BULLETIN BIBLIOGRAPHIQUE

Généralités

Stéphane BALAC, Frédéric STURM. — **Algèbre et analyse: cours de mathématiques de première année avec exercices corrigés.** — Collection des sciences appliquées de l'INSA de Lyon. — Un vol. broché, 16×24, de XXII, 1021 p. — ISBN 2-88074-558-6. — Prix: SFr. 74.25. — Presses polytechniques et universitaires romandes, Lausanne, 2003.

Cet ouvrage, réunissant en un tout cohérent algèbre et analyse, s'adresse de manière plus spécifique aux élèves de première année des cycles préparatoires intégrés des écoles d'ingénieurs mais peut être utilisé avec profit par les autres étudiants de premier cycle universitaire. Ce livre ne constitue pas seulement une somme de connaissances mathématiques de 1ère année de l'enseignement supérieur mais vise à présenter de manière précise les résultats essentiels à une formation d'ingénieur généraliste. L'ouvrage est divisé en 20 chapitres regroupés en 5 grandes parties: ensembles numériques fondamentaux, polynômes et fractions rationnelles, algèbre linéaire, calcul différentiel et calcul intégral. Chaque chapitre contient de courts exercices visant à tester la bonne compréhension des notions introduites et se termine par quelques exercices de synthèse. Une correction détaillée et commentée de tous les exercices est fournie en fin de chapitre. Quelques éléments biographiques de mathématiciens cités dans l'ouvrage y figurent également afin de mieux situer les résultats présentés dans leur contexte historique.

Heinz BAUER. — **Selecta.** — Edited by Herbert HEYER, Niels JACOB, Ivan NETUKA. — Un vol. relié, 18×24, de XIV, 597 p. — ISBN 3-11-017350-6. — Prix: €128.00. — Walter de Gruyter, Berlin, 2003.

Selecta from the work of a highly acknowledged mathematician can be effective reading with respect to various points of view. They can serve as an overview of the interactions between the fields the author has worked in. Occasionally they contain contributions that are difficult to find in libraries. The editors have collected Bauer's most important contributions, classified them within the three topics "Measure and integration", "Convexity" and "Potential theory" and had the three subcollections provided by instructive essays on the work achieved and its implications. Together with the curriculum and bibliography the resulting volume is designed to offer to the appreciative reader Bauer's main innovative ideas in a convenient presentation.

Edward BRITTON, Lynn PAINE, David PIMM, Senta RAIZEN, (Editors). — **Comprehensive teacher induction: systems for early career learning.** — Un vol. relié, 17×24,5, de XIV, 404 p. — ISBN 1-4020-1147-4. — Prix: €151.00. — Kluwer, Dordrecht, 2003.

What does it take to meet the wide-ranging needs of beginning teachers? Based on a three-year study, the authors describe how comprehensive teacher induction systems can not only provide teacher support but also promote learning more about how to teach. For the past 10 to

25 years, induction programs in Shanghai, France, Japan, New Zealand and Switzerland have provided well-funded induction support that reaches all beginning teachers. With National Science Foundation funding and under the auspices of WestEd's National Center for Improving Science Education and Michigan State University, researchers conducted in-depth case studies of induction programs. They particularly focused on novice mathematics and science teachers. This resulting book calls for re-thinking what teacher induction is about, whom it should serve, what the "curriculum" of induction should be and the policies, programs, and practices needed to deliver it.

Yves CAUMEL. — **Cours d'analyse fonctionnelle et complexe: pour les élèves ingénieurs et les étudiants des filières mathématiques de l'Université.** — Un vol. broché, 17×24, de 238 p. — ISBN 2-85428-563-8. — Prix: €24.00. — Cépadues Editions, Toulouse, 2003.

Le cours d'analyse d'une école d'ingénieurs est le socle conceptuel sur lequel reposent les autres enseignements mathématiques, constituant ensemble le cadre de modélisation des autres enseignements scientifiques. La rédaction de ce cours, tant dans son contenu que dans sa structure, est inspirée par le profil et les besoins en mathématiques de l'élève et du futur ingénieur. L'auteur a donc choisi d'exposer un cours d'analyse allégé des concepts et des résultats à faible plus-value théorique ou pratique. Adepte d'une pédagogie constructive et motivante, évitant autant que faire se peut l'inefficace linéarité de l'exposé déductif, l'auteur a semé le parcours du néophyte d'appels à l'intuition géométrique et d'applications aux sciences physiques, d'intermèdes historiques ou épistémologiques ainsi que de nombreux exercices et problèmes corrigés. Cet ouvrage n'est donc pas un traité, mais un livre compagnon qui convient à l'apprentissage de l'analyse par les étudiants de Licence et de Maîtrise des filières mathématiques et physiques.

Graeme COHEN. — **A course in modern analysis and its applications.** — Australian Mathematical Society lecture series, vol. 17. — Un vol. broché, 15×22,5, de XIII, 333 p. — ISBN 0-521-52627-2 (relié: 0-521-81996-2). — Prix: £24.95 (relié: £60.00). — Cambridge University Press, Cambridge, 2003.

Designed as a textbook for a one-semester course at a senior undergraduate level, this book will appeal not only to mathematics undergraduates, but also to those who need to learn some mathematical analysis for use in other areas such as engineering, physics, biology or finance. Topics such as completeness and compactness are approached initially through convergence of sequences in metric space, and emphasis remains on this approach. However, the alternative topological approach is described in a separate chapter. This gives the book more flexibility, making it especially useful as an introduction to more advanced areas such as functional analysis. Nominal divisions of pure and applied mathematics have been merged, leaving enough for students of either inclination to have a feeling for what further developments might look like. Applications have been included such as differential and integral equations, systems of linear algebraic equations, approximation theory, numerical analysis and quantum mechanics.

Ulrich DAEPP, Pamela GORKIN. — **Reading, writing, and proving: a closer look at mathematics.** — Undergraduate texts in mathematics. — Un vol. relié, 16×24, de XVI, 395 p. — ISBN 0-387-00834-9. — Prix: €64.95. — Springer, New York, 2003.

This book, which is based on Pólya's method of problem solving, aids students in their transition from calculus (or precalculus) to higher-level mathematics. The book begins by providing a great deal of guidance on how to approach definitions, examples, and theorems in mathematics. It ends by providing projects for independent study. Students will follow Pólya's four-step process: learn to understand the problem; devise a plan to solve the problem; carry out that plan; and look back and check what the results told them. Special emphasis is placed

on reading carefully and writing well. The authors have included a wide variety of examples, exercises with solutions, problems, and over 40 illustrations, chosen to emphasize these goals. Historical connections are made throughout the text, and students are encouraged to use the rather extensive bibliography to begin making connections of their own. While standard texts in this area prepare students for future courses in algebra, this book also includes chapters on sequences, convergence, and metric spaces for those wanting to bridge the gap between the standard course in calculus and one in analysis.

Jacques DOUCHET. — **Analyse: recueil d'exercices et aide-mémoire, vol. 1**. — Enseignement des mathématiques. — Un vol. broché, 16×24, de IX, 408 p. — ISBN 2-88074-552-7. — Prix: SFr. 48.00. — Presses polytechniques et universitaires romandes, Lausanne, 2003.

Ce recueil de 1277 exercices est principalement destiné aux étudiants du premier cycle universitaire qui suivent un cours sur le calcul différentiel et intégral concernant les fonctions réelles d'une variable réelle. L'ouvrage contient 9 chapitres divisés chacun en 2 parties. La première est un rappel de tous les principaux résultats et définitions qu'il faut connaître sur la matière traitée. Les propositions sont énoncées avec précision mais sans démonstration. La deuxième partie est constituée d'un recueil d'exercices en rapport avec chacun des chapitres, accompagnés de leurs solutions.

Michele EMMER, Mirella MANARESI, (Editors). — **Mathematics, art, technology and cinema.** — Un vol. relié, 16×24, de XI, 242 p. — ISBN 3-540-00601-X. — Prix: € 79.95. — Springer, Berlin, 2003.

This book is about mathematics. But also about art, technology and images. And above all, about cinema. The book was conceived as a contribution to the World Mathematical Year 2000. The editors argue that the discussion about the differences between the so called two cultures of science and humanism is a thing of the past. They hold that both cultures are truly linked through ideas and creativity, not only through technology. In doing so, they succeed in reaching out to non-mathematicians, and those who are not particularly fond of mathematics. An insightful book for mathematicians, film lovers, those who feel passionate about images, and those with a questioning mind.

Leonhard EULER. — **Lettres à une princesse d'Allemagne sur divers sujets de physique et de philosophie.** — Un vol. broché, 15×22,5, de XXIX, 512 p. — ISBN 2-88074-524-1. — Prix: SFr. 48.00. — Presses polytechniques et universitaires romandes, Lausanne, 2003.

Ces lettres rédigées à Berlin entre 1760 et 1762 et publiées à Saint-Pétersbourg de 1768 à 1772 constituent un brillant exemple de vulgarisation scientifique destiné à un lectorat non spécialisé. Ecrites par le grand mathématicien bâlois Euler (1707-1783), elles ont immédiatement rencontré un véritable succès populaire dès leur première publication. Rédigées dans un français limpide, elles ont été traduites dans de nombreuses langues. Euler aborde ici tous les sujets en dehors des mathématiques proprement dites, comme l'astronomie, la mécanique, l'optique, la musique, la philosophie et la logique, domaine auquel il a personnellement contribué de manière significative.

Roger GODEMENT. — **Analyse mathématique II: calcul différentiel et integral, series de Fourier, fonctions holomorphes.** — 2ème édition corrigée. — Un vol. broché, 16,5×24, de VIII, 490 p. — ISBN 3-540-00655-9. — Prix: € 42.61. — Springer, Berlin, 2003.

Les deux premiers volumes sont consacrés aux fonctions dans **R** ou **C**, y compris la théorie élémentaire des séries et intégrales de Fourier et une partie de celle des fonctions holomorphes.

L'exposé, non strictement linéaire, combine indications historiques et raisonnement rigoureux. Il montre la diversité des voies d'accès aux principaux résultats afin de familiariser le lecteur avec les méthodes de raisonnement et idées fondamentales plutôt qu'avec les techniques de calcul, point de vue utile aussi aux personnes travaillant seules.

Roger GODEMENT. — **Analyse mathématique IV: intégration et théorie spectrale, analyse harmonique, le jardin des délices modulaires.** — Un vol. broché, 16,5×24, de XII, 509 p. — ISBN 3-540-438410. — Prix: €44.95. — Springer, Berlin, 2003.

Ce 4ème volume de l'ouvrage *Analyse mathématique* initiera le lecteur à l'analyse fonctionnelle (intégration, espaces de Hilbert, analyse harmonique en théorie des groupes) et aux méthodes de la théorie des fonctions modulaires (série L et theta, fonctions elliptiques, usage de l'algèbre de Lie de $SL(2,\mathbf{R})$. Tout comme pour les volumes 1 à 3, on reconnaîtra ici encore le style inimitable de l'auteur et pas seulement par son refus de l'écriture condensée en usage dans de nombreux manuels. Mariant judicieusement les mathématiques dites «modernes» et «classiques», la première partie (Intégration) est d'utilité universelle tandis que la seconde oriente le lecteur vers un domaine de recherche spécialisé et très actif, avec de vastes généralisations possibles.

Ross HONSBERGER. — **Mathematical diamonds.** — Dolciani mathematical expositions, no. 26. — Un vol. broché, 15×23, de X, 245 p. — ISBN 0-88385-332-9. — Prix: £21.95. — The Mathematical Association of America, Washington, D.C., distributed by Cambridge University Press, Cambridge, 2003.

Ross Honsberger has done it again! He has brought together another wonderful collection of elementary mathematical problems and their solutions that reflect the beauty of mathematics. The problems abound in striking surprises and brilliant ideas. Many come from mathematical journals. Others come from various mathematical competitions such as the *Tournament of the Towns*, the *Balkan Olympiads*, the *American Invitational Mathematics Exam*, and the *Putnam Mathematical Competition*. And two chapters are based on work by Paul Erdős. The mathematical requirements rarely go beyond the knowledge of a college freshman, but the ingenuity of the solutions is what makes *Mathematical Diamonds* so brilliant.

V. LAKSHMIBAI, V. BALAJI, V.B. MEHTA, K.R. NAGARAJAN, K. PARANJAPE, P. SANKARAN, R. SRIDHARAN, (Editors). — **A tribute to C.S. Seshadri: a collection of articles on geometry and representation theory.** — Trends in mathematics. — Un vol. relié, 17,5×24, de XIX, 541 p. — ISBN 3-7643-0444-8. — Prix: SFr. 198.00. — Birkhäuser, Basel, 2003.

C.S. Seshadri turned seventy on the "29th of February", 2002. Some of his friends and students came together on March 1, 2002 to felicitate Seshadri. To mark this occasion, a symposium was held in Chennai, India, where some of his colleagues gave expository talks highlighting Seshadri's contributions to mathematics. This volume contains expanded texts of these talks as well as research and expository papers on geometry and representation theory. It will serve as an excellent reference to researchers and students in these areas.

Niels LAURITZEN. — **Concrete abstract algebra: from numbers to Gröbner bases.** — Un vol. broché, 15×23, de XIV, 240 p. — ISBN 0-521-53410-0 (relié: 0-521-82679-9). — Prix: £19.95 (relié: £55.00). — Cambridge University Press, Cambridge, 2003.

This book develops the theory of abstract algebra from numbers to Gröbner bases, whilst taking in all the usual material of a traditional introductory course. In addition, there is a rich supply of topics such as cryptography, factoring algorithms for integers, quadratic residues,

finite fields, factoring algorithms for polynomials, and systems of non-linear equations. A special feature is that Gröbner bases do not appear as an isolated example. They are fully integrated as a subject that can be successfully taught in an undergraduate context. Lauritzen's approach to teaching abstract algebra is based on an extensive use of examples, applications, and exercises. The basic philosophy is that inspiring, non-trivial applications and examples give motivation and ease the learning of abstract concepts.

Les POOK. — **Flexagons inside out.** — Un vol. broché, 17,5×25, de XI, 170 p. — ISBN 0-521-52574-8 (relié: 0-521-81970-9). — Prix: £19.95 (relié: £55.00). — Cambridge University Press, Cambridge, 2003.

Flexagons are hinged polygons that have the intriguing property of displaying different pairs of faces when they are flexed. Workable paper models of flexagons are easy to make and entertaining to manipulate. Flexagons have a surprisingly complex mathematical structure and just how a flexagon works is not obvious on casual examination of a paper model. Flexagons may be appreciated at three different levels: firstly as toys or puzzles, secondly as a recreational mathematics topic and finally as the subject of serious mathematical study. This book is written for anyone interested in puzzles or recreational maths. No previous knowledge of flexagons is assumed, and the only prerequisite is some knowledge of elementary geometry. An attractive feature of the book is a collection of nets, with assembly instructions, for a wide range of paper models of flexagons. These are printed full size and laid out so they can be photocopied.

Judith D. SALLY, Paul J. SALLY, Jr. — **Trimathlon: a workout beyond the school curriculum.** — Un vol. broché, 20,5×25, de XIV, 250 p. — ISBN 1-56881-184-5. — Prix: US$30.00. — A. K. Peters, Natick, Massachusetts, 2003.

In this book you will find games, problems and investigations to flex your math muscles and give you a new perspective on mathematics. The guided activities are fun, interesting and challenging – you will be introduced to some truly heavy-weight mathematical ideas. The strenuous mental activity often required has as its reward the satisfaction and confidence that accompany meaningful investigations of mathematical ideas. All information needed to solve the problems (as well as hints and suggestions) is provided.

Goro SHIMURA. — **Collected papers.** — 4 vol. reliés, 17×25,5, de respectivement, 795, 831, 924, 754 p. — ISBN 0-387-95406-6 (vol. 1), 0-387-95417-1 (vol. 2), 0-387-95418-X (vol. 3), 0-387-95416-3 (vol. 4). — Prix: €169.00 (vol. 1,2,4) €179.00 (vol. 3). — Springer, New York, 2002-2003.

Contents Volume I: 1954-1965
A note on the normalization-theorem of an integral domain. — Reduction of algebraic varieties with respect to a discrete valuation of the basic field. — On complex multiplications. — La fonction [zêta] du corps des fonctions modulaires elliptiques. — Correspondances modulaires et les fonctions zêta de courbes algébriques. — Modules des variétés abéliennes polarisées et fonctions modulaires. — Fonctions automorphes et correspondances modulaires. — On the theory of automophic functions. — Sur les intégrales attachées aux formes automorphes. — On specializations of Abelian varieties (with Shoji Koizumi). — On vector differential forms attached to automorphic forms (with Michio Kuga). — On the zeta functions of the algebraic curves uniformized by certain automorphic functions. — On Dirichlet series and Abelian varieties attached to automorphic forms. — On the class-fields obtained by complex multiplication of Abelian varieties. — Arithmetic of alternating forms and quaternion Hermitian forms. — On analytic families of polarized Abelian varieties and automorphic

functions. — On the cohomology groups attached to certain vector valued differential forms on the product of the upper half planes (with Yozo Matsushima). — On modular correspondences for $Sp(n, \mathbf{Z})$ and their congruence relations. — On the fields of definition for fields of automorphic functions. — Arithmetic of unitary groups. — On the field of definition for a field of automorphic functions. — Class-fields and automorphic functions. — On purely transcendental fields of automorphic functions of several variables. — The zeta function of an algebraic variety and automorphic functions. — On the field of definition for a field of automorphic functions: II. — On the zeta function of a fibre variety whose fibres are Abelian varieties (with Michio Kuga). — A reciprocity law in non-solvable extensions. — Moduli and fibre systems of Abelian varieties. — On the field of definition for a field of automorphic functions: III. — Moduli of Abelian varieties and number theory.

Contents Volume II: 1967-1977

Discontinuous groups and Abelian varieties. — Construction of class fields and zeta functions of algebraic curves. — Number fields and zeta functions associated with discontinuous groups and algebraic varieties. — Algebraic number fields and symplectic discontinuous groups. — Algebraic varieties without deformation and the Chow variety. — An *l*-adic method in the theory of automorphic forms. — Local representations of Galois groups. — On canonical models of arithmetic quotients of bounded symmetric domains. — On canonical models of arithmetic quotients of bounded symmetric domains: II. — On arithmetic automorphic functions. — On the zeta-function of an Abelian variety with complex multiplication. — Class fields over real quadratic fields in the theory of modular functions. — On elliptic curves with complex multiplication as factors of the Jacobians of modular function fields. — On the field of rationality for an Abelian variety. — Class fields over real quadratic fields and Hecke operators. — On modular forms of half integral weight. — On the factors of the Jacobian variety of a modular function field. — On the trace formula for Hecke operators. — On the holomorphy of certain Dirichlet series. — On the real points of an arithmetic quotient of a bounded symmetric domain. — On some arithmetic properties of modular forms of one and several variables. — On the Fourier coefficients of modular forms of several variables. — Theta functions with complex multiplication. — The special values of the zeta functions associated with cusp forms. — On Abelian varieties with complex multiplication. — Unitary groups and theta functions. — On the derivatives of theta functions and modular forms. — On the periods of modular forms.

Contents Volume III: 1978-1988

On certain reciprocity-laws for theta functions and modular forms. — The arithmetic of automorphic forms with respect to a unitary group. — The special values of the zeta functions associated with Hilbert modular forms. — Automorphic forms and the periods of Abelian varieties. — On some problems of algebraicity. — The arithmetic of certain zeta functions and automorphic forms on orthogonal groups. — The critical values of certain zeta functions associated with modular forms of half-integral weight. — On certain zeta functions attached to two Hilbert modular forms: I. The case of Hecke characters. — On certain zeta functions attached to two Hilbert modular forms: II. The case of automorphic forms on a quaternion algebra. — Arithmetic of differential operators on symmetric domains. — Models of an Abelian variety with complex multiplication over small fields. — The periods of certain automorphic forms of arithmetic type. — Confluent hypergeometric functions on tube domains. — Algebraic relations between critical values of zeta functions and inner products. — On Eisenstein series. — Differential operators and the singular values of Eisenstein series. — On differential operators attached to certain representations of classical groups. — On Eisenstein series of half-integral weight. — On the Eisenstein series of Hilbert modular groups. — On a class of nearly holomorphic automorphic forms. — Nearly holomorphic

functions on Hermitian symmetric spaces. — On Hilbert modular forms of half-integral weight. — On the critical values of certain Dirichlet series and the periods of automorphic forms.

Contents Volume IV: 1989-2001

Yutaka Taniyama and his time. — L-functions and eigenvalue problems. — Invariant differential operators on Hermitian symmetric spaces. — On the fundamental periods of automorphic forms of arithmetic type. — The critical values of certain Dirichlet series attached to Hilbert modular forms. — On the transformation formulas of theta series. — On the Fourier coefficients of Hilbert modular forms of half-integral weight. — Fractional and trigonometric expressions for matrices. — Euler products and Fourier coefficients of automorphic forms on symplectic groups. — Differential operators, holomorphic projection, and singular forms. — Eisenstein series and zeta functions on symplectic. — Zeta functions and Eisenstein series on metaplectic groups. — Convergence of zeta functions on symplectic and metaplectic groups. — Response. — Zeta functions and Eisenstein series on classical groups. — An exact mass formula for orthogonal groups. — The number of representations of an integer by a quadratic form. — Generalized Bessel functions on symmetric spaces. — Some exact formulas on quaternion unitary groups. — André Weil as I knew him. — Arithmeticity of Dirichlet series and automorphic forms on unitary groups. — The relative regulator of an algebraic number field.

Qi-Xiao YE, W. BLUM, S. K. HOUSTON, Qi-Yuan JIANG. — **Mathematical modelling in education and culture: ICTMA 10**. — Un vol. relié, 16×24, de XII, 330 p. — ISBN 1-904275-05-2. —Prix: £40.00. — Horwood Publishing, Chichester, 2003.

The "mathematical modelling" movement in mathematics education both at school and university level has now been influencing curricula for about 20 years. Mathematics lecturers will find here useful material to enhance their teaching and extracurricular activities and educators will find innovative ideas to inform their course design and to focus their research, while students will find interesting problems to explore. The book contains contributions by international lecturers, researchers and educators recording the latest thinking and research, and demonstrates how the movement is influencing the culture of mathematics teaching in China.

Histoire

H.-W. ALTEN, A. DJAFARI NAINI, M. FOLKERTS, H. SCHLOSSER, K.-H. SCHLOTE, H. WUSSING. — **4000 Jahre Algebra: Geschichte, Kulturen, Menschen.** — Von Zählstein zum Computer. — Un vol. relié, 16×24, de XIV, 653 p. — ISBN 3-540-43554-9. — Prix: €39.95. — Springer, Berlin, 2003.

Der Name Algebra entstand aus dem Buchtitel des persischen Gelehrten al-Chorezmi, dessen Namen als Algorithmus den Rechenvorgang in modernen Computern beschreibt. So spannt sich der Bogen von den Anfängen der Algebra vor 4000 Jahren über ihre Entwicklung durch islamische Gelehrte des Mittelalters, Rechenmeister der Renaissance und Forscher der Neuzeit bis hin zur abstrakten Theorie algebraischer Strukturen und der Computeralgebra. Zeit- und kulturgeschichtliche Tabellen führen in die jeweilige Epoche ein, die Zusammenstellung der wesentlichen Inhalte und Aufgaben schliessen jedes Kapitel ab. Kulturhistorische und biographische Details sowie viele Abbildungen durchziehen und begleiten den Text.

Arild Stubhaug. — **Niels Henrik Abel et son époque.** — Traduit par Patricia Chwat et Nicolas Puech. — Un vol. broché, 15,5×23,5, de xii, 463 p. — ISBN 2-287-59746-8. — Prix: € 53.03. — Springer, Paris, 2004.

L'auteur nous relate le destin singulier de Niels Henrik Abel (1802-1829), qui fut l'un des plus grands génies des mathématiques, en le replaçant dans le contexte culturel et politique de l'époque. Au cours d'une vie exceptionnellement brève et fertile, ce jeune Norvégien résout un problème séculaire et ouvre de nouvelles voies. En compagnie d'Abel et de ses amis, le lecteur est invité à parcourir la Norvège et une grande partie de l'Europe du XIXe siècle. Il se rend au théâtre, croise Hegel, fréquente des salons littéraires, attend l'avis de l'Académie des sciences à Paris, rencontre les grands mathématiciens. En cette période troublée, il assiste à l'évolution politique de la Norvège qui s'affranchit de la tutelle danoise pour jeter les fondations de son indépendance. Abel meurt de tuberculose, criblé de dettes, sans avoir obtenu un poste digne de son talent. L'Académie des sciences lui décerne un grand prix à titre posthume. En 1902, la Norvège lui rend un hommage national. L'année 2002 voit la création du prix Abel décerné tous les ans au plus grand mathématicien et destiné à pallier l'absence de prix Nobel dans la discipline.

Logique et fondements

Thomas Forster. — **Logic, induction and sets.** — London Mathematical Society student texts, vol. 56. — Un vol. broché, 15×23, de x, 234 p. — ISBN 0-521-53361-9 (relié: 0-521-82621-7). — Prix: £18.95 (relié: £50.00). — Cambridge University Press, Cambridge, 2003.

This is an introduction to logic and the axiomatization of set theory from a unique standpoint. Philosophical considerations, which are often ignored or treated casually, are here given careful consideration: furthermore, the author places the notion of inductively defined sets (recursive datatypes) at the center of his exposition, resulting in a treatment of well-established topics that is fresh and insightful. The presentation is engaging, but great care is always taken to illustrate difficult points. Understanding is also aided by the inclusion of many exercises. Little previous knowledge of logic is required of the reader, and only a background of standard undergraduate mathematics is assumed.

Analyse combinatoire

C.D. Wensley, (Editor). — **Surveys in combinatorics 2003.** — London Mathematical Society lecture note series, vol. 307. — Un vol. broché, 15×23, de vii, 370 p. — ISBN 0-521-54012-7. — Prix: £34.95. — Cambridge University Press, Cambridge, 2003.

The British Combinatorial Conference (BCC) is held every two years and is a key event for mathematicians worldwide working in combinatorics. In June 2003 the conference was held at the University of Wales, Bangor. The papers contained here are the surveys contributed by the invited speakers and are of the high quality that befits the event. — *Contents:* Norman Biggs: W.T. Tutte, 1917-2002. — L.D. Andersen and C.A. Rodger: Decompositions of complete graphs: embedding partial edge-colourings and the method of amalgamations. — Simon R. Blackburn: Combinatorial schemes for protecting digital content. — A.V. Borovik: Matroids and Coxeter groups. — D.M. Donovan, E.S. Mahmoodian, C. Ramsay and A.P. Street: Defining sets in combinatorics: a survey. — D. Ghinelli and D. Jungnickel: Finite projective planes with a large

Abelian group. — P. Hell: Algorithmic aspects of graph homomorphisms. — V. Kaibel and G.M. Ziegler: Counting lattices triangulations. — I. Leader: Partition regular equations. — K. Nelsen and A. Ram: Kostka-Foulkes polynomials and Macdonald spherical functions.

Théorie des nombres

Jean–Paul ALLOUCHE, Jeffrey SHALLIT. — **Automatic sequences: theory, applications, generalizations.** — Un vol. relié, 18×26, de XVI, 571 p. — ISBN 0-521-82332-3. — Prix: £37.50. — Cambridge University Press, Cambridge, 2003.

Uniting dozens of disparate results from different fields, this book combines concepts from mathematics and computer science to present the first integrated treatment of sequences generated by the simple model of computation called the finite automaton. The authors develop the theory of automatic sequences and their generalizations, such as Sturmian words and k-regular sequences. Further, they discuss applications to number theory (particularly formal power series and transcendence in finite characteristic), physics, computer graphics, and music. Results are presented from first principles where feasible, and the book is supplemented by a collection of 460 exercises, 85 open problems, and more than 1600 citations to the literature. Thus, this book is suitable for graduate students or advanced undergraduates, as well as for mature researchers wishing to know more about this fascinating subject.

Joseph BERNSTEIN, Stephen GELBART, (Editors). — **An introduction to the Langlands program.** — Un vol. broché, 15×23,5, de VIII, 281 p.— ISBN 0-8176-3211-5. — Prix: SFr. 72.00. — Birkhäuser, Basel, 2003.

This monograph presents a broad, user-friendly introduction to the Langlands program, that is, the theory of automorphic forms and its connection with the theory of L-functions and other fields of mathematics. — *Key features:* Basic zeta function of Riemann and its generalizations to Dirichlet and Hecke L-function, class field theory and some topics on classical automorphic functions (E. Kowalski). — A study of the conjectures of Artin and Shimura-Taniyama-Weil (E. de Shalit). — An examination of classical modular (automorphic) L-functions as $GL(2)$ functions, bringing into play the theory of representations (S. Kudla). — Selberg's theory of the trace formula, which is a way to study automorphic representations (D. Bump). — Discussion of cuspidal automorphic representations of $GL(2)$ leads to Langlands theory for $GL(n)$ and the importance of the Langlands dual group (J. Cogdell). — An introduction to the geometric Langlands program, a new and active area of research that permits using powerful methods of algebraic geometry to construct automorphic sheaves (D. Gaitsgory).

Shigeru KANEMITSU, Chaohua JIA, (Editor). — **Number theoretic methods: future trends.** — Developments in mathematics, vol. 8. — Un vol. relié, 16,5×24,5, de X, 439 p. — ISBN 1-4020-1080-X. — Prix: € 173.00. — Kluwer, Dordrecht, 2003.

This volume contains the proceedings of the very successful second China-Japan Seminar held in Iizuka, Fukuoka, Japan, during March 12-16, 2001 under the support of the Japan Society for the Promotion of Science (JSPS) and the National Science Foundation of China (NSFC), and some invited papers of eminent number-theorists who visited Japan during 1999-2001 at the occasion of the Conference at the Research Institute of Mathematical Science (RIMS), Kyoto University. The book, in keeping with the spirit of the earlier volume, *Number Theory and its Applications* (Developments in mathematics, vol. 4), presents various topics in number theory from current and future research in a unified manner with a collection of state-of-the-art research

as well as survey papers which provide the reader with an overview of past and future developments in the field.

Jeffrey STOPPLE. — **A primer of analytic number theory: from Pythagoras to Riemann.** — Un vol. broché, 15×23, de XIII, 383 p. — ISBN 0-521-01253-8 (relié: 0-521-81309). — Prix: US$35.00 (relié: US$95.00). — Cambridge University Press, Cambridge, 2003.

This undergraduate introduction to analytic number theory develops analytic skills in the course of a study of ancient questions on polygonal numbers, perfect numbers, and amicable pairs. The question of how the primes are distributed among all integers is central in analytic number theory. This distribution is determined by the Riemann zeta function, and Riemann's work shows how it is connected to the zeros of his function and the significance of the Riemann hypothesis. Starting from a traditional calculus course and assuming no complex analysis, the author develops the basic ideas of elementary number theory. The text is supplemented by a series of exercises to further develop the concepts and includes brief sketches of more advanced ideas, to present contemporary research problems at a level suitable for undergraduates.

Corps et polynômes

Leila SCHNEPS, (Editor). — **Galois groups and fundamental groups.** — Mathematical Sciences Research Institute publications, vol. 41. — Un vol. relié, 16,5×24, de XIV, 467 p. — ISBN 0-521-80831-6. — Prix: £50.00. — Cambridge University Press, Cambridge, 2003.

This book explores recent research underlining the remarkable connections between the algebraic and arithmetic world of Galois theory and the topological and geometric world of fundamental groups. B.H. Matzat and M. van der Put introduce differential Galois theory and solve the differential inverse Galois problem over global fields in positive characteristic; D. Harbater gives a comparative exposition of formal and rigid patching starting from the familiar complex case. S. Mochizuki discusses aspects of Grothendieck's famous anabelian geometry, while the articles by R. Guralnick, A. Tamagawa, and F. Pop and M. Saïdi investigate the structure of the fundamental groups of curves over different kinds of characteristic p fields. M. Imbert and L. Schneps study the structure of the Hurwitz spaces and moduli spaces of curves, which are of great importance to Galois theory because of the Galois action on their fundamental groups. The first interesting such group is $SL_2(\mathbf{Z})$, a family of special subgroups of which is studied by F. Bogomolov and Y. Tschinkel. Finally, R. Hain and M. Matsumoto present their result proving part of a conjecture by Deligne on the structure of the Lie algebra associated to the Galois action on the fundamental group of the thrice-punctured projective plane.

Géométrie algébrique

Igor DOLGACHEV. — **Lectures on invariant theory**. — London Mathematical Society lecture note series, vol. 296 — Un vol. broché, 15×23, de XVI, 220 p. — ISBN 0-521-52548-5 — Prix: £29.95. — Cambridge University Press, Cambridge, 2003.

The primary goal of this book is to give a brief introduction to the main ideas of algebraic and geometric invariant theory. It assumes only a minimal background in algebraic geometry, algebra and representation theory. Topics covered include the symbolic method for computation of invariants on the space of homogeneous forms, the problem of finite generatedness of the algebra of invariants, the theory of covariants and constructions of categorical and geometric quotients.

Throughout, the emphasis is on concrete examples which originate in classical algebraic geometry. A novel feature of the book is a discussion of possible linearizations of actions and the variation of quotients under the change of linearization. Also included is the construction of toric varieties as torus quotients of affine spaces.

Shigeru MUKAI. — **An introduction to invariants and moduli.** — Cambridge studies in advanced mathematics, vol. 81. — Un vol. relié, 16×23,5, de XII, 505 p. — ISBN 0-521-80906-1. — Prix: £65.00. — Cambridge University Press, Cambridge, 2003.

Incorporated in this volume are the first two books in Mukai's series on moduli theory. The notion of a moduli space is central to geometry. However, its influence is not confined there: for example, the theory of moduli spaces is a crucial ingredient in the proof of Fermat's last theorem. Researchers and graduate students working in areas ranging from Donaldson or Seiberg-Witten invariants to more concrete problems such as vector bundles on curves will find this to be a valuable resource. Among other things, this volume includes an improved presentation of the classical foundations of invariant theory that, in addition to geometers, will be useful to those studying representation theory. This translation gives an accurate account of Mukai's influential Japanese texts.

Alexander POLISHCHUK. — **Abelian varieties, theta functions and the Fourier transform.** — Cambridge tracts in mathematics, vol. 153. — Un vol. relié, 16×23, de XVI, 292 p. — ISBN 0-521-80804-9. — Prix: £47.50. — Cambridge University Press, Cambridge, 2003.

This book is a modern introduction to the theory of Abelian varieties and theta functions. Here the Fourier transform techniques play a central role, appearing in several different contexts. In transcendental theory, the usual Fourier transform plays a major role in the representation theory of the Heisenberg group, the main building block for the theory of theta functions. Also, the Fourier transform appears in the discussion of mirror symmetry for complex and symplectic tori, which are used to compute cohomology of holomorphic line bundles on complex tori. When developing the algebraic theory (in arbitrary characteristic), emphasis is placed on the importance of the Fourier-Mukai transform for coherent sheaves on Abelian varieties. In particular, it is used in the computation of cohomology of line bundles, in classification of vector bundles on elliptic curves, and proofs of Riemann and Torelli theorems for Jacobians of algebraic curves. Another subject discussed in the book is the construction of equivalences between derived categories of coherent sheaves on Abelian varieties, which follows the same pattern as the construction of intertwining operators between different realizations of the unique irreducible representation of the Heisenberg group.

Claire VOISIN. — **Hodge theory and complex algebraic geometry II.** — Cambridge studies in advanced mathematics, vol. 77. — Un vol. relié, 16×23,5, de IX, 351 p. — ISBN 0-521-80283-0. — Prix: £60.00. — Cambridge University Press, Cambridge, 2003.

The second volume of this modern account of Kaehlerian geometry and Hodge theory starts with the topology of families of algebraic varieties. Proofs of the Lefschetz theorem on hyperplane sections, the Picard-Lefschetz study of Lefschetz pencils, and Deligne's theorems on the degeneration of the Leray spectral sequence and the global invariant cycles follow. The second part is devoted to the variations of Hodge structures, the study of Hodge loci, and the introduction of infinitesimal invariants. It is illustrated by Griffiths' description of the variation of Hodge structures of hypersurfaces. The main results of this part are the generalised Noether-Lefschetz theorems, the generic triviality of the Abel-Jacobi maps, and most importantly Nori's connectivity theorem which generalises the above. The last part of the book is devoted to the relationships between Hodge theory and algebraic cycles. The generalised Mumford theorem is

proved and the main conjectures on the subject are stated. The proof of Bloch's conjecture is given for certain types of surfaces. The book concludes with the example of cycles on Abelian varieties, where some results of Bloch and Beauville, for example, are expounded. The text is complemented by exercises which provide useful results in complex algebraic geometry.

Anneaux et algèbres

Tomasz BRZEZINSKI, Robert WISBAUER. — **Corings and comodules.** — London Mathematical Society lecture note series, vol. 309. — Un vol. broché, 15×23, de X, 476 p. — ISBN 0-521-53931-5. — Prix: £37.95. — Cambridge University Press, Cambridge, 2003.

This is the first extensive treatment of the theory of corings and their comodules. In the first part, the module-theoretic aspects of coalgebras over commutative rings are described. Corings are then defined as coalgebras for noncommutative rings. Topics covered include: module-theoretic aspects of corings, such as the relation of comodules to special subcategories of the category of modules (sigma-type categories); connections between corings and extensions of rings; properties of new examples of corings associated to entwining structures; generalisations of bialgebras such as bialgebroids and weak bialgebras; and the appearance of corings in noncommutative geometry.

Antonio GIAMBRUNO, Amitai REGEV, Mikhail ZAICEV, (Editors). — **Polynomial identities and combinatorial methods.** —Lecture notes in pure and applied mathematic, vol. 235. — Un vol. broché, 18×25, de IX, 421 p. — ISBN 0-8247-4051-3. — Prix: US$175.00. — Marcel Dekker, New York, 2003.

Presenting a wide range of perspectives on topics ranging from ring theory and combinatorics to invariant theory and associative algebras, this reference covers current breakthroughs and strategies impacting research on polynomial identities – identifying new concepts in algebraic combinatorics, invariant and representation theory, and Lie algebras and superalgebras for novel studies in the field. It provides intensive discussions on various methods and techniques relating the theory of polynomial identities to other branches of algebraic study. The book examines Hopf algebras and quantum polynomials... free algebras and Scheier varieties... group-graded algebras... combinatorics of Young diagrams... Lie and Leibniz algebras... the theory of superalgebras... exponential functions and growth of varieties... group actions... and Poincaré series and Schur functions.

W. Keith NICHOLSON, Mohamed F. YOUSIF. — **Quasi-Frobenius rings.** — Cambridge tracts in mathematics, vol. 158. — Un vol. relié, 16×24, de XVII, 307 p. — ISBN 0-521-81593-2. — Prix: £55.00. — Cambridge University Press, Cambridge, 2003.

This book makes no attempt to be encyclopedic but provides an elementary account of the basic facts about these rings at a level allowing researchers and graduate students to gain entry to the field. Many earlier results about self-injective rings are extended to the much wider class of mininjective rings; the methods used unify and simplify what is known in the area and so bring the reader up to current research. Sufficient background knowledge can be found in standard texts on noncommutative rings. However, appendices on Morita equivalence; on perfect, semiperfect, and semiregular rings; and on the Camps-Dicks theorem are included to make the book self-contained. After the basic results are established, recent work is reviewed on three open problems in the field (the Faith conjecture, the FGF-conjecture, and the Faith-Menal conjecture). Some new results are provided, and new and old methods for attacking these problems are outlined in an easily accessible format.

Jerzy WEYMAN. — **Cohomology of vector bundles and syzygies.** — Cambridge tracts in mathematics, vol. 149. — Un vol. relié, 16 × 23, de XIV, 371 p. — ISBN 0-521-62197-6. — Prix: £55.00. — Cambridge University Press, Cambridge, 2003.

The central theme of this book is an exposition of the geometric technique of calculating syzygies. It is written from the point of view of commutative algebra; without assuming any knowledge of representation theory, the calculation of syzygies of determinantal varieties is explained. The starting point is a definition of Schur functors, and these are discussed from both an algebraic and a geometric point of view. Then a chapter on various versions of Bott's theorem leads to a careful explanation of the technique itself, based on a description of the direct image of a Koszul complex. Applications to determinantal varieties follow. There are also chapters on applications of the technique to rank varieties for symmetric and skew symmetric tensors of arbitrary degree, closures of conjugacy classes of nilpotent matrices, discriminants, and resultants. Numerous exercises are included to give the reader insight into how to apply this important method.

K-*théorie*

Guido MISLIN, Alain VALETTE. — **Proper group actions and the Baum-Connes conjecture.** — Advanced courses in mathematics, CRM Barcelona. — Un vol. broché, 17 × 24, de VII, 131 p. — ISBN 3-7643-0408-1. — Prix: SFr. 44.00. — Birkhäuser, Basel, 2003.

This book contains a concise introduction to the techniques used to prove the Baum-Connes conjecture. The Baum-Connes conjecture predicts that the K-homology of the reduced C*-algebra of a group can be computed as the equivariant K-homology of the classifying space for proper actions. The approach is expository, but it contains proofs of many basic results on topological K-homology and the K-theory of C*-algebras. It features a detailed introduction to Bredon homology for infinite groups, with applications to K-homology. It also contains a detailed discussion of naturality questions concerning the assembly map, a topic not well documented in the literature.

Théorie des groupes et généralisations

Jung Rae CHO, Jens MENNICKE, (Editors). — **Recent advances in group theory and low-dimensional topology.** — Research and exposition in mathematics, vol. 27. — Un vol. broché, 17 × 24, de 181 p. — ISBN 3-88538-227-X. — Prix: € 30.00. — Heldermann Verlag, Lemgo, 2003.

This volume presents a selection of worked-out lectures that were held at the 2nd German-Korean Workshop on Algebra and Topology which took place at Pusan, Korea, in August 2000. The papers present surveys and new results that have not been published elsewhere. — *Contents:* P. Ackermann, M. Näätänen, G. Rosenberger: The arithmetic Fuchsian groups with signature $(0; 2,2,2,q)$. — R. Brown, M. Bullejos, T. Porter: Crossed complexes, free crossed resolutions and graph products of groups. — C.M. Campbell, P.P. Campbell, B.T.K. Hopson, E.F. Robertson: On the efficiency of direct powers of $PGL(2p)$. — D.A. Derevnin, Ann Chi Kim: The Coxeter prism in H^3. — D. Hennig, G. Rosenberger: Recent developments in the theory of Fuchsian and Kleinian groups. — Ann Chi Kim, Yangkok Kim: On generalized Whitehead links and 3-manifolds. — Jae-Ryong Kim, Moo Ha Woo: Topology fields and fixed points of flows. — E. Kudryavtseva, R. Weidmann, H. Zieschang: Quadratic equations in free groups and topological applications. — A. Mednykh, A. Vesnin: Colourings of polyhedra and hyperelliptic

3-manifolds. — J. Mennicke: Linear groups over rings of integers. — Ch. Menzel, J.R. Parker: Pseudo-Anosov diffeomorphisms of the twice punctured torus. — M. Mulazzani: 3-manifolds with cyclic symmetry and (1,1)-knots. — A. Szczepański: Holonomy groups of crystallographic groups with finite outer automorphism groups. — K.-I. Tahara: Survey on dimension subgroup problem.

Groupes topologiques; groupes et algèbres de Lie

Brian C. HALL. — **Lie groups, Lie algebras, and representations: an elementary introduction.** — Graduate texts in mathematics, vol. 222. — Un vol. relié, 16×24, de XIV, 351 p. — ISBN 0-387-40122-9. — Prix: € 64.95. — Springer, New York, 2003.

This book addresses Lie groups, Lie algebras, and representation theory. In order to keep the prerequisites to a minimum, the author restricts attention to matrix Lie groups and Lie algebras. This approach keeps the discussion concrete, allows the reader to get to the heart of the subject quickly, and covers all the most interesting examples. The book introduces the often-intimidating machinery of roots and the Weyl group in a gradual way, using examples and representation theory as motivation. The first part of the text covers Lie groups and Lie algebras and the relationship between them, along with basic representation theory. The second covers the theory of semisimple Lie groups and Lie algebras, beginning with a detailed analysis of the representations of SU(3). The author illustrates the general theory with numerous images pertaining to Lie algebras of rank two and rank three, including images of root systems, lattices of dominant integral weights, and weight diagrams. This book is sure to become a standard textbook for graduate students in mathematics and physics with little or no prior exposure to Lie theory.

Shrawan KUMAR. — **Kac-Moody groups, their flag varieties and representation theory.** — Progress in mathematics, vol. 204. — Un vol. relié, 16,5×24, de XIII, 606 p. — ISBN 0-8176-4227-7. — Prix: € 159.00. — Birkhäuser, Boston, 2002.

Kac-Moody (K-M) groups are a standard tool in mathematics and mathematical physics having undergone tremendous developments in various directions over the last decades. K-M theory has indeed made profound connections with such diverse areas as number theory, combinatorics, topology, moduli of vector bundles, singularities, quantum groups, completely integrable systems, and mathematical physics. — *Key features:* A comprehensive, well-written exposition of K-M theory, moving the reader in a systematic fashion from K-M Lie algebras to the broader group setting; in particular, the algebro-geometric, topological and representation-theoretic aspects of K-M theory are treated. — No prior knowledge of K-M Lie algebras or of (finite-dimensional) algebraic groups is required. — Several examples, an extensive bibliography, and thorough index. — Numerous exercises, some with hints, at the end of each section. — Challenging open problems. — A self-contained text containing material not available elsewhere in book form.

Fonctions d'une variable complexe

Mark J. ABLOWITZ, Athanassios S. FOKAS. — **Complex variables: introduction and applications.** — Second edition. — Cambridge texts in applied mathematics. — Un vol. broché, 15×23, de XII, 647 p. — ISBN 0-521-53429-1. — Prix: £ 29.95. — Cambridge University Press, Cambridge, 2003.

Part I of this text provides an introduction to the subject, including analytic functions, integration, series, and residue calculus. It also includes transform methods, ordinary differential

equations in the complex plane, numerical methods, and more. Part II contains conformal mappings, asymptotic expansions, and the study of Riemann-Hilbert problems. The authors also provide an extensive array of applications, illustrative examples, and homework exercises. The new edition has been improved throughout and is ideal for use in introductory undergraduate level courses in complex variables.

John Mackintosh HOWIE. — **Complex analysis.** — Springer undergraduate mathematics series. — Un vol. broché, 18×24, de XI, 260 p. — ISBN 1-85233-733-8. — Prix: €29.95. — Springer, London, 2003.

This book takes account of the varying needs and backgrounds and provides a self-study text for students in mathematics, science and engineering. Beginning with a summary of what the student needs to know at the outset, it covers all the topics likely to feature in a first course in the subject, including: complex numbers, differentiation, integration, Cauchy's theorem and its consequences, applications of contour integration, Laurent series and the residue theorem, conformal mappings and harmonic functions. A brief final chapter explains the Riemann hypothesis, the most celebrated of all the unsolved problems in mathematics, and ends with a short descriptive account of iteration, Julia sets and the Mandelbrot set. Clear and careful explanations are backed up with worked examples and more than 100 exercises, for which full solutions are provided.

Fonctions de plusieurs variables complexes

James CARLSON, Stefan MÜLLER-STACH, Chris PETERS. — **Period mappings and period domains.** — Cambridge studies in advanced mathematics, vol. 85. — Un vol. relié, 16×23,5, de XVI, 430 p. — ISBN 0-521-81466-9. — Prix: £65.00. — Cambridge University Press, Cambridge, 2003.

The basic theory as developed by Griffiths is explained in the first part of the book. Then, in the second part spectral sequences and Koszul complexes are introduced and are used to derive results about cycles on higher dimensional algebraic varieties such as the Noether-Lefschetz theorem and Nori's theorem. Finally, in the third part differential geometric methods are explained leading up to proofs of Arakelov-type theorems, the theorem of the fixed part, the rigidity theorem, and more. Higgs bundles and relations to harmonic maps are discussed, and this leads to striking results such as the fact that compact quotients of certain period domains can never admit a Kähler metric or that certain lattices in classical Lie groups can't occur as the fundamental group of a Kähler manifold.

Ian GRAHAM, Gabriela KOHR. — **Geometric function theory in one and higher dimensions.** — Monographs and textbooks in pure and applied mathematics, vol. 255. — Un vol. relié, 15,5×23,5, de XV, 530 p. — ISBN 0-8247-0976-4. — Prix: US$185.00. — Marcel Dekker, New York, 2003.

This text/reference is the first book to combine classical results in univalent complex function theory and generalizations of these results to several complex variables. It presents a unique overview of current progress in the field, including the authors' personal research detailing valuable results that lead to improvements in existence theorems for the Loewner differential equation in higher dimensions. Focusing on growth, distortion, covering theorems, and coefficient estimates, this book discusses the compactness of the analog of the Carathéodory class in several variables... offers a detailed study of Loewner chains in one variable and in several variables... studies various classes of univalent mappings according to their geometrical

definitions... examines the theory of linear-invariant families on the Euclidean unit ball and the polydisc... introduces the infinite-dimensional theory of univalent mappings... and provides numerous exercises in each chapter.

Équations différentielles ordinaires

William E. BOYCE, Richard C. DIPRIMA. — **Équations différentielles.** — Adaptation française: Richard LABONTÉ, avec la collaboration de Fernand BAUDET, traduction de l'américain: Louise DUROCHER. — Un vol. broché, 21×27,5, de x, 630 p. — ISBN 2-89461-715-1. — Prix: SFr. 110.50. — Chenelière/McGraw-Hill, Montréal, 2002, diffusé par Servidis, Lonay, Suisse.

Avant-propos: Cet ouvrage a été rédigé du point de vue du mathématicien dont l'intérêt pour les équations différentielles peut être soit théorique, soit pratique, soit quelque part entre les deux. Nous avons cherché à combiner un exposé solide et précis (mais non abstrait) de la théorie élémentaire des équations différentielles avec beaucoup d'accent sur les méthodes de résolution, l'analyse et l'approximation des solutions. Ce manuel s'adresse d'abord aux étudiants de premier cycle en mathématiques, en sciences ou en ingénierie... Le préalable essentiel est la connaissance pratique du calcul différentiel et intégral acquise durant un cours de deux ou trois semestres ou l'équivalent... un bon manuel doit pouvoir être adapté à diverses stratégies d'enseignement. Cela implique au moins deux choses. Premièrement, le professeur doit pouvoir choisir les sujets qu'il désire traiter et l'ordre dans lequel il souhaite enseigner cette matière. Deuxièmement, le manuel doit être utile aux étudiants qui ont accès à une grande variété de technologies. Le présent manuel permet cette souplesse car nous nous sommes efforcés dans la mesure du possible de rendre chaque chapitre indépendant les uns des autres...

Équations aux dérivées partielles

Yu. Ya. BELOV. — **Inverse problems for partial differential equations.** — Inverse and ill-posed problems series. — Un vol. relié, 16×24,5, de VIII, 211 p. — ISBN 90-6764-358-0. — Prix: € 128.00. — VSP, Utrecht, 2002.

This monograph is devoted to identification problems of coefficients in equations of mathematical physics. It investigates the existence and uniqueness of the solutions for identification coefficient problems in parabolic and hyperbolic equations and equation systems of composite type. It includes a study on the problems with Cauchy data and equations in which the Fourier transform with respect to the chosen variable is supposed to occur. Differential properties of solutions for direct problems and their behaviour under great values of time are studied on the basis of solution properties for direct problems. In addition, identification problems with one or two unknown coefficients are investigated.

Systèmes dynamiques et théorie ergodique

R. Daniel MAULDIN, Mariusz URBAŃSKI. — **Graph directed Markov systems: geometry and dynamics of limit sets.** — Cambridge tracts in mathematics, vol. 148. — Un vol. relié, 16×23, de XI, 281 p. — ISBN 0-521-82538-5. — Prix: £37.50. — Cambridge University Press, Cambridge, 2003.

The main focus of this book is the exploration of the geometric and dynamic properties of a far reaching generalization of a conformal iterated function system – a graph directed Markov

system. These systems are very robust in that they apply to many settings that do not fit into the scheme of conformal iterated systems. The basic theory is laid out here and the authors have touched on many natural questions arising in its context. However, they also emphasize the many issues and current research topics which can be found in original papers, for example the detailed analysis of the structure of harmonic measures of limit sets, the examination of the doubling property of conformal measures, the extensive study of generalized polynomial-like mapping or multifractal analysis of geometrically finite Kleinian groups.

Yuri B. SURIS. — **The problem of integrable discretization: Hamiltonian approach.** — Progress in mathematics, vol. 219. — Un vol. relié, 17×24, de XXI, 1070 p. — ISBN 3-7643-6995-7. — Prix: SFr. 228.00. — Birkhäuser, Basel, 2003.

The book explores the theory of discrete integrable systems, with an emphasis on the following general problem: how to discretize one or several of independent variables in a given integrable system of differential equations, maintaining the integrability property? This question (related in spirit to such a modern branch of numerical analysis as geometric integration) is treated in the book as an immanent part of the theory of integrable systems, also commonly termed as the theory of solitons. Among several possible approaches to this theory, the Hamiltonian one is chosen as the guiding principle. A self-contained exposition of the Hamiltonian (r-matrix, or "Leningrad") approach to integrable systems is given, culminating in the formulation of a general recipe for integrable discretization of r-matrix hierarchies. The book is a kind of encyclopedia on discrete integrable systems. It unifies the features of a research monograph and a handbook. It is supplied with an extensive bibliography (about 700 items).

Approximations et développements en série

Carlo BARDARO, Julian MUSIELAK, Gianluca VINTI. — **Nonlinear integral operators and applications.** — De Gruyter series in nonlinear analysis and applications, vol. 9. — Un vol. relié, 17,5×24,5, de XII, 201 p. — ISBN 3-11-017551-7. — Prix: €88.00. — Walter de Gruyter, Berlin, 2003.

This book represents the first attempt at a comprehensive treatment of approximation theory by means of nonlinear integral operators in function spaces. In particular, the fundamental notions of approximate identity for kernels of nonlinear operators and a general concept of modulus of continuity are developed in order to obtain consistent approximation results. Applications to nonlinear summability, nonlinear integral equations and nonlinear sampling theory are given. In particular, the study of nonlinear sampling operators in various function spaces is important since the results permit the processing of several classes of signals. In a wider context, the material of this book represents a starting point for new areas of research in nonlinear analysis. For this reason the text is written in a style accessible not only to researchers but to advanced students as well.

Manfred REIMER. — **Multivariate polynomial approximation.** — International series of numerical mathematics, vol. 144. — Un vol. relié, 17×24, de X, 358 p. — ISBN 3-7643-1638-1. — Prix: SFr. 156.00. — Birkhäuser, Basel, 2003.

The book begins with an introduction to the general theory by presenting the most important facts on multivariate interpolation, quadrature, orthogonal projections and their summation, all treated under a constructive view, and embedded in the theory of positive linear operators. On this background, the book gives the first comprehensive introduction to the recently developed theory of generalized hyperinterpolation, which is a positive discrete polynomial approximation

method, combining reasonable cost and uniform convergence, in particular cases at the best possible approximation order. The theory is established first on the sphere under an intrinsic asymptotic investigation of the node and weight distribution of positive quadratures. Then it is carried over to the balls of lower dimension by an identification of certain Laplace and Appell series. As an application, the book gives a quick introduction to tomography and even a view on the k-plane transform.

Analyse de Fourier, analyse harmonique abstraite

Anders VRETBLAD. — **Fourier analysis and its applications.** — Graduate texts in mathematics, vol. 223. — Un vol. relié, 16×24, de XI, 269 p. — ISBN 0-387-00836-5. — Prix : € 64.95. — Springer, New York, 2003.

This book presents the basic ideas in Fourier analysis and its applications to the study of partial differential equations. It also covers the Laplace and zeta transformations and the fundaments of their applications. The author has intended to make his exposition accessible to readers with a limited background, for example, those not acquainted with the Lebesgue integral or with analytic functions of a complex variable. At the same time, he has included discussions of more advanced topics such as the Gibbs phenomenon, distributions, Sturm-Liouville theory, Cesaro summability, and multidimensional Fourier analysis, topics that one usually will not find in books at this level.

Analyse fonctionnelle

Pierre LÉVY-BRUHL. — **Introduction à la théorie spectrale: cours et exercices corrigés, master 1re et 2e années, agrégation.** — Sciences sup. — Un vol. broché, 17×24, de X, 190 p. — 2-10-007072-X. — Prix : € 28.00. — Dunod, Paris, 2003.

La théorie spectrale, branche essentielle de l'analyse fonctionnelle, s'applique tant en mathématiques pures et appliquées, qu'en physique et en chimie. Destiné principalement aux étudiants, mais également aux chercheurs opérant dans d'autres branches des mathématiques, cet ouvrage présente les outils mathématiques de la théorie spectrale: passage de la dimension finie à la dimension infinie pour des opérateurs linéaires continus, théorie des opérateurs compacts et traçables, diverses formes du théorème spectral, théorie des opérateurs auto-adjoints non bornés (avec une étude détaillée du théorème spectral et de nombreux exemples reposant sur l'équation de Schrödinger). De nombreux exemples et des exercices d'application corrigés illustrent le cours.

Gilles PISIER. — **Introduction to operator space theory.** — London Mathematical Society lecture note series, vol. 294. — Un vol. broché, 15,5×23, de VII, 478 p. — ISBN 0-521-81165-1. — Prix : £ 39.95. — Cambridge University Press, Cambridge, 2003.

The theory of operator spaces is very recent and can be described as a non-commutative Banach space theory. An "operator space" is simply a Banach space with an embedding into the space *B(H)* of all bounded operators on a Hilbert space *H*. The first part of this book is an introduction with emphasis on examples that illustrate various aspects of the theory. The second part is devoted to applications to C^*-algebras, with a systematic exposition of tensor products of C^*-algebras. The third (and shortest) part of the book describes applications to non-self-adjoint operator algebras and similarity problems. In particular, the author's counterexample to the "Halmos problem" is presented, as well as work on the new concept of "length" of an operator algebra.

Théorie des opérateurs

G. BELITSKII, V. TKACHENKO. — **One-dimensional functional equations.** — Operator theory: advances and applications, vol. 144. — Un vol. relié, 17×24, de XIV, 206 p. — ISBN 3-7643-0084-1. — Prix: SFr. 156.00. — Birkhäuser, Basel, 2003.

This monograph is devoted to the study of functional equations with the transformed argument on the real line and on the unit circle. Such equations systematically arise in dynamical systems, differential equations, probabilities, singularities of smooth mappings, and other areas. The purpose of the book is to present modern methods and new results in the subject, with an emphasis on a connection between local and global solvability. The general concepts developed in the book are applicable to multidimensional functional equations. Some of the methods are presented for the first time in the monograph literature, in particular, a functional parametrization of local mappings, the gluing of local solutions, and a decomposition method.

Reinhard MENNICKEN, Manfred MÖLLER. — **Non-self-adjoint boundary eigenvalue problems.** — North-Holland mathematics studies, vol. 192. — Un vol. relié, 17×24,5, de XVIII, 500 p. — ISBN 0-444-51447-3. — Prix: € 105.00. — Elsevier, Amsterdam, 2003.

This monograph provides a comprehensive treatment of expansion theorems for regular systems of first order differential equations and n-th order ordinary differential equations. In 10 chapters and one appendix, it provides a comprehensive treatment from abstract foundations to applications in physics and engineering. The focus is on non-self-adjoint problems. Bounded operators are associated to these problems, and Chapter 1 provides an in depth investigation of eigenfunctions and associated functions for bounded Fredholm valued operators in Banach spaces. Since every n-th order differential equation is equivalent to a first order system, the main techniques are developed for systems. Asymptotic fundamental systems are derived for a large class of systems of differential equations. Together with boundary conditions, which may depend polynomially on the eigenvalue parameter, this leads to the definition of Birkhoff and Stone regular eigenvalue problems. An effort is made to make the conditions relatively easily verifiable... the contour integral method and estimates of the resolvent are used to prove expansion theorems. For Stone regular problems, not all functions are expandable, and again relatively easily verifiable conditions are given, in terms of auxiliary boundary conditions, for functions to be expandable. The last chapter deals exclusively with applications.

Calcul des variations et contrôle optimal

Gerhard-Wilhelm WEBER. — **Generalized semi-infinite optimization and related topics.** — Research and exposition in mathematics, vol. 29. — Un vol. broché, 17×24, de 361 p. — ISBN 3-88538-229-6. — Prix: € 40.00. — Heldermann Verlag, Lemgo, 2003.

A very general class of nonlinear programming programs became of increasing interest in the last years. The interest of the author focuses on these so-called generalized semi-infinite optimization problems. He studies basic properties and unfolding iterative concepts for approximately solving them and applies insight and methods to related problems from optimal control and discrete optimization. — *Contents:* Representations and optimality. — Topological and stability properties. — Concepts of iteration procedures. — Optimal control and discrete mathematics.

Géométrie

Pascal DUPONT. — **Introduction à la géométrie: géométrie linéaire & géométrie différentielle.** — Préface de Marcel Berger. — Un vol. broché, 18×25, de 691 p. — ISBN 2-8041-4072-5. — Prix: €64.95. — De Boeck Université, Bruxelles, 2002, diffusé par Servidis, Lonay, Suisse.

Destiné aux étudiants et aux professeurs du premier cycle en sciences mathématiques et physiques, cet ouvrage présente trois importantes structures géométriques: espaces affines, espaces euclidiens, espace projectifs et quatre types d'êtres géométriques fondamentaux: quadriques, courbes, surfaces, arcs riemanniens. Les trois premiers chapitres abordent, entre autres thèmes, les sous-espaces, les transformations préservant la structure, l'introduction des coordonnées. D'autres sujets évoqués sont les barycentres, les similitudes, les produits mixte et vectoriel, les coordonnées sphériques, le principe de dualité, le birapport... le chapitre 4 étudie les quadriques d'un point de vue affine d'abord, euclidien ensuite, projectif enfin. Une attention particulière est accordée aux coniques ainsi qu'aux quadriques de l'espace tridimensionnel. Dans les trois derniers chapitres, le principal outil de travail est le calcul différentiel. Courbes et surfaces sont étudiées d'abord pour leurs propriétés affines (tangentes ou plan tangent, asymptotes, enveloppes...) et ensuite pour leurs propriétés métriques (longueur ou aire, normale, courbure(s)...). L'objectif du dernier chapitre est, non pas véritablement d'introduire la géométrie riemannienne, mais de familiariser le lecteur à son langage et à son mode de pensée. Chaque notion est illustrée de multiples exemples et contre-exemples. Plus de 600 exercices et problèmes sont proposés, la plupart avec solutions.

Géométrie différentielle

Michèle AUDIN, Ana CANNAS DA SILVA, Eugen LERMAN. — **Symplectic geometry of integrable Hamiltonian systems.** — Advanced courses in mathematics, CRM Barcelona. — Un vol. broché, 17×24, de x, 225 p. — ISBN 3-7643-2167-9. — Prix: SFr. 48.00. — Birkhäuser, Basel, 2003.

Among all the Hamiltonian systems, the *integrable* ones – those which have many conserved quantities – have special geometric properties; in particular, their solutions are very regular and quasi-periodic. The quasi-periodicity of the solutions of an integrable system is a result of the fact that the system is invariant under a (semi-global) torus action. It is thus natural to investigate the symplectic manifolds that can be endowed with a (global) torus action. This leads to symplectic toric manifolds which are examples of extremely symmetric Hamiltonian systems. Physics makes a surprising come-back to describe mirror symmetry, one looks for a special kinds of Lagrangian submanifolds and integrable systems, the special Lagrangians. Furthermore, integrable Hamiltonian systems on punctured cotangent bundles are a starting point for the study of contact toric manifolds (part C of this book). Along the way, tools from many different areas of mathematics are brought to bear on the questions at hand, in particular, actions of Lie groups in symplectic and contact manifolds, the Delzant theorem, Morse theory, sheaves and Čech cohomology, and aspects of Calabi-Yau manifolds.

Marcel BERGER. — **A panoramic view of Riemannian geometry.** — Un vol. relié, 16×24, de XXIII, 824 p. — ISBN 3-540-65317-1. — Prix: €59.95.— Springer, Berlin, 2003.

Riemannian geometry has today become a vast and important subject. This new book of Marcel Berger sets out to introduce readers to most of the living topics of the field and convey them quickly to the main results known to date. These results are stated without detailed proofs but the main ideas involved are described and motivated. This enables the reader to obtain a sweeping panoramic view of almost the entirety of the field. However, since a Riemannian

manifold is, even initially, a subtle object, appealing to highly non-natural concepts, the first three chapters devote themselves to introducing the various concepts and tools of Riemannian geometry in the most natural and motivating way, following in particular Gauss and Riemann.

Udo HERTRICH-JEROMIN. — **Introduction to Möbius differential geometry.** — London Mathematical Society lecture note series, vol. 300. — Un vol. broché, 15×23, de XI, 413 p. — ISBN 0-521-53569-7. — Prix: £29.95. — Cambridge University Press, Cambridge, 2003.

The book introduces the reader to the geometry of surfaces and submanifolds in the conformal n-sphere. Various models for Möbius geometry are presented: the classical projective model; the quaternionic approach; and an approach that uses the Clifford algebra of the space of homogeneous coordinates of the classical model — the use of 2+2 matrices in this context is elaborated. For each model, in turn, applications are discussed. Topics comprise conformally flat hypersurfaces, isothermic surfaces and their transformation theory, Willmore surfaces, orthogonal systems, and the Ribaucour transformation, as well as analogous discrete theories for isothermic surfaces and orthogonal systems. Certain relations with curved flats, a particular type of integrable system, are revealed.

Topologie algébrique

F.E.A. JOHNSON. — **Stable modules and the D(2)-problem.** — London Mathematical Society lecture note series, vol. 301 — Un vol. broché, 15×23, de IX, 267 p. — ISBN 0-521-53749-5. — Prix: £29.95. — Cambridge University Press, Cambridge, 2003.

This book is concerned with two fundamental problems in low-dimensional topology. Firstly the D(2)-problem, which asks whether cohomology detects dimension, and secondly the realization problem, which asks whether every algebraic 2-complex is geometrically realizable. The author shows that for a large class of fundamental groups these problems are equivalent. Moreover, in the case of finite groups, Professor Johnson develops general methods and gives complete solutions in a number of instances. In particular, he presents a complete treatment of Yoneda extension theory from the viewpoint of derived objects and proves that for groups of period four, two-dimensional homotopy types are parametrized by isomorphism classes of projective modules. The book is carefully written with an eye on the wider context and as such is suitable for graduate students wanting to learn low-dimensional homotopy theory as well as for established researchers in the field.

Elon Lages LIMA. — **Fundamental groups and covering spaces.** — Un vol. relié, 16×23,5, de VII, 210 p. — ISBN 1-56881-131-4. — Prix: US$49.00. — A. K. Peters, Natick, Massachusetts, 2003.

This is an introductory book on fundamental groups, perhaps the simplest non-trivial algebraic structure that one can attach to a space, and their topological soul mates, the covering spaces. An accomplished example of the algebraic topologist's dream come true, covering spaces are a geometric (that is, topological) structure that is completely characterized by its algebraic counterpart. Fundamental groups and covering spaces are interesting not only for their intrinsic elegance, but are also important auxiliary instruments in complex analysis, differential geometry, group theory, and physics. This book provides several illustrative examples from these areas. In keeping with its introductory aim, basic concepts are clearly defined, proofs are complete, and no results from the exercises are assumed in the text.

Topologie des variétés, analyse globale et analyse des variétés

Fritz GESZTESY, Helge HOLDEN. — **Soliton equations and their algebro-geometric solutions, vol. 1: (1+1)-dimensional continuous models.** — Cambridge studies in advanced mathematics, vol. 79. — Un vol. relié, 16×23,5, de XII, 505 p. — ISBN 0-521-75307-4. — Prix: £65.00. — Cambridge University Press, Cambridge, 2003.

The focus of this book is on algebro-geometric solutions of completely integrable, nonlinear, partial differential equations in (1+1) dimensions, also known as soliton equations. Explicitly treated integrable models include the KdV, AKNS, sine-Gordon, and Camassa-Holm hierarchies as well as the classical massive Thirring system. An extensive treatment of the class of algebro-geometric solutions in the stationary as well as time-dependent contexts is provided. The formalism presented includes trace formulas, Dubrovin-type initial value problems, Baker-Akhiezer functions, and theta function representations of all relevant quantities involved. The book uses techniques from the theory of differential equations, spectral analysis, and elements of algebraic geometry (most notably, the theory of compact Riemann surfaces). The presentation is rigorous, detailed, and self-contained with ample background material in various appendices.

Andrzej GRANAS, James DUGUNDJI. — **Fixed point theory.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de XV, 690 p. — ISBN 0-387-00173-5. — Prix: €84.95. — Springer, New York, 2003.

This monograph gives a carefully worked-out account of the most basic principles and applications of the theory of fixed points. Until now, a treatment of many of the discussed topics has been unavailable in book form. The presentation is self-contained and is accessible to a broad spectrum of readers. The main text is complemented by numerous exercises, detailed comments, and a comprehensive bibliography.

Y. KOMORI, V. MARKOVIC , C. SERIES, (Editors). — **Kleinian groups and hyperbolic 3-manifolds: proceedings of the Warwick Workshop, September 2001.** — London Mathematical Society lecture note series, vol. 299. — Un vol. broché, 15×23, de VII, 384 p. — ISBN 0-521-54013-5. — Prix: £39.95. — Cambridge University Press, Cambridge, 2003.

The subject of Kleinian groups and hyperbolic 3-manifolds is currently undergoing explosively fast development, with many old problems and conjectures close to resolution. This volume, proceedings of the Warwick Workshop in September 2001, contains expositions of many of these breakthroughs including Minsky's lectures on the first half of the proof of the Ending Lamination Conjecture, the Bers Density Conjecture by Brock and Bromberg, the Tameness Conjecture by Kleineidam and Souto, the state of the art in cone manifolds by Hodgson and Kerckhoff, and the counter-example to Thurston's $K=2$ conjecture by Epstein, Marden and Markovic. It also contains Jørgensen's famous paper *On pairs of once punctured tori* in print for the first time.

I. MOERDIJK, J. MRČUN. — **Introduction to foliations and Lie groupoids.** —Cambridge studies in advanced mathematics, vol. 91 — Un vol. relié, 16×24, de IX, 173 p. — ISBN 0-521-83197-0 — Prix: £30.00. — Cambridge University Press, Cambridge, 2003.

This book gives a quick introduction to the theory of foliations, Lie groupoids, and Lie algebroids. An important feature is the emphasis on the interplay between these concepts; Lie groupoids form an indispensable tool for the study of the transverse structure of foliations as well as their noncommutative geometry, while the theory of foliations has immediate applications to the Lie theory of groupoids and their infinitesimal algebroids. The book starts with a

detailed presentation of the main classical theorems in the theory of foliations, then proceeds to Molino's theory, foliation, and finally Lie algebroids. Among other things, the authors discuss to what extent Lie's theory for Lie groups and Lie algebras holds in the more general context of groupoids and algebroids. Based on the authors' extensive teaching experience, this book contains numerous examples and exercises making it ideal for graduate students and their instructors.

David MOND, Marcelo José SAIA, (Editors). — **Real and complex singularities**. — Lecture notes in pure and applied mathematics, vol. 232. — Un vol. broché, 18 × 25,5, de VIII, 326 p. — ISBN 0-8247-4091-2. — Prix: US$175.00. — Marcel Dekker, New York, 2003.

Offering a selection of invited papers on singularity theory presented at the Sixth Workshop on Real and Complex Singularities held at Instituto de Ciências Matemáticas e de Computação-USP, São Carlos, São Paulo, Brazil, this reference discusses the most recent results and applications of singularity theory to related areas such as algebraic geometry, quantum cohomology, geometry, and dynamical systems. This book contains papers on Frobenius manifolds and the construction of global moduli spaces for isolated hypersurface singularities... global topological invariants of stable maps from a surface to the plane... indices of Newton nondegenerate vector fields and a conjecture of Loewner for surfaces in $\mathbf{R}^4$ ... transversal Whitney topology and singularities of Haefliger foliations... and deformations of boundary singularities and noncrystallographic Coxeter groups.

Probabilités et processus stochastiques

Bernt ØKSENDAL. — **Stochastic differential equations: an introduction with applications.** — Sixth edition. — Universitext. — Un vol. broché, 15,5 × 23,5 de XXIII, 360 p. — ISBN 3-540-04758-1. — Prix: €34.95. — Springer, Berlin, 2003.

For the sixth edition the author has added further exercises and, for the first time, solutions to many of the exercises are provided. — _Contents:_ Introduction. — Some mathematical preliminaries. — Itô integrals. — The Itô formula and the martingale representation theorem. — Stochastic differential equations. — The filtering problem. — Diffusions: basic properties. — Other topics in diffusion theory. — Applications to boundary value problems. — Application to optimal stopping. — Application to stochastic control. — Application to mathematical finance. — Normal random variables. — Conditional expectation. — Uniform integrability and martingale convergence. — An approximation result. — Solutions and additional hints to some of the exercises. — References.

Statistique

Jim ALBERT, Jay BENNETT. — **Curve Ball: baseball, statistics, and the role of chance in the game.** — Revised edition. — Un vol. broché, 15,5 × 23,5, de XXII, 410 p. — ISBN 0-387-00193-X. — Prix: €22.95. — Copernicus Books, an imprint of Springer-Verlag, New York, 2003.

We're surrounded – some might say inundated – by baseball statistics. We find them in newspapers and magazines, in books and on the back of baseball cards, and on TV, radio, and the Internet. The question is, can fans – or anyone – make sense of this proliferating data? Authors Jim Albert and Jay Bennett believe we all can, given just a slightly more sophisticated approach to statistics. In this revised and updated paperback edition, the authors take a fresh look at time-

honored stats, introduce some new measures of performance, and delve into the all-important role of chance in the game. Whether they're analyzing Barry Bonds or the extraordinary drama of the 2002 World Series, they show us how statistics can enhance not just our understanding, but our appreciation of the game.

Analyse numérique

Heinrich FREISTÜHLER, Gerald WARNECKE, (Editors). — **Hyperbolic problems: theory, numerics, applications: Eighth International Conference in Magdeburg, February/March 2000.** — International series of numerical mathematics, vol. 140 et 141. — Deux vol. reliés, 17×24, de 972 p. au total. — ISBN 3-7643-6709-1 et 3-7643-6710-5. — Prix: l'ensemble des volumes, SFr. 198.00. — Birkhäuser, Basel, 2003.

Hyperbolic partial differential equations describe phenomena of material or wave transport in physics, biology and engineering, especially in the field of fluid mechanics. The mathematical theory of hyperbolic equations has recently made considerable progress. Accurate and efficient numerical schemes for computation have been and are being further developed. This two-volume set of conference proceedings contains about 100 refereed and carefully selected papers. The books are intended for researchers and graduate students in mathematics, science and engineering interested in the most recent results in theory and practice of hyperbolic problems. Applications touched in these proceedings concern one-phase and multiphase fluid flow, phase transitions, shallow water dynamics, elasticity, extended thermodynamics, electromagnetism, classical and relativistic magnetohydrodynamics, cosmology. Contributions to the abstract theory of hyperbolic systems deal with viscous and relaxation approximations, front tracking and wellposedness, stability of shock profiles and multi-shock patterns, traveling fronts for transport equations. Numerically oriented articles study finite difference, finite volume, and finite element schemes, adaptive, multiresolution, and artificial dissipation methods.

R. GLOWINSKI, (Author), P.G. CIARLET, J.L. LIONS, (Editors). — **Handbook of numerical analysis, vol. 9: Numerical methods for fluids (part 3).**— Un vol. relié, 17×25, de x, 1176 p. — ISBN 0-444-51224-1. — Prix: € 190.00. — Elsevier, Amsterdam, 2003.

This book is dedicated to the numerical simulation of unsteady incompressible viscous flow modelled by the Navier-Stokes equations, or by non-Newtonian variants of them. In order to achieve this goal, the author has developed a methodology based on the following tools: (1) Time discretization by operator splitting schemes such as Peaceman-Rachford's, Douglas-Rachford's, Marchuk-Yanenko's, Strang's symmetrized, and the so-called theta–scheme introduced by the author in the mid-eighties. (2) Projection methods (in L2 or H1) for the treatment of the incompressibility condition div $\mathbf{u} = 0$. (3) Treatment of the advection by either a centered scheme leading to linear or nonlinear advection-diffusion problems solved by least squares/conjugate gradient algorithms, or to a linear wave-like equation well suited to finite element based solution methods. (4) Space approximation by finite element methods such as Hood-Taylor and Bercovier-Pironneau, which are relatively easy to implement. In addition to the above topics the text contains detailed discussions of conjugate gradient algorithms, least-squares methods for boundary value problems which are not equivalent to problems of the calculus of variations, Uzawa-type algorithms for the solution of saddle-point problems, embedding/fictitious domain methods for the solution of elliptic and parabolic problems. In fact many computational methods discussed apply also to non-CFD problems although they were mostly designed for the solution of flow problems.

Claude LE BRIS, (Editor). — **Handbook of numerical analysis, Vol. 10: Special volume: Computational chemistry.** — Un vol. broché, 17×25, de XVI, 899 p. — ISBN 0-444-51248-9. — Prix: € 170.00. — Elsevier, Amsterdam, 2003.

The book aims to provide the reader with a general overview of the mathematical and numerical techniques used for the simulation of matter at the microscopic scale. The emphasis lays upon the numerics, but modelling aspects are also addressed. The contributors come from different scientific communities: physics, theoretical chemistry, mathematical analysis, stochastic analysis, numerical analysis. The first four contributions aim at introducing the field. They present the basics that will be used throughout the volume. The second part of the volume consists of contributions focusing on special techniques and/or applications. The volume ends with contributions, by outstanding researchers of the field, on the control of chemical reactions, in the sense "laser control of the evolution of quantum systems", one of the major and the most promising fields of applications related to theoretical chemistry.

Informatique

L. F. SHAMPINE, I. GLADWELL, S. THOMPSON. — **Solving ODEs with Matlab** — Un vol. broché, 20×23, de VIII, 263 p. — ISBN 0-521-53094-6. — Prix: £21.95. — Cambridge University Press, Cambridge, 2003.

This concise text for a one-semester course for upper-level undergraduates and beginning graduate students in engineering, science, and mathematics can also serve as a quick reference for professionals. The major topics in ordinary differential equations, initial value problems, boundary value problems, and delay differential equations, are usually taught in three separate semester-long courses, but this book provides a sound treatment of all three in about 250 pages. Each chapter begins with a discussion of the "factor of life" for the problem, mainly by means of examples. Numerical methods for the problem are then developed – but only those methods most widely used. The treatment of each method is brief and technical issues are minimized, but all the issues important in practice and for understanding the codes are discussed. The last part of each chapter is a tutorial that shows how to solve problems by means of small but realistic examples.

Mécanique des fluides, acoustique

D. F. PARKER. — **Fields, flows and waves: an introduction to continuum models.** — Springer undergraduate mathematics series — Un vol. broché, 18×24, de XII, 270 p. — ISBN 1-85233-708-7. — Prix: € 24.95. — Springer, London, 2003.

Mathematical ideas and techniques are widely used for describing collective phenomena in the physical and biological sciences. This book, derived from an innovative course of lectures, is a first introduction to the mathematical description of fields, flows and waves. It shows students, early in their studies, how many of the topics they have encountered are useful in constructing, analysing and interpreting phenomena in the real world. Designed for second-year undergraduate students in mathematics, mathematical physics, and engineering, it presumes only a limited familiarity with several variable calculus and vector fields. It develops the concepts of flux, conservation law and boundary value problem through simple examples of heat flow, electric potentials and gravitational fields. The ideas are developed through worked examples, and a range of exercises (with solutions) is provided to test understanding.

Biologie et sciences du comportement

Nicholas F. BRITTON. — **Essential mathematical biology.** — Springer undergraduate mathematics series — Un vol. broché, 18 × 24, de xv, 335 p. — ISBN 1-85233-536-X. — Prix : € 29.95. — Springer, London, 2003.

This book is a self-contained introduction to the fast-growing field of mathematical biology. Written for students with a mathematical background, it sets the subject in its historical context and then guides the reader towards questions of current research interest, providing a comprehensive overview of the field and a solid foundation for interdisciplinary research in the biological sciences. A broad range of topics is covered including: populations dynamics; infectious diseases; population genetics and evolution; dispersal; molecular and cellular biology; pattern formation; cancer modelling.

B.A. FUSARO, P.C. KENSCHAFT, (Editors). — **Environmental mathematics in the classroom.** — Classroom resources material. — Un vol. broché, 18 × 25,5, de viii, 253 p. — Prix : £ 29.95. — ISBN 0-88385-714-6. — The Mathematical Association of America, distributed by Cambridge University Press, Cambridge, 2003.

Several chapters are accessible enough to be a text in a general education course or to enrich an elementary algebra course. Ground-level ozone, pollution and water use, preservation of whales, mathematical economics, the movement of clouds over a mountain range, at least one population model, and a smorgasbord of newspaper mathematics can be studied at this level and would form a stimulating course. It prepares future teachers not only to learn basic mathematics, but to understand how they can integrate it into other topics that will intrigue their students. Other chapters provide sufficient challenge for prospective mathematics majors. More difficult population models, the spread of infections, and the survival of buffalo after the nineteenth century slaughter provide substance for such students. This title can be a text for an independent mathematics course. With the expertise of another teacher, it could be the basis of an interdisciplinary course relating to mathematics and science.

Anton E. LAWSON. — **The neurological basis of learning, development and discovery : implications for science and mathematics instruction**. — Science and technology education library, vol. 18. — Un vol. relié, 16,5 × 24,5, de xvi, 283 p. — ISBN 1-4020-1180-6. — Prix : € 114.00. — Kluwer, Dordrecht, 2003.

This book is unique in that it: links neural physiology and neural network theory with cognition and instructional practice; grounds the current emphasis on inquiry and constructivism in epistemological, philosophical and developmental theory; links neural network theory, learning theory, conceptual change theory, and scientific discovery to classroom practice; provides examples of scientifically-based research in education as a guide for science and math educators and graduate students; has examples of lessons that can teach discipline-specific concepts as well as provoke the development of general reasoning and argumentative skills; can be used in graduate-level courses in science education and in service courses for science teachers.

Information, communication, circuits

Sebastià XAMBÓ-DESCAMPS. — **Block error-correcting codes : a computational primer.** — Universitext. — Un vol. broché, 15,5 × 23,5, de iv, 265 p. — ISBN 3-540-00395-9. — Prix : € 34.95. — Springer, Berlin, 2003.

Error-correcting codes have been incorporated in numerous working communication and memory systems. This book covers the mathematical aspects of the theory of block error-correcting codes together, in mutual reinforcement, with computational discussions, implementations and examples of all relevant concepts, functions and algorithms. This combined approach facilitates the reading and understanding of the subject. The digital companion of the book is a non-printable .pdf document freely downloaded from http://www.wiris.com/cc/. The examples included in the book can be run with just a mouse click either directly in this URL or by clicking the hyperlinks in the .pdf document. All the examples can be modified and saved by users for their own purpose.