Généralités

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BULLETIN BIBLIOGRAPHIQUE

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Analyse combinatoire

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

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

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

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

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

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