars or independent study in analysis and its historical

development. The book includes historical and biographical information, a wide range of problem types, selected readings on a variety of topics, and many references for additional study. Since all these materials are collected in a single book, teachers and students can easily choose items most suitable for their purpose. Teachers may use the book as a supplement to their courses, while students may read much of the book on their own. No other book has been written specifically as a supplement for a real analysis course.

Claude CHEVALLEY. — **Classification des groupes algébriques semi-simples = The classification of semi-simple algebraic groups, Collected works, volume 3.** — Avec la collaboration de P. CARTIER, A. GROTHENDIECK, M. LAZARD, texte révisé par P. CARTIER. — Un vol. relié, 16×24, de XIII, 276 p. — ISBN 3-540-23031-9. — Prix: €69.95. — Springer, Berlin, 2005.

The third volume of the Collected Works of Claude Chevalley assembles his work on semi-simple algebraic groups contained, for the most part, in the notes of the famous Séminaire Chevalley held at the École Normale Supérieure in Paris between 1956 and 1958 and written up by participants of the seminar namely, P. Cartier, A. Grothendieck, R. Lazard and J.L. Verdier. These texts have been entirely reset in TeX for this edition, and edited and annotated by Pierre Cartier. Almost 50 years after the original writing, these texts still constitute a choice reference from which to enter and learn this part of the theory of algebraic groups.

Barry CIPRA, Erik D. DEMAINE, Martin L. DEMAINE, Tom RODGERS, (Editors). — **Tribute to a mathemagician.** — Un vol. relié, 16×24, de XLI, 262 p. — ISBN 1-56881-204-3. — Prix: US$38.00. — A. K. Peters, Wellesley, Mass., 2005.

The tradition continues with this new carefully selected and edited collection in which Martin Gardner and friends inspire and entertain. The contributors to this volume — virtually a list of Who's Who in the World of Puzzles — trace their inspiration to Gardner's puzzle column in *Scientific American* and to his contributions to the world of recreational mathematics. This book contains an author index for the two previous books in the collection of books based on the Gatherings for Gardner. Sample puzzles and games include: tripos, Black Jack, Chinese ceramic puzzle vessels, paper folding, Mongolian interlocking puzzles, rolling block puzzles, sliding puzzles, cryptic crosswords, the Panex puzzle, polyomino puzzles... and more.

P.M. COHN. — **Basic algebra: groups, rings and fields.** — 2nd printing. — Un vol. relié, 17×25, de XII, 465 p. — ISBN 1-85233-587-4. — Prix: €64.95. — Springer, London, 2005.

Basic Algebra is the first volume of a new revised edition of P.M. Cohn's classic three-volume text *Algebra* which is widely regarded as one of the most outstanding introductory algebra textbooks. For this edition, the text has been reworked and updated into two self-contained, companion volumes, covering advanced topics in algebra for second- and third-year undergraduate and postgraduate research students. In this first volume, the author covers the important results of algebra; the companion volume, *Further Algebra and Applications*, brings more advanced topics and focuses on the applications. Readers should have some knowledge of linear algebra and have met groups and fields before, although all the essential facts and definitions are recalled. The coverage is comprehensive and includes topics such as: groups, lattices and categories, rings, modules and algebras, and fields. The author gives a clear account, supported by worked examples, with full proofs. There are numerous exercises with occasional hints, and some historical remarks.

Keith DEVLIN. — **Les énigmes mathématiques du 3ème millénaire: les 7 grands problèmes non résolus à ce jour.** — Traduit par Céline Laroche. — Collection Romans & plus. — Un vol. broché, 15,5×20, de 328 p. — ISBN 2-7465-0163-5. — Prix: €29.00. — Editions Le Pommier, Paris, 2005.

En 2000, le Clay Institute annonça l'ouverture d'une compétition historique: quiconque résoudra l'un des sept problèmes mathématiques non encore résolus à ce jour et jugés comme les plus difficiles et les plus importants du siècle gagnera un million de dollars! Les problèmes du troisième millénaire – choisis par un comité international de mathématiciens reconnus – sont de mêmes statures que les problèmes proposés par David Hilbert, cent ans plus tôt. Leurs solutions (ou leur absence de solution) joueront un rôle déterminant non seulement en mathématiques, mais pour les sciences en général. Dans ce livre à la fois fascinant et accessible à tout lecteur qui peut se rappeler un peu des mathématiques apprises au lycée, Keith Devlin présente avec beaucoup de clarté ces «Everest» des mathématiques contemporaines qu'il reste à grimper!

Steven G. KRANTZ. — **Real analysis and foundations.** — Second edition. — Studies in advanced mathematics. — Un vol. relié, 16×24, de XVI, 454 p. — ISBN 1-58488-483-5. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2005.

The enormously popular first edition of *Real Analysis and Foundations* gave students the appropriate combination of authority, rigor, and readability that made the topic accessible while retaining the strict discourse necessary to advance their understanding. The second edition maintains this feature while further integrating new concepts built on Fourier analysis and ideas about wavelets to indicate their application to the theory of signal processing. The author also introduces relevance to the material and surpasses a purely theoretical treatment by emphasizing the applications of real analysis to concrete engineering problems in higher dimensions.

Serge LANG. — **Algèbre.** — Sciences Sup. — 3e édition révisée. — Un vol. relié, 19×26, de XVIII, 926 p. — ISBN 2-10-007980-8. — Prix: €75.00. — Dunod, Paris, 2004.

L'*Algèbre* de Serge Lang est l'un des plus célèbres traités d'algèbre de ces dernières années. Sa rédaction a été régulièrement reprise, étendue et enrichie par l'auteur, de nouvelles pages inédites faisant notamment leur apparition dans cette traduction en langue française. Ouvert sur les recherches actuelles, l'ouvrage est écrit dans un style élégant et précis. Partant des définitions de base, Serge Lang aborde l'ensemble des domaines fondamentaux de l'algèbre d'aujourd'hui: théorie de Galois, modules et anneaux, algèbre linéaire et multilinéaire, représentation des groupes, algèbre homologique, théories des catégories, etc. A la fin de chaque chapitre, de très nombreux exercices complètent et illustrent le cours. L'ouvrage est destiné à un vaste public: les étudiants en 2e cycle / Master pourront s'y initier aux notions de base essentielles de l'algèbre moderne; les chercheurs débutants ou confirmés pourront y trouver des présentations très riches des domaines de l'algèbre qu'ils seront amenés, un jour ou l'autre, à étudier.

François NORGUET, Salomon OFMAN et Jean-Jacques SZCZECINIARZ, (Editeurs). — **Géométrie complexe.** — Présentations de Pierre LELONG et Raymond STORA. — Collection actualités scientifiques et industrielles, vol. 1438. — Un vol. broché, 18×24, de 335 p. — ISBN 2-7056-1438-9. — Prix: €35.06. — Hermann, Paris, 1996.

Cet ouvrage associe des exposés de mathématiques, de physique théorique et d'histoire des sciences, axés sur la géométrie complexe, issue des travaux de Cauchy et de Poincaré. Le lecteur trouvera ici, entre autres, des résultats récents sur les transformations intégrales,

la théorie des résidus à plusieurs variables ainsi que sur la théorie des champs. Ces travaux sont suivis d'exposés historiques sur les sources et l'évolution de la géométrie complexe, en particulier les théories des résidus et la transformation de Radon analytique. Ces articles développent les contributions de leurs auteurs au colloque de géométrie complexe de juin-juillet 1992 organisé parallèlement au premier congrès européen de mathématiques.

François NORGUET, Salomon OFMAN, (Directeurs). — **Géométrie complexe II: aspects contemporains dans les mathématiques et la physique.** — Un vol broché, 18×24, de 204 p. — ISBN 2-7056-6497-1. — Prix: €45.00. — Hermann, Paris, 2004.

Ce second volume présente des articles de mathématiques et de physique théorique liés à la géométrie complexe, tous originaux. — Table des matières: Vincenzo Ancona, Bernard Gaveau: Residues and mixed Hodge structures on open algebraic varieties. — Jacques Bros, Ugo Moschella: Fourier analysis and holomorphic decomposition on the one-sheeted hyperboloid. — Natalia Buruchenko, August Tsikh: Homology of quasiaffine and quasitoric varieties in general position. — Marc Chaperon: Generic complex flows. — Alicia Dickenstein: Hypergeometric functions with integer homogeneities. — Michael Eastwood, Vladimir Ezhov: Classifying the homogeneous hypersurfaces in a homogeneous space. — Jean-Pierre Gazeau, Rudolf Krejcar: Penrose tilling wavelets and quasicrystals. — Alain Hénaut: Géométrie des tissus et formes différentielles abéliennes. — Camillo Imbimbo: The homomorphic anomaly of the topological strings and quantum field theory. — Serge Lazzarini: Beltrami parametrization in 2-D conformal field theory. — Salomon Ofman: La transformation de Radon analytique en dimension quelconque. — Françoise Richard-Jung: Newton polygon and Newton algorithms. — Alain Yger: Aspects opérationnels de la théorie des résidus hors du cadre intersection complète.

Victor PRASOLOV, Yulij ILYASHENKO, (Editors). — **Surveys in modern mathematics: the Independent University of Moscow seminars.** — London Mathematical Society lecture note series, vol. 321. — Un vol. broché, 15,5×23, de XI, 348 p. — ISBN 0-521-54793-8. — Prix: £38.00. — Cambridge University Press, Cambridge, 2005.

This collection of articles from the Independent University of Moscow is derived from the Gobus seminars held there. They are given by world authorities, from Russia and elsewhere, in various areas of mathematics and are designed to introduce graduate students to some of the most dynamic areas of mathematical research. The seminars aim to be informal, wide ranging and forward looking, getting across the ideas and concepts rather than formal proofs, and this carries over to the articles here. Topics covered range from computational complexity, algebraic geometry, dynamics, through number theory and quantum groups. The volume as a whole is a fascinating and exciting overview of contemporary mathematics.

François ROTHEN. — **Et pourtant, elle tourne!** — Un vol. broché, 15×23, de XIV, 289 p. — ISBN 2-88074-603-5. — Prix: SFr. 49.50. — Presses polytechniques et universitaires romandes, Lausanne, 2004.

Les grandes étapes qui ont marqué l'histoire récente des sciences ont bouleversé notre conception de la naissance de l'univers et de la place qu'y occupe l'être humain. La découverte de la radioactivité et celle du noyau, la détermination de l'âge de la Terre et de celui de l'univers, l'identification de la source du rayonnement solaire ou de l'origine de la chaleur interne de la Terre, l'enquête sur la disparition des dinosaures, la découverte des planètes, des pulsars et des exoplanètes, chacune de ces étapes décisives a influencé notre vision du monde. Mais chacune de ces découvertes est aussi le couronnement d'une aventure unique à laquelle ont participé des hommes et des femmes pleins d'abnégation ou soucieux de leur gloire, avides de connaissances ou parfois pétris d'ambition.

Steve Russ. — **The mathematical works of Bernard Bolzano.** — Un vol. relié, 17×24, de xxx, 698 p. — ISBN 0-19-853930-4. — Prix: £120.00. — Oxford University Press, Oxford, 2004.

Aimed at historians and philosophers of both mathematics and logic, and research students in those fields, this volume contains English translations, in most cases for the first time, of many of Bolzano's most significant mathematical writings. These are the primary sources for many of his celebrated insights and anticipations, including: clear topological definitions of various geometric extensions; an effective statement and use of the Cauchy convergence criterion before it appears in Cauchy's work; proofs of the binomial theorem and the intermediate value theorem that are more general and rigorous than previous ones; an impressive theory of measurable numbers (a version of real numbers); a theory of functions including the construction of a continuous, non-differentiable function (around 1830); and his tantalising conceptual struggles over the possible relationships between infinite collections.

Patrice Tauvel. — **Exercices d'algèbre linéaire: 400 énoncés avec solutions détaillées.** — Sciences Sup. — Un vol. broché, 17×24, de xi, 355 p. — ISBN 2-10-008294-9. — Prix: €37.00. — Dunod, Paris, 2004.

Ce livre contient les énoncés et corrigés de 400 exercices d'algèbre linéaire. Ils ont été regroupés sous différents thèmes afin que le lecteur puisse aborder progressivement les diverses notions rencontrées. Les exercices proposés sont de niveaux très divers: certains sont des applications directes de résultats vus en cours, tandis que d'autres sont nettement plus difficiles et nécessitent plus d'efforts de la part du lecteur s'il veut les résoudre sans regarder le corrigé. Dans les 14 thèmes de l'ouvrage sont traités: les espaces vectoriels, les applications linéaires, les déterminants, la réduction des endomorphismes, les espaces euclidiens et hermitiens, et les formes quadratiques. Un chapitre important est également consacré aux liens entre l'algèbre linéaire et l'analyse. L'ouvrage s'adresse tout à la fois aux étudiants préparant les concours d'enseignement et aux étudiants en 2e cycle / Master de mathématiques.

Patrice Tauvel. — **Exercices d'algèbre générale et d'arithmétique: 470 énoncés avec solutions détaillées.** — Sciences Sup. — Un vol. broché, 17×24, de xi, 388 p. — ISBN 2-10-008292-2. — Prix: €39.00. — Dunod, Paris, 2004.

Ce livre contient les énoncés et corrigés de 470 exercices d'algèbre générale et d'arithmétique. En algèbre générale, l'ouvrage traite des groupes, des anneaux, des corps, des polynômes à une ou plusieurs indéterminées, des fractions rationnelles, et des séries formelles. L'arithmétique est traitée à travers certains des thèmes précédents (anneaux, corps et polynômes), mais également en abordant les nombres premiers ou l'analyse combinatoire. Les exercices sont classés en 17 thèmes de niveaux différents, afin de satisfaire un large public: étudiants préparant concours d'enseignement et étudiants en 2e cycle / Master.

Nils Tongring, R.C. Penner, (Editors). — **Woods Hole mathematics: perspectives in mathematics and physics.** — Series on knots and everything, vol. 34. — Un vol. relié, 16×24, de xiii, 344 p. — ISBN 981-256-021-1. — Prix: £54.00. — World Scientific, New Jersey, 2004.

The central theme of this volume is the contemporary mathematics of geometry and physics, but the work also discusses the problem of the secondary structure of proteins, and an overview of arc complexes with proposed applications to macromolecular folding is given. — *Contents*: L. Chekhov: Quantizing Teichmüller spaces using graphs. — C.L. Epstein: Lectures on indices and relative indices on contact and CR-manifolds. — L.H. Kauffman:

Biologic II. — R.M. Kauffmann: Operads, moduli of surfaces and quantum algebras. — P. Lochak: Fragments of nonlinear Grothendieck-Teichmüller theory. — R.C. Penner: Cell decomposition and compactification of Riemann's moduli space in decorated Teichmüller theory. — K Schneider, M. Farge and N. Kevlahan: Spatial intermittency in two-dimensional turbulence: a wavelet approach. — N. Tongring: An elementary definition of Brownian motion in Hilbert space.

Laurent VIVIER. — **La topologie: l'infini maîtrisé.** — Collection Quatre à Quatre, 3ème niveau. — Un vol. broché, 13,5×20, de 158 p. — ISBN 2-7465-0154-6. — Prix: €14.00. — Editions Le Pommier, Paris, 2004.

Au profane, l'infini donne le vertige. Un bon remède est de circonscrire l'infini dans une théorie mathématique, la topologie. Avec de très nombreux exemples, dans des cadres très variés, illustrés par de multiples figures, c'est un véritable cheminement qui est proposé au lecteur. Les surprenants phénomènes topologiques ne sont pas pour autant négligés, non plus que la topologie algébrique, très abstraite et qui mobilise encore de nos jours de nombreux chercheurs en mathématique. Pour la comprendre, l'explication part d'objets concrets et familiers tels que les cercles, disques, sphères, cylindres pour les objets mathématiques et tasses, théières, pneus, ballons, nœuds pour les objets de la vie courante. Exposée avec un grand sérieux, la théorie topologique prend souvent une tournure très ludique et récompense le lecteur pugnace.

Histoire

Anita BURDMAN FEFERMAN, Solomon FEFERMAN. — **Alfred Tarski: life and logic.** — Un vol. relié, 16×24, de VI, 425 p. — ISBN 0-521-80240-7. — Prix: £23.00. — Cambridge University Press, Cambridge, 2004.

Alfred Tarski, one the greatest logicians of all time, is widely thought of as "the man who defined truth". His work on the concepts of truth and logical consequence are cornerstones of modern logic, influencing developments in mathematics, philosophy, linguistics, and computer science. From the cafés of Warsaw and Vienna to the mountains and deserts of California, this first full-length biography places Tarski in the social, intellectual, and historical context of his times and presents a frank, vivid picture of a personality and professionally passionate man – interlaced with an account of his major scientific achievements.

Yvette KOSMANN-SCHWARZBACH, avec la collaboration de Laurent MEERSSEMAN. — **Les théorèmes de Noether: invariance et lois de conservation au XXe siècle.** — Avec une traduction de l'article original, *Invariante Variationsprobleme*. — Un vol. broché, 17×24, de 173 p. — ISBN 2-7302-1138-1. — Prix: €22.80. — Les Éditions de l'École polytechnique, Paris, 2004.

Texte fondamental établissant le lien entre symétries et lois de conservation des problèmes variationnels, l'article d'Emmy Noether, *Invariante Variationsprobleme* fut publié en 1918. D'une portée restée longtemps méconnue, il eut une influence considérable sur la physique moderne, après une saga d'oublis et de redécouvertes. Ce livre contient la première traduction de ce texte d'allemand en français. Il contient aussi un commentaire approfondi, avec près de trois cents références: les origines du problème, l'atmosphère scientifique à Göttingen lors des débuts de la Relativité Générale, la réception du travail de Noether par Klein, Hilbert, Weyl et Pauli, la curieuse fortune tant du premier que du second théorème, ainsi qu'un précis en termes modernes de l'article, et un chapitre sur ses prolongements mathématiques récents.

Logique et fondements

Itay NEEMAN. — **The determinacy of long games.** — De Gruyter series in logic and its applications, 7. — Un vol. relié, 18×24,5 de XI, 317 p. — ISBN 3-11-018341-2. — Prix: €119.63. — Walter de Gruyter, Berlin, 2004.

In this volume the author develops and applies methods for proving, from large cardinals, the determinacy of definable games of countable length on natural numbers. The determinacy is ultimately derived from iteration strategies, connecting games on natural numbers with the specific iteration games that come up in the study of large cardinals. The games considered in this text range in strength, from games of fixed countable length, through games where the length is clocked by natural numbers, to games in which a run is complete when its length is uncountable in an inner model (or a pointclass) relative to the run. More can be done using the methods developed here, reaching determinacy for games of length ω_1. The book is largely self-contained. Overall it is intended that the book should be accessible both to specialists and to advanced graduate students in set theory.

Théorie des ensembles

Egbert HARZHEIM. — **Ordered sets.** — Advances in mathematics, vol. 7. — Un vol. relié, 17×25, de XII, 386 p. — ISBN 0-387-24219-8. — Prix: €99.95. — Springer, New York, 2005.

The textbook literature on ordered sets is still rather limited. A lot of material is presented in this book that appears now for the first time in a textbook. Order theory works with combinatorial and set-theoretical methods, depending on whether the sets under consideration are finite or infinite. In this book the set-theoretical parts prevail. The book treats in detail lexicographic products and their connections with universally ordered sets, and further it gives thorough investigations on the structure of power sets. Other topics dealt with include dimension theory of ordered sets, well-quasi-ordered sets, trees, combinatorial set theory for ordered sets, comparison of order types, and comparability graphs. — *Contents:* Preface. — Fundamental notion of set theory. — Fundamental notions. — General relations between posets and their chains and antichains. — Linearly ordered sets. — Products of orders. — Universally ordered sets. — Applications of the splitting method. — The dimension of posets. — Well-founded posets, pwo-sets, and trees. — On the order structure of power sets. — Comparison of order types. — Comparability graphs. — References. — Index. — List of symbols.

Analyse combinatoire

Lowell W. BEINEKE, Robin J. WILSON, (Editors), Peter J. CAMERON, (Academic Consultant). — **Topics in algebraic graph theory.** — Encyclopedia of mathematics and its applications, vol. 102. — Un vol. relié, 16,5×24, de XV, 276 p. — ISBN 0-521-80197-4. — Prix: £50.00. — Cambridge University Press, Cambridge, 2004.

The rapidly expanding area of algebraic graph theory uses two different branches of algebra to explore various aspects of graph theory: linear algebra (for spectral theory) and group theory (for studying graph symmetry). These areas have links with other areas of

mathematics, such as logic and harmonic analysis, and are increasingly being used in such areas as computer networks where symmetry is an important feature. Other books cover portions of this material, but this book is unusual in covering both of these aspects and there are no other books with such a wide scope. This book contains ten expository chapters written by acknowledged international experts in the field. To help the reader, there is an extensive introductory chapter that covers the basic background material in graph theory, linear algebra and group theory. Each chapter concludes with an extensive list of references.

G. CHARTRAND, L. LESNIAK. — **Graphs and digraphs.** — Fourth edition. — Un vol. relié, 16×24, de VIII, 386 p. — ISBN 1-58488-390-1. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2005.

With a growing range of applications in fields from computer science to chemistry and communications networks, graph theory has enjoyed a rapid increase of interest and widespread recognition as an important area of mathematics. Through more than 20 years of publication, *Graphs and Digraphs* has remained a popular point of entry to the field, and through its various editions, has evolved with the field from a purely mathematical treatment to one that also addresses the mathematical needs of computer scientists. *New in the fourth edition:* Expanded treatment of Ramsey theory. — Major revisions to the material on domination and distance. — New material on list colourings that includes interesting recent results. — A solutions manual covering many of the exercises available to instructors with qualifying course adoptions. — A comprehensive bibliography including an updated list of graph theory books.

William KOCAY, Donald L. KREHER. — **Graphs, algorithms, and optimization.** — Discrete mathematics and its applications. — Un vol. relié, 16×24,5, de XIV, 483 p. — ISBN 1-58488-396-0. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2005.

A valuable resource for mathematics and computer science students and professionals, *Graphs, Algorithms, and Optimization* presents the theory of graphs from an algorithmic point of view. The authors cover the key topics in graph theory and introduce discrete optimization and its connection to graph theory. The book contains a wealth of information on algorithms and the data structures needed to program them efficiently. Many programming techniques used for algorithms, discussions on algorithmic complexity and efficiency, a chapter on NP-completeness, and three chapters on linear optimization are also included. The graph theory presented is rigorous, but the style is informal.

Théorie des nombres

George E. ANDREWS, Kimmo ERIKSSON. — **Integer partitions.** — Un vol. broché, 15×23, de X, 141 p. — ISBN 0-521-60090-1 (relié: 0-521-84118-6). — Prix: £15.99 (relié: £40.00). — Cambridge University Press, Cambridge, 2004.

The aim of this introductory textbook is to provide an accessible and wide-ranging introduction to partitions, without requiring anything more of the reader than some familiarity with polynomials and infinite series. Many exercises are included, together with some solutions and helpful hints. The book has a short introduction followed by an initial chapter introducing Euler's famous theorem on partitions with odd parts and partitions with distinct parts. This is followed by chapters titled Ferrers graphs, the Rogers-Ramanujan identities, generating functions, formulas for partition functions, Gaussian polynomials, Durfee squares, Euler refined, plane partitions, growing Ferrers boards, and musings.

G.I. ARKHIPOV, V.N. CHUBARIKOV, A.A. KARATSUBA. — **Trigonometric sums in number theory and analysis.** — De Gruyter expositions in mathematics, vol. 39. — Un vol. relié, 18×24,5, de X, 554 p. — ISBN 3-11-016266-0. — Prix: €119.63. — Walter de Gruyter, Berlin, 2004.

In this book a systematic account of the theory of multiple trigonometric sums is given as created by the authors over a period of more than twenty years. The authors develop a unified approach with which they obtain estimates for these sums similar to the classical ones of I.M. Vinogradov. They use them to solve several problems in analytic number theory and investigate trigonometric integrals, which are often encountered in physics, mathematical statistics, and analysis. Moreover, purely mathematical results concerning the solvability of equations in integers are presented. The book is intended for graduate students and researchers in number theory, probability theory, and analysis.

Lars BRÜNJES. — **Forms of Fermat equations and their zeta functions.** — Un vol. relié, 15,5×23,5, de X, 238 p. — ISBN 981-256-039-4. — Prix: £37.00. — World Scientific, Singapore, 2004.

In this volume, an abstract theory of forms is developed, thus providing a conceptually satisfying framework for the classification of forms of Fermat equations. The classical results on diagonal forms are extended to the broader class of all forms of Fermat varieties. The main topic is the study of forms of the Fermat equations over an arbitrary field K. Using Galois descent, all such forms are classified; particularly, a complete and explicit classification of all cubic binary equations is given. If K is a finite field containing the d-th roots of unity, the Galois representation on l-adic cohomology (and so in particular the zeta function) of the hypersurface associated with an arbitrary form of the Fermat equation of degree d is computed.

Harold DAVENPORT. — **Analytic methods for Diophantine equations and Diophantine inequalities.** — Second edition. — Un vol. broché, 16×23, de XX, 140 p. — ISBN 0-521-60583-0. Prix: £19.99. — Cambridge University Press, Cambridge, 2005.

Harold Davenport was one of the truly great mathematicians of the twentieth century. Based on lectures he gave at the University of Michigan in the early 1960s, this book is concerned with the use of analytic methods in the study of integer solutions to Diophantine equations and Diophantine inequalities. It provides an excellent introduction to a timeless area of number theory that is still as relevant today as it was when the book originally appeared. The three main themes of the book are Waring's problem and the representation of integers by diagonal forms, the solvability in integers of systems of forms in many variables, and the solvability in integers of diagonal inequalities. For the second edition of the book a comprehensive foreword has been added in which three leading experts describe the modern context and recent developments. A complete list of references has also been added.

Fred DIAMOND, Jerry SHURMAN. — **A first course in modular forms.** — Graduate texts in mathematics, vol. 228. — Un vol. relié, 17×25, de XV, 436 p. — ISBN 0-387-23229-X. — Prix: €59.95. — Springer, New York, 2005.

This book introduces the theory of modular forms with an eye toward the modularity theorem: all rational elliptic curves arise from modular forms. The topics covered include: elliptic curves as complex tori and as algebraic curves, modular curves as Riemann surfaces and as algebraic curves, Hecke operators and Atkin-Lehner theory, Hecke eigenforms

and their arithmetic properties, the Jacobians of modular curves and the Abelian varieties associated to Hecke eigenforms, elliptic and modular curves modulo p and the Eichler-Shimura Relation, the Galois representations associated to elliptic curves and to Hecke eigenforms. As it presents these ideas, the book states the modularity theorem in various forms, relating them to each other and touching on their applications to number theory. *A First Course in Modular Forms* is written for beginning graduate students and advanced undergraduates. It does not require background in algebraic number theory or algebraic geometry, and it contains exercises throughout.

Jozsef SÁNDOR, Borislav CRSTICI. — **Handbook of number theory II.** — Un vol. relié, 17×25, de 637 p. — ISBN 1-4020-2546-7. — Prix: €170.00. — Kluwer Academic Publishers, Dordrecht and Springer, Berlin, 2004.

This handbook focuses on some important topics from number theory and discrete mathematics. These include the sum of divisors function with the many old and new issues on perfect numbers; Euler's totient and its many facets; the Moebius function along with its generalizations, extensions, and applications; the arithmetic functions related to the divisors or the digits of a number; the Stirling, Bell, Bernoulli, Euler and Eulerian numbers, with connections to various fields of pure or applied mathematics. Each chapter is a survey and can be viewed as an encyclopedia of the considered field, underlining the interconnections of number theory with combinatorics, numerical mathematics, algebra, or probability theory. This reference work would be useful to specialists in number theory and discrete mathematics as well as mathematicians or scientists who need access to some of these results in other fields of research.

Corps et polynômes

Antoine CHAMBERT-LOIR. — **A field guide to algebra.** — Undergraduate Texts in Mathematics. — Un vol. relié, 17×25, de x, 195 p. — ISBN 0-387-21428-3. — Prix: €49.95. — Springer, New York, 2005.

This unique textbook focuses on the structure of fields and is intended for a second course in abstract algebra. Besides providing proofs of the transcendence of π and e, the book includes material on differential Galois groups and a proof of Hilbert's irreducibility theorem. The reader will learn about equations, both polynomial and differential, and about the algebraic structure of their solutions. In explaining these concepts, the author also provides comments on their historical development and leads the reader along many interesting paths. In addition, there are theorems from analysis: as stated before, the transcendence of the numbers π and e, the fact that the complex numbers form an algebraically closed field, and also Puiseux's theorem that shows how one can parametrize the roots of polynomial equations, the coefficients of which are allowed to vary. There are exercises at the end of each chapter, varying in degree from easy to difficult. To make the book more lively, the author has incorporated pictures from the history of the mathematics, including scans of mathematical stamps and pictures of mathematicians.

Victor V. PRASOLOV. — **Polynomials.** — Algorithms and computation in mathematics, vol. 11. — Un vol. relié, 16×24, de xiii, 301 p. — ISBN 3-540-40714-6. — Prix: SFr. 106.00. — Springer, Berlin, 2004.

This comprehensive book covers both long-standing results in the theory of polynomials and recent developments which have until now only been available in the research literature.

After initial chapters on the location and separation of roots and on irreducibility criteria, the book covers more specialised polynomials, including those which are symmetric, integer-valued or cyclotomic, and those of Chebyshev and Bernoulli. There follow chapters on Galois theory and ideals in polynomial rings. Finally there is a detailed discussion of Hilbert's 17th problem on the representation of non-negative polynomials as sums of squares of rational functions and generalizations.

John SWALLOW. — **Exploratory Galois theory.** — Un vol. broché, 19,5×24, de XII, 208 p. — ISBN 0-521-54499-8 (relié: 0-521-83650-6). — Prix: £19.99 (relié: £45.00). — Cambridge University Press, Cambridge, 2004.

Combining a concrete perspective with an exploration-based approach, this book develops Galois theory at an entirely undergraduate level. The text grounds the presentation in the concept of algebraic numbers with complex approximations and assumes of its readers only a first course in abstract algebra. The author organizes the theory around natural questions about algebraic numbers, and exercises with hints and proof sketches encourage students' participation in the development. For readers with *Maple* or *Mathematica*, the text introduces tools for hands-on experimentation with finite extensions of the rational numbers, enabling a familiarity never before available to students of the subject. The book includes classical applications, from ruler-and-compass constructions to solvability by radicals, and also outlines the generalization from subfields of the complex numbers to arbitrary fields.

Helmut VOELKLEIN, Tanush SHASKA, (Editors). — **Progress in Galois theory: proceedings of John Thompson's 70th Birthday Conference.** — Developments in mathematics, vol. 12. — Un vol. relié, 17×25, de IX, 168 p. — ISBN 0-387-23533-7. — Prix: €89.95. — Springer, New York, 2005.

The theme of this book are the interactions between group theory and algebra, geometry, and number theory, showing ubiquity and power of the basic principle of Galois theory. The book presents recent developments in a major line of work about covers of the projective line (and other curves), their fields of definition and parameter spaces, and associated questions about arithmetic fundamental groups. This is intimately tied up with the inverse problem of Galois theory, and uses methods of algebraic geometry, group theory and number theory. *Contents:* Supplementary thoughts on symplectic groups. — Automorphisms of the modular curves. — Reducing the Fontaine-Mazur conjecture to group theory. — Relating two genus 0 problems of John Thompson. — Relatively projective groups as absolute Galois groups. — Invariants of binary forms. — Some classical views on the parameters of GT. — The image of a Hurwitz space under the moduli map. — Very simple presentation: variations on a theme of Clifford.

Géométrie algébrique

David EISENBUD. — **The geometry of syzygies: a second course in commutative algebra and algebraic geometry.** — Graduate texts in mathematics, vol. 229. — Un vol. broché, 16×24, de XVI, 243 p. — ISBN 0-387-22232-4, (relié: 0-387-22215-4). —Prix: €29.95, (relié: €59.95). — Springer, New York, 2005.

Algebraic geometry can seem very abstract, but in fact it is full of concrete examples and problems. The concrete side can be approached by studying the equations of a variety, and syzygies are useful in this study. This book is the first textbook-level account of syzygies

as they are used in algebraic geometry. It includes geometric examples ranging from interpolation to canonical curves. The text has served as the basic for graduate courses at Berkeley, Brandeis, and in Paris. It is also suitable for self-study by a reader who knows a little commutative algebra and algebraic geometry. As aids to the reader, one appendix gives an introduction to local cohomology and another provides a summary of commutative algebra, tying together examples and major results from a wide range of topics.

Algèbre linéaire et multilinéaire, théorie des matrices

Gerald FARIN, Dianne HANSFORD. — **Practical linear algebra: a geometry toolbox.** — Un vol. relié, 20×25, de XVI, 384 p. — ISBN 1-56881-234-5. — Prix: US$67.00. — A. K. Peters, Wellesley, Mass., 2005.

Practical Linear Algebra introduces students in mathematics, science, engineering, and computer science to linear algebra from an intuitive and geometric viewpoint, creating a level of understanding that goes far beyond mere matrix manipulations. Practical aspects, such as computer graphics topics and numerical strategies, are covered throughout, and thus students can build a "Geometry Toolbox", based on a geometric understanding of the key concepts. This book covers all the standard linear algebra material for a first-year course; the authors teach by motivation, illustration, and example rather than by using a theorem/proof style.

Juan Ramón RUÍZ-TOLOSA, Enrique CASTILLO. — **From vectors to tensors.** — Un vol. broché, 16×24, de XVI, 670 p. — ISBN 3-540-22887-X. — Prix: €49.95. — Springer, Berlin, 2005.

This textbook deals with tensors that are treated as vectors, and its orientation is practical. In addition to dealing with the classical topics of standard books on tensors, it introduces new tensor concepts, such as the rotation of tensors, the transposer tensor, the eigentensors, the permutation tensor structure. The book bridges a gap between the classical theory of tensors and the possibility of solving tensor problems with a computer. In fact, the computational algebra required is formulated in matrix form to facilitate its implementation on computers. For the first time, tensor contraction is formulated in terms of matrix operations. A computer package complementing the book and written in Mathematica, is available at: http://personales.unican.es/castie/tensors. Addressed primarily to students of engineering, applied mathematics and mathematical physics, this unconventional approach to tensors is original for its orientation, its novel concepts, the choice of notation and the stretching-condensing techniques applied to most of the transformations used.

Anneaux et algèbres

Luchezar L. AVRAMOV, Mark GREEN, Craig HUNEKE, Karen E. SMITH, Bernd STURMFELS, (Editors). — **Trends in commutative algebra.** — Un vol. relié, 17×25, de X, 254 p. — ISBN 0-521-83195-4. — Prix: £35.00. — Cambridge University Press, Cambridge, 2004.

This book is based on lectures by six internationally known experts presented at the 2002 MSRI Introductory Workshop on Commutative Algebra. They focus on the interaction of commutative algebra with other areas of mathematics, including algebraic geometry, group

cohomology and representation theory, and combinatorics, with all necessary background provided. Short complementary papers describing work at the research frontier are also included. The unusual scope and format make the book invaluable reading for graduate students and researchers interested in commutative algebra and its various uses.

Stefaan CAENEPEEL, Freddy VAN OYSTAEYEN, (Editors). — **Hopf algebras in noncommutative geometry and physics.** — Pure and applied mathematics: a program of monographs, textbooks, and lecture notes, vol. 239. — Un vol. relié, 18×26, de 320 p. — ISBN 0-8247-5759-9. — Prix: US$189.95. — Marcel Dekker, New York, 2005.

This book summarizes the proceedings and keynote presentations from a recent conference held in Brussels, Belgium — focusing on new results in classical Hopf algebras, as well as the classification theory of finite dimensional Hopf algebras, categorical aspects of Hopf algebras, applications in mathematical physics, and recent advances in the theory of corings and quasi-Hopf algebras. Offering 1155 display equations, *Hopf Algebras in Noncommutative Geometry and Physics* provides recent examples and basic properties of corings and their comodules in relation to ring and Hopf algebra theory... presents new computational, geometric, and algebraic methods for quantum groups and differential operators... discusses topological Hopf algebras, quantum groups, and deformation quantization... considers the Lasker-Noether theorem for commutative and Noetherian module algebras over a pointed Hopf algebra... analyzes entwining structures and Morita theory for corings... and shows computational strategies for braided monoidal categories.

Friedrich ISCHEBECK, Ravi A. RAO. — **Ideals and reality: projective modules and number of generators of ideals.** — Springer monographs in mathematics. — Un vol. relié, 17×24, de XIV, 336 p. — ISBN 3-540-23032-7. — Prix: €69.95. — Springer, Berlin, 2005.

This monograph tells the story of a philosophy of J.-P. Serre and his vision of relating that philosophy to problems in affine algebraic geometry. It gives a lucid presentation of the Quillen-Suslin theorem settling Serre's conjecture. The motivating topic of the book is the question of whether a curve in n-space is a set-theoretic complete intersection, depicted by the central theorems of Ferrand, Szpiro, Cowsik-Nori, Mohan Kumar, Boratýnski. The book gives a comprehensive introduction to basic commutative algebra, together with the related methods from homological algebra, which will enable students who know only the fundamentals of algebra to enjoy the power of using these tools. At the same time, it also serves as a valuable reference for the research specialist and as potential course material, because the authors present, for the first time in book form, an approach here that is an intermix of classical algebraic K-theory and complete intersection techniques, making connections with the famous results of Forster-Swan and Eisenbud-Evans. A study of projective modules and their connections with topological vector bundles in a form due to Vaserstein is included. Important subsidiary results appear in the copious exercises.

Alexei KANEL-BELOV, Louis HALLE ROWEN. — **Computational aspects of polynomial identities.** — Research notes in mathematics, vol. 9. — Un vol. relié, 17×24, de XXI, 378 p. — ISBN 1-56881-163-2. — Prix: US$69.00. — A. K. Peters, Wellesley, Mass., 2005.

Some of the important advances in polynomial identity (or PI) theory in the last twenty years have remained accessible only to experts, limiting the exposure of advanced aspects of PI-theory to the general mathematical community. Here, Alexei Kanel-Belov and Louis Halle Rowen have made these breakthroughs available by: Plainly explaining Shirshov's

theorem and the underlying theory. — Discussing Kemer's solution of Specht's conjecture in characteristic zero. — Expanding on related topics (Specht's conjecture in characteristic p, Noetherian PI-algebras, Poincaré-Hilbert series, Gelfand-Kirillov dimension, the combinatoric theory of affine PI-algebras, the ideals of identities, multilinear identities in terms of representation theory and trace identities). — Closing with a proof of Shirkov's theorem. — Belov and Rowen make the highly technical computational aspects of PI theory accessible, thereby allowing mathematicians in related fields to appreciate and use these techniques and insights in their own work.

Ezra MILLER, Bernd STURMFELS. — **Combinatorial commutative algebra.** — Graduate texts in mathematics, vol. 227. — Un vol. relié, 17×25, de XIV, 417 p. — ISBN 0-387-22356-8. — Prix : €69.95. — Springer, New York, 2005.

Combinatorial commutative algebra is an active area of research with thriving connections to other fields of pure and applied mathematics. This book provides a self-contained introduction to the subject, with an emphasis on combinatorial techniques for multigraded polynomial rings, semigroup algebras, and determinantal rings. The eighteen chapters cover a broad spectrum of topics, ranging from homological invariants of monomial ideals and their polyhedral resolutions, to hands-on tools for studying algebraic varieties with group actions, such as toric varieties, flag varieties, quiver loci, and Hilbert schemes. Over 100 figures, 250 exercises, and pointers to the literature make this book appealing to both graduate students and researchers.

Théorie des groupes et généralisations

Ivan CHEREDNIK. — **Double affine Hecke algebras.** — London Mathematical Society lecture note series, vol. 319. — Un vol. broché, 15,5×23, de XII, 434 p. — ISBN 0-521-60918-6. — Prix : £40.00. — Cambridge University Press, Cambridge, 2005.

This book is a unique, essentially self-contained, monograph in a new field of fundamental importance for representation theory, harmonic analysis, mathematical physics, and combinatorics. It is a major source of general information about the double affine Hecke algebra, also called Cherednik's algebra, and its impressive applications. The first chapter is devoted to the Knizhnik-Zamolodchikov equations attached to root systems and their relations to affine Hecke algebras, Kac-Moody algebras, and Fourier analysis. The second chapter contains a systematic exposition of the representation theory of the one-dimensional DAHA. It is the simplest case but far from trivial with deep connections in the theory of special functions. The third chapter is about DAHA in full generality, including applications to Macdonald polynomials, Fourier transforms, Gauss-Selberg integrals, Verlinde algebras, and Gaussian sums.

A. A. IVANOV. — **The fourth Janko group.** — Oxford mathematical monographs. — Un vol. relié, 17×24, de XV, 233 p. — ISBN 0-19-852759-4. — Prix : £60.00. — Clarendon Press, Oxford, 2004.

This unique reference illustrates how different methods of finite group theory including representation theory, cohomology theory, combinatorial group theory and local analysis are combined to construct one of the last of the sporadic finite simple groups – the fourth Janko group **J4**.

John C. LENNOX, Derek J. S. ROBINSON. — **The theory of infinite soluble groups.** — Oxford mathematical monographs. — Un vol. relié, 17×24, de XVI, 342 p. — ISBN 0-19-850728-3. — Prix: £75.00. — Clarendon Press, Oxford, 2004.

The central concept in this monograph is that of a soluble group – a group which is built up from Abelian groups by repeatedly forming group extensions. It covers all the major areas, including finitely generated soluble groups, soluble groups of finite rank, modules over group rings, algorithmic problems, applications of cohomology, and finitely presented groups, whilst remaining fairly strictly within the boundaries of soluble group theory. An up-to-date survey of the area aimed at research students and academic algebraists and group theorists, it is a compendium of information that will be especially useful as a reference work for researchers in the field.

Sándor SZABÓ. — **Topics in factorization of Abelian groups.** — Un vol. relié, 17,5×24, de VI, 334 p. — ISBN 3-7643-7158-7. — Prix: SFr. 164.00. — Birkhäuser, Basel, 2004.

The main objective of this book is to give a systematic exposition of the main results and techniques of the factorization theory of Abelian groups. The necessary background materials are presented along with some of the most important applications in geometry, combinatorics, coding theory, and number theory. A large part of the text is accessible to students, requiring only basic knowledge in group theory and algebra. Helpful exercises are provided in every chapter. Researchers will find the book a comprehensive reference work on the topic.

Groupes topologiques; groupes et algèbres de Lie

Jean-Philippe ANKER, Bent ORSTED, (Editors). — **Lie theory: unitary representations and compactifications of symmetric spaces.** — Progress in mathematics, vol. 229. — Un vol. relié, 17×24, de X, 207 p. — ISBN 0-8176-3526-2. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2005.

Semisimple Lie groups, and their algebraic analogues over fields other than the reals, are of fundamental importance in geometry, analysis, and mathematical physics. Three independent, self-contained volumes, under the general title *Lie Theory*, feature survey work and original results by well-established researchers in key areas of semi simple Lie theory. *Unitary Representations and Compactifications of Symmetric Spaces*, a self-contained work by A. Borel, L. Ji, and T. Kobayashi, focuses on two fundamental questions in the theory of semisimple Lie groups: the geometry of Riemannian symmetric spaces and their compactifications; and branching laws for unitary representations, i.e., restricting unitary representations to (typically, but not exclusively, symmetric) subgroups and decomposing the ensuing representations into irreducibles.

Fonctions de variables réelles

D. E. EDMUNDS, W.D. EVANS. — **Hardy operators, function spaces and embeddings.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de XII, 326 p. — ISBN 3-540-21972-2. — Prix: €89.95. — Springer, Berlin, 2004.

Classical Sobolev spaces, based on Lebesgue spaces on an underlying domain with smooth boundary, are not only of considerable intrinsic interest but have for many years

proved to be indispensable in the study of partial differential equations and variational problems. Many developments of the basic theory arise in response to concrete problems, for example those involving sets with fractal boundaries. The theory will probably enjoy substantial further growth, but even now a connected account of the mature parts of it makes a useful addition to the literature. Accordingly, the main themes of this book are Banach function spaces and spaces of Sobolev type based on them; integral operators of Hardy type on intervals and on trees; and the distribution of the approximation numbers (singular numbers in the Hilbert space case) of embeddings of Sobolev spaces based on generalised ridged domains.

Mesure et intégration

Julius B. BARBANEL. — **The geometry of efficient fair division.** — Un vol. relié, 16×24, de IX, 462 p. — ISBN 0-521-84248-4. — Prix: £55.00. — Cambridge University Press, Cambridge, 2005.

What is the best way to divide a "cake" and allocate the pieces among some finite collection of players? In this book, the cake is a measure space, and each player uses a countably additive, non-atomic probability measure to evaluate the size of the pieces of cake, with different players generally using different measures. The author investigates efficiency properties (such as Pareto maximality: is there another partition that would make everyone at least as happy, and would make at least one player happier, than the present partition?) and fairness properties (such as envy-freeness: do all players think that their piece is at least as large as every other player's piece?). He focuses exclusively on abstract existence results rather than algorithms, and on the geometric objects that arise naturally in this context. By examining the shape of these objects and the relationship between them, he demonstrates results concerning the existence of efficient and fair partitions. This is a work of mathematics that will be of interest to both mathematicians and economists.

Fonctions d'une variable complexe

Fabrizio COLOMBO, Irene SABADINI, Franciscus SOMMEN, Daniele C. STRUPPA. — **Analysis of Dirac systems and computational algebra.** — Progress in mathematical physics, vol. 39. — Un vol. relié, 16,5×24, de XIV, 332 p. — ISBN 0-8176-4255-2. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2004.

The main treatment in this work is devoted to the analysis of systems of linear partial differential equations with constant coefficients, focusing attention on null solutions of Dirac systems. In addition to their usual significance in physics, such solutions are important mathematically as an extension of the function theory of several complex variables. The term "computational" in the title emphasizes two main features of the book, namely, the heuristic use of computers to discover results in some particular cases, and the application of Gröbner bases as a primary theoretical tool. Knowledge from different fields of mathematics such as commutative algebra, Gröbner bases, sheaf theory, cohomology, topological vector spaces, and generalized functions (distributions and hyperfunctions) is required of the reader. However, all the necessary classical material is initially presented.

Armen M. JERBASHIAN — **Functions of α-bounded type in the half-plane.** — Advances in complex analysis and its applications, vol. 4 — Un vol. relié, 16,5×24, 5, de XVI, 196 p. — ISBN 0-387-23625-2 — Prix: €89.95. — Springer, New York, 2005.

This is a unique book related to the theory of functions of α-bounded type in the half-plane of the complex plane, which is constructed by application of the Liouville integro-differential operator. In addition, the book contains improvements of several results such as the Phragmen-Lindelof principle and Nevanlinna factorization in the half-plane, and offers a new, equivalent definition of the classical Hardy spaces in the half-plane. The last chapter of the book presents an application of the constructed theory as well as M.M. Djrbashian's theory of Nevanlinna type classes in the disc in the spectral theory of linear operators. This is a solution of a problem repeatedly stated by M.G. Krein and has been of special interest for a long time. — *Audience:* This book is intended for a wide range of readers. Parts are appropriate for graduate students, while the book overall is intended for new researchers and qualified specialists in the field.

Fonctions de plusieurs variables complexes

Kehe ZHU. — **Spaces of holomorphic functions in the unit ball.** — Graduate text in mathematics, vol. 226. — Un vol. relié, 16×25, de x, 271 p. — ISBN 0-387-22036-4. — Prix: €74.85. — Springer, New York, 2005.

There has been a flurry of activity in recent years in the loosely defined area of holomorphic spaces. This book discusses the most well-known and widely used spaces of holomorphic functions in the unit ball of $\mathbf{C}^n$. Spaces discussed include the Bergman spaces, the Hardy spaces, the Bloch space, BMOA, the Dirichlet space, the Besov spaces, and the Lipschitz spaces. Most proofs in the book are new and simpler than the existing ones in the literature. The central idea in almost all these proofs is based on integral representations of holomorphic functions and elementary properties of the Bergman kernel, the Bergman metric, and the automorphism group. The unit ball was chosen as the setting since most results can be achieved there using straightforward formulas without much fuss. The book can be read comfortably by anyone familiar with single variable complex analysis; no prerequisite on several complex variables is required. The author has included exercises at the end of each chapter that vary greatly in the level of difficulty.

Systèmes dynamiques et théorie ergodique

Geon Ho CHOE. — **Computational ergodic theory.** — Algorithms and computation in mathematics, vol. 13. — Un vol. relié, 17×25, de XIX, 453 p. — ISBN 3-540-23121-8. — Prix: €69.95. — Springer, Berlin, 2005.

Ergodic theory is hard to study because it is based on measure theory, which is a technically difficult subject to master for ordinary students, especially for physics majors. Many of the examples are introduced from a different perspective than in other books and theoretical ideas can be gradually absorbed while doing computer experiments. Theoretically less prepared students can appreciate the deep theorems by doing various simulations. The computer experiments are simple but they have close ties with theoretical implications. Even the researchers in the field can benefit by checking their conjectures, which might have been regarded as unrealistic to be programmed easily, against numerical output using some of the

ideas in the book. One last remark: The last chapter explains the relation between entropy and data compression, which belongs to information theory and not to ergodic theory. It will help students to gain an understanding of the digital technology that has shaped the modern information society.

Stephen LYNCH. — **Dynamical systems with applications using MATLAB®.** — Un vol. broché, 15,5×23,5, de XV, 459 p. — ISBN 0-8176-4321-4. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2004.

Beginning with a tutorial guide to MATLAB®, the text thereafter is divided into two main areas. In Part I, both real and complex discrete dynamical systems are considered, with examples presented from population dynamics, nonlinear optics, and materials science. Part II includes examples from mechanical systems, chemical kinetics, electric circuits, economics, population dynamics, epidemiology, and neural networks. Common themes such as bifurcation, bistability, chaos, fractals, instability, multistability, periodicity, and quasiperiodicity run through several chapters. Chaos control and multifractal theories are also included along with an example of chaos synchronization. Some material deals with cutting-edge published research articles and provides a useful resource for open problems in nonlinear dynamical systems. Approximately 330 illustrations, over 300 examples, and exercises with solutions play a key role in the presentation. Over 60 MATLAB® program files and Simulink® model files are listed throughout the text; these files may also be downloaded from the internet at *www.mathworks.com/matlabcentral/fileexchange/*.

Approximations et développements en série

Radu PĂLTĂNEĂ. — **Approximation theory using positive linear operators.** — Un vol. broché, 15,5×23,5, de VIII, 202 p. — ISBN 0-8176-4350-8. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2004.

This work treats quantitative aspects of the approximation of functions using positive linear operators. In this book, the crucial role of the second order moduli of continuity in the study of such operators is emphasized. New and efficient methods, applicable to general operators and to diverse concrete moduli, are presented. The advantages of these methods consist in obtaining improved and even optimal estimates, as well as in broadening the applicability of the results. — *Additional topics and features:* Examination of the simultaneous approximation; special focus on the Bernstein operators, including applications, and on two new classes of Bernstein-type operators. — Many general estimates, leaving room for future applications (e.g. the B-spline case). — Extensions to approximation operators acting on spaces of vector functions. — Historical perspective in the form of previous significant results.

Analyse de Fourier, analyse harmonique abstraite

Luca BRANDOLINI, Leonardo COLZANI, Alex IOSEVICH, Giancarlo TRAVAGLINI, (Editors). — **Fourier analysis and convexity.** — Applied and numerical harmonic analysis. — Un vol. relié, 16×24,5 de VIII, 268 p. — ISBN 0-8176-3263-8. — Prix: SFr. 130.00. — Birkhäuser, Boston, 2004.

This unified, self-contained volume is dedicated to Fourier analysis, convex geometry, and related topics. The book presents both a broad overview of Fourier analysis and convexity as

well as an intricate look at applications in some specific settings. It will be useful to graduate students and researchers in harmonic analysis, convex geometry, functional analysis, number theory, computer science, and combinatorial analysis. — *Specific topics covered include:* The geometric properties of convex bodies. — The study of Radon transforms. — The geometry of numbers. — The study of translational tilings using Fourier analysis. — Irregularities in distributions. — Lattice point problems examined in the context of number theory, probability theory, and Fourier analysis; restriction problems for the Fourier transform.

Analyse fonctionnelle

David P. BLECHER, Christian LE MERDY. — **Operator algebras and their modules: an operator space approach.** — London mathematical society monographs. — Un vol. relié, 17×24, de x, 387 p. — ISBN 0-19-852659-8. — Prix: £85.00. — Clarendon Press, Oxford, 2004.

This invaluable reference tool is the first to present the general theory of algebras of operators on a Hilbert space, and the modules over such algebras. The new theory of operator spaces is presented early on and the text assembles the basic concepts, theory and methodologies needed to equip a beginning researcher in this area. — *Contents:* Operator spaces. — Basic theory of operator algebras. — Basic theory of operator modules. — Some extremal theory. — Completely isomorphic theory of operator algebras. — Tensor products of operator algebras. — Selfadjointness criteria. — C*-modules and operator spaces.

N. L. CAROTHERS. — **A short course on Banach space theory.** — London mathematical society student texts, vol. 64. — Un vol. broché, 15×23, de xii, 184 p. — ISBN 0-521-60372-2. — Prix: £40.00. — Cambridge University Press, Cambridge, 2004.

This is a short course on Banach space theory with special emphasis on certain aspects of the classical theory. In particular, the course concentrates on three major topics: The elementary theory of Schauder bases, an introduction to L_p spaces, and an introduction to $C(K)$ spaces. While these topics can be traced back to Banach himself, the primary focus here is on the postwar renaissance of Banach space theory brought about by James, Lindenstrauss, Mazur, Namioka, Pelczynski, and others. Their elegant and insightful results are useful in many contemporary research endeavors such as harmonic analysis, the theory of frames and wavelets, signal processing, economics, and physics.

Théorie des opérateurs

Peter EBENFELT, Björn GUSTAFSSON, Dmitry KHAVINSON, Mihai PUTINAR, (Editors). — **Quadrature domains and their applications: the Harold S. Shapiro anniversary volume.** — Operator theory: advances and applications, vol. 156. — Un vol. relié, 18×24, de xxviii, 277 p. — ISBN 3-7643-7145-5. — Prix: SFr. 178.00. — Birkhäuser, Basel, 2005.

The concept of quadrature domains, introduced in the early 1970s by D. Aharonov and H.S. Shapiro and independently by Ph. Davis and M. Sakai, has proven to be a remarkably fruitful and successful idea at the summit of many crossroads in classical analysis and applied mathematics. This volume is devoted to recent advances in the theory of the quadrature domains, illustrating well the multi-facet aspects of their nature. It consists of both original articles and survey papers covering quite a wide scope of ideas and applications in potential theory, complex analysis, fluid mechanics, and operator theory. The

survey articles, written by the leading experts in the field, will help to orient beginners in the vastly increasing literature on the subject. A large collection of open problems pertaining to the general theme of quadrature domains should attract a wide audience of analysts.

Ryuichi ASHINO, Paolo BOGGIATTO, M.W. WONG, (Editors). — **Advances in pseudo-differential operators.** — Operator theory: advances and applications, vol. 155. — Un vol. relié, 17,5×24, de VII, 233 p. — ISBN 3-7643-7140-4. — Prix: SFr. 205.00. — Birkhäuser, Basel, 2004.

This volume consists of the plenary lectures and invited talks in the Special Session on Pseudo-Differential Operators given at the fourth Congress of the International Society for Analysis, Applications and Computation (ISAAC) held at York University in Toronto, August 11-16, 2003. The theme is to look at pseudo-differential operators in a very general sense and to report recent advances in a broad spectrum of topics, such as applications in partial differential equations, quantization in terms of Weyl transforms and Wick operators, filters and localization operators in signal analysis, modulation spaces in the study of pseudo-differential operators and their variants, numerical experiments in wavelet transforms and orthonormal wavelet bases.

Calcul des variations et contrôle optimal

Guy DAVID. — **Singular sets of minimizers for the Mumford-Shah functional.** — Progress in mathematics, vol. 233. — Un vol. relié, 17×24, de XIV, 581 p. — ISBN 3-7643-7182-X. — Prix: SFr. 178.00. — Birkhäuser, Basel, 2005.

This book studies regularity properties of Mumford-Shah minimizers. The Mumford-Shah functional was introduced in the 1980s as a tool for automatic image segmentation, but its study gave rise to many interesting questions of analysis and geometric measure theory. The main object under scrutiny is a free boundary K where the minimizer may have jumps. The book presents an extensive description of the known regularity properties of the singular sets K, and the techniques to get them. Some time is spent on the C^1 regularity theorem (with an essentially unpublished proof in dimension 2), but a good part of the book is devoted to applications of A. Bonnet's monotonicity and blow-up techniques. In particular, global minimizers in the plane are studied in full detail. The book is largely self-contained and should be accessible to graduate students in analysis. The core of the book is composed of regularity results that were proved in the last ten years and which are presented in a more detailed and unified way.

Martin SCHECHTER. — **An introduction to nonlinear analysis.** — Cambridge studies in advanced mathematics, vol. 95. — Un vol. relié, 15,5×23,5, de XVII, 357 p. — ISBN 0-521-84397-9. — Prix: £40.00. — Cambridge University Press, Cambridge, 2004.

The techniques that can be used to solve nonlinear problems are very different from those used to solve linear problems. Many courses in analysis and applied mathematics attack linear cases simply because they are easier to solve and do not require a large theoretical background in order to approach them. Professor Schechter's book is devoted to nonlinear methods using the least background material possible and the simplest linear techniques. An understanding of the tools for solving nonlinear problems is developed whilst demonstrating their application to problems in one dimension and then leading to higher dimensions. The reader is guided using simple exposition and proof, assuming a minimal set

of prerequisites. To complete, a set of appendices covering essential basics in functional analysis and metric spaces is included, making this ideal as an accompanying text on an upper-undergraduate or graduate course, or even for self-study.

Géométrie différentielle

David BAO, Robert L. BRYANT, Shiing-Shen CHERN, Zhongmin SHEN, (Editors). — **A sampler of Riemann-Finsler geometry.** — Mathematical Sciences Research Institute publications, vol. 50. — Un vol. relié, 16×24, de XII, 363 p. — ISBN 0-521-83181-4. — Prix: £45.00. — Cambridge University Press, Cambridge, 2004.

Finsler geometry generalizes Riemannian geometry in the same sense that Banach spaces generalize Hilbert spaces. This book presents an expository account of seven important topics in Riemann-Finsler geometry, which have recently undergone significant development but have not had a detailed pedagogical treatment elsewhere. Each article will open the door to an active area of research and is suitable for a special topics course in graduate-level differential geometry. — *Contents:* J.C. Álvarez Paiva and A.C. Thompson: Volumes on normed and Finsler spaces. — Giovanni Bellettini: Anisotropic and crystalline mean curvature flow. — Tadashi Aikou: Finsler geometry on complex vector bundles. — Karen Chandler and Pit-Mann Wong: Finsler geometry of holomorphic jet bundles. — David Bao and Colleen Robles: Ricci and flag curvatures in Finsler geometry. — Hans-Bert Rademacher: Nonreversible Finsler metrics of positive flag curvature. — Zhongmin Shen: Landsberg curvature, S-curvature and Riemann curvature.

Jerrold E. MARSDEN, Tudor S. RATIU, (Editors). — **The breadth of symplectic and Poisson geometry: Festschrift in honor of Alan Weinstein.** — Progress in mathematics, vol. 232. — Un vol. relié, 17×24, de XXIII, 654 p. — ISBN 0-8176-3565-3. — Prix: SFr. 162.00. — Birkhäuser, Boston, 2005.

One of the world's foremost geometers, Alan Weinstein has made deep contributions to symplectic and differential geometry, Lie theory, mechanics, and related fields. Written in his honor, the invited papers in this volume reflect the active and vibrant research in these areas and are a tribute to Weinstein's ongoing influence. The well-recognized contributors to this text cover a broad range of topics: induction and reduction for systems with symmetry, symplectic geometry and topology, geometric quantization, the Weinstein conjecture, Poisson algebra and geometry, Dirac structures, deformations for Lie group actions, Kähler geometry of moduli spaces, theory and applications of Lagrangian and Hamiltonian mechanics and dynamics, symplectic and Poisson groupoids, and quantum representations. Intended for graduate students and working mathematicians in symplectic and Poisson geometry as well as mechanics, this text is a distillation of prominent research and an indication of the future trends and directions in geometry, mechanics, and mathematical physics.

Athanase PAPADOPOULOS. — **Metric spaces, convexity and nonpositive curvature.** — IRMA lectures in mathematics and theoretical physics, vol. 6. — Un vol. broché, 17×24, de XI, 287 p. — ISBN 3-03719-010-8. — Prix: €48.00. — European Mathematical Society, Zürich, 2005.

This book is about metric spaces of nonpositive curvature in the sense of Busemann, that is, metric spaces whose distance function satisfies a convexity condition. The book also

contains a systematic introduction to the theory of geodesics in metric spaces, as well as a detailed presentation of some facets of convexity theory that are useful in the study of nonpositive curvature. The concepts and the techniques are illustrated by many examples from classical hyperbolic geometry and from the theory of Teichmüller spaces. The book is useful for students and researchers in geometry, topology and analysis.

Topologie générale

B.P. DVALISHVILI. — **Bitopological spaces: theory, relations with generalized algebraic structures, and applications.** — North-Holland Mathematics studies, vol. 199. — Un vol. relié, 28×25, de XIII, 415 p. — ISBN 0-444-51793-6. — Prix: €125.00. — Elsevier, Amsterdam, 2005.

This monograph is the first and an initial introduction to the theory of bitopological spaces and its applications. In particular, different families of subsets of bitopological spaces are introduced and various relations between two topologies are analyzed on one and the same set; the theory of dimension of bitopological spaces and the theory of Baire bitopological spaces are constructed, and various classes of mappings of bitopological spaces are studied. The previously known results as well the results obtained in this monograph are applied in analysis, potential theory, general topology, and theory of ordered topological spaces. — *Contents:* Different families of sets in bitopological spaces. — Different relations between two topologies on a set and bitopological insertions. — Dimension of bitopological spaces. — Baire-like properties of bitopological spaces. — Dynamics of bitopological relations, Baire-like properties and dimensions. — Generalized Boolean algebras and related problems. Representation theorems. — Applications of bitopologies.

S.D. ILIADIS. — **Universal spaces and mappings.** — North-Holland mathematics studies, vol. 198. — Un vol. relié, 18×25, de XVI, 559 p. — ISBN 0-444-51586-0. — Prix: €150.00. — Elsevier, Amsterdam, 2005.

The book is devoted to universality problems. A new approach to these problems is given using some specific spaces. Since the construction of these specific spaces is set-theoretical, the given theory can be applied to different topics of topology such as: universal mappings, dimension theory, action of groups, inverse spectra, isometrical embeddings, and so on. — *Contents:* The construction of containing spaces. — Saturated classes. — Dimension-like functions. — Saturated classes of spaces with structure. — Completely regular and compact spaces. — Saturated classes of mapping. — Actions of groups. — Containing spaces and factorizing T-spectra. — Isometries and universality. — Concluding remarks and open problems.

Topologie des variétés, analyse globale et analyse des variétés

Augustin BANYAGA, David HURTUBISE. — **Lectures on Morse homology.** — Kluwer texts in the mathematical sciences, vol. 29. — Un vol. relié, 17×25, de IX, 324 p. — ISBN 1-4020-2695-1. — Prix: €62.00. — Kluwer Academic Publishers, Dordrecht, and Springer, Berlin, 2004.

This book presents in great detail all the results one needs to prove the Morse homology theorem using classical techniques from algebraic topology and homotopy theory. Most of

these results can be found scattered throughout the literature dating from the mid to late 1900's in some form or other, but often the results are proved in different contexts with a multitude of different notations and different goals. This book collects all these results together into a single reference with complete and detailed proofs. The core material in this book includes CW-complexes, Morse theory, hyperbolic dynamical systems (the lambda-lemma, the stable/unstable manifold theorem), transversality theory, the Morse-Smale-Witten boundary operator, and Conley index theory. More advanced topics include Morse theory on Grassmann manifolds and Lie groups, and an overview of Floer homology theories. With the stress on completeness and by its elementary approach to Morse homology, this book is suitable as a textbook for a graduate level course, or as a reference for working mathematicians and physicists.

Matthias KRECK, Wolfgang LÜCK. — **The Novikov conjecture: geometry and algebra.** — Un vol. broché, 17×24, de XV, 266 p. — ISBN 3-7643-7141-5. — Prix: SFr. 64.00. — Birkhäuser, Basel, 2003.

These lecture notes contain a guided tour to the Novikov conjecture and related conjectures due to Baum-Connes, Borel and Farrell-Jones. They begin with basics about higher signatures, Whitehead torsion and the *s*-cobordism theorem. Then an introduction to surgery theory and a version of the assembly map is presented. Using the solution of the Novikov conjecture for special groups some applications to the classification of low dimensional manifolds are given. Finally, the most recent developments concerning these conjectures are surveyed, including a detailed status report.

Burak OZBAGCI, András I. STIPSICZ. — **Surgery on contact 3-manifolds and Stein surfaces.** — Bolyai Society mathematical studies, vol. 13. — Un vol. relié, 18×24, de 281 p. — ISBN 3-540-22944-2. — Prix: €79.95. — Springer, Berlin, János Bolyai Mathematical Society, Budapest, 2004.

Surgery is the most effective way of constructing manifolds. This is especially true in dimensions 3 and 4, where Kirby calculus provides a method for manipulating surgery diagrams. The groundbreaking results of Donaldson (on Lefschetz fibrations) and Giroux (on open book decompositions) now allow one to incorporate analytic structures into these diagrams: symplectic or Stein structures in the 4-dimensional case, contact structures in the 3-dimensional situation. This volume gives an introduction to the surgery techniques adapted to these additional structures. The necessary topological background on Lefschetz fibrations and open book decompositions is developed. Also included are rapid introductions to the basics and applications of Seiberg-Witten and Heegaard Floer theories.

Shmuel WEINBERGER. — **Computers, rigidity and moduli: the large-scale fractal geometry of Riemannian moduli space.** — Un vol. relié, 17×25, de X, 174 p. — ISBN 0-691-11889-2. — Prix: £26.95. — Princeton University Press, Princeton, New Jersey, and Oxford, 2005.

This book is the first to present a new area of mathematical research that combines topology, geometry and logic. Shmuel Weinberger seeks to explain and illustrate the implications of the general principle, first emphasized by Alex Nabutovsky, that logical complexity engenders geometric complexity. He provides applications to the problem of closed geodesics, the theory of submanifolds, and the structure of the moduli space of isometry classes of Riemannian metrics with cuvature bounds on a given manifold. Ultimately, geometric complexity of a moduli space forces functions defined on that space to

have many critical points, and new results about the existence of extrema or equilibria follow. The main sort of algorithmic problem that arises is recognition: is the presented object equivalent to some standard one? If it is difficult to determine whether the problem is solvable, then the original object has doppelgängers—that is, other objects that are extremely difficult to distinguish from it. Many new questions emerge about the algorithmic nature of known geometric theorems, about "dichotomy problems," and about the metric entropy of moduli space. Weinberger studies them using tools from group theory, computability, differential geometry, and topology, all of which he explains before use. Since several examples are worked out, the overarching principles are set in a clear relief that goes beyond the details of any one problem.

Afra J. ZOMORODIAN. — **Topology for computing.** — Cambridge monographs on applied and computational mathematics, vol. 16. — Un vol. relié, 16×24, de XII, 243 p. — ISBN 0-521-83666-2. — Prix: £35.00. — Cambridge University Press, Cambridge, 2005.

The emerging of computational topology utilizes theory from topology and the power of computing to solve problems in diverse fields. Recent applications include computer graphics, computer-aided design (CAD), and structural biology, all of which involve understanding the intrinsic shape of some real or abstract space. A primary goal of this book is to present basic concepts from topology and Morse theory to enable a nonspecialist to grasp and participate in current research in computational topology. The author gives a self-contained presentation of the mathematical concepts from a computer scientist's point of view, combining point set topology, algebraic topology, group theory, differential manifolds, and Morse-Smale theory. He also presents some recent advances in the area, including topological persistence and hierarchical Morse complexes. Throughout, the focus is on computational challenges and on presenting algorithms and data structures when appropriate.

Probabilités et processus stochastiques

Fabrice BAUDOIN. — **An introduction to the geometry of stochastic flows.** — Un vol. relié, 16×24, de X, 140 p. — ISBN 1-86094-481-7. — Prix: £23.00. — Imperial College Press, London, distributed by World Scientific Publishing, Singapore, 2004.

This book aims to provide a self-contained introduction to the local geometry of stochastic flows. It studies the hypoelliptic operators, which are written in Hörmander's form, by using the connection between stochastic flows and partial differential equations. The book stresses the author's view that the local geometry of any stochastic flow is determined very precisely and explicitly by a universal formula referred to as the Chen-Strichartz formula. The natural geometry associated with the Chen-Strichartz formula is the sub-Riemannian geometry, and its main tools are introduced throughout the text.

Nicolas BOULEAU. — **Processus stochastiques et applications: problèmes et exercices.** — Nouvelle édition revue et augmentée. — Collection Méthodes. Écoles d'ingénieurs, Écoles de commerce, deuxième cycle. — Un vol. broché, 15×22, de VII, 280 p. — ISBN 2-7056-6406-8. — Prix: €30.49. — Hermann, Paris, 2004.

On trouve d'abord dans cet ouvrage les connaissances mathématiques nécessaires pour comprendre la structure des grandes familles de processus aléatoires: chaînes de Markov, processus ponctuels, processus stationnaires, processus de Markov et diffusions. Le livre

aborde ensuite le maniement des modèles où interviennent ces processus aléatoires: trafic routier, gestion de stocks, calcul des structures sous sollicitations aléatoires, etc... On trouvera également une présentation claire du calcul d'Ito et des équations différentielles stochastiques, particulièrement importants pour les modèles financiers et pour le calcul des structures non linéaires. Par son formalisme rigoureux, son riche arsenal mathématique et les nombreux domaines concrets abordés, l'ouvrage intéressera aussi bien les étudiants, les professeurs en mathématiques appliquées, les ingénieurs que les financiers et les économistes.

Vincenzo CAPASSO, David BAKSTEIN. — **An introduction to continuous-time stochastic processes: theory, models and applications to finance, biology, and medicine.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16×25, de XI, 343 p. — ISBN 0-8176-3234-4. — Prix: SFr. 130.00. — Birkhäuser, Boston, 2005.

This concisely written book is a rigorous and self-contained introduction to the theory of continuous-time stochastic processes. A balance of theory and applications, the work features concrete examples of modeling real-world problems from biology, medicine, finance, and insurance using stochastic methods. No previous knowledge of stochastic processes is required. *An Introduction to Continuous-Time Stochastic Processes* will be of interest to a broad audience of students, pure and applied mathematicians, and researchers or practitioners in mathematical finance, biomathematics, biotechnology, physics, and engineering. Suitable as a textbook for graduate or advanced undergraduate courses, the work may also be used for self-study or as a reference. Prerequisites include knowledge of calculus and some analysis; exposure to probability would be helpful but is not required since the necessary fundamentals of measure and integration are provided.

Jean-Dominique DEUSCHEL, Andreas GREVEN, (Editors). — **Interacting stochastic systems.** — Un vol. relié, 17×24, de XI, 450 p. — ISBN 3-540-23033-5. — Prix: €89.95. — Springer, Berlin, 2005.

The Research Network on "Interacting stochastic systems of high complexity" set up by the German Research Foundation aimed at exploring and developing connections in research between infinite-dimensional stochastic analysis, statistical physics, spatial population models from mathematical biology, complex models of financial markets or of stochastic models interacting with other sciences. This book presents a structured collection of papers on the core topics, written at the close of the 6-year programme by the research groups who took part in it. The structure chosen highlights the interweaving of certain themes and certain interconnections discovered throught the joint work. This yields a reference work on results and methods that will be useful to all who work between applied probability and the physical, economic and life sciences.

Michael MITZENMACHER, Eli UPFAL. — **Probability and computing: randomized algorithms and probabilistic analysis.** — Un vol. relié, 18×26, de XVI, 352 p. — ISBN 0-521-83540-2. — Prix: £30.00. — Cambridge University Press, Cambridge, 2005.

Randomization and probabilistic techniques play an important role in modern computer science, with applications ranging from combinatorial optimization and machine learning to communication networks and secure protocols. This textbook is designed to accompany a one- or two-semester course for advanced undergraduates or beginning graduate students in computer science and applied mathematics. It gives an excellent introduction to the probabilistic techniques and paradigms used in the development of probabilistic algorithms

and analyses. It assumes only an elementary background in discrete mathematics and gives a rigorous yet accessible treatment of the material, with numerous examples and applications. The first half of the book covers core material, including random sampling, expectations, Markov's inequality, Chebyshev's inequality, Chernoff bounds, balls-and-bins models, the probabilistic method, and Markov chains. In the second half, the authors delve into more advanced topics such as continuous probability, applications of limited independence, entropy, Markov chain Monte Carlo methods, coupling, martingales, and balanced allocations. With its comprehensive selection of topics, along with many examples and exercises, this book is an indispensable teaching tool.

Larry RABINOWITZ. — **Elementary probability with applications.** — Un vol. relié, 16×24, de x, 198 p. — ISBN 1-56881-222-1. — Prix: US$35.00. — A. K. Peters, Wellesley, Mass., 2005.

Professor Rabinowitz, based on many years of teaching, has created a textbook suited for classroom use as well as for self-study that is filled with hundreds of carefully chosen examples based on real-world case studies about sports, elections, drug testing, legal cases, population growths, business and more. His approach is innovative, practical, and entertaining. *Elementary Probability with Applications* will serve to enhance classroom instruction, as well as benefit those who want to review the basics of probability at their own pace.

M. M. RAO, (Editor). — **Real and stochastic analysis: new perspectives.** — Trends in mathematics. — Un vol. relié, 16,5×24, de VIII, 405 p. — ISBN 0-8176-4332-X. — Prix: SFr. 210.00. — Birkhäuser, Boston, 2004.

Written by active researchers, each of the six independent chapters in this volume is devoted to a particular application of functional analytic methods in stochastic analysis, ranging from work in hypoelliptic operators to quantum field theory. Every chapter contains substantial new results as well as a clear, unified account of the existing theory; relevant references and numerous open problems are also included. — *Key topics:* Stochastic differential equations (SDEs), hypoelliptic operators and SDEs based on Lévy processes. — Stochastic calculus on Riemannian manifolds and curved Wiener spaces. — Noncommutative and quantum probability; the Feynman integral, evolution processes, the Feyman-Kac formula, and applications to quantum field theory. — Convolution operators and the amenability of the underlying locally compact groups, with connections among classical random walks, spectral theory, and Beurling and Segal subalgebras.

Daniel W. STROOCK. — **An introduction to Markov processes.** — Graduate texts in mathematics, vol. 230. — Un vol. relié, 17×24, de XIV, 171 p. — ISBN 3-540-23499-3. — Prix: €69.95. — Springer, Berlin, 2005.

This book provides a rigorous but elementary introduction to the theory of Markov processes on a countable state space. It should be accessible to students with a solid undergraduate background in mathematics, including students from engineering, economics, physics, and biology. Topics covered are: Doeblin's theory, general ergodic properties, and continuous time processes. A whole chapter is devoted to reversible processes and the use of their associated Dirichlet forms to estimate the rate of convergence to equilibrium, and these considerations are applied to an analysis of the efficiency of the Metropolis algorithm. For the convenience of the reader, the final chapter gives a résumé of the requisite ideas from measure theory.

Statistique

Hubert EGON, Pascal POREE. — **Statistique et probabilités en production industrielle. I: Étude générale. Problèmes et exercices corrigés.** — Collection Méthodes, Écoles d'ingénieurs, B.T.S., I.U.T. — Un vol. broché, 15×22, de XII, 325 p. — ISBN 2-7056-6454-8. — Prix: €32.00. — Hermann, Paris, 2004.

L'automatisation généralisée de la production industrielle rend de plus en plus important et délicat le contrôle de la qualité et de la fiabilité des produits. Ce contrôle ne peut se concevoir, de nos jours, sans l'utilisation poussée des méthodes statistiques. Le présent ouvrage a pour objectif d'y préparer les acteurs concernés, depuis les étudiants des écoles d'ingénieurs jusqu'aux industriels eux-mêmes. Le premier volume met au point l'outil indispensable, largement mathématique, relatif à l'étude de la statistique descriptive, du calcul des probabilités et de la statistique inférentielle (échantillonnage et estimation).

Hubert EGON, Pascal POREE. — **Statistique et probabilités en production industrielle. II: Contrôle et maîtrise de la qualité. Fiabilité. Problèmes et exercices corrigés.** — Collection Méthodes, Écoles d'ingénieurs, B.T.S., I.U.T. — Un vol. broché, 15×22, de X, 384 p. — ISBN 2-7056-6454-8. — Prix: €32.00. — Hermann, Paris, 2004.

Ce volume est consacré à la mise en place du contrôle de la qualité des produits en cours de fabrication et à réception, en s'appuyant sur les tests, paramétriques ou non paramétriques, actuellement en vigueur. Une large référence est faite aux normes AFNOR, dont l'emploi est incontournable.

Janos GALAMBOS, Italo SIMONELLI. — **Products of random varables: applications to problems of physics and to arithmetical functions.** — Monographs and textbooks in pure and applied mathematics, vol. 268. — Un vol. broché, 15,5×23,5 de 320 p. — ISBN 0-8247-5402-6. — Prix: US$169.95. — Marcel Dekker, New York, 2005.

This impressive work sees the theory of products of random variables through from distributions and limit theorems to characterizations, to applications in physics, order statistics, and number theory — using entirely probabilistic arguments in actualizing the potential of the asymptotic theory of products of independent random variables and obtaining results with dependent variables using a new Bonferroni-type argument. Well indexed and well referenced, this book clarifies foundational concepts such as symmetric and limiting distributions of products... examines various limit theorems, from logarithmically Poisson distributions to triangular arrays... explores characterization theorems, detailing normal, Cauchy, and bivariate distributions... describes models of interactive particles... elucidates dual systems of interactive particles, dual systems of increasing size, and random walks... covers the Kubilius-Turán inequality and distributions for multiplicative functions... probes sequences of prime divisors and prime numbers... discusses Markov chains, Hilbert spaces, and quotients of random variables... and presents income growth models and numerous other applied models tapping products of random variables.

Analyse numérique

LI Tatsien, (Editor). — **Frontiers in mathematical analysis and numerical methods, in memory of Jacques-Louis Lions.** — Un vol. relié, 16×24, de X, 295 p. — ISBN 981-238-941-5. Prix: £51.00. — World Scientific, Singapore, 2004.

This invaluable volume is a collection of articles in memory of Jacques-Louis Lions, a leading mathematician and the founder of the Contemporary French Applied

Mathematics School. The contributions have been written by his friends, colleagues and students, including C. Bardos, A. Bensoussan, S.S. Chern, P.G. Ciarlet, R. Glowinski, Gu Chaohao, B. Malgrange, G. Marchuk, O. Pironneau, W. Strauss, R. Tenam, etc. The book concerns many important results in analysis, geometry, numerical methods, fluid mechanics, control theory, etc.

Pierre-Arnaud RAVIART, Jean-Marie THOMAS. — **Introduction à l'analyse numérique des équations aux dérivées partielles.** — Sciences Sup. — Un vol. broché, 17×24, de 224 p. — ISBN 2-10-048645-4. — Prix: €29.50. — Dunod, Paris, 2004.

La plupart des phénomènes mécaniques, physiques, biologiques ou économiques sont modélisés à l'aide d'équations aux dérivées partielles. Le but de cet ouvrage est de servir d'introduction à la théorie de ces équations. Dans le cadre nécessairement limité de ce livre, les auteurs se sont restreints aux problèmes linéaires. Parmi les méthodes d'approximation numérique, l'étude est centrée sur la méthode des éléments finis, la plus riche en généralité et en possibilités. Cet ouvrage s'adresse aux étudiants de 2ᵉ cycle / Master de mathématiques, ainsi qu'aux élèves des écoles d'ingénieurs. Un recueil d'exercices corrigés, rédigés par P. Rabier et J.-M. Thomas, permettra au lecteur d'appliquer ses connaissances et de vérifier sa compréhension du cours.

Informatique

Bill CASSELMAN. — **Mathematical illustrations: a manual of geometry and postscript.** — Un vol. broché, 18×24, de XVIII, 318 p. — ISBN 0-521-54788-1, relié: 0-521-83921-1. — Prix: £22.99, relié: £50.00. — Cambridge University Press, Cambridge, 2005.

This practical introduction to the techniques needed to produce high-quality mathematical illustrations is suitable for anyone having a modest acquaintance with coordinate geometry. The author combines a completely self-contained, step-by-step introduction to the graphics programming language Postscript with advice on what goes into good mathematical illustrations, chapters showing how good graphics can be used to explain mathematics, and a treatment of all the mathematics needed to make such illustrations. The many small, simple graphics projects can also be used in courses in geometry, graphics, or general mathematics. Code for many of the illustrations is included, and can be downloaded from the book's Web site: *www.math.ubc.ca/-cass/graphics/manual.* Mathematicians, scientists, engineers, and even graphic designers seeking help in creating technical illustrations need look no further.

Mécanique quantique

Gerardus 'T HOOFT, (Editor). — **50 years of Yang-Mills theory.** — Un vol. broché, 17×25, de IX, 487 p. — ISBN 981-256-007-6 (relié: 981-238-934-2). — Prix: US$34.00 (relié: US$84.00). —World Scientific, Hackensack, N.J., 2005.

On the 50ᵗʰ anniversary of Yang-Mills theory, this volume looks back at the developments and achievements in elementary particle physics that ensued from that beautiful idea. During the last five decades, Yang-Mills theory, which is undeniably the most important cornerstone of theoretical physics, has expanded widely. It has been investigated from many perspectives, and many new and unexpected features have been uncovered from this theory. In recent decades, apart from high energy physics, the theory has been actively

applied in other branches of physics, such as statistical physics, condensed matter physics, nonlinear systems, etc. This makes the theory an indispensable topic for all who are involved in physics. An international team of experts, each of whom has left his mark on the developments of this remarkable theory, contribute essays or more detailed technical accounts to this volume. These articles highlight the new discoveries from the respective authors' perspectives.

Relativité

Patrick R. GIRARD. — **Quaternions, algèbre de Clifford et physique relativiste.** — Collection des sciences appliquées de l'INSA de Lyon. Physique. — Un vol. broché, 16×24, de XII, 165 p. — ISBN 2-88074-606-X. — Prix: SFr. 68.00. — Presses polytechniques et universitaires romandes, Lausanne, 2004.

L'utilisation de l'algèbre de Clifford en physique mathématique et dans les sciences de l'ingénieur a connu un essor rapide ces dernières années. Alors que les développements récents ont privilégié l'approche géométrique, l'auteur s'intéresse quant à lui à l'approche algébrique, qui peut être introduite comme un produit tensoriel d'algèbres de quaternions et qui fournit un calcul unifié, relativiste pour une grande partie de la physique. Cet ouvrage propose une introduction pédagogique à ce nouveau calcul, à partir du groupe des quaternions, avec des applications principalement dans les domaines de la relativité restreinte, de l'électromagnétisme classique et de la relativité générale. Il s'adresse aux étudiants et chercheurs en physique et en sciences de l'ingénieur, intéressés par l'utilisation de ce nouveau calcul de Clifford quaternionien.

Économie, recherche opérationnelle, jeux

Yadolah DODGE. — **Optimisation appliquée.** — Avec la collaboration de Sylvie GONANO-WEBER et Jean-Pierre RENFER. — Un vol. broché, 16×24, de X, 332 p. — ISBN 2-287-21335-X. — Prix: €45.59. — Springer, Berlin, 2003.

L'ouvrage comporte une partie de théorie mathématique sur le calcul matriciel et les systèmes d'équations et d'inéquations linéaires. Il traite ensuite d'optimisation classique avec et sans contraintes, de programmation linéaire, de la méthode du simplexe et du simplexe révisé. Les derniers chapitres sont consacrés à la dualité, à la post-optimisation et analyse de sensibilité ainsi qu'aux problèmes de transport. L'accent a été mis sur l'explication des méthodes exposées et leur utilisation. De nombreux exemples numériques tirés de diverses situations de la vie économique et sociale sont proposés.

Systèmes, contrôle

Vilmos KOMORNIK, Paola LORETI. — **Fourier series in control theory.** — Springer monographs in mathematics. — Un vol. relié, 16×25, de IX, 226 p. — ISBN 0-387-22383-5. — Prix: €85.55. — Springer, New York, 2005.

This monograph will be of interest to experts and researchers, as well as graduate students in such courses as control series and harmonic analysis. Starting with an overview of the problems of observability, controllability, and stabilization of linear systems and

their interconnections, the text contains complete proofs along with a short, simplified, presentation of some properties of Bessel functions for the convenience of the reader. Only basic knowledge of functional analysis is required.

Olof STAFFANS. — **Well-posed linear systems.** — Encyclopedia of mathematics and its applications, 103. — Un vol. relié, 17×24, de XVIII, 776 p. — ISBN 0-521-82584-9. — Prix: £80.00. — Cambridge University Press, Cambridge, 2005.

Many infinite-dimensional linear systems can be modeled in a Hilbert space setting. Others, such as those dealing with heat transfer or population dynamics, need to be set more generally in Banach spaces. This is the first book dealing with well-posed infinite-dimensional linear systems with an input, a state, and an output in a Hilbert or Banach space setting. It is also the first to describe the class of non-well-posed systems induced by system nodes. The author shows how standard finite-dimensional results from systems theory can be extended to these more general classes of systems, and complements them with new results that have no finite-dimensional counterpart. Much of the material presented is original, and many results have never appeared in book form before. A comprehensive bibliography rounds off this work, which will be indispensable to all working in systems theory, operator theory, delay equations, and partial differential equations.

BULLETIN BIBLIOGRAPHIQUE

Généralités

A.D. ALEXANDROV. — **Selected works, part 2: Intrinsic geometry of convex surfaces.** — Edited by S.S. KUTATELADZE. — Translated from Russian by S. VAKHRAMEYEV. — Un vol. relié, 16×24, de XIII, 426 p. — ISBN 0-415-29802-4. — Prix: US$129.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

A.D. Alexandrov is considered by many to be the father of intrinsic geometry, second only to Gauss in surface theory. That appraisal stems primarily from this masterpiece – now available in its entirety for the first time since its 1948 publication in Russian. Alexandrov's treatise begins with an outline of the basic concepts, definitions, and results relevant to intrinsic geometry. It reviews the general theory, then presents the requisite general theorems on rectifiable curves and curves of minimum length. Proof of some of the general properties of the intrinsic metric of convex surfaces follows. The study then splits into two almost independent lines: further exploration of the intrinsic geometry of convex surfaces and proof of the existence of a surface with a given metric. The final chapter reviews the generalization of the whole theory to convex surfaces in the Lobachevskii space and in the spherical space, concluding with an outline of the theory of nonconvex surfaces. Alexandrov's work was both original and extremely influential. This book gave rise to studying surfaces "in the large", rejecting the limitations of smoothness, and reviving the style of Euclid. Progress in geometry in recent decades correlates with the resurrection of the synthetic methods of geometry and brings the ideas of Alexandrov once again into focus.

Marlow ANDERSON, Todd FEIL. — **A first course in abstract algebra: rings, groups, and fields.** — Second edition. — Un vol. relié, 25×17, de XVIII, 673 p. — ISBN 1-58488-515-7. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

Most abstract algebra texts begin with groups, and then proceed to rings and fields. While groups are the logically simplest of the structures, the motivation for studying groups can be somewhat lost on those approaching abstract algebra for the first time. To engage and motivate students, starting with something they know and abstracting from there is more natural and ultimately more effective. The authors developed *A First Course in Abstract Algebra: Rings, Groups, and Fields* based upon that conviction. The text begins with ring theory, building upon the assumed familiarity with integers and polynomials, and introduces groups later, when the reader has gained more experience. Each section of the book ends with a "nutshell" synopsis of important definitions and theorems. Each chapter includes "quick exercises" designed to be worked as the text is read. Problem sets at the end of each chapter begin with "warm-up exercises" that test fundamental comprehension, followed by regular exercises, both computational and "supply the proof" problems. A "hints and answers"

section is provided at the end of the book. As stated in the title, this book is designed for a first course. It requires only a typical calculus sequence as a prerequisite and does not assume any familiarity with linear algebra or complex numbers.

Fedor BOGOMOLOV, Yuri TSCHINKEL, (Editors). — **Geometric methods in algebra and number theory.** — Progress in mathematics, vol. 235. — Un vol. relié, 16×24, de VIII, 362 p. — ISBN 0-8176-4349-4. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2005.

The transparency and power of geometric constructions has been a source of inspiration to generations of mathematicians. The beauty and persuasion of pictures, communicated in words or drawings, continue to provide the intuition and arguments for working with complicated concepts and structures of modern mathematics. This volume contains a selection of articles exploring geometric approaches to problems in algebra, algebraic geometry and number theory. Key topics include: curves and their Jacobians; algebraic surfaces; moduli spaces, Shimura varieties; motives and motivic integration; number-theoretic applications, rational points; combinatorial aspects of algebraic geometry; quantum cohomology; arithmetic dynamical systems. The collection gives a representative sample of problems and the most recent results in algebraic and arithmetic geometry; the text can serve as an intense introduction for graduate students and those wishing to pursue research in these areas.

Giovanni BONIOLO, Paolo BUDINICH, Majda TROBOK. — **The role of mathematics in physical sciences: interdisciplinary and philosophical aspects.** — Un vol. relié, 16,5×25, de X, 244 p. — ISBN 1-4020-3106-8. — Prix: €85.00. — Springer, Dordrecht, 2005.

Even though mathematics and physics have been related for centuries and this relation appears to be unproblematic, there are many questions still open: Is mathematics really necessary for physics, or could physics exist without mathematics? Should we think physically and then add the mathematics apt to formalise our physical intuition, or should we think mathematically and then interpret physically the obtained results? Do we get mathematical objects by abstraction from real objects, or vice versa? Why is mathematics effective in physics? These are all relevant questions, whose answers are necessary to fully understand the status of physics, particularly of contemporary physics. The aim of this book is to offer plausible answers to such questions through both historical analyses of relevant cases, and philosophical analyses of the relations between mathematics and physics.

Reinhard ILLNER, C. Sean BOHUN, Samantha McCOLLUM, Thea van ROODE. — **Mathematical modelling: a case studies approach.** — Student mathematical library, vol. 27. — Un vol. broché, 14×21,5, de XVI, 196 p. — ISBN 0-8218-3650-1. — Prix: US$35.00. — Providence R.I., American Mathematical Society, 2005.

Mathematical modelling is a subject without boundaries. It is the means by which mathematics becomes useful to virtually any subject. Moreover, modelling has been and continues to be a driving force for the development of mathematics itself. This book explains the process of modelling real situations to obtain mathematical problems that can be analyzed, thus solving the original problem. The presentation is in the form of case studies, which are developed much as they would be in true applications. In many cases, an initial model is created, then modified along the way. Some cases are familiar, such as the evaluation of an annuity. Others are unique, such as the fascinating situation in which an engineer, armed only with a slide rule, had 24 hours to compute whether a valve would hold when a temporary rock plug was removed from a water tunnel. Each chapter ends with a set

of exercises and some suggestions for class projects. Some projects are extensive, as with the explorations of the predator-prey model; others are more modest. The text was designed to be suitable for a one-term course for advanced undergraduates. The selection of topics and the style of exposition reflect this choice. The authors have also succeeded in demonstrating just how enjoyable the subject can be. This is an ideal text for classes on modelling. It can also be used in seminars or as preparation for mathematical modelling competitions.

Jürgen JOST. — **Postmodern analysis.** — Third edition. — Universitext. — Un vol. broché, 16×24, de XV, 371 p. — ISBN 3-540-25830-2. — Prix: €39.95. — Springer, Berlin, 2005.

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

May-Britt KALLENRODE. — **Rechenmethoden der Physik: mathematischer Begleiter zur Experimentalphysik.** — Zweite Auflage. — Un vol. broché, 15,5×23,5, de XVII, 386 p. — ISBN 3-540-21454-2. — Prix: €29.95. — Springer, Berlin, 2005.

Die vollständig überarbeitete zweite Auflage der *Rechenmethoden der Physik* führt beispiel- und praxisorientiert in mathematische Handwerkszeuge wie Differential-gleichungen ein. Methoden der Fehlerrechnung, wie im Praktikum benötigt, werden unter konsequenter Verwendung von Verteilungsfunktionen behandelt. Durch die enge Anbindung an das Themenspektrum der Experimentalphysik werden die Rechenmethoden in der Reihenfolge bereitgestellt, wie sie in der Experimentalphysik benötigt werden. Zahlreiche Aufgaben und Lösungen vervollständigen das Buch. In der neuen Auflage werden zudem Optimierungsprobleme, statistische Verfahren im Praktikum und numerische Verfahren ausführlich beschrieben.

Richard A. MOLLIN. — **Codes: the guide to secrecy from ancient to modern times.** — Discrete mathematics and its applications. — Un vol. relié, 16×24, de XX, 679 p. — ISBN 1-58488-470-3. — Prix: US$79.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

From the Rosetta Stone to public-key cryptography, the art and science of cryptology has been used to unlock the vivid history of ancient cultures, to turn the tide of warfare, and to thwart potential hackers from attacking computer systems. *Codes: the Guide to Secrecy from Ancient to Modern Times* explores the depth and breadth of the field, remaining accessible to the uninitiated while retaining enough rigor for the seasoned cryptologist. The book begins by tracing the development of cryptology from that of an arcane practice used, for example, to conceal alchemic recipes, to the modern scientific method that is studied and employed today. The remainder of the book explores the modern aspects and applications of cryptography, covering symmetric- and public-key cryptography, cryptographic protocols, key management, message authentication, e-mail and internet security, and advanced applications such as wireless security, smart cards, biometrics, and quantum cryptography. The author also includes non-cryptographic security issues and a chapter devoted to information theory and coding. Nearly 200 diagrams, examples, figures, and tables along with abundant references and exercises complement the discussion.

Ian Stewart. — **Math hysteria: fun and games with mathematics.** — Un vol. broché, 15,5×23,5, de x, 235 p. — ISBN 0-19-861336-9. — Prix: £9.99. — Oxford University Press, Oxford, 2004.

Welcome to Ian Stewart's strange and magical world of mathematics. In *Math Hysteria*, Professor Stewart presents us with a wealth of intriguing, challenging, and fun puzzles, each one spun around an amazing tale: from the quirks of logic (I know that you know that...) to curious numbers (counting the cattle of the sun) and optimization (the great drain robbery) to the practical matter of why toast falls butter-side down (the anthropomurphic principle). Along the way, we also meet many curious characters, including the extremely polite monks of the Perplexian order, and the stonemason Rocky Rocknuttersson and his apprentice Pnerd.

Leonard M. Wapner. — **The pea and the sun: a mathematical paradox.** — Un vol. relié, 24×16, de xiv, 218 p. — ISBN 1-56881-213-2. — Prix: US$34.00. — A K Peters, Wellesley, Massachusetts, 2005.

Take an apple and cut it into five pieces. Would you believe that these five pieces can be reassembled in such a fashion so as to create two apples equal in shape and size to the original? Would you believe that you could make something as large as the sun by breaking a pea into a finite number of pieces and putting it back together again? Neither did Leonard Wapner, author of *The Pea and the Sun*, when he was first introduced to the Banach-Tarski paradox, which asserts exactly such a notion. Written in an engaging style, *The Pea and the Sun* catalogues the people, events, and mathematics that contributed to the discovery of Banach and Tarski's magical paradox. Wapner makes one of the most interesting problems of advanced mathematics accessible to the non-mathematician.

Histoire

John W. Dawson, Jr. — **Logical dilemmas: the life and work of Kurt Gödel.** — Un vol. broché, 15,5×23, de xiv, 361 p. — ISBN 1-56881-256-6. — Prix: US$34.00. — A K Peters, Wellesley, Massachusetts, 1997.

This definitive biography of the logician and philosopher Kurt Gödel is the first in-depth account to integrate details of his personal life with his work and is based on the author's intensive study of Gödel's papers and surviving correspondence. Dawson, a logician and historian of science, examines the life of this driven man whose work on the foundations of mathematics has fundamentally changed our thoughts on this subject and has stimulated much of the research conducted in the twentieth century. He further explores the relationship between Gödel's personality and his scientific achievements and describes the impact that Gödel's results have had on our modern world view.

Joseph Kouneiher, Dominique Flament, Philippe Nabonnand, Jean-Jacques Szczeciniarz. — **Géométrie au XXe siècle, 1930-2000: histoire et horizons.** — Un vol. relié, 17×25, de vi, 424 p. — ISBN 2-7056-6545-5. — Prix: €90.00. — Hermann, Paris, 2005.

Peu de travaux historiques et philosophiques ont été consacrés à l'histoire récente de la géométrie. Pourtant, au cours de la seconde moitié du vingtième siècle, l'approche géométrique s'est révélée d'une fécondité extraordinaire dans tous les domaines mathématiques, ainsi qu'en physique théorique. En retour, la géométrie a été profondément bouleversée. Le foisonnement des recherches en géométrie, la diversité des intérêts et des travaux et leurs multiples domaines d'application rendent nécessaire, mais extrêmement délicate, toute tentative d'en proposer une approche réflexive et/ou historique. Cet ouvrage

se propose de contribuer à l'émergence de tels travaux historiques et philosophiques en offrant une large présentation réflexive des géométries du vingtième siècle et de leurs fondements conceptuels. L'ensemble des textes dus à des mathématiciens, des philosophes ou des historiens ne prétend pas à l'exhaustivité. Ils constituent un matériau d'une richesse remarquable pour tous ceux qui sont intéressés par une approche historique et philosophique des théories géométriques contemporaines.

Saunders MAC LANE. — **A mathematical autobiography.** — Un vol. relié, 16×23,5, de XVI, 358 p. — ISBN 1-56881-150-0. — Prix: US$39.00. — AK Peters, Wellesley, Massachusetts, 2005.

Saunders Mac Lane was an extraordinary mathematician, a dedicated teacher, and a good citizen who cared deeply about the values of science and education. In this autobiography, he gives us a glimpse of his "life and times", mixing the highly personal with professional observations. His recollections bring to life a century of extraordinary accomplishments and tragedies that inspire and educate. During the earlier part of the twentieth century, he participated in the exciting happenings in Göttingen. He studied under David Hilbert, Hermann Weyl, and Paul Bernays and witnessed the collapse of a great tradition under the political pressure of a brutal dictatorship. Later, he contributed to the more abstract and general mathematical viewpoints developed in the twentieth century. Perhaps the most outstanding accomplishment during his long and extraordinary career was the development of the concept of categories together with Samuel Eilenberg, and the creation of a theory that has broad applications in different areas of mathematics, in particular topology and foundations. As a member and vice president of the National Academy of Sciences and an advisor to the Administration, he exerted considerable influence on science and education policies in the post-war period.

Marco PANZA. — **Newton et les origines de l'analyse: 1664-1666.** — Collection Sciences dans l'histoire. — Un vol. broché, 16×24,5, de XVII, 548 p. — ISBN 2-85367-230-1. — Prix: €65.00. — A. Blanchard, Paris, 2005.

Encore jeune (il est né en 1642), Isaac Newton élabore entre 1664 et 1666 la théorie des fluxions, théorie qui constituera à son tour une étape fondamentale d'un long chemin qui a conduit à concevoir l'analyse mathématique comme une théorie des fonctions. Toute la question est de savoir comment Newton, à partir des objets mathématiques fournis par Descartes dans sa *Géométrie* et par Wallis dans son *Arithmétique des infinis*, a pu concevoir les nouveaux objets de sa théorie. Ce livre est entièrement consacré à la restitution de ce chemin, important à la fois pour l'histoire des mathématiques et pour la philosophie des mathématiques, à partir des manuscrits de Newton édités et traduits dans les dernières décennies.

Karl-Heinz SCHLOTE. — **Zu den Wechselbeziehungen zwischen Mathematik und Physik an der Universität Leipzig in der Zeit von 1830 bis 1904/05.** — Abhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig. Mathematisch-naturwissenschaftliche Klasse, Bd. 63, Heft 1. — Un vol. broché, 21×29,5, de 132 p. — ISBN 3-7776-1353-3. — Prix: €59.00. — Verlag der Sächsischen Akademie der Wissenschaften zu Leipzig, in Kommission bei S. Hirzel Stuttgart/Leipzig, 2004.

Die gegenseitige Beeinflussung von Mathematik und Physik wird an einem konkreten Beispiel, der Universität Leipzig im 19. Jahrhundert, untersucht. Die Studie konzentriert sich auf das mit den Begriffen mathematische Physik, theoretische Physik und Mathematisierung

der Physik umschriebene Problemfeld. Vor dem Hindergrund der Entwicklung der beiden Fachgebiete und dem Voranschreiten der mathematischen bzw. der Entstehung der theoretischen Physik soll dem diesbezüglichen Geschehen an der Universität Leipzig nachgegangen werden. Der Untersuchungszeitraum wird durch zwei Leipziger universitäre Ereignisse begrenzt, die Universitätsreform von 1830 und den Umzug des Physikalischen sowie des Mathematischen Instituts in neue Räumlichkeiten in den Jahren 1904/05. Schwerpunktmässig werden die Veränderungen im Lehrkörper, die Vorlesungstätigkeit und die Forschungen der einzelnen Hochschullehrer betrachtet. Die Erörterungen sind sowohl als eine Detailstudie zur Herausbildung der mathematischen und theoretischen Physik in Deutschland zu verstehen als auch als ein Beitrag zur Geschichte der Universität Leipzig.

Logique et fondements

Jean-Yves BÉZIAU, (Editor). — **Logica universalis: towards a general theory of logic.** — Un vol. broché, 24×17, de x, 228 p. — ISBN 3-7643-7259-1. — Prix: SFr. 78.00. — Birkhäuser, Basel, 2005.

Universal logic is not a new logic, but a general theory of logics, considered as mathematical structures. The name was introduced about ten years ago, but the subject is as old as the beginning of modern logic: Alfred Tarski and other Polish logicians such as Adolf Lindenbaum developed a general theory of logics at the end of the 1920s based on consequence operations and logical matrices. The subject was revived after the flowering of thousands of new logics during the last thirty years: there was a need for a systematic theory of logic to put some order in this chaotic multiplicity. The present book contains recent works on universal logic by first-class researchers from all around the world. The book is full of new and challenging ideas that will guide the future of this exciting subject. It will be of interest to people who want to better understand what logic is. It will help those who are lost in the jungle of heterogeneous logical systems to find a way. Tools and concepts are provided here for those wishing to study classes of already existing logics or to design and build new ones.

Torkel FRANZÉN. — **Gödel's theorem: an incomplete guide to its use and abuse.** — Un vol. broché, 15×23, de x, 172 p. — ISBN 1-56881-238-8. — Prix: US$24.95. — A K Peters, Wellesley, Massachusetts, 2005.

"Among the many expositions of Gödel's incompleteness theorems written for non-specialists, this book stands apart. With exceptional clarity, Franzén gives careful, non-technical explanations both of what those theorems say and, more importantly, what they do not. No other book aims, as his does, to address in detail the misunderstandings and abuses of the incompleteness theorems that are so rife in popular discussions of their significance. As an antidote to the many spurious appeals to incompleteness in theological, anti-mechanist and post-modernist debates, it is a valuable addition to the literature." — John W. Dawson, author of *Logical Dilemmas: the Life and Work of Kurt Gödel.*

Analyse combinatoire

Miklós BÓNA. — **Combinatorics of permutations.** — Discrete mathematics and its applications. — Un vol. broché, 16×24, 383 p. — ISBN 1-58488-434-7. — Prix: £49.99. — Chapman & Hall/CRC, Boca Raton, FL, 2004.

Combinatorics of Permutations offers the first comprehensive, up-to-date treatment of both enumerative and extremal combinatorics and looks at permutations as both linear orders

and as elements of the symmetric group. The author devotes two full chapters to the young but active area of pattern avoidance. He explores the quest for the Stanley-Wilf conjecture and includes the recent and spectacular Marcus-Tardos proof of this problem. He examines random permutations and Standard Young Tableaux and provides an overview of the very rich algebraic combinatorics of permutations. The final chapter takes an in-depth look at combinatorial sorting algorithms. The author's style is relaxed, entertaining, and clearly reflects his enthusiasm for the "serious fun" the subject holds. Filled with applications from a variety of fields and exercises that draw upon recent research results, this book serves equally well as a graduate-level text and a reference for combinatorics researchers.

Reinhard DIESTEL. — **Graph theory.** — Third edition. — Graduate texts in mathematics, vol. 173. — Un vol. relié, 16,5×24, de XVI, 410 p. — ISBN 3-540-26182-6. — Prix: €69.95. — Springer, Berlin, 2005.

The third edition of this standard textbook of modern graph theory has been carefully revised, updated, and substantially extended. Covering all its major recent developments it can be used both as a reliable textbook for an introductory course and as a graduate text: on each topic it covers all the basic material in full detail, and adds one or two deeper results (again with detailed proofs) to illustrate the more advanced methods of that field.

M. LOTHAIRE. — **Applied combinatorics on words.** — Encyclopedia of mathematics and its applications, vol. 105. — Un vol. relié, 24×17, de XV, 610 p. — ISBN 0-521-84802-4. — Prix: £70.00. — Cambridge University Press, Cambridge, 2005.

A series of important applications of combinatorics on words has emerged with the development of computerized text and string processing, for example in biology and linguistics. The aim of this volume, the third in a trilogy, is to present a unified treatment of some of the major fields of applications. After an introduction that sets the scene and gathers together the basic facts, there follow chapters in which applications are considered in detail. The areas covered include: core algorithms for text processing, natural language processing, speech processing, bioinformatics, and several areas of applied mathematics such as combinatorial enumeration and fractal analysis. No special prerequisites are needed, and no familiarity with the application areas, or with the material covered by the previous volumes, is required. The breadth of application, combined with the inclusion of problems and algorithms and a complete bibliography, will make this book ideal for graduate students and professionals in mathematics, computer science, biology and linguistics.

Bridget S. WEBB, (Editor). — **Surveys in combinatorics, 2005.** — London Mathematical Society lecture note series, vol. 327. — Un vol. broché, 15,5×23, de VII, 258 p. — ISBN 0-521-61523-2. — Prix: £30.00. — Cambridge University Press, Cambridge, 2005.

This volume contains survey articles based on the invited lectures given at the twentieth British Combinatorial Conference, organised jointly by the University of Durham and the Open University. It was held in July 2005 at the University of Durham. This biennial conference is a well-established international event, with speakers from all over the world. By its nature this volume provides an up-to-date overview of current research activity in several areas of combinatorics, ranging from combinatorial number theory to geometry. The book provides a valuable survey of the present state of knowledge in combinatorics. — *Contents:* Ben Green: Finite field models in additive combinatorics. — Oliver H. King: The subgroup structure of finite classical groups in terms of geometric configurations. — Patric R.J. Östergård: Constructing combinatorial objects via cliques. — Tim Penttila: Flocks of

circle planes. — Alex Scott: Judicious partitions and related problems. — O. Serra: An isoperimetric method for the small sumset problem. — Maria Chudnovsky and Paul Seymour: The structure of claw-free graphs. — Alan D. Sokal: The multivariate Tutte polynomial (alias Potts model) for graphs and matroids. — Stefanie Gerke and Angelika Steger: The sparse regularity lemma and its applications.

Ordre, treillis

T.S. BLYTH. — **Lattices and ordered algebraic structures.** — Universitext. — Un vol. relié, 25×16, de xi, 303 p. — ISBN 1-85233-905-5. — Prix: €69.95. — Springer, London, 2005.

Lattices and Ordered Algebraic Structures provides a lucid and concise introduction to the basic results concerning the notion of an order. Although as a whole it is mainly intended for beginning postgraduates, the prerequisites are minimal, and selected parts can profitably be used to broaden the horizon of the advanced undergraduate. The treatment is modern, with a slant towards recent developments in the theory of residuated lattices and ordered regular semigroups. Featuring material that has been hitherto available only in research articles, and an account of the range of applications of the theory, there are also many illustrative examples and numerous exercises throughout, making it ideal for use as a course text, or as a basic introduction to the field for researchers in mathematics, logic and computer science. — *Topics covered include:* Residuated mappings. — Galois connections, modular, distributive, and complemented lattices. — Boolean algebras. — Pseudocomplemented lattices. — Stone algebras. — Heyting algebras. — Ordered groups. — Lattice-ordered groups. — Representable groups. — Archimedean ordered structures. — Ordered semigroups. — Naturally ordered regular and inverse Dubreil-Jacotin semigroups.

Théorie des nombres

James W. COGDELL, Dihua JIANG, Stephen S. KUDLA, David SOUDRY, Robert STANTON, (Editors). — **Automorphic representations, *L*-functions and applications: progress and prospects: proceedings of a conference honouring Steve Rallis on the occasion of his 60th birthday, The Ohio State University, March 27-30, 2003.** — Ohio State University mathematical research institute publications, 11. — Un vol. relié, 18×24,5, de viii, 430 p. — ISBN 3-11-017939-3. — Prix: €138.32. — De Gruyter, Berlin, 2005.

This volume is the proceedings of the Conference on Automorphic Representations, *L*-Functions and Applications: Progress and Prospects, held at the Department of Mathematics of the Ohio State University, March 27-30, 2003, in honor of the 60th birthday of Steve Rallis. The theory of automorphic representations, automorphic *L*-functions and their applications to arithmetic continues to be an area of vigorous and fruitful research. The contributed papers in this volume represent many of the most recent developments and directions, including: Rankin-Selberg *L*-functions (Bump, Ginzburg-Jiang-Rallis, Lapid-Rallis) — the relative trace formula (Jacquet, Mao-Rallis) — automorphic representations (Gan-Gurevich, Ginzburg-Rallis-Soudry) — representation theory of *p*-adic groups (Baruch, Kudla-Rallis, Moeglin, Cogdell-Piatetski-Shapiro-Shahidi) — *p*-adic methods (Harris-Li-Skinner, Vigneras) — arithmetic applications (Chinta-Friedberg-Hoffstein). The survey articles by Bump, on the Rankin-Selberg method, and by Jacquet, on the relative trace formula, should be particularly useful as an introduction to the

key ideas about these important topics. This volume should be of interest both to researchers and students in the area of automorphic representations, as well as to mathematicians in other areas interested in having an overview of current developments in this important field.

Francesco MEZZADRI, Nina C. SNAITH, (Editors). — **Recent perspectives in random matrix theory and number theory.** — London Mathematical Society lecture note series, vol. 322. — Un vol. broché, 15,5×23, de IX, 518 p. — ISBN 0-521-62058-9. — Prix: £35.00. — Cambridge University Press, Cambridge, 2005.

In recent years the application of random matrix techniques to analytic number theory has been responsible for major advances in this area of mathematics. As a consequence, it has created a new and rapidly developing area of research. The aim of this book is to provide the necessary grounding both in relevant aspects of number theory and in techniques of random matrix theory, as well as to inform the reader of what progress has been made when these two apparently disparate subjects meet. This volume of proceedings is addressed to graduate students and other researchers in both pure mathematics and theoretical physics. The contributing authors, who are among the world's leading experts in this area, have taken care to write self-contained lectures on subjects chosen to produce a coherent volume.

Jörn STEUDING. — **Diophantine analysis.** — Discrete mathematics and its applications. — Un vol. relié, 16×24, de 261 p. — ISBN 1-58488-482-7. — Prix: US$69.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

While its roots reach back to the third century, Diophantine analysis continues to be an extremely active and powerful area of number theory. Many Diophantine problems have simple formulations, they can be extremely difficult to attack, and many open problems and conjectures remain. *Diophantine Analysis* examines the theory of Diophantine approximations and the theory of Diophantine equations, with emphasis on interactions between these subjects. Beginning with the basic principles, the author develops his treatment around the theory of continued fractions and examines the classic theory, including some of its applications. He also explores modern topics rarely addressed in other texts, including the *abc* conjecture, the polynomial Pell equation, and the irrationality of the zeta function and touches on topics and applications related to discrete mathematics, such as factoring methods for large integers. Setting the stage for tackling the field's many open problems and conjectures, *Diophantine analysis* is an ideal introduction to the fundamentals of this venerable but still dynamic field. A detailed appendix supplies the necessary background material, more than 200 exercises reinforce the concepts, and engaging historical notes bring the subject to life.

James J. TATTERSALL. — **Elementary number theory in nine chapters.** — Second edition. — Un vol. broché, 15×23, de XI, 430 p. — ISBN 0-521-61524-0 (relié: 0-521-85014-2). — Prix: £19.99 (relié: £55.00). — Cambridge University Press, Cambridge, 2005.

This textbook has been revised throughout and many new exercises have been added. Historical perspective is included and emphasis is given to some of the subject's applied aspects; in particular the field of cryptography is highlighted. At the heart of the book are the major number theoretic accomplishments of Euclid, Fermat, Gauss, Legendre and Euler and, to fully illustrate the properties of numbers and concepts developed in the text, a wealth of exercises has been included. It is assumed that the reader will have "pencil in hand" and ready access to a calculator or computer. For students new to number theory, whatever their background, this is a stimulating and entertaining introduction to the subject.

Corps et polynômes

Antonio J. ENGLER, Alexander PRESTEL. — **Valued fields.** — Springer monographs in mathematics. — Un vol. relié, 16,5×24, de x, 205 p. — ISBN 3-540-24221-X. — Prix: €69.95. — Springer, Berlin, 2005.

Absolute values and their completions – like the p-adic number fields – play an important role in number theory. Krull's generalization of absolute values to valuations made applications in other branches of mathematics, such as algebraic geometry, possible. In valuation theory, the notion of a completion has to be replaced by that of the so-called Henselization. In this book, the theory of valuations as well as of Henselizations is developed. The presentation is based on the knowledge acquired in a standard graduate course in algebra. The last chapter presents three applications of the general theory – for instance to Artin's conjecture on the p-adic number fields – that could not be obtained by the use of absolute values alone.

Teo MORA. — **Solving polynomial equation systems II: Macaulay's paradigm and Gröbner technology.** — Encyclopedia of mathematics and its applications, vol. 99. — Un vol. relié, 24×17, de xxii, 759 p. — ISBN 0-521-81156-2. — Prix: £85.00. — Cambridge University Press, Cambridge, 2005.

The second volume of this comprehensive treatise focuses on Buchberger theory and its application to the algorithmic view of commutative algebra. In distinction from other works, the presentation here is based on the intrinsic linear algebra structure of Gröbner bases, and thus elementary considerations lead to an easy introduction to the state of the art in issues of implementation. The same language describes the applications of Gröbner technology to the central problems of commutative algebra (from Hilbert function and resolution computation, up to the Lasker-Noether decomposition). At the same time, the book can be used as a reference on elementary ideal theory and a source for the state of the art in its algorithmization. The efficiency of this algorithmization is shown by its ability to link the new Gröbner technology with the old combinatorial and linear algebra approach performed and advocated by Macaulay; such a paradigm is discussed and illustrated in this book, which also gives a careful commentary of Macaulay's notion of inverse systems and algorithms for computing them. Aiming to be a complete survey on Gröbner based and their applications, the book also includes the advanced aspects of Buchberger theory, such as the complexity of the algorithm, Galligo's theorem, the optimality of degrevlex, the Gianni-Kalkbrener theorem, the FGLM algorithm, and so on.

Géométrie algébrique

Michel BRION, Shrawan KUMAR. — **Frobenius splitting methods in geometry and representation theory.** — Progress in mathematics, vol. 231. — Un vol. relié, 16,5×24, de viii, 250 p. — ISBN 0-8176-4191-2. — Prix: SFr. 116.00. — Birkhäuser, Boston, 2005.

The theory of Frobenius splittings has made a significant impact in the study of the geometry of flag varieties and representation theory. This work, unique in book literature, systematically develops the theory and covers all its major developments. _Key features:_ Concise, efficient exposition unfolds from basic introductory material on Frobenius splittings, definitions, properties and examples, to cutting-edge research. — Studies in detail the geometry of Schubert varieties, their syzygies, equivariant embeddings of reductive groups, Hilbert schemes, canonical splittings, good filtrations, among other topics. — Applies

Frobenius splitting methods to algebraic geometry and various problems in representation theory. — Many examples, exercises, and open problems suggested throughout. — Comprehensive bibliography and index.

Antonio CAMPILLO, Julio CASTELLANOS. — **Curve singularities: an algebraic and geometric approach.** — Actualités mathématiques. — Un vol. broché, 17×24, de VII, 136 p. — ISBN 2-7056-6542-0. — Prix: €50.00. — Hermann, Paris, 2005.

This book presents a treatment of curve singularities, a subject of renewed actuality. Curve singularities become a fundamental tool in recent developments as arc spaces, resolution of singularities, base point of linear systems, valuation theory or coding theory. Rational branches, parameterizations, Hamburger-Noether matrices, resolution of singularities, Arf closure and saturation are specially developed on an algebraic basis. On the other hand, exceptional divisors and combinatorial configurations obtained by blowing ups, proximity relations, infinitely near points and linear systems obtained from them are also developed on a geometric basis. Ground fields are arbitrary perfect fields. All together gives an algebraic geometric insight of singular points of curves, which can have any embedding dimension. The book is addressed to researchers as well as to postgraduate students interested in the topic or related areas.

Algèbre linéaire et multilinéaire, théorie des matrices

Rémi GOBLOT. — **Algèbre linéaire.** — Mathématiques à l'Université, cours et exercices corrigés. — Un vol. broché, 18×26, de VIII, 326 p. — ISBN 2-7298-2567-3. — Prix: €29.50. — Ellipses, Paris, 2005.

Ce livre s'adresse aux étudiants de seconde, troisième et quatrième années d'études universitaires en mathématiques et aux candidats à l'Agrégation. Le sujet traité est l'étude de l'algèbre linéaire des espaces vectoriels de dimension finie sur un corps commutatif. Les modules sur un anneau (pas nécessairement commutatif) sont également présentés, car certaines situations fréquemment rencontrées font appel à cette notion. La démarche choisie par l'auteur consiste à étudier d'abord les situations les plus élémentaires, puis à explorer les domaines connexes plus généraux. L'éclairage nouveau ainsi apporté au sujet permet souvent une compréhension plus approfondie de la situation particulière initialement étudiée. L'auteur s'est attaché à présenter des applications de l'algèbre linéaire à la géométrie. Ces applications, qui toutes font partie du programme de l'Agrégation, contribueront au décloisonnement et au retour de la géométrie dans la culture mathématique. Elles donnent aussi un contenu concret à des énoncés algébriques abstraits. Une grande importance a été donnée à la notion de groupe, dont les étudiants ont souvent une conception très formelle.

Steven ROMAN. — **Advanced linear algebra.** — Second edition. — Un vol. relié, 16,5×24, de XVI, 482 p. — ISBN 0-387-24766-1. — Prix: €54.95. — Springer, New York, 2005.

This is a graduate textbook covering an especially broad range of topics. The first part of the book contains a careful but rapid discussion of the basics of linear algebra, including vector spaces, linear transformations, quotient spaces, and isomorphism theorems. The author then proceeds to modules, emphasizing a comparison with vector spaces. A thorough discussion of inner product spaces, eigenvalues, eigenvectors, and finite dimensional spectral theory follows, culminating in the finite dimensional spectral theorem for normal operators. The second part of the book is a collection of topics, including metric vector spaces, metric spaces, Hilbert spaces, tensor products, and affine geometry. The last chapter

discusses the umbral calculus, an area of modern algebra with many important applications. The new edition has been thoroughly rewritten, both in the text and exercise sets, and contains new chapters on convexity and separation, positive solutions to linear systems, singular values and QR decomposition. Treatments of tensor products and the umbral calculus have been greatly expanded and discussions of determinants, complexification of a real vector space, Schur's lemma and Gersgorin disks have been added.

Anneaux et algèbres

Scott T. CHAPMAN. — **Arithmetical properties of commutative rings and monoids.** — Lecture notes in pure and applied mathematics, vol. 241. — Un vol. broché, 26×18, de XVII, 391 p. — ISBN 0-8247-2327-9. — Prix: US$ 169.95. — Chapman &Hall/CRC, Boca Raton, FL, 2005.

The study of nonunique factorizations of elements into irreducible elements in commutative rings and monoids has emerged as an independent area of research only over the last 30 years and has enjoyed a recent flurry of activity and advancement. This book presents the proceedings of two recent meetings that gathered key researchers from around the world to review recent major results. The first seven chapters show the diversity of approaches taken in studying nonunique factorizations and demonstrate the broad range of mathematical techniques, from the purely algebraic and combinatorial to number theoretic methods, needed to obtain results in this area. The remaining chapters reflect research motivated by arithmetical properties of commutative rings and monoids. Topics include multiplicative ideal theory, the factorization of ideals and ideal generation problems, integer-valued polynomials, Prüfer rings and domains, block monoids, and numerical monoids. Featuring 26 refereed papers from 33 expert contributors representing 6 different countries, *Arithmetic Properties of Commutative Rings and Monoids* presents a unique opportunity to survey the major results and current trends in this area. It also offers beginning graduate students an authoritative, up-to-date introduction to factorization theory.

Alberto CORSO, Philippe GIMENEZ, Maria VAZ PINTO, Santiago ZARZUELA, (Editors). — **Commutative algebra: geometric, homological, combinatorial and computational aspects.** — A series of lecture notes in pure and applied mathematics. — Un vol. broché, 18×26, de 265 p. — ISBN 0-8247-2335-X. — Prix: US$ 139.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

With international contributors, *Commutative Algebra: Geometric, Homological, Combinatorial and Computational Aspects* features new research results that borrow methods from neighboring fields such as combinatorics, homological, algebra, polyhedral geometry, symbolic computation, and topology. This book consists of articles presented during two conferences held in Spain and Portugal in June, 2003. It encompasses a variety of topics, including blowup algebras, Castelnuovo-Mumford regularity, integral closure and normality, Koszul homology, liaison theory, multiplicities, polarization, reductions of ideals. This comprehensive volume will stimulate further research in the field.

Wolmer VASCONCELOS. — **Integral closure: Rees algebras, multiplicities, algorithms.** — Springer monographs in mathematics. — Un vol. relié, 16,5×24, de XII, 519 p. — ISBN 3-540-25540-0. — Prix: €79.95. — Springer, Berlin, 2005.

Integral Closure gives an account of theoretical and algorithmic developments on the integral closure of algebraic structures. These are shared concerns in commutative algebra, algebraic geometry, number theory and the computational aspects of these fields. The overall

goal is to determine and analyze the equations of the assemblages of the set of solutions that arise under various processes and algorithms. It gives a comprehensive treatment of Rees algebras and multiplicity theory – while pointing to applications in many other problem areas. Its main goal is to provide complexity estimates by tracking numerically invariants of the structures that may occur. This book is intended for graduate students and researchers in the fields mentioned above. It contains, besides exercises aimed at giving insights, numerous research problems motivated by the developments reported.

K-théorie

Eric M. FRIEDLANDER, Daniel R. GRAYSON, (Editors). — **Handbook of *K*-theory, vol. 1-2.** — XIV, X, 1163 p., en deux volumes reliés,16,5×24. — ISBN 3-540-23019-X. — Prix: € 109.95. — Springer, Berlin, 2005.

This two-volume handbook offers a compilation of techniques and results in *K*-theory. These two volumes consist of chapters, each of which is dedicated to a specific topic and is written by a leading expert. Many chapters present historical background; some present previously unpublished results, whereas some present the first expository account of a topic; many discuss future directions as well as open problems. The overall intent of this handbook is to offer the interested reader an exposition of our current state of knowledge as well as an implicit blueprint for future research. This handbook should be especially useful for students wishing to obtain an overview of *K*-theory and for mathematicians interested in pursuing challenges in this rapidly expanding field. — *Contents:* Foundations and computations. — *K*-theory and algebraic geometry. — *K*-theory and geometric topology. — *K*-theory and operator algebras. — Other forms of *K*-theory. — Appendix: Bourbaki articles on the Milnor conjecture.

Théorie des groupes et généralisations

Patrick BAHLS. — **The isomorphism problem in Coxeter groups.** — Un vol. broché, 16×24, de XIV, 176 p. — ISBN 1-86094-554-6. — Prix: £27.00. — Imperial College Press, London, 2005, distributed by World Scientific.

The primary purpose of the book is to highlight approximations to the difficult isomorphism problem in Coxeter groups. A number of theorems relating to this problem are stated and proven. Most of the results addressed here concern conditions which can be seen as varying degrees of uniqueness of representations of Coxeter groups. Throughout the investigation, the readers are introduced to a large number of tools in the theory of Coxeter groups, drawn from dozens of recent articles by prominent researchers in geometric and combinatorial group theory, among other fields. As the central problem of the book may in fact be solved soon, the book aims to go further, providing the readers with many techniques that can be used to answer more general questions. The readers are challenged to practice those techniques by solving exercises, a list of which concludes each chapter.

Anders BJÖRNER, Francesco BRENTI. — **Combinatorics of Coxeter groups.** — Graduate texts in mathematics, vol. 231. — Un vol. relié, 16×24, de XII, 363 p. — ISBN 3-540-44238-3. — Prix: €46.95. — Springer, New York, 2005.

Coxeter groups are of central importance in several areas of algebra, geometry, and combinatorics. This clear and rigorous exposition focuses on the combinatorial aspects of Coxeter groups, such as reduced expressions, partial order of group elements, enumeration, associated graphs and combinatorial cell complexes, and connections with combinatorial

representation theory. While Coxeter groups have already been exposited from algebraic and geometric perspectives, this text is the first one to focus mainly on the combinatorial aspects of Coxeter groups. The first part of the book provides a self-contained introduction to combinatorial Coxeter group theory. The emphasis here is on the combinatorics of reduced decompositions, Bruhat order, weak order, and some aspects of root systems. The second part deals with more advanced topics, such as Kazhdan-Lusztig polynomials and representations, enumeration, and combinatorial descriptions of the classical finite and affine Weyl groups. A wide variety of exercises, ranging from easy to quite difficult are also included. The book will serve graduate students as well as researchers.

Alexander KLESHCHEV. — **Linear and projective representations of symmetric groups.** — Cambridge tracts in mathematics, vol. 163. — Un vol. broché, 16×24, de XIV, 277 p. — ISBN 0-521-83703-0. — Prix: £45.00. — Cambridge University Press, Cambridge, 2005.

The representation theory of symmetric groups is one of the most beautiful, popular, and important parts of algebra with many deep relations to other areas of mathematics, such as combinatorics, Lie theory, and algebraic geometry. Kleshchev describes a new approach to the subject, based on the recent work of Lascoux, Leclerc, Thibon, Ariki, Grojnowski, Brundan, as well as his own. Much of this work has previously appeared only in the research literature. However, to make it accessible to graduate students, the theory is developed from scratch, the only prerequisite being a standard course in abstract algebra... The methods are purely algebraic, exploiting affine and cyclotomic Hecke algebras. For the first time in book form, the projective (or spin) representation theory is treated along the same lines as linear representation theory... This unique book will be welcomed by graduate students and researchers as a modern account of the subject.

Groupes topologiques; groupes et algèbres de Lie

Jean-Philippe ANKER, Bent ORSTED, (Editors). — **Lie theory: unitary representations and compactifications of symmetric spaces.** — Progress in mathematics, vol. 229. — Un vol. relié, 24×17, de X, 207 p. — ISBN 0-8176-3526-2. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2005.

Semisimple Lie groups, and their algebraic analogues over fields other than the reals, are of fundamental importance in geometry, analysis, and mathematical physics. Three independent, self-contained volumes, under the general title *Lie Theory*, feature survey work and original results by well-established researchers in key areas of semisimple Lie theory. *Unitary Representations and Compactifications of Symmetric Spaces*, a self-contained work by A. Borel, L. Ji, and T. Kobayashi, focuses on two fundamental questions in the theory of semisimple Lie group: the geometry of Riemannian symmetric spaces and their compactifications; and branching laws for unitary representations, i.e., restricting unitary representations to (typically, but not exclusively, symmetric) subgroups and decomposing the ensuing representations into irreducibles.

Jean-Philippe ANKER, Bent ORSTED, (Editors). — **Lie theory: harmonic analysis on symmetric spaces – general Plancherel theorems.** — Progress in mathematics, vol. 230. — Un vol. relié, 16×24, de VIII, 175 p. — ISBN 0-8176-3777-X. — Prix: SFr. 118.00. — Birkhäuser, Basel, 2005.

This book presents extensive surveys by E.P. van den Ban, H. Schlichtkrull, and P. Delorme of the spectacular progress over the past decade in deriving the Plancherel

theorem on reductive symmetric spaces. Van den Ban's introductory chapter explains the basic setup of a reductive symmetric space along with a careful study of the structure theory, particularly for the ring of invariant differential operators for the relevant class of parabolic subgroups. Advanced topics for the formulation and understanding of the proof are covered, including Eisenstein integrals, regularity theorems, Maass-Selberg relations, and residue calculus for root systems. Schlichtkrull provides a cogent account of the basic ingredients in the harmonic analysis on a symmetric space through the explanation and definition of the Paley-Wiener theorem. Approaching the Plancherel theorem through an alternative viewpoint, the Schwartz space, Delorme bases his discussion and proof on asymptotic expansions of eigenfunctions and the theory of intertwining integrals. Well suited for both graduate students and researchers in semisimple Lie theory and neighbouring fields, and possibly even mathematical cosmology, *Harmonic Analysis on Symmetric Spaces – General Plancherel Theorems* provides a broad, clearly focused examination of semisimple Lie groups and their integral importance and applications to research in many branches of mathematics and physics. Knowledge of basic representation theory of Lie groups as well as familiarity with semisimple Lie groups, symmetric spaces, and parabolic subgroups is required.

Roger CARTER. — **Lie algebras of finite and affine type.** — Cambridge studies in advanced mathematics, vol. 96. — Un vol. relié, 16×23,5, de XVII, 632 p. — ISBN 0-521-85138-6. — Prix : £45.00. — Cambridge University Press, Cambridge, 2005.

Lie algebras have many varied applications, both in mathematics and in mathematical physics. This book provides a thorough but relaxed mathematical treatment of the subject, including both the Cartan-Killing-Weyl theory of finite dimensional simple algebras and the more modern theory of Kac-Moody algebras. Proofs are given in detail and the only prerequisite is a sound knowledge of linear algebra. The first half of the book deals with the classification of the finite dimensional simple Lie algebras and of their finite dimensional irreducible representations. The second half deals with the theory of Kac-Moody algebras; a brief account of Borcherds algebras is also included. An appendix gives a summary of the basic properties of each Lie algebra of finite and affine type.

S.V. DUZHIN, B.D. CHEBOTAREVSKY. — **Transformation groups for beginners.** — Student mathematical library, vol. 25 — Un vol. broché, 14×21,5, de X, 246 p. — ISBN 0-8218-3643-9. — Prix : US$39.00. — Providence, R.I., American Mathematical Society, 2004.

This book is intended for undergraduate students and all those interested in mathematics. Its goal is to give an easy introduction to the concept of a transformation group using examples from different areas of mathematics. The warm-up of the first two chapters includes a discussion of algebraic operations on points in the plane, and of Euclidean plane movements. Then the notions of a transformation group and of an abstract group are introduced. Group actions, orbits, and invariants constitute the subject of the next chapter. The book concludes with an elementary exposition of the basic ideas of Sophus Lie about symmetries of differential equations. The book contains plenty of figures, as well as many exercises with hints and solutions, which help the reader to master the material.

Walter FERRER SANTOS, Alvaro RITTATORE. — **Actions and invariants of algebraic groups.** —Pure and applied mathematics, vol. 269. — Un vol. relié, 24×16, de XVI, 454 p. — ISBN 0-8247-5896-X. — Prix : US$99.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

Actions and Invariants of Algebraic Groups presents a self-contained introduction to geometric invariant theory that links the basic theory of affine algebraic groups to Mumford's

more sophisticated theory. The authors systematically exploit the viewpoint of Hopf algebra theory and the theory of comodules to simplify and compactify many of the relevant formulas and proofs. The first two chapters introduce the subject and review the prerequisites in commutative algebra, algebraic geometry, and the theory of semisimple Lie algebras over fields of characteristic zero. The authors' early presentation of the concepts of actions and quotients helps to clarify the subsequent material, particularly in the study of homogeneous spaces. This study includes a detailed treatment of the quasi-affine and affine cases and the corresponding concepts of observable and exact subgroups. Among the many other topics discussed are Hilbert's 14th problem, complete with examples and counterexamples, and Mumford's results on quotients by reductive groups. End-of-chapter exercises, which range from the routine to the rather difficult, build expertise in working with the fundamental concepts. The appendix further enhanced this work's completeness and accessibility with an exhaustive glossary of basic definitions, notations, and results.

Petr P. KULISH, Nenad MANOJLOVIC, Henning SAMTLEBEN, (Editors). — **Infinite dimensional algebras and quantum integrable systems.** — Progress in mathematics, vol. 237. — Un vol. relié, 24 × 16, de VIII, 263 p. — ISBN 3-7643-7215-X. — Prix: SFr. 138.00. — Birkhäuser, Basel, 2005.

This volume presents the invited lectures of the Workshop "Infinite Dimensional Algebras and Quantum Integrable Systems" held in July 2003 at the University of Algarve, Faro, Portugal, as a Satellite Workshop of the XIVth International Congress on Mathematical Physics. Recent developments in the theory of infinite dimensional algebras and their applications to quantum integrable systems are reviewed by some of the leading experts in the field. The volume will be of interest to a broad audience from graduate students to researchers in mathematical physics and related fields.

Kirill C.H. MACKENZIE. — **General theory of Lie groupoids and Lie algebroids.** — London mathematical society lecture notes series, vol. 213. — Un vol. broché, 23 × 16, de XXXV, 501 p. — ISBN 0-521-49928-3. — Prix: £50.00. — Cambridge University Press, Cambridge, 2005.

This is the most comprehensive and up-to-date account of the theory of Lie groupoids and Lie algebroids and their importance in differential geometry, in particular their relations with Poisson geometry and general connection theory. It covers much work done since the mid 1980s including the first treatment in book form of Poisson groupoids, Lie bialgebroids and double vector bundles, as well as a revised account of the relation between locally trivial Lie groupoids, Atiyah sequences, and connections in principal bundles. As such, this book will be of great interest to all those concerned with the use of Poisson geometry as a semi-classical limit of quantum geometry, as well as to all those working in, or wishing to learn, the modern theory of Lie groupoids and Lie algebroids.

Patrice TAUVEL, Rupert W.T. YU. — **Lie algebras and algebraic groups.** — Springer monographs in mathematics. — Un vol. relié, 24 × 17 cm, de XVI, 653 p. — ISBN 3-540-24170-1. — Prix: €69.95. — Springer, Berlin, 2005.

The theory of Lie algebras and algebraic groups has been an area of active research for the last 50 years. It intervenes in many different areas of mathematics: for example invariant theory, Poisson geometry, harmonic analysis, mathematical physics. The aim of this book is to assemble in a single volume the algebraic aspects of the theory, so as to present the foundations of the theory in characteristic zero. Detailed proofs are included and some recent

results are discussed in the final chapters. All the prerequisites on commutative algebra and algebraic geometry are included.

Mesure et intégration

Luigi AMBROSIO, Nicola GIGLI, Giuseppe SAVARÉ. — **Gradient flows in metric spaces and in the space of probability measures.** — Lectures in mathematics, ETH Zürich. — Un vol. broché, 17×24, de VII, 333 p. — ISBN 3-7643-2428-7. — Prix: SFr. 52.00. — Birkhäuser, Basel, 2005.

This book is devoted to a theory of gradient flows in spaces which are not necessarily endowed with a natural linear or differentiable structure. It consists of two parts, the first one concerning gradient flows in metric spaces and the second one devoted to gradient flows in the space of probability measures on a separable Hilbert space, endowed with the Kantorovich-Rubinstein-Wasserstein distance. The two parts have some connections, due to the fact that the space of probability measures provides an important model to which the "metric" theory applies, but the book is conceived in such a way that the two parts can be read independently, the first one by the reader more interested in non-smooth analysis and analysis in metric spaces, and the second one by the reader more orientated towards the applications in partial differential equations, measure theory and probability.

Fonctions d'une variable complexe

John B. GARNETT, Donald E. MARSHALL. — **Harmonic measure.** — New mathematical monographs, vol. 2. — Un vol. relié, 24×16, de xv, 571 p. — ISBN 0-521-47018-8. — Prix: £60.00. — Cambridge University Press, Cambridge, 2005.

During the last two decades several remarkable new results were discovered about harmonic measure in the complex plane. This book provides a survey of these results and an introduction to the branch of analysis that contains them. Many of these results, due to Bishop, Carleson, Jones, Makarov, Wolff, and others, appear here in book form for the first time. The book is accessible to students who have completed standard graduate courses in real and complex analysis. The first four chapters provide the needed background material on univalent functions, potential theory, and extremal length, and each chapter has many exercises to further inform and teach the reader.

Wolfgang TUTSCHKE, Harkrishan L. VASUDEVA. — **An introduction to complex analysis: classical and modern approaches.** — Modern analysis series, vol. 7. — Un vol. relié, 25×16, de XVI, 460 p. — ISBN 1-584-88478-9. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

Like real analysis, complex analysis has generated methods indispensable to mathematics and its applications. Exploring the interactions between these two branches, this book uses the results of real analysis to lay the foundations of complex analysis and presents a unified structure of mathematical analysis as a whole. To set the groundwork and mitigate the difficulties newcomers often experience, *An Introduction to Complex Analysis* begins with a complete review of concepts and methods from real analysis, such as metric spaces and the Green-Gauss integral formula. The approach leads to brief, clear proofs of basic statements – a distinct advantage for those mainly interested in applications. Alternate approaches, such as Fichera's proof of the Goursat theorem and Estermann's proof of Cauchy's integral theorem, are also presented for comparison. Discussions include holomorphic functions, the

Weierstrass convergence theorem, analytic continuation, isolated singularities, homotopy, residue theory, conformal mappings, special functions, and boundary value problems. More than 200 examples and 150 exercises illustrate the subject matter and make this book an ideal text for university courses on complex analysis, while the comprehensive compilation of theories and succinct proofs make this an excellent volume for reference.

Fonctions spéciales

Mourad E.H. ISMAIL, Erik KOELINK, (Editors). — **Theory and applications of special functions: a volume dedicated to Mizan Rahman.** — Developments in mathematics, vol. 13. — Un vol relié, 24 × 17, de x, 491 p. — ISBN 0-387-24231-7. — Prix: € 134.95. — Springer, New York, 2005.

This book, dedicated to Mizan Rahman, is made up of a collection of articles on various apects of q-series and special functions. It also includes an article by Askey, Ismail, and Koelink on Rahman's mathematical contributions and how they influenced the recent upsurge in the subject. — *Contents:* Dedication. — Mizan Rahman, his mathematics and literary writings. — q-Bessel functions. — a-Gaussian polynomials. — On a generalized gamma convolution related to the q-calculus. — Ramanujan and Cranks. — The Saalschütz chain reactions and multiple q-series transformations. — Painlevé equations and associated polynomials. — Zeta functions of Heisenberg graphs over finite rings. — q-analogues of some multivariable biorthogonal polynomials. — Multivariable Askey-Wilson polynomials. — Continuous Hahn functions. — Series and integrals. — Little q-Jacobi functions. — A second addition formula for continuous q-ultraspherical polynomials. — A bilateral series involving basic hypergeometric functions. — Hilbert space asymptotics for orthogonal polynomials. — Generalizations of Jacobi's triple product identity. — Summable sums. — Askey-Wilson functions and quantum groups. — Expansions in q-polynomials. — Strong nonnegative linearization of orthogonal polynomials. — Remarks on some basic hyper-geometric series.

Équations différentielles ordinaires

Werner O. AMREIN, Andreas M. HINZ, David B. PEARSON, (Editors). — **Sturm-Liouville theory: past and present.** — Un vol. relié, 17 × 24, de xx, 335 p. — ISBN 3-7643-7066-1. — Prix: SFr. 108.00. — Birkhäuser, Basel, 2005.

This is a collection of survey articles based on lectures presented at a colloquium and workshop in Geneva in 2003 to commemorate the 200th anniversary of the birth of Charles François Sturm. It aims at giving an overview of the development of Sturm-Liouville theory from its historical roots to present day research. It is the first time that such a comprehensive survey is made available in compact form. The book can serve both as an introduction to Sturm-Liouville theory and as background for ongoing research. The text is particularly strong on the spectral theory of Sturm-Liouville equations, which has given rise to a major branch of modern analysis. Among other current aspects of the theory discussed are oscillation theory for differential equations and Jacobi matrices, approximation of singular boundary value problems by regular ones, applications to systems of differential equations, extension of the theory to partial differential equations and to non-linear problems, and various generalizations of Borg's inverse theory. A unique feature of the book is a comprehensive catalogue of Sturm-Liouville differential equations covering more than fifty examples, together with their spectral properties. Many of these examples are connected with special functions and with problems in mathematical physics and applied mathematics.

Équations aux dérivées partielles

Catherine BANDLE, Henri BERESTYCKI, Bernhard BRIGHI, [etc.] (Editors). — **Elliptic and parabolic problems: a special tribute to the work of Haim Brezis.** — Progress in nonlinear differential equations and their applications, vol. 63. — Un vol. relié, 16×24, de VIII, 470 p. — ISBN 3-7643-7249-4. — Prix: SFr. 228.00. — Birkhäuser, Basel, 2005.

This volume contains contributions by former students and collaborators of Haim Brezis given in honor of his 60th anniversary at a conference in Gaeta. H. Brezis has made significant contributions in the fields of partial differential equations and functional analysis. He is an inspiring teacher and counsellor of many mathematicians in the front ranks. The collection of papers presented here grew out of his deep insight into analysis. In addition it reflects Brezis's elegant way of creative thinking.

M.N. FELLER. — **The Lévy Laplacian.** — Cambridge tracts in mathematics, 166. — Un vol. relié, 16×23,5, de VI, 153 p. — ISBN 0-521-84622-6. — Prix: £40.00. — Cambridge University Press, Cambridge, 2005.

The Lévy Laplacian is an infinite-dimensional generalization of the well-known classical Laplacian. Its theory has been increasingly well developed in recent years and this book is the first systematic treatment of it. The book describes the infinite-dimensional analogues of finite-dimensional results, and more especially those features that appear only in the generalized context. It develops a theory of operators generated by the Lévy Laplacian and the symmetrized Lévy Laplacian, as well as a theory of linear and nonlinear equations involving it. There are many problems leading to equations with Lévy Laplacians and to Lévy-Laplace operators, for example superconductivity theory, the theory of control systems, the Gauss random field theory, and the Yang-Mills equation. The book is complemented by exhaustive bibliographic notes and references. The result is a work that will be valued by those working in functional analysis, partial differential equations and probability theory.

Dan HENRY. — **Perturbation of the boundary in boundary-value problems of partial differential equations.** — London mathematical society lecture note series, vol. 318. — Un vol. broché, 23×16, de VIII, 206 p. — ISBN 0-521-57491-9. — Prix: £35.00. — Cambridge University Press, Cambridge, 2005.

Perturbation of the boundary is a rather neglected topic in the study of partial differential equations for two main reasons: 1. On the surface it appears trivial, merely a change of variables and an application of the chain rule. 2. Carrying out such a change of variables frequently results in long and difficult calculations. Here the author carefully discusses a calculus that allows the computational morass to be bypassed, and he goes on to develop more general forms of standard theorems, which help answer a wide range of problems involving boundary perturbations. Many examples are presented to demonstrate the usefulness of the author's approach, while on the other hand many tantalizing open questions remain. All whose research involves PDEs will find something of interest in this book.

Yehuda PINCHOVER, Jacob RUBINSTEIN. — **An introduction to partial differential equations.** — Un vol. broché, 25×18, de XII, 371 p. — ISBN 0-521-61323-X (relié: 0-521-84886-5). — Prix: £26.00 (relié: £65.00). — Cambridge University Press, Cambridge, 2005.

A complete introduction to partial differential equations, this textbook provides a rigorous yet accessible guide to students in mathematics, physics and engineering. The presentation

is lively and up to date, with particular emphasis on developing an appreciation of the underlying mathematical theory. Beginning with basic definitions, properties and derivations of some fundamental equations of mathematical physics, the book studies first-order equations, the classification of second-order equations, and the one-dimensional wave equation. Two chapters are devoted to the separation of variables, while others concentrate on a wide range of topics including elliptic theory, Green's functions, variational and numerical methods. A rich collection of worked examples and exercises accompany the text, along with a large number of illustrations and graphs to provide insight into the numerical examples. Solutions to selected exercises are included for students while extended solution sets are available to lecturers from www.cambridge.org/052161323X.

Tomáš ROUBÍČEK. — **Nonlinear partial differential equations with applications.** — International series of numerical mathematics, vol. 153. — Un vol. relié, 17,5×24, de XVIII, 405 p. — ISBN 3-7643-7293-1. — Prix: SFr. 178.00. — Birkhäuser, Basel, 2005.

This book primarily concerns quasilinear and semilinear elliptic and parabolic partial differential equations, inequalities, and systems. It balances the abstract functional-analysis approach based on nonlinear monotone, pseudomonotone, weakly continuous, or accretive mappings with concrete partial differential equations in their weak (or more general) formulation. Methods of Galerkin or of Rothe are exposed in a large generality. Other methods include various direct methods, regularization, or fixed points. The exposition leads general theory as fast as possible towards the analysis of concrete equations, which have specific applications in continuum (thermo)mechanics of solids and fluids, electrically (semi)conductive media, modelling of biological systems, or in mechanical engineering. Selected parts are rather an introduction into the subject while some others form an advanced textbook. The intended audience is graduate and PhD students and researchers in the theory of partial differential equations or in mathematical modelling of distributed parameter systems.

Systèmes dynamiques et théorie ergodique

Jürgen JOST. — **Dynamical systems: examples of complex behaviour.** — Universitext. — Un vol. broché, 16×24, de VIII, 189 p. — ISBN 3-540-22903-6. — Prix: €39.95. — Springer, Berlin, 2005.

This book presents a survey of the field of dynamical systems and its significance for research in complex systems and other fields, based on a careful analysis of specific important examples. It also explains the fundamental underlying mathematical concepts, with a particular focus on invariants of dynamical systems, including a systematic treatment of Morse-Conley theory. Entropy and related concepts in the topological, metric, measure theoretic and smooth settings and some connections with information theory are discussed, and cellular automata and random Boolean networks are presented as specific examples.

James MONTALDI, Tudor RATIU, (Editors). — **Geometric mechanics and symmetry: the Peyresq lectures.** — London mathematical society lecture note series, vol. 306. — Un vol. broché, 23×16, de X, 402 p. — ISBN 0-521-53957-9. — Prix: £40.00. — Cambridge University Press, Cambridge, 2005.

These lectures are intended to bring young researchers to the current frontier of knowledge in geometrical mechanics and dynamical systems. They succinctly cover a

unparalleled range of topics from the basic concepts of symplectic and Poisson geometry, to integrable systems, KAM theory, fluid dynamics and symmetric bifurcation theory. The lectures are based on summer schools for graduate students and postdocs, and provide complementary and contrasting viewpoints of key topics: the authors cut through an overwhelming amount of literature to show young mathematicians how to get to the core of the various subjects and thereby enable them to embark on research careers.

Équations aux différences finies, équations fonctionnelles

Paul CULL, Mary FLAHIVE, Robby ROBSON. — **Difference equations: from rabbits to chaos.** — Un vol. relié, 25×17, de XIII; 392 p. — ISBN 0-387-23233-8, (broché: 0-387-23234-6). — Prix: €69.95 (broché: €42.75). — Springer, New York, 2005.

In this new text, designed for sophomores studying mathematics and computer science, the authors cover the basics of difference equations and some of their applications in computing and in population biology. Each chapter leads to techniques that can be applied by hand to small examples or programmed for larger problems. Along the way, the reader will use linear algebra and graph theory, develop formal power series, solve combinatorial problems, visit Perron-Frobenius theory, discuss pseudorandom number generation and integer factorization, and apply the Fast Fourier Transform to multiply polynomials quickly. The book contains many worked examples and over 250 exercises. While these exercises are accessible to students and have been class-tested, they also suggest further problems and possible research topics.

Saber ELAYDI. — **An introduction to difference equations.** — Third edition. — Undergraduate texts in mathematics. — Un vol. relié, 16×24, de XXII, 539 p. — ISBN 0-387-23059-9. — Prix: €59.95. — Springer, New York, 2005.

The book integrates both classical and modern treatments of difference equations. It contains the most updated and comprehensive material, yet the presentation is simple enough for the book to be used by advanced undergraduate and beginning graduate students. This third edition includes more proofs, more graphs, and more applications. The author has also updated the contents by adding a new chapter on higher order scalar difference equations, along with recent results on local and global stability of one-dimensional maps, a new section on the various notions of asymptoticity of solutions, a detailed proof of Levin-May theorem, and the latest results on the LPA flour-beetle model.

Approximations et développements en série

Santiago ALVES TAVARES. — **Generation of multivariate Hermite interpolating polynomials.** — Monographs and textbooks in pure and applied mathematics, vol. 274. — Un vol. relié, 16×23,5, de 672 p. — ISBN 1-58488-572-6. — Prix: US$99.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

This book advances the study of approximate solutions to partial differential equations by presenting a novel approach that employs Hermite interpolating polynomials and by supplying algorithms useful in applying this approach. Organized into three sections, the book begins with a thorough examination of constrained numbers, which form the basis for constructing interpolating polynomials. The author develops their geometric representation

in coordinate systems in several dimensions and presents generating algorithms for each level number. He then discusses their applications in computing the derivative of the product of functions of several variables and in the construction of expressions for *n*-dimensional natural numbers. Section II focuses on the construction of Hermite interpolating polynomials, from their characterizing properties and generating algorithms to a graphical analysis of their behaviour. The final section of the book is dedicated to the application of Hermite interpolating polynomials to linear and nonlinear differential equations in one or several variables. Of particular interest is an example based on the author's thermal analysis of the space shuttle during reentry to the earth's atmosphere. He uses the polynomials developed in the book to solve the heat transfer equations for the heating of the lower surface of the wing.

J. Ferrera, J. López-Gómez, F.R. Ruiz del Portal, (Editors). — **Ten mathematical essays on approximation in analysis and topology.** — Un vol. relié, 17×24,5, de XII, 270 p. — ISBN 0-444-51861-4. — Prix: € 140.00. — Elsevier, Amsterdam, 2005.

This book collects essays by the most influent mathematicians of the last third of the 20th century. Besides the very ultimate results in each of their respective fields, many of them also include a series of historical remarks about the state of mathematics at the time they found their most celebrated results. These gems of mathematical intra-history should delight many forthcoming generations of mathematicians, who will enjoy some of the most fruitful mathematics of the last third of 20th century presented by their own authors. — *Contents:* H. Amann: Maximum principles and principal eigenvalues. — A.N. Dranishnikov: On some approximation problems in topology. — J.K. Hale: Eigenvalues and perturbed domains. — V. Lakshmikantham: Monotone approximations and rapid convergence. — J. López-Gómez: Spectral theory and nonlinear analysis. — S. Mardešić: Approximating topological spaces by polyhedra. — J. Mawhin: Periodic solutions in the golden sixties. — R. Ortega: The stability of the equilibrium. — R.R. Phelps: The Bishop-Phelps theorem. — A.G. Ramm: An essay on some problems of approximation theory.

Analyse de Fourier, analyse harmonique abstraite

Rajendra Bhatia. — **Fourier series.** — Classroom resource materials. — Un vol. relié, 19×26, de X, 120 p. — ISBN 0-88385-740-5. — Prix: £27.00. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2005.

This is a concise introduction to Fourier series covering history, major themes, theorems, examples and applications. It can be used to learn the subject, and also to supplement, enhance and embellish undergraduate courses on mathematical analysis. The book begins with a brief summary of the rich history of Fourier series over three centuries. The subject is presented in a way that enables the reader to appreciate how a mathematical theory develops in stages from a practical problem (such as conduction of heat) to an abstract theory dealing with concepts such as sets, functions, infinity and convergence. The abstract theory then provides unforeseen applications in diverse areas. The author starts out with a description of the problem that led Fourier to introduce his famous series. The mathematical problems this leads to are then discussed rigorously. Examples, exercises and directions for further reading and research are provided, along with a chapter that provides material at a more advanced level suitable for graduate students. The author demonstrates applications of the theory to

a broad range of problems. The exercises of varying levels of difficulty that are scattered throughout the book will help readers test their understanding of the material.

Anton DEITMAR. — **A first course in harmonic analysis, second edition.** — Universitext. — Un vol. broché, 16×24, de XII, 192 p. — ISBN 0-387-22837-3. — Prix: €44.95. — Springer, New York, 2005.

This book is a primer in harmonic analysis using an elementary approach. Its first aim is to provide an introduction to Fourier analysis, leading up to the Poisson summation formula. Secondly, it makes the reader aware of the fact that both the Fourier series and the Fourier transform are special cases of a more general theory arising in the context of locally compact Abelian groups. The third goal of this book is to introduce the reader to the techniques used in harmonic analysis of noncommutative groups. There are two new chapters in this new edition. One on distributions will complete the set of real variable methods introduced in the first part. The other on the Heisenberg group provides an example of a group that is neither compact nor Abelian, yet is simple enough to easily deduce the Plancherel theorem.

Carl ROHWER. — **Nonlinear smoothing and multiresolution analysis.** — International series of numerical mathematics, vol. 150. — Un vol. relié, 17×24, de XIV, 136 p. — ISBN 3-7643-7119-X. — Prix: SFr. 128.00. — Birkhäuser, Basel, 2005.

This monograph presents a new theory for analysis, comparison and design of nonlinear smoothers, linking to established practices. Although a part of mathematical morphology, the special properties yield many simple, powerful and illuminating results leading to a novel nonlinear multiresolution analysis with pulses that may be as natural to vision as wavelet analysis is to acoustics. Similar to median transforms, they have the advantages of a supporting theory, computational simplicity, remarkable consistency, full trend preservation, and a Parseval-type identity.

Analyse fonctionnelle

Spiro A. ARGYROS, Stevo TODORCEVIC. — **Ramsey methods in analysis.** — Advanced courses in mathematics CRM Barcelona. — Un vol. broché, 17×24, de VI, 257 p. — ISBN 3-7643-7264-8. — Prix: SFr. 64.00. — Birkhäuser, Basel, 2005.

This book introduces graduate students and researchers to the study of the geometry of Banach spaces using combinatorial methods. The combinatorial, and in particular the Ramsey-theoretic, approach to Banach space theory is not new. It can be traced back as early as the 1970s. Its full appreciation, however, came only during the last decade or so, after some of the most important problems in Banach space theory were solved, such as, for example, the distortion problem, the unconditional basic sequence problem, and the homogeneous space problem. The book covers most of these advances, but one of its primary purposes is to discuss some of the recent advances that are not present in survey articles of these areas. We show, for example, how to introduce a conditional structure to a given Banach space under construction that allows us to essentially prescribe the corresponding space of non-strictly singular operators. We also apply the Nash-Williams theory of fronts and barriers in the study of Cesàro summability and unconditionality present in basic sequences inside a given Banach space. We further provide a detailed exposition of the block-Ramsey theory and its recent deep adjustments relevant to the Banach space theory due to Gowers.

Paul F.X. MÜLLER. — **Isomorphisms between H¹ spaces.** — Monografie matematyczne, New Series, vol. 66. — Un vol. relié, 17×24, de xiv, 453 p. — ISBN 3-7643-2431-7. — Prix: SFr. 158.00. — Birkhäuser, Basel, 2005.

This book presents a thorough and self-contained presentation of H^1 and its known isomorphic invariants, such as the uniform approximation property, the dimension conjecture, and dichotomies for the complemented subspaces. The necessary background is developed from scratch. This includes a detailed discussion of the Haar system, together with the operators that can be built from it (averaging projections, rearrangement operators, paraproducts, Calderon-Zygmund singular integrals). Complete proofs are given for the classical martingale inequalities of C. Fefferman, Burkholder, and Khinchine-Kahane, and for large deviation inequalities. Complex interpolation, analytic families of operators, and the Calderon product of Banach lattices are treated in the context of H^p spaces. Throughout the book, special attention is given to the combinatorial methods developed in the field, particularly J. Bourgain's proof of the dimension conjecture, L. Carleson's biorthogonal system in H^1, T. Figiel's integral representation, W.B. Johnson's factorization of operators, B. Maurey's isomorphism, and P. Jones' proof of the uniform approximation property. An entire chapter is devoted to the study of combinatorics of colored dyadic intervals.

Théorie des opérateurs

Kung-Ching CHANG. — **Methods in nonlinear analysis.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de ix, 439 p. — ISBN 3-540-24133-7. — Prix: €69.95. — Springer, Berlin, 2005.

Nonlinear analysis has developed rapidly in the last three decades. Theories, techniques and results in many different branches of mathematics have been combined in solving nonlinear problems. This book collects and reorganizes up-to-date materials scattered throughout the literature from the methodology point of view, and presents them in a systematic way. It contains the basic theories and methods with many interesting problems in partial and ordinary differential equations, differential geometry and mathematical physics as applications, and provides the necessary preparation for almost all important aspects in contemporary studies. There are five chapters that cover linearization, fixed-point theorems based on compactness and convexity, topological degree theory, minimization and topological variational methods. Each chapter combines abstract, classical and applied analysis. Particular topics included are bifurcation, perturbation, gluing technique, transversality, Nash-Moser technique, Ky Fan's inequality and Nash equilibrium in game theory, setvalued mappings and differential equations with discontinuous nonlinear terms, multiple solutions in partial differential equations, direct method, quasiconvexity and relaxation, Young measure, compensation compactness method and Hardy space, concentration compactness and best constants, Ekeland variational principle, infinite-dimensional Morse theory, minimax method, index theory with group action, and Conley index theory. All methods are illustrated by carefully chosen examples from mechanics, physics, engineering and geometry.

V.Ya. EIDERMAN, M.V. SAMOKHIN, (Editors). — **Selected topics in complex analysis: the S.Ya. Khavinson memorial volume.** — Operator theory: advances and applications, vol. 158. — Un vol. relié, 17×24, de 222 p. — ISBN 3-7643-7251-6. — Prix: SFr. 194.00. — Birkhäuser, Basel, 2005.

This volume is dedicated to the memory of the outstanding mathematician S.Ya. Khavinson. It begins with an expository paper by V.P. Havin presenting a comprehensive

survey of Khavinson's works as well as certain biographical material. The complete bibliography following this paper has not previously been published anywhere. It consists of 163 items; a considerable part of these cannot be found in easily accessible sources. The book also contains a series of photographs and twelve original peer-reviewed research and expository papers by leading mathematicians worldwide, including the joint paper by S.Ya. Khavinson and T.S. Kuzina, the last publication of S.Ya. Khavinson. The main topics covered are extremal problems for various classes of functions, approximation problems, Cauchy integral and analytic capacity, Cantor sets, meromorphic functions (value distribution, quasinormal families), Carathéodory's inequality, integral representation of functions, and the shift operator. The book is suitable for graduate students and researchers interested in analysis.

Leszek GASIŃSKI, Nikolaos S. PAPAGEORGIOU. — **Nonlinear analysis.** — Series in mathematical analysis and applications, vol. 9. — Un vol. relié, $16,5 \times 24$, de XI, 971 p. — ISBN 1-58488-484-3. — Prix: US\$99.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

This volume focuses on topics in nonlinear analysis pertinent to the theory of boundary value problems and their application in areas such as control theory and the calculus of variations. It complements the many other books on nonlinear analysis by addressing topics previously discussed fully only in scattered research papers. These include recent results on critical point theory, nonlinear differential operators, and related regularity and comparison principles. The rich variety of topics, both theoretical and applied, makes *Nonlinear Analysis* useful to anyone, whether graduate student or researcher, working in analysis or its applications in optimal control, theoretical mechanics, or dynamical systems. An appendix contains all of the background material needed, and a detailed bibliography forms a guide for further study.

Marinus A. KAASHOEK, Sebastiano SEATZU, Cornelis van der MEE, (Editors). — **Recent advances in operator theory and its applications: The Israel Gohberg anniversary volume, International Workshop on Operator Theory and its Applications, IWOTA 2003, Cagliari, Italy**. — Operator theory: advances and applications, vol. 160. — Un vol. relié, $17,5 \times 24$, de VI, 478 p. — ISBN 3-7643-7290-7. — Prix: SFr. 278.00. — Birkhäuser, Basel, 2005.

This book contains a selection of carefully refereed research papers, most of which were presented at the fourteenth International Workshop on Operator Theory and its Applications (IWOTA), held at Cagliari, Italy, from June 24-27, 2003. The papers, many of which have been written by leading experts in the field, concern a wide variety of topics in modern operator theory and applications, with emphasis on differential operators and numerical methods. Included are papers on the structure of operators, spectral theory of differential operators, theory of pseudo-differential operators and Fourier integral operators, numerical methods for solving nonlinear integral equations, singular integral equations, and Toeplitz systems. Other main topics covered are inverse problems for canonical systems, factorization methods, metric constrained interpolation, mathematical system theory, and elements of multivariable operator theory. This volume is dedicated to Israel Gohberg, one of the founding fathers of the IWOTA Workshops, on the occasion of his 75th birthday, with admiration and respect. The book will be of interest to a wide audience of pure and applied mathematicians and engineers.

Michael REISSIG, Bert-Wolfgang SCHULZE, (Editors). — **New trends in the theory of hyperbolic equations.** — Operator theory: advances and applications, vol. 159. — Un vol. relié, 17×24, de XIII, 511 p. — ISBN 3-7643-7283-4. — Prix: SFr. 238.00. — Birkhäuser, Basel, 2005.

The present volume is dedicated to modern topics of the theory of hyperbolic equations such as evolution equations, multiple characteristics, propagation phenomena, global existence, influence of nonlinearities. It is addressed to beginners as well as specialists in these fields. The contributions are to a large extent self-contained. Key topics include: low regularity solutions to the local Cauchy problem associated with wave maps; local well-posedness, non-uniqueness and ill-posedness results are proved; coupled systems of wave equations with different speeds of propagation; here pointwise decay estimates for solutions in spaces with hyperbolic weights come in; damped wave equations in exterior domains; the energy method is combined with the geometry of the exterior domain; for the critical part of the boundary a restricted localized effective dissipation is employed; the phenomenon of parametric resonance for wave map type equations; the influence of time-dependent oscillations on the existence of global small data solutions is studied – a unified approach to attack degenerate hyperbolic problems as weakly hyperbolic ones and Cauchy problems for strictly hyperbolic equations with non-Lipschitz coefficients; weakly hyperbolic Cauchy problems with finite time degeneracy: the precise loss of regularity depending on the spatial variables is determined; the main step is to find the correct class of pseudodifferential symbols and to establish a calculus which contains a symmetrizer.

Calcul des variations et contrôle optimal

Robert HARDT, (Editor), Steven J. COX, Robin FORMAN, Frank JONES, Barbara Lee KEYFITZ, Frank MORGAN, Michael WOLF. — **Six themes on variation.** — Student mathematical library, vol. 26 — Un vol. broché, 14×21,5, de XI, 153 p. — ISBN 0-8218-3720-6. — Prix: US$29.00. — Providence, R.I., American Mathematical Society, 2004.

The calculus of variations is a beautiful subject with a rich history and with origins in the minimization problems of calculus. Although it is now at the core of many modern mathematical fields, it does not have a well-defined place in most undergraduate mathematics courses or curricula. This small volume should nevertheless give the undergraduate reader a sense of its great character and importance. Interesting functionals, such as area or energy, often give rise to problems whose most natural solution occurs by differentiating a one-parameter family of variations of some function. The critical points of the functional are related to the solutions of the associated Euler-Lagrange equation. These differential equations are at the heart of the calculus of variations. Some of the topics addressed here are Morse theory, wave mechanics, minimal surfaces, soap bubbles, and modelling traffic flow. All are readily accessible to advanced undergraduates. This book is derived from a workshop that was sponsored by Rice University.

Géométrie

James W. ANDERSON. — **Hyperbolic geometry.** — Second edition. — Springer undergraduate mathematics series. — Un vol. broché, 18×23,5, de XI, 276 p. — ISBN 1-85233-934-9. — Prix : €29.95. — Springer, London, 2005.

The geometry of the hyperbolic plane has been an active and fascinating field of mathematical inquiry for most of the past two centuries. This book provides a self-contained introduction to the subject, suitable for third or fourth year undergraduates. The basic approach taken is to define hyperbolic lines and develop a natural group of transformations preserving hyperbolic lines, and then study hyperbolic geometry as those quantities invariant under this group of transformations. Topics covered include the upper half-plane model of the hyperbolic plane, Möbius transformations, the general Möbius group, and their subgroups preserving the upper half-plane, hyperbolic arc-length and distance as quantities invariant under these subgroups, the Poincaré disc model, convex subsets of the hyperbolic plane, the hyperbolic area, and the Gauss-Bonnet formula and its applications. This updated second edition also features: an expanded discussion of planar models of the hyperbolic plane arising from complex analysis, the hyperboloid model of the hyperbolic plane, a brief discussion of generalizations to higher dimensions and many new exercises.

Alan F. BEARDON. — **Algebra and geometry.** — Un vol. broché, 23×16, de XII, 326 p. — ISBN 0-521-89049-7, (relié : 0-521-81362-X). — Prix : £21.99, (relié : £48.00). — Cambridge University Press, Cambridge, 2005.

This text gives a basic introduction, and a unified approach to algebra and geometry. It covers the ideas of complex numbers, scalar and vector products, determinants, linear algebra, group theory, permutation groups, symmetry groups and various aspects of geometry including groups of isometries, rotations and spherical geometry. The emphasis is always on the interaction between these topics, and each topic is constantly illustrated by using it to describe and discuss the others. Many of the ideas are developed gradually throughout the book. For example, the definition of a group is given in Chapter 1 so that it can be used in a discussion of the arithmetic of real and complex numbers; however, many of the properties of groups are given later, and at a time when the importance of the concept has become clear. The text is divided into short sections, with exercises at the end of each.

Walter BENZ. — **Classical geometries in modern contexts: geometry of real inner product spaces.** — Un vol. relié, 17×24, de XII, 242 p. — ISBN 3-7643-7371-7. — Prix : SFr. 128.00. — Birkhäuser, Basel, 2005.

This book is based on real inner product spaces X of arbitrary (finite or infinite) dimension greater than or equal to 2. With natural properties of (general) translations and general distances of X Euclidean, hyperbolic translations and distances, respectively, are characterized. For these spaces X also the sphere geometries of Möbius and Lie are studied (besides Euclidean and hyperbolic geometry), as well as geometries where Lorentz transformations play the key role. The geometrical notions of this book are based on general spaces X as described. This implies that also mathematicians who have not so far been especially interested in geometry may study and understand great ideas of classical geometries in modern and general contexts. Proofs of newer theorems, characterizing isometries and Lorentz transformations under mild hypotheses are included, like for instance

infinite dimensional versions of famous theorems of A.D. Alexandrov on Lorentz transformations. A real benefit is the dimension-free approach to important geometrical theories. Only prerequisites are basic linear algebra and basic 2- and 3-dimensional real geometry.

Jacob E. GOODMAN, János PACH, Emo WELZL, (Editors). — **Combinatorial and computational geometry.** — Mathematical Sciences Research Institute publications, vol. 52. — Un vol. relié, 16×24, de XI, 616 p. — ISBN 0-521-84862-8. — Prix: £45.00. — Cambridge University Press, Cambridge, 2005.

During the past few decades, the gradual merger of discrete geometry and the newer discipline of computational geometry have provided enormous impetus to mathematicians and computer scientists interested in geometric problems. This volume, which contains 32 papers on a broad range of topics of current interest in the field, is an outgrowth of that synergism. It includes surveys and research articles exploring geometric arrangements, polytopes, packing, covering, discrete convexity, geometric algorithms and their complexity, and the combinatorial complexity of geometric objects, particularly in low dimension. There are points of contact with many applied areas such as mathematical programming, visibility problems, kinetic data structures, and biochemistry, as well as with algebraic topology, geometric probability, real algebraic geometry, and combinatorics.

Keith KENDIG. — **Conics.** — The Dolciani mathematical expositions, no. 29. — Un vol. relié, 19×26, de XVI, 403 p. — ISBN 0-88385-335-3. — Prix: £30.00. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2005.

This book engages the reader in a journey of discovery through a spirited discussion among three characters: philosopher, teacher and student. Throughout the book, philosopher pursues his dream of a unified theory of conics, where exceptions are banished. With a helpful teacher and example-hungry student, the trio soon finds that conics reveal much of their beauty when viewed over the complex numbers. In their odyssey, they uncover a goldmine of unsuspected results. They experience a series of "Aha!" moments as they stumble upon living brothers to familiar conics objects like foci and directrices. They also discover a normally unseen ellipse spanning the gap between the branches of any hyperbola. On the applied side, they learn how interfering wave sources create systems of hyperbolas; these are used in making astonishingly precise astronomical observations. The book is profusely illustrated with pictures, worked-out examples, and includes a CD containing 36 applets.

Miles REID, Balázs SZENDRŐI. — **Geometry and topology.** — Un vol. broché, 17,5×25, de XVIII, 196 p. — ISBN 0-521-61325-6. — Prix: £24.99. — Cambridge, Cambridge University Press, 2005.

Geometry provides a whole range of views on the universe, serving as the inspiration, technical toolkit and ultimate goal for many branches of mathematics and physics. The book introduces the ideas of geometry, and includes a generous supply of simple explanations and examples. The treatment emphasises coordinate systems and the coordinate changes that generate symmetries. The discussion moves from Euclidean to non-Euclidean geometries,

including spherical and hyperbolic geometry, and then on to affine and projective linear geometries. Group theory is introduced to treat geometric symmetries, leading to the unification of geometry and group theory in the Erlangen program. An introduction to basic topology follows, with the Möbius strip, the Klein bottle and the surface with g handles exemplifying quotient topologies and the homeomorphism problem. Topology combines with group theory to yield the geometry of transformation groups, having applications to relativity theory and quantum mechanics. A final chapter features historical discussions and indications for further reading. While the book requires minimal prerequisites, it provides a first glimpse of many research topics in modern algebra, geometry and theoretical physics. The book is based on many years' teaching experience, and is thoroughly class tested. There are copious illustrations, and each chapter ends with a wide supply of exercises. Further teaching material is available for teachers via the web, including assignable problem sheets with solutions.

Kenneth STEPHENSON. — **Introduction to circle packing: the theory of discrete analytic functions.** — Un vol. relié, 18×26, de XII, 356 p. — ISBN 0-521-82356-0. — Prix: £35.00. — Cambridge University Press, Cambridge, 2005.

A circle packing is a configuration of circles having a specified pattern of tangencies, as introduced by William Thurston in 1985. This book lays out their study, from first definitions to the latest theory, computations, and applications. The topic can be enjoyed for the visual appeal of the packing images – over 200 in the book – and the elegance of circle geometry, for the clean line of theory, for the deep connections to classical topics, or for the emerging applications. Circle packing has an experimental and visual character that is unique in pure mathematics, and the book exploits that character to carry the reader from the very beginnings to links with complex analysis and Riemann surfaces. There are intriguing, often very accessible, open problems throughout the book and seven appendices on subtopics of independent interest. This book lays the foundation for a topic with wide appeal and a bright future.

Géométrie différentielle

David BAO, Robert L. BRYANT, Shiing-Shen CHERN, and Zhongmin SHEN, (Editors). — **A sampler of Riemann-Finsler geometry.** — Mathematical Sciences Research Institute publications, vol. 50. — Un vol. relié, 16×24, de XII, 363 p. — ISBN 0-521-83181-4. — Prix: £45.00. — Cambridge University Press, Cambridge, 2004.

Finsler geometry generalizes Riemannian geometry in the same sense that Banach spaces generalize Hilbert spaces. This book presents an expository account of seven important topics in Riemann-Finsler geometry, which have recently undergone significant development but have not had a detailed pedagogical treatment elsewhere. Each article will open the door to an active area of research and is suitable for a special topics course in graduate-level differential geometry. — *Contents:* J.C. Álvarez Paiva and A.C. Thompson: Volumes on normed and Finsler spaces. — Giovanni Bellettini: Anisotropic and crystalline mean curvature flow. — Tadashi Aikou: Finsler geometry on complex vector bundles. — Karen Chandler and Pit-Mann Wong: Finsler geometry of holomorphic jet bundles. — David Bao and Colleen Robles: Ricci and flag curvatures in Finsler geometry. — Hans-Bert Rademacher: Nonreversible Finsler metrics of positive flag curvature. — Zhongmin Shen: Landsberg curvature, S-curvature and Riemann curvature..

Keith BURNS, Marian GIDEA. — **Differential geometry and topology: with a view to dynamical systems.** — Studies in advanced mathematics. — Un vol. relié, 16×24, de IX, 389 p. — ISBN 1-58488-253-0. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

Topics of special interest addressed in the book include Brouwer's fixed point theorem, Morse theory, and the geodesic flow. Smooth manifolds, Riemannian metrics, affine connections, the curvature tensor, differential forms, and integration on manifolds provide the foundation for many applications in dynamical systems and mechanics. The authors also discuss the Gauss-Bonnet theorem and its applications in non-Euclidean geometry models. The differential topology aspect of the book centers on classical, transversality theory, Sard's theorem, intersection theory, and fixed-point theorems. The construction of the de Rham cohomology builds further arguments for the strong connection between the differential structure and the topological structure. It also furnishes some of the tools necessary for a complete understanding of the Morse theory. These discussions are followed by an introduction to the theory of hyperbolic systems, with emphasis on the quintessential role of the geodesic flow. The integration of geometric theory, topological theory, and concrete applications to dynamical systems set this book apart. With clear, clear prose and effective examples, the authors' intuitive approach creates a treatment that is comprehensible to relative beginners, yet rigorous enough for those with more background and experience in the field.

Ovidiu CALIN, Der-Chen CHANG. — **Geometric mechanics on Riemannian manifolds: applications to partial differential equations.** — Applied and numerical harmonic analysis. — Un vol. broché, 16×24, de XV, 278 p. — ISBN 0-8176-4354-0. — Prix: SFr. 120.00. — Birkhäuser, Boston, 2005.

Differential geometry techniques have very useful and important applications in partial differential equations and quantum mechanics. This work presents a purely geometric treatment of problems in physics involving quantum harmonic oscillators, quartic oscillators, minimal surfaces, and Schrödinger's, Einstein's and Newton's equations. Historically, problems in these areas were approached using the Fourier transform or path integrals, although in some cases (e.g., the case of quartic oscillators) these methods do not work. New geometric methods are introduced in the work that have the advantage of providing quantitative or at least qualitative descriptions of operators, many of which cannot be treated by other methods. And, conservation laws of the Euler-Lagrange equations are employed to solve the equations of motion qualitatively when quantitative analysis is not possible. Main topics include: Lagrangian formalism on Riemannian manifolds; energy momentum tensor and conservation laws; Hamiltonian formalism; Hamilton-Jacobi theory; harmonic functions, maps, and geodesics; fundamental solutions for heat operators with potential; and a variational approach to mechanical curves. The text is enriched with good examples and exercises at the end of every chapter.

Jean-Paul DUFOUR, Nguyen TIEN ZUNG. — **Poisson structures and their normal forms.** — Progress in mathematics, vol. 242. — Un vol. relié, 16,5×24, de XV, 321 p. — ISBN 3-7643-7334-2. — Prix: SFr. 78.00. — Birkhäuser, Basel, 2005.

Poisson manifolds play a fundamental role in Hamiltonian dynamics, where they serve as phase spaces. They also arise naturally in other mathematical problems, and form a bridge from the commutative world to the noncommutative world. The aim of this book is twofold. On the one hand, it gives a quick, self-contained introduction to Poisson geometry and related subjects, including singular foliations, Lie groupoids and Lie algebroids. On the other hand, it presents a comprehensive treatment of the normal form problem in Poisson geometry. Even

when it comes to classical results, the book gives new insights. It contains results obtained over the past 10 years which are not available in other books.

Simone GUTT, John RAWNSLEY, Daniel STERNHEIMER, (Editors). — **Poisson geometry, deformation quantisation and group representations.** — Un vol. broché, 15,5×22,5, de x, 359 p. — ISBN 0-521-61505-4. — Prix: £35.00. — Cambridge University Press, Cambridge, 2005.

Poisson geometry lies at the cusp of non-commutative algebra and differential geometry, with natural and important links to classical physics and quantum mechanics. This book presents an introduction to the subject from a small group of leading researchers, and the result is a volume accessible to graduate students or experts from other fields. The contributions are: Poisson geometry and Morita equivalence by Bursztyn and Weinstein; formality and star products by Cattaneo; Lie groupoids, sheaves and cohomology by Moerdijk and Mrčun; geometric methods in representation theory by Schmid; and deformation theory: a powerful tool in physics modelling by Sternheimer.

Felix SCHLENK. — **Embedding problems in symplectic geometry.** — De Gruyter expositions in mathematics.— Un vol. broché, 17.5×24.5, de x, 250 p. — ISBN 3-11-017876-1. — Prix: €98.00. — W. de Gruyter, Berlin, 2005.

Symplectic geometry is the geometry underlying Hamiltonian dynamics, and symplectic mappings arise as time-1-maps of Hamiltonian flows. The spectacular rigidity phenomena for symplectic mappings discovered in the last two decades show that certain things cannot be done by a symplectic mapping. For instance, Gromov's famous "non-squeezing" theorem states that one cannot map a ball into a thinner cylinder by a symplectic embedding. The aim of this book is to show that certain other things can be done by symplectic mappings. This is achieved by various elementary and explicit symplectic embedding constructions, such as "folding", "wrapping" and "lifting". These constructions are carried out in detail and are used to solve some specific symplectic embedding problems. The exposition is self-contained and addressed to students and researchers interested in geometry or dynamics.

Topologie générale

Elisabeth BURRONI. — **La topologie des espaces métriques: niveau L3.** — Mathématiques à l'Université, cours et exercices corrigés. — Un vol. broché, 18×26, de x, 210 p. — ISBN 2-7298-2564-9. — Prix: €21.50. — Ellipse, Paris, 2005.

Cet ouvrage s'adresse aux étudiants qui entrent en L3, la troisième année de la nouvelle licence et ne suppose donc que les acquis des deux premières années, L1 et L2, de cette licence (qui correspond à l'ancien DEUG) dont on rappelle les éléments vraiment utiles ici dans le chapitre préliminaire. On y enseigne une topologie allégée, celle des espaces métriques (i.e. munis d'une distance). Cette topologie est bien suffisante pour la grande majorité des utilisateurs, par exemple pour les étudiants de la licence MASS, de la licence préparatoire au CAPES, pour ceux qui préparent l'agrégation (interne ou non) ou encore ceux des classes préparatoires aux grandes écoles; elle nous permet de toute façon d'étudier en détail les espaces de Banach et les espaces de Hilbert. De très nombreux exercices, cités en exemple ou dans les remarques, accompagnent les énoncés du cours; on en donne des solutions détaillées en fin d'ouvrage.

Sergio Macías. — **Topics on continua.** — Un vol. relié, 16×24, de 361 p. — ISBN 0-8493-3738-0. — Prix: US$ 89.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

In *Topics on Continua*, Sergio Macías, one of the field's leading scholars, presents four of his favorite continuum topics: inverse limits, Jones's set function T, homogenous continua, and n-fold hyperspaces, and in doing so, presents the most complete set of theorems and proofs ever contained in a single topology volume. Many of the results presented have previously appeared only in research papers, and some appear here for the first time. After building the requisite background and exploring the inverse limits of continua, the discussions focus on Professor Jones's set function T and continua for which T is continuous. An introduction to topological groups and group actions lead to a proof of Effros's theorem, followed by a presentation of two decomposition theorems. The author then offers an in-depth study of n-fold hyperspaces. This includes their general properties, conditions that allow points of n-fold symmetric products to be arcwise accessible from their complement, points that arcwise disconnect the n-fold hyperspaces, the n-fold hyperspaces of graphs, and theorems relating n-fold hyperspaces and cones. The concluding chapter presents a series of open questions on each topic discussed in the book.

Volker Runde. — **A taste of topology.** — Universitext. — Un vol. broché, 16×24, de x, 176 p. — ISBN 0-387-25790-X. — Prix: €32.95. — Springer, New York, 2005.

If mathematics is a language, then taking a topology course at the undergraduate level is cramming vocabulary and memorizing irregular verbs: a necessary, but not always exciting exercise one has to go through before one can read great works of literature in the original language. The present book grew out of notes for an introductory topology course at the University of Alberta. It provides a concise introduction to set-theoretic topology (and to a tiny little bit of algebraic topology). It is accessible to undergraduates from the second year on, but even beginning graduate students can benefit from some parts. Great care has been devoted to the selection of examples that are not self-serving, but already accessible for students who have a background in calculus and elementary algebra, but not necessarily in real or complex analysis. In some points, the book treats its material differently than other texts on the subject: Baire's theorem is derived from Bourbaki's Mittag-Leffler theorem; nets are used extensively, in particular for an intuitive proof of Tychonoff's theorem; a short and elegant, but little known proof for the Stone-Weierstrass theorem is given.

Topologie algébrique

Dagmar M. Meyer and Larry Smith. — **Poincaré duality algebras, Macaulay's dual systems, and Steenrod operations.** — Cambridge tracts in mathematics, vol. 167. — Un vol. relié, 16×23,5, de vi, 193 p. — ISBN 0-521-85064-9. — Prix: £43.00. — Cambridge University Press, Cambridge, 2005.

Poincaré duality algebras originated in the work of topologists on the cohomology of closed manifolds, and Macaulay's dual systems in the study of irreducible ideals in polynomial algebras. These two ideas are tied together using basic commutative algebra involving Gorenstein algebras. Steenrod operations also originated in algebraic topology, but may best be viewed as a means of encoding the information often hidden behind the Frobenius map in characteristic $p \neq 0$. They provide a noncommutative tool to study commutative algebras over a Galois field. The authors skilfully bring together these ideas and apply them to problems in invariant theory. A number of remarkable and unexpected

interdisciplinary connections are revealed that will interest researchers in the areas of commutative algebra, invariant theory or algebraic topology.

Topologie des variétés, analyse globale et analyse des variétés

Vincenzo ANCONA, Bernard GAVEAU. — **Differential forms on singular varieties: de Rham and Hodge theory simplified.** — Monographs and textbooks in pure and applied mathematics, vol. 273. — Un vol. relié, 16×23,5, de XIX, 311 p. — ISBN 0-8493-3739-9. — Prix: US$99.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

This title uses complexes of differential forms to give a complete treatment of the Deligne theory of mixed Hodge structures on the cohomology of singular spaces. This book features an approach that employs recursive arguments on dimension and does not introduce spaces of higher dimension than the initial space. It simplifies the theory through easily identifiable and well-defined weight filtrations, and to maintain accessibility, it also avoids discussion of cohomological descent theory. The treatment is self-contained and brings together information that allows readers to follow and understand this difficult but important subject without jumping from one reference to another.

Jorge A. CALVO, Kenneth C. MILLETT, Eric J. RAWDON, Andrzej STASIAK, (Editors). — **Physical and numerical models in knot theory: including applications to the life sciences.** — Series on knots and everything, vol. 36 — Un vol. relié, 16,5×24, de XIX, 606 p. — ISBN 981-256-187-0. — Prix: £66.00. — World Scientific Publishing, Singapore, 2005.

The physical properties of knotted and linked configurations in space have long been of interest to mathematicians. More recently, these properties have become significant to biologists, physicists, and engineers among others. Their depth of importance and breadth of application are now widely appreciated and valuable progress continues to be made each year. This volume presents several contributions from researchers using computers to study problems that would otherwise be intractable. While computations have long been used to analyze problems, formulate conjectures, and search for special structures in knot theory, increased computational power has made them a staple in many facets of the field. The volume also includes contributions concentrating on models researchers use to understand knotting, linking, and entanglement in physical and biological systems. Topics include properties of knot invariants, knot tabulation, studies of hyperbolic structures, knot energies, the exploration of spaces of knots, knotted umbilical cords, studies of knots in DNA and proteins, and the structure of tight knots. Together, the chapters explore four major themes: physical knot theory, knot theory in the life sciences, computational knot theory, and geometric knot theory.

Martin D. CROSSLEY. — **Essential topology.** —Springer undergraduate mathematics series. — Un vol. broché, 18×23,5, de IX, 224 p. — ISBN 1-85233-782-6. — Prix: €29.95. — Springer, London, 2005.

Taking a direct route, _Essential Topology_ brings the most important aspects of modern topology within reach of a second-year undergraduate student. Based on courses given at the University of Wales Swansea, it begins with a discussion of continuity and, by way of many examples, leads to the celebrated "Hairy Ball theorem" and on to homotopy and homology: the cornerstones of contemporary algebraic topology. While containing all the key results of basic topology, _Essential Topology_ never allows itself to get mired in details. Instead, the

focus throughout is on providing interesting examples that clarify the ideas and motivate the student, reflecting the fact that these are often the key examples behind current research. With chapters on: continuity and topological spaces — deconstructionist topology — the Euler number — homotopy groups including the fundamental group — simplicial and singular homology — fibre bundles. *Essential Topology* contains enough material for two semester-long courses, and offers a one-stop-shop for undergraduate-level topology, leaving students motivated for postgraduate study in the field, and well prepared for it.

Vladimir E. NAZAIKINSKII, Anton Yu. SAVIN, Bert-Wolfgang SCHULZE, Boris Yu. STERNIN. — **Elliptic theory on singular manifolds.** — Differential and integral equations and their applications, vol. 7. — Un vol. relié, 18,5×26, de XIV, 356 p. — ISBN 1-58488-520-3. — Prix: US$99.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

The analysis and topology of elliptic operators on manifolds with singularities are much more complicated than in the smooth case and require completely new mathematical notions and theories. While there has recently been much progress in the field, many of these results have remained scattered in journals and preprints. Starting from an elementary level and finishing with the most recent results, this book gives a systematic exposition of both analytical and topological aspects of elliptic theory on manifolds with singularities. The presentation includes a review of the main techniques of the theory of elliptic equations, offers a comparative analysis of various approaches to differential equations on manifolds with singularities, and devotes considerable attention to applications of the theory. These include Sobolev problems, theorems of Atiyah-Bott-Lefschetz type, and proofs of index formulas for elliptic operators and problems on manifolds with singularities, including the authors' new solution to the index problem for manifolds with nonisolated singularities.

Satish SHIRALI, Harkrishnan L. VASUDEVA. — **Metric spaces.** — Un vol. broché, de VIII, 222 p. — ISBN 1-85233-922-5. — Prix: €32.95. — Springer, London, 2006.

This volume provides a complete introduction to metric space theory for undergraduates. It covers the topology of metric spaces, continuity, connectedness, compactness and product spaces, and includes results such as the Tietze-Urysohn extension theorem, Picard's theorem on ordinary differential equations, and the set of discontinuities of the pointwise limit of a sequence of continuous functions. Key features include a full chapter on product metric spaces, including a proof of Tychonoff's theorem; a wealth of examples and counter-examples from real analysis, sequence spaces and spaces of continuous functions; numerous exercises, with solutions to most of them, to test understanding. The only prerequisite is a familiarity with the basics of real analysis: the authors take care to ensure that no prior knowledge of measure theory, Banach spaces or Hilbert spaces is assumed. The material is developed at a leisurely pace and applications of the theory are discussed throughout, making this book ideal as a classroom text for third- and fourth-year undergraduates or as a self-study resource for graduate students and researchers.

Probabilités et processus stochastiques

Adam BOBROWSKI. — **Functional analysis for probability and stochastic processes.** — Un vol. broché, 15,5×23, de XII, 393 p. — ISBN 0-521-53937-4 (relié: 0-521-83166-0). — Prix: £28.00 (relié: £55.00). — Cambridge University Press, Cambridge, 2005.

This text is designed both for students of probability and stochastic processes, and for students of functional analysis. For the reader not familiar with functional analysis, a detailed

introduction to necessary notions and facts is provided. However, this is not a straight textbook in functional analysis; rather it presents some chosen parts of functional analysis that can help understand ideas from probability and stochastic processes. The subjects range from basic Hilbert and Banach spaces, through weak topologies and Banach algebras, to the theory of semigroups of bounded linear operators. Numerous standard and non-standard examples and exercises make the book suitable both for a course textbook and for self-study.

Jacques ISTAS. — **Mathematical modeling for the life sciences.** — Universitext. — Un vol. broché, 16×24, de VI, 164 p. — ISBN 3-540-25305-X. — Prix: €39.95. — Springer, Berlin, 2005.

Proposing a wide range of mathematical models that are currently used in life sciences may be regarded as a challenge, and that is precisely the challenge that this book takes up. Of course this panoramic study does not claim to offer a detailed and exhaustive view of the many interactions between mathematical models and life sciences. This textbook provides a general overview of realistic mathematical models in life sciences, considering both deterministic and stochastic models and covering dynamical systems, game theory, stochastic processes and statistical methods. Each mathematical model is explained and illustrated individually with an appropriate biological example. Finally three appendices on ordinary differential equations, evolution equations, and probability are added to make it possible to read this book independently of other literature.

Kai LIU. — **Stability of infinite dimensional stochastic differential equations with applications.** — Chapman & Hall/CRC monographs and surveys in pure and applied mathematics, vol. 135. — Un vol. relié, 16,5×24,5, de XI, 298 p. — ISBN 1-58488-598-X. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

Stochastic differential equations in infinite dimensional spaces are motivated by the theory and analysis of stochastic processes and by applications such as stochastic control, population biology, and turbulence, where the analysis and control of such systems involves investigating their stability. While the theory of such equations is well established, the study of their stability properties has grown rapidly only in the past 20 years, and most results have remained scattered in journals and conference proceedings. This book offers a systematic presentation of the modern theory of the stability of stochastic differential equations in infinite dimensional spaces – particularly Hilbert spaces. The treatment includes a review of basic concepts and investigation of the stability theory of linear and nonlinear stochastic differential equations and stochastic functional differential equations in infinite dimensions. The final chapter explores topics and applications such as stochastic optimal control and feedback stabilization, stochastic reaction-diffusion, Navier-Stokes equations, and stochastic population dynamics.

M.M. RAO. — **Conditional measures and applications.** — Second edition. — Monographs and textbooks in pure and applied mathematics, vol. 271. — Un vol. relié, 16×24, de XXIV, 483 p. — ISBN 1-57444-593-6. — Prix: US$99.95. — Chapman & Hall/CRC, Boca Raton, FL, 2005.

Conditional Measures and Applications clearly elucidates the subject, from fundamental principles to abstract analysis. The author illustrates the computational difficulties in evaluating conditional probabilities in nondiscrete cases with numerous examples, demonstrates applications to Markov processes, martingales, potential theory, and Reynolds operators as well as sufficiency in statistics, and clarifies ideas in modern noncommutative

probability structures through conditioning in general structures, including parts of operator algebras and "free" random variables. He also discusses existence and construction problems from the Bishop-Brouwer constructive analysis point of view. — *In the second edition:* greater detail in the approach to the computational/algorithmic point of view; integral representations of conditional expectations as operators in vector spaces and illustrated for special cases; existence of projective limits of regular conditional measures; novel application of Weil-Mackey-Bruhat formula; dichotomy of absolute continuity and singularity of probability measures; conditioning in a W*-algebra context and a related Kolmogorov existence theorem; "free independence," Gleason measure, and quantum probability; martingale convergence and sufficiency in the W*-algebra context...

Marta SANZ-SOLÉ. — **Malliavin calculus: with applications to stochastic partial differential equations.** — Un vol. relié, 17×25, de VIII, 162 p. — ISBN 2-940222-06-1 (EPFL Press) 0-8493-4030-6(CRC Press). — Prix: US$84.95. — EPFL Press, Lausanne, distributed by CRC Press, Boca Raton, FL, 2005.

Malliavin calculus is a stochastic calculus of variations on the Wiener space. The main results of this theory are currently having influence on research developments at the cross section of probability and infinite-dimensional analysis. On the applied level, Malliavin calculus is used, for example, in the study by probabilistic methods of mathematical models in finance. This book presents some applications of Malliavin calculus to stochastic partial differential equations driven by Gaussian noises. The first five chapters are devoted to an introduction of the calculus itself, based on a general Gaussian space. In the last chapters of the book, recent research on regularity of the solution of stochastic partial differential equations, and the existence and smoothness of their probability laws, are discussed.

Statistique

N. BALAKRISHNAN, N. KANNAN, H.N. NAGARAJA, (Editors). — **Advances in ranking and selection, multiple comparisons, and reliability: methodology and applications.** — Statistics for industry and technology. — Un vol. relié, 18,5×26, de XLI, 412 p. — ISBN 0-8176-3232-8. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2005.

S. Panchapakesan has made significant contributions to ranking and selection and has published in many other areas of statistics, including order statistics, reliability theory, stochastic inequalities, and inference. Written in his honour, the twenty invited articles in this volume reflect recent advances in these areas and form a tribute to Panchapakesan's influence and impact on these areas. Thematically organised, the chapters cover a broad range of topics from: inference, ranking and selection, multiple comparisons and tests, agreement assessment, reliability, biostatistics. Featuring theory, methods, applications, and extensive bibliographies with special emphasis on recent literature, this comprehensive reference work will serve researchers, practitioners, and graduate students in the statistical and applied mathematics communities.

Thomas A. SEVERINI. — **Elements of distribution theory.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5×26, de XII, 515 p. — ISBN 0-521-84472-X. — Prix: £35.00. — Cambridge University Press, Cambridge, 2005.

This detailed introduction to distribution theory uses no measure theory, making it suitable for students in statistics and econometrics as well as for researchers who use

statistical methods. Good backgrounds in calculus and linear algebra are important and a course in elementary mathematical analysis is useful, but not required. An appendix gives a detailed summary of the mathematical definitions and results that are used in the book. Topics covered range from the basic distribution and density functions, expectation, conditioning, characteristic functions, cumulants, convergence in distribution, and the central limit theorem to more advanced concepts such as exchangeability, models with a group structure, asymptotic approximations to integrals, orthogonal polynomials, and saddlepoint approximations. The emphasis is on topics useful in understanding statistical methodology; thus, parametric statistical models and the distribution theory associated with the normal distribution are covered comprehensively.

Jun SHAO. — **Mathematical statistics: exercises and solutions.** — Un vol. broché, 15,5×23,5, de XXVIII, 359 p. — ISBN 0-387-24970-2. — Prix: €39.95. — Springer, New York, 2005.

This book consists of four hundred exercises in mathematical statistics and their solutions, over 95% of which are in the author's *Mathematical Statistics*, second edition (Springer, 2003). For students preparing for work on a Ph.D. degree in statistics and instructors of mathematical statistics courses, this useful book provides solutions to train students for their research ability in mathematical statistics and presents many additional results and examples that complement any text in mathematical statistics. To develop problem-solving skills, two solutions and/or notes of brief discussions accompany a few exercises. The exercises are grouped into seven chapters with titles matching those in the author's *Mathematical Statistics*. On the other hand, the book is stand-alone because exercises and solutions are comprehensible independently of their source, and notation and terminology are explained in the front of the book. Readers are assumed to have a good knowledge in advanced calculus. A course in real analysis or measure theory is highly recommended. If this book is used with a statistics textbook that does not include probability theory, then knowledge in measure-theoretic probability theory is required.

G.A. YOUNG, R.L. SMITH. — **Essentials of statistical inference.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5×26, de X, 225 p. — ISBN 0-521-83971-8. — Prix: £30.00. — Cambridge University Press, Cambridge, 2005.

This book presents the concepts and results underlying the Bayesian, frequentist, and Fisherian approaches, with particular emphasis on the contrasts between them. Written in a lucid and informal style, this concise text provides basic material on the main approaches to inference, as well as more advanced material on modern developments in statistical theory, including: contemporary material on Bayesian computation, such as MCMC; higher-order likelihood theory; predictive inference; bootstrap methods and conditional inference. It contains numerous extended examples of the application of formal inference techniques to real data, as well as historical commentary on the development of the subject. Throughout, the text concentrates on concepts, rather than on mathematical detail, while maintaining appropriate levels of formality. Each chapter ends with a set of accessible problems. Based to a large extent on lectures given at the University of Cambridge over a number of years, the material has been polished by student feedback. Some prior knowledge of probability is assumed, while some previous knowledge of the objectives and main approaches to statistical inference would be helpful but is not essential.

Analyse numérique

James F. BLOWEY, Alan W. CRAIG (Editors). — **Frontiers cf numerical analysis.** — Universitext. — Un vol. broché, 16×24, de IX, 262 p. — ISBN 3-540-23921-9. — Prix: €49.95. — Springer, Berlin, 2005.

This book contains detailed lecture notes on four topics at the forefront of current research in computational mathematics. Each set of notes presents a self-contained guide to a current research area and has an extensive bibliography. In addition, most of the notes contain detailed proofs of the key results. The notes start from a level suitable for first year graduate students in applied mathematics, mathematical analysis or numerical analysis, and proceed to current research topics. The reader should therefore be able to gain quickly an insight into the important results and techniques in each area without recourse to the large research literature. Current (unsolved) problems are also described and directions for future research are given. This book is also suitable for professional mathematicians who require a succinct and accurate account of recent research in areas parallel to their own, and graduates in mathematical sciences.

P.G. CIARLET, W.H.A. SCHILDERS, E.J.W ter MATEN, (Editors). — **Handbook of numerical analysis: volume XIII: special volume: numerical methods in electromagnetics.** — Un vol relié, 25×18, de XVI, 912 p. — ISBN 0-444-51375-2. — Prix: €235.00. — Elsevier, Amsterdam, 2005.

This special volume provides a broad overview and insight in the way numerical methods are being used to solve the wide variety of problems in the electronics industry. Futhermore its aim is to give researchers from other fields of application the opportunity to benefit from the results which have been obtained in the electronics industry. *Contents:* Introduction to electromagnetism. — Discretization of electromagnetic problems. — Finite-difference time-domain methods. — Discretization of semiconductor device problems I. — Discretization of semiconductor device problems II. — Modelling and discretization of circuit problems. — Simulation of EMC behaviour. — Solution of linear systems. — Reduced-order modelling.

Yu. P. PETROV and V.S. SIZIKOV. — **Well-posed, ill-posed, and intermediate problems with applications.** — Inverse and ill-posed problems series. — Un vol. relié, 16,5×24,5, de VI, 234 p. — ISBN 90-6764-432-3. —Prix: €119.00. — Leiden, VSP, Brill Academic Publishers, 2005.

The notion of well- and ill-posed problems, and also that of problems intermediate between well- and ill-posed ones, is described. Examples of such mathematical problems (systems of linear algebraic equations, systems of ordinary differential equations, partial differential equations, integral equations, and also examples of practical problems arising in control theory, image processing and tomography) are given. It is shown that classically equivalent transformations, when applied to well-posed equations, may yield ill-posed equations, and *vice versa.* The notion of transformations equivalent in the broadened sense is introduced. The stable Tikhonov regularization method and the solution-on-compact method are described. Solution results for some numerical examples are presented. The present book can be regarded both as a tutorial for advanced students and as a monograph for students, masters, post-graduate students, lecturers and scientific researchers in pure and applied mathematics.

Informatique

Richard H. ENNS. — **Computer algebra recipes for mathematical physics.** — Un vol. broché, 16×24, de XIV, 390 p. — ISBN 0-8176-3223-9. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2005.

Over two hundred novel and innovative computer algebra worksheets of "recipes" will enable readers in engineering, physics, and mathematics to easily and rapidly solve and explore most problems they encounter in their mathematical physics studies. While the aim of this text is to illustrate applications, a brief synopsis of the fundamentals for each topic is presented, the topics being organized to correlate with those found in traditional mathematical physics texts. The recipes are presented in the form of stories and anecdotes, a pedagogical approach that makes a mathematically challenging subject easier and more fun to learn. Every chapter contains supplementary recipes and solutions on a CD-ROM. This is a self-contained and standalone text using MAPLE that may be used in the classroom, for self-study, as a reference, or as a text for an online course.

Économie, recherche opérationnelle, jeux

Alan D. TAYLOR. — **Social choice and the mathematics of manipulation.** — Un vol. broché, 23×16, de XI, 176 p. — ISBN 0-521-00883-2 (relié: 0-521-81052-3). — Prix: £14.99 (relié: £40.00). — Cambridge University Press, Cambridge, 2005.

Honesty in voting, it turns out, is not always the best policy. Indeed, in the early 1970s, Allan Gibbard and Mark Satterthwaite, building on the seminal work of the Nobel laureate Kenneth Arrow, proved that with three or more alternatives there is no reasonable voting system that is non-manipulable; voters will always have an opportunity to benefit by submitting a disingenuous ballot. The ensuing decades produced a number of theorems of striking mathematical naturality that dealt with the manipulability of voting systems. This book presents many of these results from the last quarter of the twentieth century – especially the contributions of economists and philosophers – from a mathematical point of view, with many new proofs. The presentation is almost completely self-contained and requires no prerequisites except a willingness to follow rigorous mathematical arguments.

Information, communication, circuits

Henri COHEN, Gerhard FREY, Roberto AVANZI, Christophe DOCHE, Tanja LANGE, Kim NGUYEN, and Frederik VERCAUTEREN. — **Handbook of elliptic and hyperelliptic curve cryptography.** — Discrete mathematics and its applications. — Un vol., 18,5×26, de XXXIV, 808 p. — ISBN 1-58488-518-1. — Prix: US$99.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

The *Handbook of Elliptic and Hyperelliptic Curve Cryptography* introduces the theory and algorithms involved in curve-based cryptography. After a very detailed exposition of the mathematical background, it provides ready-to-implement algorithms for the arithmetic of elliptic and hyperelliptic curves and the computation of pairings. It explores methods for point counting and constructing curves with the complex multiplication method. It also surveys

generic methods to compute discrete logarithms and details index calculus methods for hyperelliptic curves as well as transfers of discrete logarithm problems for special curves. It ends with concrete realizations of cryptosystems in smart cards, including efficient implementation in hardware and side-channel attacks as well as countermeasures. Authored by an outstanding group of experts, this is the definitive guide to quickly and easily implementing curve-based cryptography for efficient and robust security.