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# BULLETIN BIBLIOGRAPHIQUE

## *Généralités*

Raymond G. AYOUB, (Editor). – **Musings of the masters: an anthology of mathematical reflections.** — Un vol. relié, 16×23,5, de XVI, 277 p. — ISBN 0-88385-549-6. — Prix: £28.00. — The Mathematical Association of America, Washington D.C., distributed by Cambridge University Press, Cambridge, 2004.

This anthology is a collection of articles written by renowned mathematicians of the 20th century. The articles are on a variety of topics that we refer to, for want of a better name, as "humanistic". An important criterion, thereby limiting the choice, is that the articles should be accessible to the literate reader who may or may not have a technical knowledge of mathematics. The articles span roughly a century in time and touch on a wide range of subjects. Each article is preceded by a brief biographical sketch of the author and some indication of the content. One object of the anthology is to reveal to the reader some of the thoughts and speculations of noted mathematicians discoursing on subjects outside the strict confines of their discipline.

Jean C. BAUDET. — **Mathématique et vérité: une philosophie du nombre.** — Ouverture philosophique. — Un vol. broché, 13,5×21,5, de 180 p. — ISBN 2-7475-8059-8. — Prix: €16.00. — Paris, L'Harmattan, 2005.

La mathématique – science par excellence – n'est-elle qu'une coquille vide? Après la perte de nombreux repères religieux, culturels et politiques, l'homme postmoderne va-t-il devoir renoncer à la seule vérité qui lui paraissait certaine, absolue et indestructible, la vérité mathématique? L'avènement de la théorie des ensembles (Dedekind et Cantor), la découverte des paradoxes ensemblistes (Russell), la crise des fondements (Hilbert), le théorème d'incomplétude (Gödel), l'effondrement de l'entreprise bourbakiste et l'arrivée des nouvelles philosophies américaines niant la vérité mathématique, tout cela nous conduit-il à la certitude de l'impossibilité de savoir et à la négation de toute entreprise philosophique? L'homme, aujourd'hui, sait-il vraiment qu'il ne saura jamais rien? C'est à ce questionnement que se livre l'auteur: enjeu de civilisation plus que jeu d'intellectuel. En parcourant l'histoire de la pensée mathématicienne (d'avant Pythagore jusqu'après Dieudonné), il montre que les découvertes successives du zéro et de l'infini conduisent à une profonde interrogation sur les sources et le sens de tout savoir humain.

Pierre CARTIER, Bernard JULIA, Pierre MOUSSA, Pierre VANHOVE, (Editors). — **Frontiers in number theory, physics, and geometry I: on random matrices, zeta functions, and dynamical systems.** — Un vol. relié, 16,5×24, de XII, 640 p. — ISBN 3-540-23189-7. — Prix: €69.95. — Springer, Berlin, 2006.

The relation between mathematics and physics has a long history, in which the role of number theory and of other more abstract parts of mathematics has recently become more prominent. More than ten years after a first meeting in 1989 between number theorists and physicists at the Centre de Physique des Houches, a second 2-week event focused on the broader interface of number theory, geometry, and physics. This book is the result of that exciting meeting, and collects, in 2 volumes, extended versions of the lecture courses, followed by shorter texts on special topics of eminent mathematicians and physicists. The companion volume is subtitled: *On Conformal Field Theories, Discrete Groups and Renormalization*, and will be published in a few months.

Thibault DAMOUR. — **Once upon Einstein.** — Translated by Eric Novak. — Un vol. broché, 15,5×22,5, de XIII, 185 p. — ISBN 1-56881-289-2. — Prix: US$24.95. — A K Peters, Wellesley, Massachusetts, 2006.

Through a selection of concrete scenes taken from Einstein's life, the author offers a view into the formation of his theories, as well as reminders of the day-to-day applications of his ideas. Simultaneously the reader is led through a reflection on their philosophical impact: How should we think of time according to the theory of relativity, which removes any meaningful "now" and shows that twins can have different ages? How should we think of reality when quantum theory predicts that spatially separated objects nevertheless remain connected through Einstein's notion of "entanglement," which has recently been verified through scientific observation? This book puts readers in Einstein's place, allowing them to share some of those particular moments when he succeeded in "lifting a corner of the great veil."

Pavel ETINGOF, Vladimir RETAKH, I.M. SINGER, (Editors). — **The unity of mathematics: in honor of the ninetieth birthday of I.M. Gelfand.** — Progress in mathematics, vol. 244. — Un vol. relié, 16×24, de XXII, 631 p. — ISBN 0-8176-4076-2. — Prix: SFr. 152.00. — Birkhäuser, Boston, 2006.

A tribute to the vision and legacy of Israel Moiseevich Gelfand, the invited papers in this volume reflect the unity of mathematics as a whole, with particular emphasis on the many connections between the fields of geometry, physics, and representation theory. Written by distinguished mathematicians, the text is divided as follows: several articles are devoted to developments at the intersection of geometry and physics, while others treat the interaction of representation theory, Poisson- and algebraic geometry. Topics include conformal field theory, *K*-theory, noncommutative geometry, gauge theory, representations of infinite-dimensional Lie algebras, Gelfand-Kirillov theory, and various aspects of the Langlands program.

Roger GODEMENT. — **Analysis II: differential and integral calculus, Fourier series, holomorphic functions.** — Universitext. — Un vol. broché, 15,5×23,5, de VII, 443 p. — ISBN 3-540-20921-2. — Prix: €44.95. — Springer, Berlin, 2005.

Functions in **R** and **C**, including the theory of Fourier series, Fourier integrals and part of that of holomorphic functions, form the focal topic of these two volumes (*Analysis I* and *Analysis II*). Based on a course given by the author to large audiences at Paris VII University

for many years, the exposition proceeds somewhat nonlinearly, blending rigorous mathematics skilfully with didactical and historical considerations. It sets out to illustrate the variety of possible approaches to the main results, in order to initiate the reader to methods, the underlying reasoning, and fundamental ideas. It is suitable for both teaching and self-study. In his familiar, personal style, the author emphasizes ideas over calculations and, avoiding the condensed style frequently found in textbooks, explains these ideas without parsimony of words.

Keith E. HIRST. — **Calculus of one variable.** — Springer undergraduate mathematics series. — Un vol. broché, 17,5 × 23,5, de XI, 267 p. — ISBN 1-85233-940-3. — Prix : €29.95. — Springer, London, 2006.

This book presents the key topics of introductory calculus through an extensive, well-chosen collection of worked examples, covering: algebraic techniques, functions and graphs, an informal discussion of limits, techniques of differentiation and integration, MacLaurin and Taylor expansions, geometrical applications. Aimed at first-year undergraduates in mathematics and the physical sciences, the only prerequisites are basic algebra, coordinate geometry and the beginnings of differentiation as covered in school. The transition from school to university mathematics is addressed by means of a systematic development of important classes of techniques, and through careful discussion of the basic definitions and some of the theorems of calculus, with proofs where appropriate, but stopping short of the rigour involved in real analysis. Readers are also encouraged to practice the essential techniques through numerous exercises which are an important component of the book.

Ross HONSBERGER. — **Mathematical delights.** — Dolciani mathematical expositions, no. 28. — Un vol. broché, 15, 5 × 23, de IX, 252 p. — ISBN 0-88385-334-5. — Prix : £22.99. — The Mathematical Association of America, Washington D.C., distributed by Cambridge University Press, Cambridge, 2004.

*Mathematical Delights* is a collection of 90 short elementary gems from algebra, geometry, combinatorics, and number theory. The author presents us with some surprising results, brilliant ideas, and beautiful arguments in mathematics, written in his wonderfully lucid style. Among the many pleasures you will find in this volume are: a lovely safe-cracking problem, a brief discussion of Archimedes circles in the arbelos, a characterization of Euler's congruent numbers, a formula for Eisenstein triples, an essay on Cipollas's pseudoprimes and two characterizations of twin primes. The topics are entirely independent, and can be read in any order. A useful set of indices helps the reader locate topics in the text.

A. HULPKE, R. LIEBLER, T. PENTTILA, Á. SERESS, (Editors). — **Finite geometries, groups, and computation: proceedings of the Conference "Finite Geometries, Groups, and Computation", Pingree Park, Colorado, USA, September 4-9, 2004.** — Un vol. relié, 17,5 × 24,5, de VIII, 278 p. — ISBN 3-11-018220-3. — Prix : SFr. 205.00. — Walter de Gruyter, Berlin, 2006.

This volume is the proceedings of a Conference on Finite Geometries, Groups, and Computation that took place on September 4-9, 2004, at Pingree Park, Colorado. The conference coincided with the 60th birthday of William Kantor, and the topics relate to his major research areas. Participants were encouraged to explore the deeper interplay between these fields. The survey papers by Kantor, O'Brien, and Penttila should serve to introduce both students and the broader mathematical community to these important topics and some of their connections while the volume as a whole gives an overview of current developments in the field.

Hellmuth KNESER. — **Gesammelte Abhandlungen : Collected papers.** — Herausgegeben von Gerhard Betsch, Karl Heinrich Hofmann. — Un vol. relié, 18 × 25, de XVI, 923 p. — ISBN 3-11-016653-4. — Prix : €248.00. — Walter de Gruyter, Berlin, 2005.

Hellmuth Kneser (1898-1973) is the second of three mathematicians from consecutive generations of the Kneser family, all of them with groundbreaking mathematical contributions on a wide range of topics. It was only in recent times that mathematicians recognized how Hellmuth Kneser's work influenced the course of topology and the theory of several complex variables in the 20th century. Indeed he was a mathematician of extraordinarily broad vision and insight and thus contributed to many mathematical fields of pure and applied mathematics including foundations, differential equations, operations research, and mathematics education. With the exception of two papers written in French, all of his articles were written in German. Not all of them are readily available through the usual sources. For this book, presenting the entire collection of Kneser's papers published in journals, experts in various areas have written English commentaries on aspects of Hellmuth Kneser's work, summarizing what he accomplished, describing the context of his work, and giving outlooks on its aftereffects.

Martin LIEBECK. — **A concise introduction to pure mathematics**. — Second edition. — Chapman & Hall/CRC mathematics. — Un vol. broché, 15 × 23,5, de XV, 204 p. — ISBN 1-58488-547-5. — Prix : US$44.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

*A Concise Introduction to Pure Mathematics*, second edition, provides a robust bridge between high school and university mathematics, expanding upon basic topics in ways that will interest first-year students in mathematics and related fields and stimulate further study. Divided into 22 short chapters, this textbook offers a selection of exercises ranging from routine calculations to quite challenging problems. The author discusses real and complex numbers and explains how these concepts are applied in solving natural problems. He introduces topics in analysis, geometry, number theory, and combinatorics. What's new in the second edition : contains extra material concerning prime numbers, forming the basis for data encryption ; explores "secret codes" – one of today's most spectacular applications of pure mathematics ; discusses permutations and their importance in many topics in discrete mathematics. The textbook allows for the design of courses with various points of emphasis, because it can be divided into four fairly independent sections related to : an introduction to number systems and analysis ; theory of the integers ; an introduction to discrete mathematics ; and functions, relations, and countability.

Alberto A. MARTINEZ. — **Negative math : how mathematical rules can be positively bent : an easy introduction to the study of developing algebraic rules to describe relations among things.** — Un vol. relié, 16,5 × 24, de X, 267 p. — ISBN 0-691-12309-8. — Prix : £15.95. — Princeton University Press, Princeton, N.J., 2006, distributed by John Wiley & Sons, Chichester, West Sussex.

Few books in the field of mathematics encourage creative thinking. Fewer still are engagingly written and fun to read. This one succeeds on both counts. Alberto Martinez shows us how many of the mathematical concepts that we take for granted were once considered contrived, imaginary, absurd, or just plain wrong. Even today, he writes, not all parts of math correspond to things, relations, or operations that we can actually observe or carry out in every day life. *Negative Math* ponders such issues by exploring controversies in the history of numbers, especially the so-called negative and "impossible" numbers. It uses history, puzzles, and lively debates to demonstrate how it is still possible to devise new artificial systems of mathematical rules. In fact, the book contends, departures from

traditional rules can even be the basis for new applications. For example, by using an algebra in which minus times minus makes minus, mathematicians can describe curves or trajectories that are not represented by traditional coordinate geometry. Clear and accessible, *Negative Math* expects from its readers only a passing acquaintance with basic high school algebra. It will prove pleasurable reading not only for those who enjoy popular math, but also for historians, philosophers, and educators.

Alexandre MOATTI. — **Les indispensables : mathématiques et physiques pour tous.** — Un vol. broché, 14,5×22, de 258 p. — ISBN 2-7381-1722-8. — Prix : €21.90. — Odile Jacob, Paris, 2006.

Tout ce que vous devez savoir sur le nombre d'or, les nombres parfaits et amicaux, sur la quadrature du cercle et les courbes fractales, sur la vitesse de la lumière et les trous noirs, le théorème de Gödel et la relation d'incertitude, $E = mc^2$ et le chaos… Ce livre est une invitation au voyage dans un monde mathématique et physique finalement si proche de notre quotidien. — *Avant-propos :* «J'ai choisi de naviguer dans les sciences pour montrer comment certaines notions de base, mathématiques ou physiques, sont tout à fait abordables et passionnantes, y compris dans leur formulation ou leur démonstration.»

George M. PHILLIPS. — **Mathematics is not a spectator sport.** — Un vol. relié, 16×24, de XIV, 240 p. — ISBN 0-387-25528-1. — Prix : €32.95. — Springer, New York, 2005.

It is often said that mathematics and music go together, and that people with a special aptitude for mathematics often have similar gifts in music. Some music is very profound, and listeners find that there is far more in it than they appreciated at a first hearing. A similar point can be made about an understanding of mathematics. This book introduces the reader to various topics in mathematics and is intended for precocious high school students and college students just beginning their study of mathematics. The topics discussed in this book include a variety of results in number theory involving squares, and also complex numbers, early algebraic ideas such as the Euclidean algorithm, geometrical constructions created by the Greeks, and more recent topics such as group theory.

Stanley RABINOWITZ, Mark BOWRON, (Editors). — **Index to mathematical problems 1975-1979, volume 2.** — Un vol. relié, 22,5×28,5, de X, 518 p. — ISBN 0-9626401-2-3. — Prix : US$69.95. — MathPro Press, Chelmsford, Massachusetts, 1999.

This book contains the text from almost 5000 problems that were published in journal problem columns during the years 1975-1979. The problems are classified and then sorted by topic. References are given for the journal, year, and page number where the solution to the problem can be found in the literature. Also included are comprehensive author, title, and citation indexes as well as problems from national, regional, and international mathematical competitions.

Roshdi RASHED, Pierre PELLEGRIN, (Editeurs). — **Philosophie des mathématiques et théorie de la connaissance : l'œuvre de Jules Vuillemin.** — Collection Sciences dans l'histoire. — Un vol. broché, 16×24,5, de XIII, 393 p. — ISBN 2-85367-233-6. — Prix : €65.00. — Librairie scientifique et technique Albert Blanchard, Paris, 2005

Histoire de la philosophie, histoire des mathématiques, philosophie de la connaissance scientifique, philosophie de la logique, ce sont les thèmes que les auteurs de ce livre ont abordés, chacun selon ses compétences. Ce choix fait écho aux domaines que Jules Vuillemin (1920-2001) n'a cessé de cultiver et de renouveler. Reprendre les problèmes qu'il a soulevés

dans ces disciplines en examinant ses propres solutions, à la lumière des nouveaux acquis scientifiques et historiques, voilà le meilleur hommage que les auteurs du livre ont voulu rendre au philosophe. — *De la préface:* «Le lecteur trouvera dans ce livre les travaux du Colloque tenu (à Paris du 26 au 29 juin 2002) en hommage à l'œuvre de Jules Vuillemin, et où furent évoqués son impact sur la recherche philosophique et les prolongements qu'elle a suscités en France et dans le monde.»

Constance REID. — **From zero to infinity: what makes numbers interesting.** — Fiftieth anniversary edition. — Un vol. broché, 13×20,5, de XVI, 188 p. — ISBN 1-56881-273-6. — Prix: US$ 19.95. — A K Peters, Wellesley, Massachusetts, 2006.

*From Zero to Infinity* is a combination of number lore, number history, and sparkling descriptions of the simply stated but exceedingly difficult problems posed by the most ordinary numbers, that first appeared in 1955 and has been kept in print continuously ever since. With the fifth edition this classic has been updated to report on advances in number theory over the last 50 years, including the proof of Fermat's Last Theorem. Deceptively simple in style and structure, it is a book to which the reader will return again and again, gaining greater understanding and satisfaction with each reading.

K.F. RILEY, M.P. HOBSON, S.J. BENCE. — **Mathematical methods for physics and engineering.** — Third edition. — Un vol. broché, 17,5×25, de XXVII, 1333 p. — ISBN 0-521-67971-0. — Prix: £70.00. — Cambridge University Press, Cambridge, 2006.

The third edition of this highly acclaimed undergraduate textbook is suitable for teaching all the mathematics ever likely to be needed for an undergraduate course in any of the physical sciences. As well as lucid descriptions of all the topics covered and many worked examples, it contains more than 800 exercises. A number of additional topics have been included and the text has undergone significant reorganisation in some areas. New stand-alone chapters give a systematic account of the "special functions" of physical science; cover an extended range of practical applications of complex variables including WKB methods and saddle-point integration techniques; provide an introduction to quantum operators. Further tabulations, of relevance in statistics and numerical integration, have been added. In this edition, all 400 odd-numbered exercises are provided with complete worked solutions in a separate manual, available to both students and their teachers; these are in addition to the hints and outline answers given in the main text. The even-numbered exercises have no hints, answers or worked solutions and can be used for unaided homework; full solutions to them are available to instructors on a password-protected website.

K.F. RILEY, M.P. HOBSON. — **Student solutions manual for mathematical methods for physics and engineering.** — Third edition. — Un vol. broché, 17,5×25, de X, 534 p. — ISBN 0-521-67973-7. — Prix: £13.99. — Cambridge University Press, Cambridge, 2006.

This *Solutions Manual* accompanies the third edition of *Mathematical Methods for Physics and Engineering*. It contains complete worked solutions to over 400 of the exercises in the main textbook, namely the odd-numbered ones, which in the main text are provided with only hints and outline answers. For each exercise, the original question is reproduced and then followed by a fully worked solution. For those original exercises that make internal reference to the text, the questions have been reworded, usually by including additional information, so that the questions can stand alone. The solutions are intended to be instructional as well as utilitarian and so some solutions are even fuller than might be expected of a model answer. This manual could be used independently by those wishing to learn mathematical methods by following worked examples.

Alain SCHÄRLIG. — **Compter du bout des doigts: cailloux, jetons et bouliers, de Périclès à nos jours.** — Un vol. broché, 16×24, de 294 p. — ISBN 2-88074-680-9. — Prix: SFr. 55.00. — Presses polytechniques et universitaires romandes, Lausanne, 2006.

Effectuer une addition sans aucun effort mental, et sans avoir à se demander combien font 7 et 8: c'est ce que permettent les dispositifs très simples présentés ici, inventés depuis le 5e siècle avant notre ère. Ces ancêtres de nos calculettes fonctionnaient en y poussant du bout des doigts divers objets: des cailloux chez les Grecs et les Romains, des jetons au Moyen Age et à la Renaissance, ou encore des boules jusqu'à nos jours en Russie, en Chine et au Japon. Ils sont décrits au moyen de photos et de dessins, et la manière de s'en servir est expliquée par un très grand nombre de schémas, qui nécessitent seulement de savoir compter... jusqu'à dix! Le livre s'ouvre sur le phénomène du pas plus de quatre: point commun de ces dispositifs, il fut pressenti depuis la nuit des temps par de nombreuses civilisations, mais reconnu au 20e siècle seulement par les psychologues! Aussi clair et pédagogique que les précédents livres de l'auteur, cet ouvrage ne nécessite pas de prérequis particuliers en arithmétique.

Amy SHELL-GELLASCH, Dick JARDINE, (Editors). — **From calculus to computers: using the last 200 years of mathematics history in the classroom.** — MAA notes, vol. 68. — Un vol. broché, 21,5×27,5, de XII, 255 p. — ISBN 0-88385-178-4. — Prix: £29.90. — Cambridge University Press, Cambridge, 2005.

Using the history of mathematics enhances the teaching and learning of mathematics. To date, much of the literature prepared on the topic of integrating mathematics history in undergraduate teaching contains predominantly ideas from the 18th century and earlier. This volume focuses on 19th and 20th century mathematics, building on the earlier efforts, but emphasizing recent history in the teaching of mathematics, computer science, and related disciplines. *From Calculus to Computers* is a resource for undergraduate teachers that provides ideas and materials for immediate adoption in the classroom and proven examples to motivate innovation by the reader. Contributions to this volume are from historians of mathematics and college mathematics instructors with years of experience and expertise in these subjects.

Daniel J. VELLEMAN. — **How to prove it: a structured approach.** — Second edition. — Un vol. broché, 15,5×23, de XIII, 384 p. — ISBN 0-521-67599-5. — Prix: £17.99. — Cambridge University Press, Cambridge, 2006.

The book begins with the basic concepts of logic and set theory to familiarize students with the language of mathematics and how it is interpreted. These concepts are used as the basis for a step-by-step breakdown of the most important techniques used in constructing proofs. The author shows how complex proofs are built up from these smaller steps, using detailed "scratch work" sections to expose the machinery of proofs for the natural numbers, relations, functions, and infinite sets. To give students the opportunity to construct their own proofs, this new edition contains more than 200 new exercises, selected solutions, and an introduction to Proof Designer software. No background beyond standard high school mathematics is assumed.

Lucas VIENNE. — **Géométries affine et euclidienne. Quadriques.** — Collection Formation des enseignants. — Un vol. broché, 17×24, de VIII, 239 p. — ISBN 2-7056-6520-X. — Prix: €25.00. — Hermann, Paris, 2005.

Ce livre présente les bases de géométrie que doit connaître tout étudiant désirant aborder des théories plus profondes (géométrie projective, puis géométrie algébrique), ou simplement

se préparer aux concours d'enseignement en lycées. Pour éviter de se disperser dans les innombrables résultats de géométrie classique, quelques lignes directrices ont été retenues: définition de la géométrie affine, en donnant un cadre mathématique à la géométrie du monde physique; distinction claire de la nature vectorielle, affine ou euclidienne des différents concepts introduits; étude des transformations vectorielles, affines ou euclidiennes de l'espace $\mathbf{R}^n$; développement de la géométrie des coniques et des quadriques dans $\mathbf{R}^n$; classement de ces objets sous l'action du groupe affine ou du groupe orthogonal; introduction à la géométrie projective, montrant notamment comment elle permet d'unifier les trois types de coniques affines (ellipse, parabole et hyperbole).

Manfred WOLFF. — **Übungsaufgaben zur Mathematik für Informatiker und BioInformatiker: mit durchgerechneten und erklärten Lösungen.** — eXamen.press. — Un vol. broché, 15,5×23,5, de XI, 278 p. — ISBN 3-540-26135-4. — Prix: €19.95. — Berlin, Springer, 2006.

Übung macht bekanntlich den Meister. In der Mathematik gilt dieses alte Sprichwort auch heute noch uneingeschränkt! Eine Fülle erprobter studienbegleitender Übungsaufgaben zur Vorlesung *Mathematik für Informatiker* helfen dem Studenten, sein mathematisches Rüstzeug zu erneuern, zu optimieren und sich unter anderem damit bestens für Klausuren vorzubereiten. Im Gegensatz zu vielen anderen Übungsbüchern zur Mathematik werden hier nicht nur Ergebnisse oder bestenfalls Lösungsskizzen gegeben. Vielmehr werden Musteraufgaben vom ersten Ansatz bis zum Ergebnis vollständig durchgerechnet und schrittweise erklärt. Beispiele und Java-Applets erläutern dabei prinzipielle Methoden, die zur Lösung der Aufgaben angewendet werden. Das Übungsbuch und das Lehrbuch Wolff/Hauck/Küchlin: *Mathematik für BioInformatiker* sind aufeinander abgestimmt. Die Java-Applets sind unter der URL http://min.informatik.uni-tuebingen.de zu finden.

## *Histoire*

Steven G. KRANTZ. — **Mathematical apocrypha redux: more stories and anecdotes of mathematicians and the mathematical.** — Un vol. broché, 15,5×23, de IX, 294 p. — ISBN 0-88385-554-2. — Prix: £24.99. — The Mathematical Association of America, Washington, D.C., 2005, distributed by Cambridge University Press, Cambridge.

A companion to *Mathematical Apocrypha*, this second volume of anecdotes, stories, quips, and ruminations about mathematics and mathematicians is sure to please. It differs from other books of this type in that many of the stories are from the twentieth century and many about currently living mathematicians. A number of the best stories come from the author's first-hand experience. The writing is lively, engaging, and informative. There are stories the reader may wish to share with students and colleagues, friends, and relatives. The purpose of the book is to explore and to celebrate the many facets of mathematical life. The stories reveal mathematicians as intense, human, and sympathetic. They should resonate with readers everywhere.

Gérard MINAUD. — **La comptabilité à Rome: essai d'histoire économique sur la pensée comptable commerciale et privée dans le monde antique romain.** — Un vol. broché, 16×24, de 383 p. — ISBN 2-88074-667-1. — Prix: SFr. 59.00. — Presses polytechniques et universitaires romandes, Lausanne, 2005.

Le présent ouvrage a un double objectif. L'un à l'attention du lecteur qui n'a pas de formation comptable, pour lui faciliter la compréhension des modes opératoires

microéconomiques romains. L'autre pour le lecteur qui a une formation comptable, en lui présentant des sources documentaires historiques. Les textes littéraires et juridiques d'expression latine sont la principale source d'informations. En les étudiant à travers une grille de lecture comptable, le lecteur peut y trouver une multitude d'indices révélateurs de la mentalité comptable des Romains et de la façon dont ils tenaient leurs comptes. Leur comptabilité n'était absolument pas primitive, elle était élaborée. Des règles et un vocabulaire précis lui étaient consacrés. Ce système comptable avait néanmoins des limites par rapport à celui développé et conservé depuis la fin du Moyen Âge en Occident. Les Romains auraient pu avoir le même, mais ils ne l'ont pas fait. Il s'agit donc d'un choix de leur part et non d'une difficulté technique qu'ils n'auraient pas su surmonter.

Atle NÆSS. — **Als die Welt still stand: Galileo Galilei – verraten, verkannt, verehrt.** — Un vol. relié, 16,5×24, de VIII, 244 p. — ISBN 3-540-21063-6. — Prix: €19.95. — Springer, Berlin, 2006.

Im kleinen Dorf Arcetri, auf einem Hügel südlich von Florenz, saß ein alter Mann und schrieb sein Testament. Eine wichtige Reise nach Rom lag vor ihm und er wollte auf alles vorbereitet sein. Die Reise war nicht ungefährlich: Die Pest grassierte, in den letzten Monaten hatten ihn quälende Krankheiten geschwächt, die anstrengende Fahrt nach Rom könnte zuviel für ihn sein. Und selbst wenn er die Strapazen überstand, könnte in Rom der Tod auf ihn warten. Der Scheiterhaufen! Nein, diesen Gedanken schob er weit von sich. Er hoffte inständig auf die wenigen Freunde, die ihm treu geblieben warten. Wenige nur, aber einflussreich und mächtig. Die preisgekrönte Biographie des norwegischen Schriftstellers Alte Næss führt den Leser durch die Höhen und Tiefen des Lebens einer des schillerndsten Persönlichkeiten der europäischen Wissenschaftsgeschichte – in die Welt des Galileo Galilei.

M.B.W. TENT. — **The prince of mathematics: Carl Friedrich Gauss.** — Un vol. relié, 14×21,5, de XVIII, 245 p. — ISBN 1-56881-261-2. — Prix: US$27.95. — A K Peters, Wellesley, Massachusetts, 2006.

*From the preface:* This narrative of Gauss' life is based on the stories Gauss told about himself and letters and descriptions that have come down to us. The vignettes and conversations are based as closely as possible on reports of what actually happened. The stories of three-year-old Gauss correcting his father's arithmetic and later falling into the canal and of ten-years-old Gauss figuring the sum of the first 100 counting numbers in school are all classics that have been told about Gauss many time over the years. The author tells the engaging life story of Carl Friedrich Gauss, the 18th-century mathematician, from his prodigious childhood to his extraordinary achievement that earned him the title *Prince of Mathematics.*

## *Logique et fondements*

Nigel J. CUTLAND, Mauro Di NASSO, David A. ROSS, (Editors). — **Nonstandard methods and applications in mathematics.** — Lecture notes in logic, vol. 25. — Un vol. relié, 16×23,5, de IX, 248 p. — ISBN 1-56881-291-4 (broché: 1-56881-292-2). — Prix: US$75.00 (broché: US$35.00). — Association for Symbolic Logic, La Jolla, California, and A K Peters, Wellesley, Massachusetts, 2006.

This book is a collection of peer-reviewed papers from a Conference on Nonstandard Methods and Applications in Mathematics that was held in Pisa, Italy. The papers address nonstandard analysis, which is one of the great achievements of modern applied mathematical

logic. They focus on its significant philosophical impact as a sound mathematical basis for using infinitesimals in analysis, and they show how this methodology is now well established as a tool for research. A final article discusses using nonstandard analysis as a method of teaching calculus.

Derek GOLDREI. — **Propositional and predicate calculus: a model of argument.** — Un vol. broché, 19×24,5, de VI, 315 p. — ISBN 1-85233-921-7. — Prix : €36.95. — Springer, London, 2005.

At the heart of the justification for the reasoning used in modern mathematics lies the completeness theorem for predicate calculus. This unique textbook covers two entirely different ways of looking at such reasoning. Topics include : The representation of mathematical statements by formulas in a formal language. — The interpretation of formulas as true or false in a mathematical structure. — Logical consequence of one formula from others. — The soundness and completeness theorems connecting logical consequence and formal proof. — The axiomatization of some mathematical theories using a formal language. — The compactness theorem and an introduction to model theory. This book is designed for self-study, as well as for taught courses. It includes exercises embedded within the text with full solutions to many of these. Some experience of axiom-based mathematics is required but no previous experience of logic.

Viggo STOLTENBERG-HANSEN, Jouko VÄÄNÄNEN, (Editors). — **Logic Colloquium '03 : proceedings of the Annual European Summer Meeting of the Association for Symbolic Logic, held in Helsinki, Finland, August 14-20, 2003.** — Lecture notes in logic, vol. 24. — Un vol. relié, 16×23,5, de X, 408 p. — ISBN 1-56881-293-0 (broché : 1-56881-294-9). — Prix : US$75.00 (broché : US$35.00). — Association for Symbolic Logic, La Jolla, California, and A K Peters, Wellesley, Massachusetts, 2006.

This book is a compilation of papers presented at the 2003 European Summer Meeting of the Association for Symbolic Logic. It includes tutorials and research articles from some of the world's preeminent logicians. One article is a tutorial on finite model theory and query languages that lie between first order and second order logic. The other articles cover current research topics in most areas of mathematical logic, including proof theory, set theory, computability theory, and philosophy.

## *Analyse combinatoire*

Jürgen BOKOWSKI. — **Computational oriented matroids : equivalence classes of matrices within a natural framework.** — Un vol. relié, 18×25,5, de XIII, 323 p. — ISBN 0-521-84930-6. — Prix : £45.00. — Cambridge University Press, Cambridge, 2006.

Oriented matroids play the role of matrices in discrete geometry, when metrical properties, such as angles or distances, are neither required nor available. Thus they are of great use in such areas as graph theory, combinatorial optimization and convex geometry. The variety of applications corresponds to the variety of ways they can be defined. Each of these definitions corresponds to a differing data structure for an oriented matroid, and handling them requires computational support, best realized through a functional language. Haskell is used here, and, for the benefit of readers, the book includes a primer on it. The combination of concrete applications and computation, the profusion of illustrations, many in color, and the large number of examples and exercises make this an ideal introductory text on the subject. It will also be valuable for self-study for mathematicians and computer scientists working in discrete and computational geometry.

Reinhard DIESTEL. — **Graph theory.** — Third edition. — Graduate texts in mathematics, vol. 173. — Un vol. broché, 15,5×23,5, de XVI, 410 p. — ISBN 3-540-26183-4. — Prix : €39.95. — Springer, Berlin, 2006.

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

Jonathan L. GROSS, Jay YELLEN. — **Graph theory and its applications.** — Second edition. — Discrete mathematics and its applications. — Un vol. relié, 18,5×26, de 779 p. — ISBN 1-58488-505-X. — Prix : US$84.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

With the release of this greatly enhanced second edition, *Graph Theory and its Applications* is now an even better choice as a textbook for a variety of courses. The superior explanations, broad coverage, and abundance of illustrations and exercises that positioned this as the premier graph theory text remain, but are now augmented by a broad range of improvements. Nearly 200 pages have been added for this edition, including nine new sections and hundreds of new exercises. What else is new? New chapters on measurement and analytic graph theory; supplementary exercises in each chapter – ideal for reinforcing, reviewing, and testing; solutions and hints, often illustrated with figures, to selected exercises – nearly 50 pages worth; reorganization and extensive revisions in more than half of the existing chapters for smoother flow of the exposition; foreshadowing – the first three chapters now preview a number of concepts, mostly via the exercises, to pique the interest of reader.

Yuri J. IONIN, Mohan S. SHRIKHANDE. — **Combinatorics of symmetric designs.** — New mathematical monographs, vol. 5. — Un vol. relié, 16×23,5, de XIII, 520 p. — ISBN 0-521-81833-8. — Prix : £75.00. — Cambridge University Press, Cambridge, 2006.

The aim of this book is to provide a unified exposition of the theory of symmetric designs with emphasis on recent developments. The authors cover the combinatorial aspects of the theory giving particular attention to the construction of symmetric designs and related objects. The last five chapters of the book are devoted to balanced generalized weighing matrices, decomposable symmetric designs, subdesigns of symmetric designs, non-embeddable quasi-residual designs, and Ryser designs. Most results in these chapters have never previously appeared in book form. The book concludes with a comprehensive bibliography of over 400 entries. Researchers in all areas of combinatorial designs, including coding theory and finite geometries, will find much of interest here. Detailed proofs and a large number of exercises make this book suitable as a text for an advanced course in combinatorial designs.

Herbert S. WILF. — **Generatingfunctionology.** — Third edition. — Un vol. relié, 16×23,5, de X, 245 p. — ISBN 1-56881-279-5. — Prix : US$39.00. — A K Peters, Wellesley, Massachusetts, 2006.

This is the third edition of the introduction to the use of generating functions and series in combinatorial mathematics. Generating functions, one of the most important tools in enumerative combinatorics, are a bridge between discrete mathematics and continuous analysis. Generating functions have numerous applications in mathematics, especially in combinatorics, probability theory, statistics, theory of Markov chains and number theory. One of the most important and relevant recent applications of combinatorics lies in the

development of Internet search engines whose incredible capabilities dazzle even the mathematically trained user. This new edition provides a clear, unified introduction to the basic enumerative applications of generating functions.

## *Ordre, treillis*

George GRÄTZER. — **The congruences of a finite lattice: a proof-by-picture approach.** — Un vol. relié, 16×24, de XXII, 281 p. — ISBN 0-8176-3224-7. — Prix: SFr. 72.00. — Birkhäuser, Boston, 2006.

The congruences of a lattice form the congruence lattice. In the past half-century, the study of congruence lattices has become a large and important field with a great number of interesting and deep results and many open problems. This self-contained exposition by one of the leading experts in lattice theory, George Grätzer, presents the major results on congruence lattices of finite lattices featuring the author's signature proof-by-picture method and its conversion to transparencies. Key features: Includes the latest findings from a pioneering researcher in the field. — Insightful discussion of techniques to construct "nice" finite lattices with given congruence lattices and "nice" congruence-preserving extensions. — Contains complete proofs, an extensive bibliography and index, and nearly 80 open problems. — Additional information provided by the author online at: http://www.maths.umanitoba.ca/homepages/gratzer.html/. This book is appropriate for a one-semester graduate course in lattice theory, yet is also designed as a practical reference for researchers studying lattices.

## *Théorie des nombres*

Enrico BOMBIERI, Walter GUBLER. — **Heights in Diophantine geometry.** — New mathematical monographs, vol. 4. — Un vol. relié, 16×23,5, de XVI, 652 p. — ISBN 0-521-84615-3. — Prix: £75.00. — Cambridge University Press, Cambridge, 2006.

This monograph is a bridge between the classical theory and a modern approach via arithmetic geometry. The authors aim to provide a clear path through the subject for graduate students and researchers. They have re-examined many results and much of the literature, and give a thorough account of several topics at a level not seen before in book form. The treatment is largely self-contained (there are appendices on algebraic geometry, ramification and the geometry of numbers), with proofs given in full detail. Many results appear here for the first time. The first half of the book is devoted to the general theory of heights and its applications including a complete, detailed proof of the celebrated subspace theorem of W.M. Schmidt. The second part deals with Abelian varieties, the Mordell-Weil theorem and Faltings' proof of the Mordell conjecture, ending with a self-contained exposition of Nevanlinna theory and the related famous conjectures of Vojta. The book concludes with a comprehensive bibliography.

Alina Carmen COJOCARU, M. Ram MURTY. — **An introduction to sieve methods and their applications.** — London Mathematical Society student texts, vol. 66. — Un vol. broché, 15,5×23, de XII, 224 p. — ISBN 0-521-61275-6 (relié: 0-521-84816-4). — Prix: £22.99 (relié: £50.00). — Cambridge University Press, Cambridge, 2006.

Sieve theory has a rich and romantic history. The ancient question of whether there exist infinitely many twin primes (primes $p$ such that $p+2$ is also prime), and Goldbach's conjecture that every even number can be written as the sum of two prime numbers, have been two of the problems that have inspired the development of the theory. This book

provides a motivated introduction to sieve theory. Rather than focus on technical details, which can obscure the beauty of the theory, the authors focus on examples and applications, developing the theory in parallel. The text can be used for a senior level undergraduate course or for an introductory graduate course in analytic number theory, and non-experts can gain a quick introduction to the techniques of the subject.

Richard CRANDALL, Carl POMERANCE. — **Prime numbers: a computational perspective.** — Second edition. — Un vol. relié, 16,5 × 24, de XV, 597 p. — ISBN 0-387-25282-7. — Prix : €54.95. — Springer, New York, 2005.

Prime numbers beckon to the beginner, the basic notion of primality being accessible to a child. Yet, some of the simplest questions about primes have stumped humankind for millennia. In this book, the authors concentrate on the computational aspects of prime numbers, such as recognizing primes and discovering the fundamental prime factors of a given number. Over 100 explicit algorithms cast in detailed pseudocode are included in the book. Applications and theoretical digressions serve to illuminate, justify, and underscore the practical power of these algorithms. The 2nd edition adds new material on primality and algorithms and updates all the numerical records, such as the largest prime, etc. It has been revised throughout.

Alfred GEROLDINGER, Franz HALTER-KOCH. — **Non-unique factorizations: algebraic, combinatorial and analytic theory.** — Pure and applied mathematics, vol. 278. — Un vol. relié, 18,5 × 26, de XXI, 700 p. — ISBN 1-58488-576-9. — Prix : US$119.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

From its origins in algebraic number theory, the theory of non-unique factorizations has emerged as an independent branch of algebra and number theory. Focused efforts over the past few decades have wrought a great number and variety of results. However, these remain dispersed throughout the vast literature. For the first time, *Non-Unique Factorizations: Algebraic, Combinatorial and Analytic Theory* offers a look at the present state of the theory in a single, unified resource. Taking a broad look at the algebraic, combinatorial, and analytic fundamentals, this book derives factorization results and applies them in concrete arithmetical situations using appropriate transfer principles. It begins with a basic introduction that can be understood with knowledge of standard basic algebra. The authors then move to the algebraic theory of monoids, arithmetic theory of monoids, the structure of sets of lengths, additive group theory, arithmetical invariants, and the arithmetic of Krull monoids. They also provide a self-contained introduction to abstract analytic number theory as well as a modern treatment of W. Narkiewicz's analytic theory of non-unique factorizations.

Carlos J. MORENO, Samuel S. WAGSTAFF, Jr. — **Sums of squares of integers.** — Discrete mathematics and its applications. — Un vol. relié, 16 × 25, de XI, 354 p. — ISBN 1-58488-456-8. — Prix : US$89.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

*Sums of Squares of Integers* covers topics in combinatorial number theory as they relate to counting representations of integers as sums of a certain number of squares. The book introduces a stimulating area of number theory where research continues to proliferate. It is a book of "firsts" – namely it is the first book to combine Liouville's elementary methods with the analytic methods of modular functions to study the representation of integers as sums of squares. It is the first book to tell how to compute the number of representations of an integer $n$ as the sum of $s$ squares of integers for any $s$ and $n$. It is also the first book to give a proof of Szemeredi's theorem, and is the first number theory book to discuss how the modern theory of modular forms complements and clarifies the classical fundamental results about sums of

squares. The book presents several existing, yet still interesting and instructive, examples of modular forms. Two chapters develop useful properties of the Bernoulli numbers and illustrate arithmetic progressions, proving the theorems of van der Waerden, Roth, and Szemeredi. The book also explains applications of the theory to three problems that lie outside of number theory in the areas of cryptanalysis, microwave radiation, and diamond cutting. The text is complemented by the inclusion of over one hundred exercises to test the reader's understanding.

## *Géométrie algébrique*

C. CILIBERTO, A.V. GERAMITA, B. HARBOURNE, R.M. MIRO-ROIG, K. RANESTAD, (Editors). — **Projective varieties with unexpected properties: a volume in memory of Giuseppe Veronese, proceedings of the International Conference 'Varieties with Unexpected Properties' Siena, Italy, June 8-13, 2004.** — Un vol. relié, 18×24,5, de VIII, 392 p. — ISBN 3-11-018160-6. — Prix: € 138.32. — Walter de Gruyter, Berlin, 2005.

This volume contains refereed papers related to the lectures and talks given at the Conference "Projective Varieties with Unexpected Properties", held in Siena (Italy), June 8-13, 2004. Also included are research papers that grew out of discussions among the participants and their collaborators. All the papers are research papers, but some of them also contain expository sections which aim at updating the state of the art on the classical subject of special projective varieties and their applications and new trends like phylogenetic algebraic geometry. The topic of secant varieties and the classification of defective varieties is central and ubiquitous in this volume. Besides the intrinsic interest of the subject, it turns out that it is also relevant in other fields of mathematics like expressions of polynomials as sums of powers and Waring type problems, polynomial interpolation, rank tensor computations and canonical forms, Bayesian networks, algebraic statistics and number theory. These topics are mostly touched in the present volume. Classical themes concerning projective geometry of special varieties, like Grassmann, Veronese, Segre, Fano and Chow varieties and Hilbert schemes, varieties arising from group representations, their sections and projections and relevant subvarieties, have also been widely covered.

Gerard VAN DER GEER, Ben MOONEN, René SCHOOF, (Editors). — **Number fields and function fields – two parallel worlds.** — Progress in mathematics, vol. 239. — Un vol. relié, 16×24,5, de XIII, 318 p. — ISBN 0-8176-4397-4. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2005.

Ever since the analogy between number fields and function fields was discovered, it has been a source of inspiration for new ideas, and a long history has not in any way detracted from the appeal of the subject. As a deeper understanding of this analogy could have tremendous consequences, the search for a unified approach has become a sort of Holy Grail. The arrival of Arakelov's new geometry that tries to put the Archimedean places on a par with the finite ones gave a new impetus and led to spectacular success in Faltings' hands. There are numerous further examples where ideas or techniques from the more geometrically-oriented world of function fields have led to new insights in the more arithmetically-oriented world of number fields, or vice versa. These invited articles by leading researchers in the field explore various aspects of the parallel worlds of function fields and number fields. Topics range from Arakelov geometry, the search for a theory of varieties over the field with one element, via Eisenstein series to Drinfeld modules, and t-motives. This volume is aimed at a wide audience of graduate students, mathematicians, and researchers interested in geometry and arithmetic and their connections.

Christoph LOSSEN, Gerhard PFISTER, (Editors). — **Singularities and computer algebra.** — Un vol. broché, 15,5 × 23, de XXXVI, 371 p. — ISBN 0-521-68309-2. — Prix : £40.00. — Cambridge University Press, Cambridge, 2006.

This volume surveys important topics in singularity theory, with a particular focus on computation aspects of the subject. The contributors to this volume include R.O. Buchweitz, Y.A. Drozd, W. Ebeling, H.A. Hamm, D.T. Lê, I. Luengo, F.O. Schreyer, E. Shustin, J.H.M. Steenbrink, D. van Straten, B. Teissier and J. Wahl. Together they describe the development of various areas of singularity theory over many years, and a range of open questions are discussed. Research workers in singularity theory, computer algebra or related subjects will find that this book contains a wealth of valuable information.

## *Anneaux et algèbres*

Ibrahim ASSEM, Daniel SIMSON, Andrzej SKOWROŃSKI. — **Elements of the representation theory of associative algebras. Volume 1 : Techniques of representation theory.** — Un vol. broché, 15,5 × 23, de IX, 458 p. — ISBN 0-521-58631-3. — Prix : £26.00. — Cambridge University Press, Cambridge, 2006.

This is the first of a two-volume set that provides a modern account of the representation theory of finite dimensional associative algebras over an algebraically closed field. The subject is presented from the perspective of linear representations of quivers and homological algebra. The treatment is self-contained and provides an elementary and up-to-date introduction to the subject using quiver-theoretical techniques and the theory of almost split sequences as well as tilting theory and the use of integral quadratic forms. Much of this material has never appeared before in book form. The text includes many illustrative examples and a large number of exercises at the end of each of the ten chapters. Proofs are presented in complete detail, making the book suitable for courses, seminars, and self-study.

Paul COHN. — **Free ideal rings and localization in general rings.** — New mathematical monographs, vol. 3. — Un vol. relié, 16 × 23,5, de XXII, 572 p. — ISBN 0-521-85337-0. — Prix : £75.00. — Cambridge University Press, Cambridge, 2006.

Proving that a polynomial ring in one variable over a field is a principal ideal domain can be done by means of the Euclidean algorithm, but this does not extend to more variables. However, if the variables are not allowed to commute, giving a free associative algebra, then there is a generalization, the weak algorithm, which can be used to prove that all one-sided ideals are free. This book presents the theory of free ideal rings (firs) in detail. Particular emphasis is placed on rings with a weak algorithm, exemplified by free associative algebras. There is also a full account of localization which is treated for general rings but the features arising in firs are given special attention. Each section has a number of exercises, including some open problems, and each chapter ends in a historical note.

I.N. HERSTEIN. — **Noncommutative rings.** — The Carus mathematical monographs, vol. 15. — Un vol. broché, 12,5 × 18,5, de XI, 202 p. — ISBN 0-88385-039-7. — Prix : £20.00. — Mathematical Association of America, Washington, D.C, distributed by Cambridge University Press, Cambridge, 1968 reprinted 2005.

*Noncommutative Rings* provides a cross-section of ideas, techniques and results that give the reader an idea of that part of algebra which concerns itself with noncommutative rings. In the space of 200 pages, Herstein covers the Jacobson radical, semisimple rings, commutativity theorems, simple algebras, representations of finite groups, polynomial

identities, Goldie's theorem and the Golod-Shafarevitch theorem. Almost every practicing ring theorist has studied portions of this classic monograph.

Richard P. STANLEY. — **Combinatorics and commutative algebra.** — Second edition. — Progress in mathematics, vol. 41. — Un vol. broché, 15,5×23, de VI, 164 p. — ISBN 0-8176-3836-9. — Prix : SFr. 98.00. — Birkhäuser, Boston, 1996 reprinted 2006.

Some remarkable connections between commutative algebra and combinatorics have been discovered in recent years. This book provides an overview of two of the main topics in this area. The first concerns the solutions of linear equations in nonnegative integers. Applications are given to the enumeration of integer stochastic matrices (or magic squares), the volume of polytopes, combinatorial reciprocity theorems, and related results. The second topic deals with the face ring of a simplicial complex, and includes a proof of the upper bound conjecture for spheres. An introductory chapter giving background information in algebra, combinatorics and topology broadens access to this material for non-specialists. New to this edition is a chapter surveying more recent work related to face rings, focusing in applications to f-vectors.

## *Théorie des groupes et généralisations*

Laurent BARTHOLDI, Tullio CECCHERINI-SILBERSTEIN, Tatiana SMIRNOVA-NAGNIBEDA, Andrzej ZUK, (Editors). — **Infinite groups : geometric, combinatorial and dynamical aspects.** — Progress in mathematics, vol. 248. — Un vol. relié, 16×24, de 413 p. — ISBN 3-7643-7446-2. — Prix : SFr. 148.00. — Birkhäuser, Basel, 2005.

This book offers a panorama of current research in the theory of infinite discrete groups. It contains survey papers contributed by leading specialists in group theory and other areas of mathematics. Topics addressed in the book include amenable groups, Kähler groups, automorphism groups of rooted trees, rigidity, C*-algebras, random walks on groups, pro-$p$-groups, Burnside groups, parafree groups, Fuchsian groups, among other. The articles were contributed by invited plenary speakers at the International Conference on Group Theory in Gaeta, Italy, June 2003.

Ioannis EMMANOUIL. — **Idempotent matrices over complex group algebras.** — Universitext. — Un vol. broché, 15,5×23,5, de XIII, 276 p. — ISBN 3-540-27990-3. — Prix : €34.95. — Springer, Berlin, 2006.

The theory of idempotent matrices with entries in complex group algebras has recently experienced a revival, in view of its close relationship with deep geometric problems and conjectures. The relevant questions studied in this book for general groups are motivated by specific examples. A variety of techniques is employed from commutative algebra, homological algebra and functional analysis. The book can serve as an introduction to this lively research area. The pace is suitable for independent study and the level of the presentation not very demanding. The exercises at the end of each chapter form an essential part of the book.

James E. HUMPHREYS. — **Modular representations of finite groups of Lie type.** — London Mathematical Society lecture note series, vol. 326. — Un vol. broché, 15,5×23, de XV, 233 p. — ISBN 0-521-67454-9. — Prix : £30.00. — Cambridge University Press, Cambridge, 2006.

Finite groups of Lie type encompass most of the finite simple groups. Their representations and characters have been studied intensively for half a century, though

some key problems remain unsolved. This is the first comprehensive treatment of the representation theory of finite groups of Lie type over a field of the defining prime characteristic. As a subtheme, the relationship between ordinary and modular representations is explored, in the context of Deligne-Lusztig characters. One goal has been to make the subject more accessible to those working in neighboring parts of group theory, number theory, and topology. Core material is treated in detail, but the later chapters emphasize informal exposition and are accompanied by examples and precise references.

Yann OLLIVIER. — **A January 2005 invitation to random groups.** — Ensaios matemáticos, vol. 10. — Un vol. broché, 16×23, de 100 p. — ISBN 85-85818-30-1. — Sociedade Brasileira de Matemática, Rio de Janeiro, Brasil, 2005.

Random groups provide a rigorous way to tackle such question as "What does a typical (finitely generated) group look like?" or "What is the behaviour of an element of a group when nothing particular happens?" We review the results obtained on random groups as of January 2005. We give proper definitions and list known properties of typical groups. We also emphasize properties of random elements in a given group. In addition we present more specific, randomly twisted group constructions providing new, "wild" examples of groups. A comprehensive discussion of open problems and perspectives is included.

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

Joseph BERNSTEIN, Vladimir HINICH, Anna MELNIKOV, (Editors). — **Studies in Lie theory : dedicated to A. Joseph on his sixtieth birthday.** — Progress in mathematics, vol. 243. — Un vol. relié, 16×24, de XXII, 494 p. — ISBN 0-8176-4342-7. — Prix : SFr. 138.00. — Birkhäuser, Boston, 2005.

Dedicated to Anthony Joseph, this volume contains surveys and invited articles by leading specialists in representation theory. The focus here is on semisimple Lie algebras and quantum groups, where the impact of Joseph's work has been seminal and has changed the face of the subject. Two introductory biographical overviews of Joseph's contributions in classical representation theory (the theory of primitive ideals in semisimple Lie algebras) and quantized representation theory (the study of the quantized enveloping algebra) are followed by 16 research articles covering a number of varied and interesting topics in representation theory.

Armand BOREL, Lizhen JI. — **Compactifications of symmetric and locally symmetric spaces.** — Mathematics : theory and applications. — Un vol. relié, 16×24, de XIII, 479 p. — ISBN 0-8176-3247-6. — Prix : SFr. 105.00. — Birkhäuser, Boston, 2006.

Noncompact symmetric and locally symmetric spaces appear naturally in many mathematical theories, including analysis (representation theory, nonabelian harmonic analysis), number theory (automorphic forms), algebraic geometry (modulae) and algebraic topology (cohomology of discrete groups). In most applications it is necessary to form an appropriate compactification of the space. The literature dealing with such compactifications is vast. The main purpose of this book is to introduce uniform constructions of most of the known compactifications with emphasis on their geometric and topological structures. The book is divided into three parts. Part I studies compactifications of Riemannian symmetric spaces and their arithmetic quotients. Part II is a study of compact smooth manifolds. Part III studies the compactification of locally symmetric spaces. Familiarity with the theory of semisimple Lie groups is assumed, as is familiarity with algebraic groups defined over the rational numbers in later parts of the book, although most of the pertinent material is recalled

as presented. Otherwise, the book is a self-contained reference aimed at graduate students and research mathematicians interested in the applications of Lie theory and representation theory to diverse fields of mathematics.

Gregor FELS, Alan HUCKLEBERRY, Joseph A. WOLF. — **Cycle spaces of flag domains: a complex geometric viewpoint.** — Progress in mathematics, vol. 245. — Un vol. relié, 16×24, de XX, 339 p. — ISBN 0-8176-4391-5. — Prix: SFr. 88.00. — Birkhäuser, Boston, 2006.

This monograph, divided into four parts, presents a comprehensive treatment and systematic examination of cycle spaces of flag domains. Assuming only a basic familiarity with the concepts of Lie theory and geometry, this work presents a complete structure theory for these cycle spaces, as well as their applications to harmonic analysis and algebraic geometry. Key features: Accessible to readers from a wide range of fields, with all the necessary background material provided for the nonspecialist. — Many new results presented for the first time. — Driven by numerous examples. — The exposition is presented from the complex geometric viewpoint, but the methods, applications and much of the motivation also come from real and complex algebraic groups and their representations, as well as other areas of geometry. — Comparisons with classical Barlet cycle spaces are given. — Bibliography and index. Researchers and graduate students in differential geometry, complex analysis, harmonic analysis, representation theory, transformation groups, algebraic geometry, and areas of global geometric analysis will benefit from this work.

## *Fonctions de variables réelles*

A.B. KHARAZISHVILI. — **Strange functions in real analysis.** — Second edition. — Pure and applied mathematics, vol. 272. — Un vol. relié, 16×23,5, de XII, 415 p. — ISBN 1-58488-582-3. — Prix: US$119.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

Weierstrass and blancmange nowhere differentiable functions, Lebesgue integrable functions with everywhere divergent Fourier series, and various nonintegrable Lebesgue measurable functions. While dubbed strange or "pathological," these functions are ubiquitous throughout mathematics and play an important role in analysis, not only as counterexamples of seemingly true and natural statements, but also to stimulate and inspire the further development of real analysis. *Strange Functions in Real Analysis* explores a number of important examples and constructions of pathological functions. After introducing the basic concepts, the author begins with Cantor and Peano-type functions, then moves to functions whose constructions require essentially noneffective methods. These include functions without the Baire property, functions associated with a Hamel basis of the real line, and Sierpiński-Zygmund functions that are discontinuous on each subset of the real line having the cardinality continuum. Finally, he considers examples of functions whose existence cannot be established without the help of additional set-theoretical axioms and demonstrates that their existence follows from certain set-theoretical hypotheses, such as the Continuum Hypothesis.

## *Mesure et intégration*

René L. SCHILLING. — **Measures, integrals and martingales.** — Un vol. broché, 17,5×25, de X, 381 p. — ISBN 0-521-61525-9 (relié: 0-521-85015-0). — Prix: £24.99 (relié: £50.00). — Cambridge University Press, Cambridge, 2005.

This is a concise and elementary introduction to measure and integration theory as needed nowadays in many parts of analysis and probability theory. The basic theory: measures,

integrals, convergence theorems, $L^p$-spaces and multiple integrals, is explored in the first part of the book. The second part then uses the notion of martingales to develop the theory further, covering topics such as Jacobi's general transformation theorem, the Radon-Nikodým theorem, differentiation of measures, Hardy-Littlewood maximal functions or general Fourier series. Undergraduate calculus and an introductory course on rigorous analysis in **R** are the only prerequisites, making this text suitable for both lecture courses and self-study.

## *Fonctions d'une variable complexe*

Eberhard FREITAG, Rolf BUSAM. — **Complex analysis.** — Universitext. — Un vol. broché, 15,5×23,5, de X, 547 p. — ISBN 3-540-25724-1. — Prix: €39.95. — Springer, Berlin, 2005.

The guiding principle of the presentation of classical complex analysis is to proceed as quickly as possible to the central results while using a small number of notions and concepts from other fields. Thus the prerequisites for understanding this book are minimal; only elementary facts of calculus and algebra are required. The first four chapters cover the essential core of complex analysis. Further topics included are: the theory of elliptic functions based on the model of K. Weierstrass (with an excursion to older approaches due to N.H. Abel and C.G.J. Jacobi using theta series); an introduction to the theory of elliptic modular functions and elliptic modular forms; the use of complex analysis to obtain number theoretical results; a proof of the prime number theorem with a weak form of the error term. Motivating introductions, more than four hundred exercises of all levels of difficulty with hints or solutions, historical annotations, and over 120 figures make the overall presentation very attractive.

Rita A. HIBSCHWEILER, Thomas H. MACGREGOR. — **Fractional Cauchy transforms.** — Chapman & Hall/CRC monographs and surveys in pure and applied mathematics, vol. 136. — Un vol. relié, 16×24, de XIX, 248 p. — ISBN 1-58488-560-2. — Prix: US$89.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

Presenting new results along with research spanning five decades, *Fractional Cauchy Transforms* provides a full treatment of the topic, from its roots in classical complex analysis to its current state. Self-contained, it includes introductory material and classical results, such as those associated with complex-valued measures on the unit circle, that form the basis of the developments that follow. The authors focus on concrete analytic questions, with functional analysis providing the general framework. After examining basic properties, the authors study integral means and relationships between the fractional Cauchy transforms and the Hardy and Dirichlet spaces. They then study radial and nontangential limits, followed by chapters devoted to multipliers, composition operators, and univalent functions. The final chapter gives an analytic characterization of the family of Cauchy transforms when considered as functions defined in the complement of the unit circle.

Alan JEFFREY. — **Complex analysis and applications.** — Second edition. — Un vol. relié, 16,5×24, de 581 p. — ISBN 1-58488-553-X. — Prix: US$79.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

*Complex Analysis and Applications*, second edition, explains complex analysis for students of applied mathematics and engineering. Restructured and completely revised, this textbook first develops the theory of complex analysis, and then examines its geometrical interpretation and application to Dirichlet and Neumann boundary value problems. A new structure enables students to study theory and applications separately, as needed. A discussion of complex analysis now forms the first three chapters of the book, with a description of

conformal mapping and its application to boundary value problems for the two-dimensional Laplace equation forming the final two chapters. To maintain brevity and clarity, the text limits the application of complex analysis to two-dimensional boundary value problems related to temperature distribution, fluid flow, and electrostatics. In each case, in order to show the relevance of complex analysis, each application is preceded by mathematical background that demonstrates how a real valued potential function and its related complex potential can be derived from the mathematics that describes the physical situation.

## *Fonctions de plusieurs variables complexes*

José SEADE. — **On the topology of isolated singularities in analytic spaces.** — Progress in mathematics, vol. 241. — Un vol. relié, 16×24, de XIV, 238 p. — ISBN 3-7643-7322-9. — Prix : SFr. 78.00. — Birkhäuser, Basel, 2006.

Award-winning monograph of the Ferran Sunyer i Balaguer Prize 2005. The aim of this book is to give an overview of selected topics on the topology of singularities, with emphasis on its relations to other branches of geometry and topology. The first chapters are mostly devoted to complex singularities and a myriad of results spread in a vast literature, including recent research. The second part of the book studies real analytic singularities which arise from the topological and geometric study of holomorphic vector fields and foliations. In the low dimensional case these turn out to be related to fibred links in the 3-sphere defined by meromorphic functions.

## *Fonctions spéciales*

Mourad E.H. ISMAIL. — **Classical and quantum orthogonal polynomials in one variable.** — With two chapters by Walter VAN ASSCHE. — Encyclopedia of mathematics and its applications, vol. 98. — Un vol. relié, 16,5×24, de XVIII, 706 p. — ISBN 0-521-78201-5. — Prix : £80.00. — Cambridge University Press, Cambridge, 2005.

This is the first modern treatment of orthogonal polynomials from the view point of special functions. The coverage is encyclopedic, including classical topics such as Jacobi, Hermite, Laguerre, Hahn, Charlier and Meixner polynomials, as well as those, e.g. Askey-Wilson and Al-Salam-Chihara, polynomial systems discovered over the last 50 years: multiple orthogonal polynomials are discussed for the first time in book form. Many modern applications of the subject are dealt with, including birth and death processes, integrable systems, combinatorics, and physical models. A chapter on open research problems and conjectures is designed to stimulate further research on the subject. Exercises of varying degrees of difficulty are included to help the graduate student and the newcomer. A comprehensive bibliography rounds off the work, which will be valued as an authoritative reference and for graduate teaching, in which role it has already been successfully class-tested.

## *Équations différentielles ordinaires*

J. David LOGAN. — **A first course in differential equations.** — Undergraduate texts in mathematics. — Un vol. broché, 18×23,5, de XV, 289 p. — ISBN 0-387-25964-3. — Prix : €29.95. — Springer, New York, 2006.

This book is intended as an alternative to the standard differential equation text, which typically includes a large collection of methods and applications, packaged with

state-of-the-art color graphics, student solution manuals, the latest fonts, marginal notes, and web-based supplements. Here, however, the author writes concisely, to the point, and in plain language. Many examples and exercises are included. In addition, this text also encourages students to use a computer algebra system to solve problems numerically, and as such, templates of MATLAB programs that solve differential equations are given in an appendix, as well as basic Maple and Mathematica commands. The topics include: separable and linear first-order equations, autonomous equations, second-order linear homogeneous and nonhomogeneous equations, Laplace transforms, linear and nonlinear systems in the phase plane.

Henryk ŻOŁĄDEK. — **The monodromy group.** — Monografie Matematyczne, vol. 67. — Un vol. relié, 17×23,5, de XI, 580 p. — ISBN 3-7643-7535-3. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2006.

This volume presents a unified approach to analytical and geometrical theories where the monodromy group plays an important role. The action of the monodromy group is demonstrated in singularity theory and algebraic geometry, where it is embodied in the Picard-Lefschetz formula, the Gauss-Manin connection, the Picard-Fuchs equations, and also in mixed Hodge structures. In the theory of linear and nonlinear differential equations the Riemann-Hilbert problem, the Stokes phenomena and the Ecalle-Voronin-Martinet-Ramis moduli are described. Also the relation to differential Galois theory is presented.

## *Systèmes dynamiques et théorie ergodique*

A. FATHI, J.-C. YOCCOZ, (Editors). — **Dynamical systems: Michael Herman Memorial Volume.** — Un vol. relié, de VII, 596 p. — ISBN 0-521-86068-7. — Prix: £60.00. — Cambridge University Press, Cambridge, 2006.

Michael Robert Herman had a profound impact on the theory of dynamical systems over the last 30 years. His seminar at the École polytechnique had a major worldwide influence and was the main vector in the development of the theory of dynamical systems in France. His interests covered most aspects of the subject, though closest to his heart were the so-called small divisors problems, in particular those related to the stability of quasiperiodic motions. This volume aims to reflect the depth and variety of these interests and the frontier of present research; a frontier shaped decisively by Michael Herman's contributions.

## *Suites, séries, sommabilité*

Daniel D. BONAR, Michael J. KHOURY. — **Real infinite series.** — Classroom resource materials. — Un vol. relié, 18×26, de XII, 264 p. — ISBN 0-88385-745-6. — Prix: £30.00. — The Mathematical Association of America, Washington, D.C., 2006, distributed by Cambridge University Press, Cambridge, 2006.

In its most basic setting, infinite series is the vehicle mathematicians use to extend finite addition to "infinite addition". *Real Infinite Series* presents elementary and advanced tests for convergence or divergence, information about the harmonic series, the alternating harmonic series, and closely related series. One chapter offers 107 concise, crisp, surprising results about infinite series. Recognizing the interest in problem solving that abounds with students of mathematics, the authors devote a chapter to problems on infinite series, and solutions,

which have appeared on the annual William Lowell Putnam Mathematical Competition. The lighter side of infinite series is treated in the concluding chapter where three puzzles, eighteen visuals (what Martin Gardner calls "look-see" diagrams), and several fallacious proofs are made available. Three appendices provide a listing of true or false statements, answers to why the harmonic series is so named, and an extensive list of published works devoted entirely or partially to infinite series.

## *Approximations et développements en série*

Sorin G. GAL. — **Global smoothness and shape preserving interpolation by classical operators.** — Un vol. relié, 16×24, de XIII, 146 p. — ISBN 0-8176-4387-7. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2005.

This monograph examines and develops the global smoothness preservation property (GSPP) and the shape preservation property (SPP) in the field of interpolation of functions. The study is developed for the univariate and bivariate cases using well-known classical interpolation operators of Lagrange, Grünwald, Hermite-Fejér and Shepard type. One of the first books on the subject, it presents interesting new results along with an excellent survey of past research. Key features include: Potential applications to data fitting, fluid dynamics, curves and surfaces, engineering, and computer-aided geometric design. — Presents recent work featuring many new interesting results as well as an excellent survey of past research. — Many interesting open problems for future research presented throughout the text. — Includes 20 very suggestive figures of nine types of Shepard surfaces concerning their shape preservation property. — Generic techniques of the proofs allow for easy application to obtaining similar results for other interpolation operators. This unique, well-written text is best suited to graduate students and researchers in mathematical analysis, interpolation of functions, pure and applied mathematicians in numerical analysis, approximation theory, data fitting, computer-aided geometry design, fluid mechanics, and engineering researchers.

## *Analyse de Fourier, analyse harmonique abstraite*

André UNTERBERGER. — **The fourfold way in real analysis: an alternative to the metaplectic representation.** — Progress in mathematics, vol. 250. — Un vol. relié, 15,5×24, de X, 220 p. — ISBN 3-7643-7544-2. — Prix: SFr. 128.00. — Birkhäuser, Basel, 2006.

The fourfold way starts with the consideration of entire functions of one variable satisfying specific estimates at infinity, both on the real line and pure imaginary line. A major part of classical analysis, mainly that which deals with Fourier analysis and related concepts, can then be given a parameter-dependent analogue. The parameter is some real number modulo 2, the classical case being obtained when it is an integer. The space $L^2(\mathbf{R})$ has to give way to a pseudo-Hilbert space, on which a new translation-invariant integral still exists. All this extends to the $n$-dimensional case, and in the alternative to the metaplectic representation so obtained, it is the space of the Lagrangian subspaces of $\mathbf{R}^{2n}$ that plays the usual role of the complex Siegel domain. In fourfold analysis, the spectrum of the harmonic oscillator can be an arbitrary class modulo the integers. Even though the whole development touches upon notions of representation theory, pseudodifferential operator theory, and algebraic geometry, it remains completely elementary in all these aspects. The book should be of interest to researchers working in analysis in general, in harmonic analysis, or in mathematical physics.

## Transformations intégrales, calcul opérationnel

Andrew MARKOE. — **Analytic tomography.** — Encyclopedia of mathematics and its applications, vol. 106. — Un vol. relié, 16×24, de VIII, 400 p. — ISBN 0-521-79347-5. — Prix : £60.00. — Cambridge University Press, Cambridge, 2006.

This book is about tomography, which is a way to see what is inside an object without opening it up. This book was written to appeal to the broadest possible group of readers. The first chapter, which introduces computerized tomography, X-ray imaging and the Radon transform, requires almost no mathematical background. The second chapter, which is devoted to a rigorous and detailed study of the basic properties of the Radon transform, should be accessible to readers with a good undergraduate background in mathematics. The last three chapters are devoted to the more advanced areas of mathematical tomography and the Radon transform. These chapters require a more sophisticated background in mathematics. There are numerous figures and more than 600 references to literature in the field.

## Analyse fonctionnelle

Daniel BELTIŢĂ. — **Smooth homogeneous structures in operator theory.** — Chapman & Hall/CRC monographs and surveys in pure and applied mathematics, vol. 137. — Un vol. relié, 16×24, de XV, 302 p. — ISBN 1-58488-617-X. — Prix : US$89.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

Geometric ideas and techniques play an important role in operator theory and the theory of operator algebras. *Smooth Homogeneous Structures in Operator Theory* builds the background needed to understand this circle of ideas and reports on recent developments in this fruitful field of research. Requiring only a moderate familiarity with functional analysis and general topology, the author begins with an introduction to infinite dimensional Lie theory with emphasis on the relationship between Lie groups and Lie algebras. A detailed examination of smooth homogeneous spaces follows. This study is illustrated by familiar examples from operator theory and develops methods that allow endowing such spaces with structures of complex manifolds. The final section of the book explores equivariant monotone operators and Kähler structures. It examines certain symmetry properties of abstract reproducing kernels and arrives at a very general version of the construction of restricted Grassmann manifolds from the theory of loop groups. The author provides complete arguments for nearly every result. An extensive list of references and bibliographic notes provide a clear picture of the applicability of geometric methods in functional analysis, and the open questions presented throughout the text highlight interesting new research opportunities.

Lokenath DEBNATH, Piotr MIKUSIŃSKI. — **Introduction to Hilbert spaces with applications.** — Third edition. — Un vol. relié, 15,5×23,5, de XVIII, 580 p. — ISBN 0-12-208438-1. — Prix : €72.95. — Elsevier Academic Press, Amsterdam, 2005.

Continuing on the success of the two previous editions, *Introduction to Hilbert Spaces with Applications, third edition*, offers an overview of the basic ideas and results of Hilbert space theory complemented by a variety of applications. Students and researchers will benefit from the enhanced presentation of results and proofs and new and revised examples. A completely new section on Sobolev spaces has been added, and the treatment of finite dimensional normed spaces has been expanded. The chapter on wavelets has been updated.

The diverse applications include integral and differential equations, quantum mechanics, optimization, variational and control problems, and problems in approximation theory, nonlinear instability, and bifurcation. An accessible presentation of the Lebesgue integral distinguishes this book from the other books on Hilbert spaces. Students and researchers agree that this is the definite text and research reference book on functional analysis and Hilbert space theory.

Roy F. HOSKINS, J. SOUSA PINTO. — **Theories of generalised functions: distributions, ultradistributions and other generalised functions.** — Un vol. broché, 15,5×23,5, de XII, 293 p. — ISBN 1-898563-98-5. — Prix: £38.00. — Horwood Publishing, Chichester, West Sussex, 2005.

This revised, updated and extended edition of *Distributions, Ultradistributions and Other Generalised Functions* (Ellis Horwood Ltd. 1994) provides extensive coverage of various theories of generalised functions for advanced undergraduate and graduate students in applied mathematics, physics or electrical engineering. It evaluates and compares approaches to the theory of distributions since Schwartz's first presentation, and also clarifies subsequent changes in terminology. It includes treatments of the generalised Fourier transform, ultradistributions and Sato hyperfunctions, discussion of problems arising from the definition of "irregular operations", and an exposition of the so-called new generalised functions of Colombeau. An account of some recent non-standard theories of distributions and hyperfunctions concludes the book.

## *Théorie des opérateurs*

Karl-Heinz FÖRSTER, Peter JONAS, Heinz LANGER, (Editors). — **Operator theory in Krein spaces and nonlinear eigenvalue problems.** — Operator theory: advances and applications, vol. 162. — Un vol. relié, 17×24, de VI, 308 p. — ISBN 3-7643-7452-7. — Prix: SFr. 208.00. — Birkhäuser, Basel, 2006.

This volume contains 16 original research papers written by participants of the 3rd Workshop on Operator Theory in Krein Spaces and Nonlinear Eigenvalue Problems, which was held at the Technische Universität Berlin, Germany, December 12-14, 2003. They deal with spectral and perturbation theory of linear operators in indefinite inner product spaces and their applications. The topics include extension theory of symmetric operators, normal operators, realization theory and models of generalized Nevanlinna functions, interpolation problems, reproducing kernel spaces, matrix and operator pencils, locally definitizable functions, and semigroups.

Donal O'REGAN, Yeol JE CHO, Yu-Qing CHEN. — **Topological degree theory and application.** — Series in mathematical analysis and application, vol. 10. — Un vol. relié, 16,5×24, de 221 p. — ISBN 1-58488-648-X. — Prix: £44.99. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

Since the 1960s, many researchers have extended topological degree theory to various non-compact type nonlinear mappings, and it has become a valuable tool in nonlinear analysis. Presenting a survey of advances made in generalizations of degree theory during the past decade, this book focuses on topological degree theory in normed spaces and its applications. The authors begin by introducing the Brouwer degree theory in $\mathbf{R}^n$, then consider the Leray-Schauder degree for compact mappings in normed spaces. Next, they explore the degree theory for condensing mappings, including applications to ODEs in

Banach spaces. This is followed by a study of degree theory for $A$-proper mappings and its applications to semilinear operator equations with Fredholm mappings and periodic boundary value problems. The focus then turns to construction of Mawhin's coincidence degree for $L$-compact mappings, followed by a presentation of a degree theory for mappings of class $(S+)$ and its perturbations with other monotone-type mappings. The final chapter studies the fixed point index theory in a cone of a Banach space and presents a notable new fixed point index for countably condensing maps. Examples and exercises complement each chapter. With its blend of old and new techniques, *Topological Degree Theory and Applications* forms an outstanding text for self-study or special topics courses and a valuable reference for anyone working in differential equations, analysis, or topology.

## *Géométrie*

Thomas HULL. — **Project origami: activities for exploring mathematics.** — Un vol. broché, 20,5×25,5, de XX, 245 p. — ISBN 1-56881-258-2. — Prix: US$30.00. — A K Peters, Wellesley, Massachusetts, 2006.

When it comes to mathematics, paper isn't just for pen and pencil anymore! Origami, the art and science of paper folding, can be used to explain concepts and solve problems in mathematics beyond traditional geometry. The origami activities collected here also relate to topics in calculus, abstract algebra, discrete mathematics, topology, and more. Based on many years of experience, the author has created an entertaining workbook that can be used in a variety of mathematics classes to visualize the solutions to mathematical problems. Using origami, learn about solving cubic equations, buckyballs, triangle-faced polyhedra, and tori, matrix models for folds, Gaussian curvature, and more! These activities, which can enhance the classroom experience, also make great independent student projects and are perfect for math clubs, or math circles.

John STILLWELL. — **The four pillars of geometry.** — Undergraduate texts in mathematics. — Un vol. relié, de XI, 227 p. — ISBN 0-387-25530-3. — Prix: €39.95. — Springer, New York, 2006.

This new textbook demonstrates that geometry can be developed in four fundamentally different ways, and that all should be used if the subject is to be shown in all its splendor. Euclid-style construction and axiomatics seem the best way to start, but linear algebra smooths the later stages by replacing some tortuous arguments by simple calculations. And how can one avoid projective geometry? It not only explains why objects look the way they do; it also explains why geometry is entangled with algebra. Finally, one needs to know that there is not one geometry, but many, and transformation groups are the best way to distinguish between them. In this book, two chapters are devoted to each approach, the first being concrete and introductory, while the second is more abstract. Geometry has something for everyone, and students will find themselves building on their strengths at times, and working to overcome weaknesses at other times.

Laurent VIVIER. — **La géométrie analytique.** — Collection Quatre à quatre. — Un vol. broché, 13,5×20, de 159 p. — ISBN 2-7465-0160-0. — Prix: €14.00. — Le Pommier, Paris, 2006.

Le mouvement d'une roue, d'une boule de pétanque ou d'une planète, la fabrication des télescopes et des antennes paraboliques, la maîtrise des virages par la courbure et la force

centrifuge, voilà un échantillon de problèmes résolus en géométrie analytique. Au-delà, c'est toute la technologie moderne qui utilise de façon décisive cette discipline mathématique. La géométrie analytique constitue un passage privilégié entre la géométrie, base de toute modélisation du monde physique, et le nombre, objet par excellence du calcul. Le principe, développé par Descartes et Fermat au XVII$^{e}$ siècle, repose sur l'utilisation de deux coordonnées pour se repérer sur un plan, un peu comme dans une grille de bataille navale. Les problèmes se ramènent à des calculs sur les coordonnées tout comme la détermination des longueurs, aires et volumes. La géodésie et la navigation terrestre utilisent également deux coordonnées : la latitude et la longitude. On peut, grâce à elles, calculer et comparer les distances parcourues sur une route à cap constant – avec une boussole – et sur une géodésique – avec un positionnement par satellite. Les retombées mathématiques sont fondamentales et l'explication de la quadrature du cercle en est une illustration éclatante. La géométrie analytique engendre de nouvelles perspectives mathématiques qui entraînent, à leur tour, certaines innovations scientifiques majeures dont les plus extraordinaires sont les théories de la relativité restreinte et générale.

## *Ensembles convexes et inégalités géométriques*

A.D. ALEXANDROV. — **Convex polyhedra.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de XI, 539 p. — ISBN 3-540-23158-7. — Prix : €99.00. — Springer, Berlin, 2005.

*Convex Polyhedra* is one of the classics in geometry. There simply is no other book with so many of the aspects of the theory of 3-dimensional convex polyhedra in a comparable way, and in anywhere near its detail and completeness. It is the definitive source of the classical field of convex polyhedra and contains the available answers to the question of the data uniquely determining a convex polyhedron. This question concerns all data pertinent to a polyhedron, e.g. the lengths of edges, areas of faces, etc. This vital and clearly written book includes the basics of convex polyhedra and collects the most general existence theorems for convex polyhedra that are proved by a new and unified method. The English edition includes numerous comments as well as added material and a comprehensive bibliography by V.A. Zalgaller to bring the work up to date. Moreover, related papers by L.A. Shor and Yu. A. Volkov have been added as supplements to this book.

Peter BRASS, William MOSER, János PACH. — **Research problems in discrete geometry.** — Un vol. relié, 16×24, de XII, 499 p. — ISBN 0-387-23815-8. — Prix : €52.95. — Springer, New York, 2005.

Discrete geometry abounds in open problems that even a high-school student can understand and appreciate. Some of these problems are notoriously difficult and are intimately related to deep questions in other fields of mathematics. But many problems, even old ones, can be solved by a clever undergraduate or a high-school student equipped with an ingenious idea and the kinds of skills used in a mathematical Olympiad. *Research Problems in Discrete Geometry* is the result of a 25-year-old project initiated by the late Leo Moser. It is a collection of more than 500 attractive open problems in the field. The largely self-contained chapters provide a broad overview of discrete geometry, along with historical details and the most important partial results related to these problems. This book is intended as a source book for both professional mathematicians and graduate students who love beautiful mathematical questions.

Maria MOSZYNSKA. — **Selected topics in convex geometry.** — Un vol. broché, 15,5×23,5, de XVI, 226 p. — ISBN 0-8176-4396-6. — Prix: SFr. 78.00. — Birkhäuser, Boston, 2006.

The field of convex geometry has become a fertile subject of mathematical activity in the past few decades. This exposition, examining in detail those topics in convex geometry that are concerned with Euclidean space, is enriched by numerous examples, illustrations, and exercises, with a good bibliography and index. The theory of intrinsic volumes for convex bodies, along with the Hadwiger characterization theorems, whose proofs are based on beautiful geometric ideas such as the rounding theorems and the Steiner formula, are treated in Part 1. In Part 2 the reader is given a survey on curvature and surface area measures and extensions of the class of convex bodies. Part 3 is devoted to the important class of star bodies and selectors for convex and star bodies, including a presentation of two famous problems of geometric tomography: the Shephard problem and the Busemann-Pretty problem. *Selected Topics in Convex Geometry* requires of the reader only a basic knowledge of geometry, linear algebra, analysis, topology, and measure theory. The book can be used in the classroom setting for graduate courses or seminars in convex geometry, geometric and convex combinatorics, and convex analysis and optimisation. Researchers in pure and applied areas will also benefit from the book.

Ivan NIVEN. — **Maxima and minima without calculus.** — The Dolciani mathematical expositions, no. 6. — Un vol. relié, 14,5×22, de XV, 303 p. — ISBN 0-88385-306-X. — Prix: £30.00. — The Mathematical Association of America, Washington, D.C., 1981 reprinted 2006, distributed by Cambridge University Press, Cambridge.

The purpose of this book is to put together in one place the basic elementary techniques for solving problems in maxima and minima other than the methods of calculus and linear programming. The emphasis is not on individual problems, but on methods that solve large classes of problems. The many chapters of the book can be read independently, without references to what precedes or follows. Besides the many problems solved in the book, others are left to the reader to solve, with sketches of solutions given in the later pages.

Chuanming ZONG. — **The cube: a window to convex and discrete geometry.** — Cambridge tracts in mathematics, vol. 168. — Un vol. relié, 16×23,5, de X, 174 p. — ISBN 0-521-85535-7. — Prix: £40.00. — Cambridge University Press, Cambridge, 2006.

This tract has two purposes: to show what is known about the $n$-dimensional unit cubes and to demonstrate how analysis, algebra, combinatorics, graph theory, hyperbolic geometry and number theory can be applied to the study of them. The unit cubes, from any point of view, are among the most important and fascinating objects in an $n$-dimensional Euclidean space. However, our knowledge about them is still quite limited and many basic problems remain unsolved. In this tract eight topics about the unit cubes are introduced: cross-sections, projections, inscribed simplices, triangulations, 0/1 polytopes, Minkowski's conjecture, Furtwängler's conjecture, and Keller's conjecture. In particular, the author demonstrates how deep analysis like log concave measure and the Brascamp-Lieb inequality can deal with the cross-section problem, how hyperbolic geometry helps with the triangulation problem, how group rings can deal with Minkowski's conjecture and Furtwängler's conjecture, and how graph theory handles Keller's conjecture.

## *Géométrie différentielle*

Franki J.E. DILLEN, Leopold C.A. VERSTRAELEN. — **Handbook of differential geometry, vol. II** . — Un vol. relié, 17×24,5, de XIII, 560 p. — ISBN 0-444-52052-X. — Prix: €175.00. — Elsevier North-Holland, Amsterdam, 2006.

In the series of volumes which together will constitute the *Handbook of Differential Geometry* we try to give a rather complete survey of the field of differential geometry. The different chapters will deal both with the basic material of differential geometry and with research results (old and recent). All chapters are written by experts in the area and contain a large bibliography. In this second volume a wide range of areas in the very broad field of differential geometry is discussed, as there are Riemannian geometry, Lorentzian geometry, Finsler geometry, symplectic geometry, contact geometry, complex geometry, Lagrange geometry and the geometry of foliations. Although this does not cover the whole of differential geometry, the reader will be provided with an overview of some of its most important areas.

Oldřich KOWALSKI, Emilio MUSSO, Domenico PERRONE, (Editors). — **Complex, contact and symmetric manifolds: in honor of L. Vanhecke.** — Progress in mathematics, vol. 234. — Un vol. relié, 16×24, de VIII, 277 p. — ISBN 0-8176-3850-4. — Prix: SFr. 164.00. — Birkhäuser, Boston, 2005.

This volume contains research and survey articles by well known and respected mathematicians on differential geometry and topology that have been collected and dedicated in honor of Lieven Vanhecke, as a tribute to his many fruitful and inspiring contributions to these fields. The papers, all written with the necessary introductory and contextual material, describe recent developments and research trends in spectral geometry, the theory of geodesics and curvature, contact and symplectic geometry, complex geometry, algebraic topology, homogeneous and symmetric spaces, and various applications of partial differential equations and differential systems to geometry. One of the key strengths of these articles is their appeal to non-specialists, as well as researchers and differential geometers.

Victor Andreevich TOPONOGOV. — **Differential geometry of curves and surfaces: a concise guide.** — With the editorial assistance of Vladimir Y. ROVENSKI. — Un vol. broché, 15,5×23,5, de XI, 206 p. — ISBN 0-8176-4384-2. — Prix: SFr. 78.00. — Birkhäuser, Boston, 2006.

The study of curves and surfaces forms an important part of classical differential geometry. *Differential Geometry of Curves and Surfaces: a Concise Guide* presents traditional material in this field along with important ideas of Riemannian geometry. The reader is introduced to curves, then to surfaces, and finally to more complex topics. Standard theoretical material is combined with more difficult theorems and complex problem, while maintaining a clear distinction between the two levels. Key topics and features: — Covers central concepts including curves, surfaces, geodesics, and intrinsic geometry. — Substantive material in the Aleksandrov global angle comparison theorem, which the author generalized for Riemannian manifolds (a result now known as the celebrated Toponogov comparison theorem, one of the cornerstones of modern Riemannian geometry). — Contains many nontrivial and original problems, some with hints and solutions. This rigorous exposition, with well-motivated topics, is ideal for advanced undergraduate and first-year graduate students seeking to enter the fascinating world of geometry.

## *Topologie algébrique*

Hans-Joachim BAUES. — **The algebra of secondary cohomology operations.** — Progress in mathematics, vol. 247. — Un vol. relié, 16,5×24, de XXXII, 483 p. — ISBN 3-7643-7448-9. — Prix : SFr. 198.00. — Birkhäuser, Basel, 2006.

The algebra of primary cohomology operations computed by the well-known Steenrod algebra is one of the most powerful tools of algebraic topology. This book computes the algebra of secondary cohomology operations which enriches the structure of the Steenrod algebra in a new and unexpected way. The book solves a long-standing problem on the algebra of secondary cohomology operations by developing a new algebraic theory of such operations. The results have strong impact on the Adams spectral sequence and hence on computation of homotopy groups of spheres.

Frances KIRWAN, Jonathan WOOLF. — **An introduction to intersection homology theory.** — Second edition. — Un vol. relié, 16,5×24, de 229 p. — ISBN 1-58488-184-4. — Prix : US$69.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

*An Introduction to Intersection Homology Theory* introduces the power and beauty of intersection homology, explaining the main ideas and omitting, or merely sketching, the difficult proofs. It treats both the basics of the subject and a wide range of applications, providing lucid overviews of highly technical areas that make the subject accessible and prepare readers for more advanced work in the area. This second edition contains entirely new chapters introducing the theory of Witt space, perverse sheaves, and the combinatorial intersection cohomology of fans. Intersection homology is a large and growing subject that touches on many aspects of topology, geometry and algebra. With its clear explanations of the main ideas, this book builds the confidence needed to tackle more specialized, technical texts and provides a framework within which to place them.

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

Richard CANARY, David EPSTEIN, Albert MARDEN, (Editors). — **Fundamentals of hyperbolic manifolds : selected expositions.** — London Mathematical Society lecture note series, vol. 328. — Un vol. broché, 15,5×22,5, de XII, 335 p. — ISBN 0-521-61558-5. — Prix : £40.00. — Cambridge University Press, Cambridge, 2006.

The book covers the basic properties, and explains the mathematical framework for understanding the 3-dimentional spaces that support a hyperbolic metric. Part I is an exposition of Chapters 8 and 9 of Thurston's pioneering *Princeton Notes*; in addition, there is a new introduction describing recent advances, with an up-to-date bibliography, giving a contemporary context in which the classic articles can be set. Part II expounds the theory of convex hull boundaries and their bending laminations. Of particular significance is the first full proof of Sullivan's theorem that the geometry of the convex hull boundary component is closely tied to the hyperbolic geometry of the region it faces on the sphere at infinity : there is a new addendum describing recent work. Part III is Thurston's famous paper that presents the notion of earthquakes in hyperbolic geometry and proves the earthquake theorem. This can be viewed as an analogue for hyperbolic geometry of quasiconformal mappings in complex analysis. The final part introduces the theory of measures on the limit set, drawing attention to related ergodic theory and the exponent of convergence.

Ralph L. COHEN, Kathryn HESS, Alexander A. VORONOV. — **String topology and cyclic homology.** — Advanced courses in mathematics CRM Barcelona. — Un vol. broché, 17 × 24, de VI, 163 p. — ISBN 3-7643-2182-2. — Prix : SFr. 35.00. — Birkhäuser, Basel, 2006.

Free loop spaces play a central role in both string topology and topological cyclic homology, a topological version of Connes' cyclic homology. The first part focuses on string topology and discusses the loop product from different points of view. The second part is devoted to the construction of algebraic models for computing topological cyclic homology and starts with the study of free loop spaces.

Calvin C. MOORE, Claude L. SCHOCHET. — **Global analysis on foliated spaces.** — Second edition. — Mathematical Sciences Research Institute publications, vol. 9. — Un vol. broché, 15,5 × 23,5, de XIII, de 293 p. — ISBN 0-521-61305-1. — Prix : £24.99. — Cambridge University Press, Cambridge, 2006.

Foliated spaces look locally like products, but their global structure is generally not a product, and tangential differential operators are correspondingly more complex. In the 1980s, Alain Connes founded what is now known as noncommutative geometry and topology. One of the first results was his generalization of the Atiyah-Singer index theorem to compute the analytic index associated with a tangential (pseudo)-differential operator and an invariant transverse measure on a foliated manifold, in terms of topological data on the manifold and the operator. This book presents a complete proof of this beautiful result, generalized to foliated spaces (not just manifolds). It includes the necessary background from analysis, geometry, and topology. This second edition has improved exposition, an updated bibliography, an index, and additional material covering developments and applications since the first edition came out, including the confirmation of the gap labelling conjecture of Jean Bellissard.

## *Probabilités et processus stochastiques*

Frank BEICHELT. — **Stochastic processes in science, engineering and finance.** — Un vol. relié, 16,5 × 24, de 417 p. —ISBN 1-58488-493-2. — Prix : US$89.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

This book presents a self-contained introduction to stochastic processes with emphasis on their applications in science, engineering, finance, computer science, and operations research. It provides theoretical foundations for modeling time-dependent random phenomena in these areas and illustrates their application by analyzing numerous practical examples. The treatment assumes few prerequisites, requiring only the standard mathematical maturity acquired by undergraduate applied science students. It includes an introductory chapter that summarizes the basic probability theory needed as background. Numerous exercises reinforce the concepts and techniques discussed and allow readers to assess their grasp of the subject. Solutions to most of the exercises are provided in an appendix. While focused primarily on practical aspects, the presentation includes some important proofs along with more challenging examples and exercises for those more theoretically inclined. Mastering the contents of this book prepares readers to apply stochastic modeling in their own fields and enables them to work more creatively with software designed for dealing with the data analysis aspects of stochastic processes.

Prem C. CONSUL, Felix FAMOYE. — **Lagrangian probability distributions.** — Foreword by Samuel Kotz. — Un vol. relié, 18,5×26, de XX, 352 p. — ISBN 0-8176-4365-6. — Prix: SFr. 105.00. — Birkhäuser, Boston, 2006.

Lagrangian expansions can be used to obtain numerous useful probability models, which have been applied to real life situations including, but not limited to: branching processes, queuing processes, stochastic processes, environmental toxicology, diffusion of information, ecology, strikes in industries, sales of new products, and production targets for optimum profits. This book presents a comprehensive, systematic treatment of the class of Lagrangian probability distributions, along with some of its families, their properties, and important applications. Graduate students and researchers with a good knowledge of standard statistical techniques and an interest in Lagrangian probability distributions will find this work valuable. It may be used as a reference text or in courses and seminars on distribution theory and Lagrangian distributions. Applied scientists and researchers in environmental statistics, reliability, sales management, epidemiology, operations research, optimization in manufacturing and marketing, and infectious disease control will benefit immensely from the various applications in the book.

Thomas DECK. — **Der Itô-Kalkül: Einführung und Anwendungen.** — Un vol. broché, 15,5×23,5, de VIII, 247 p. — ISBN 3-540-25392-0. — Prix: €29.95. — Springer, Berlin, 2006.

Dieses Buch behandelt stochastische Integrale bezüglich der Brownschen Bewegung (Itô-Integrale), den daraus resultierenden Itôschen Differentialkalkül und einige Anwendungen. Das Buch zeichnet sich durch zwei Besonderheiten aus: zum Einen sind die mathematischen Voraussetzungen minimiert, und zum Anderen wird der Itô-Kalkül in einem ersten Schritt völlig ohne Martingale entwickelt. Dies erleichtert (insbesondere für Anwender) den Einstieg in die Theorie, da tiefer liegende stochastische Methoden zunächst nicht benötigt werden. Erst in einem zweiten Schritt werden die engen Beziehungen zur Martingaltheorie und zur Brownschen Bewegung entwickelt (Darstellungssätze, Sätze von Lévy, Girsanov, etc.). Anwendungen auf stochastische Differentialgleichungen und Optionspreistheorie runden den Text ab.

Olle HÄGGSTRÖM. —**Streifzüge durch die Wahrscheinlichkeitstheorie.** — Un vol. broché, 15,5×23,5, de XII, 267 p. — ISBN 3-540-23050-5. — Prix: €29.95. — Berlin, Springer, 2006.

Dies ist eine Einführung in die Wahrscheinlichkeitstheorie – die Mathematik des Zufalls. In einer mehr oder weniger losen Folge von Kapiteln werden verschiedene Themen angesprochen: ein Teil behandelt klassische Begriffe, wie Irrfahrten oder die Gesetze der großen Zahlen, während andere Kapitel zeigen, wie die Mathematik in aktuelle Forschungen, z.B. die der Evolutionsbiologie, eingreift. Anschaulich wird der Zusammenhang zur Spieltheorie erläutert. Der Text widmet sich ausführlich einigen der am meisten diskutierten Paradoxa der Wahrscheinlichkeitstheorie, deren Betrachtung zu lehrreichen Einsichten führt. Einen wichtigen Raum nimmt auch die Perkolation und ihre Anwendungen ein, so wird zum Beispiel das so genannte "kleine Welt"-Phänomen mathematisch untersucht. Das Buch ist in erster Linie als Zusatzlektüre für Vorlesungen zur Wahrscheinlichkeitsrechnung und mathematischen Statistik im Grundstudium an Universität und Hochschule gedacht. Darüber hinaus gibt es Anregungen für Gymnasiallehrer und ihre Schüler. Häggströms Buch leistet für die Wahrscheinlichkeitstheorie das, was Jänichs für die Topologie tut.

Hung T. NGUYEN. — **An introduction to random sets.** — Un vol. relié, 16,5×24, de 257 p. — ISBN 1-58488-519-X. — Prix: £44.99. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

The study of random sets is a large and rapidly growing area with connections to many areas of mathematics and applications in widely varying disciplines, from economics and decision theory to biostatistics and image analysis. The drawback to such diversity is that the research reports are scattered throughout the literature, with the result that in science and engineering, and even in the statistics community, the topic is not well known and much of the enormous potential of random sets remains untapped. *An Introduction to Random Sets* provides a friendly but solid initiation into the theory of random sets. It builds the foundation for studying random set data, which, viewed as imprecise or incomplete observations, are ubiquitous in today's technological society. The author, widely known for his best-selling *A First Course in Fuzzy Logic* text as well as his pioneering work in random sets, explores motivations, such as coarse data analysis and uncertainty analysis in intelligent systems, for studying random sets as stochastic models. Other topics include random closed sets, related uncertainty measures, the Choquet integral, the convergence of capacity functionals, and the statistical framework for set-valued observations. An abundance of examples and exercises reinforce the concepts discussed. Designed as a textbook for a course at the advanced undergraduate or beginning graduate level, this book will serve equally well for self-study and as a reference for researchers in fields such as statistics, mathematics, engineering, and computer science.

Bassel SOLAIMAN. — **Processus stochastiques pour l'ingénieur.** — Un vol. broché, 16×24, de XIII, 241 p. — ISBN 2-88074-668-X. — Prix: SFr. 66.00. — Presses polytechniques et universitaires romandes, Lausanne, 2006.

Cet ouvrage propose une présentation didactique et homogène de la théorie des processus stochastiques, vue comme une extension de la théorie des probabilités. Il s'adresse donc tout autant aux étudiants ingénieurs qu'aux ingénieurs souhaitant s'initier à ce puissant outil de modélisation et d'analyse. Les concepts essentiels des processus stochastiques sont tout d'abord décrits, commentés et illustrés d'exemples dans le traitement du signal aléatoire. Plusieurs cas concrets de processus stochastiques (processus gaussiens ou de Poisson, chaînes de Markov) sont ensuite présentés dans différents contextes d'applications réelles (files d'attente, analyse de données médicales...). De très nombreux exercices corrigés illustrent l'ouvrage, et permettent au lecteur de se familiariser avec certains points particuliers de l'exposé.

Daniel W. STROOCK, S.R. Srinivasa VARADHAN. — **Multidimensional diffusion processes.** — Classics in mathematics. — Grundlehren der mathematischen Wissenschaften, vol. 233. — Un vol. broché, 15,5×23,5, de XII, 338 p. — ISBN 3-540-28998-4. — Prix: €39.95. — Springer, Berlin, 2006.

Preliminary material: Extension theorems, martingales, and compactness. — Markov processes, regularity of their sample paths, and the Wiener measure. — Parabolic partial differential equations. — The stochastic calculus of diffusion theory. — Stochastic differential equations. — The martingale formulation. — Uniqueness. — Itô's uniqueness and uniqueness to the martingale problem. — Some estimates on the transition probability functions. — Explosion. — Limit theorems. — The non-unique case.

A.L. YAKIMIV. — **Probabilistic applications of Tauberian theorems.** — Translated by Andrei V. KOLCHIN. — Modern probability and statistics. — Un vol. relié, 16×24,5, de VIII, 225 p. — ISBN 90-6764-437-4. — Prix: €160.00. — VSP, Brill Academic Publishers, Leiden, 2005.

The Tauberian theory has found a widespread application in probability theory. In the last three decades, much thought has been given to multidimensional Tauberian theory. This is primarily due to the fact that Tauberian theorems are finding ever-widening application in mathematical physics, the theory of differential equations, and probability theory. By Abelian theorems are meant those assertions which allow one to deduce from the asymptotic behaviour of sequences and functions the asymptotic properties of their generating functions and Laplace transforms (as well as other integral transforms). Theorems converse to Abelian are referred to as Tauberian. Usually, direct methods are used to prove Abelian theorems. It is much more difficult to prove the corresponding Tauberian theorems, and a wide spectrum of analytical techniques is involved. This monograph places particular emphasis on the multidimensional studies. It contains Tauberian theorems and their applications to analyse the asymptotic behaviour of stochastic processes, record processes, random permutations, and infinitely divisible random variables.

## *Statistique*

Lior PATCHER, Bernd STURMFELS, (EDITORS). — **Algebraic statistics for computational biology.** — Un vol. relié, 18×26, de XII, 420 p. — ISBN 0-521-85700-7. — Prix: £35.00. — Cambridge University Press, Cambridge, 2005.

The quantitative analysis of biological sequence data is based on methods from statistics coupled with efficient algorithms from computer science. Algebra provides a framework for unifying many of the seemingly disparate techniques used by computational biologists. This book offers an introduction to this mathematical framework and describes tools from computational algebra for designing new algorithms for exact, accurate results. These algorithms can be applied to biological problems such as aligning genomes, finding genes, and constructing phylogenies. The first part of this book consists of four chapters on the themes of statistics, computation, algebra, and biology offering speedy, self-contained introductions to the emerging field of algebraic statistics and its applications to genomics. In the second part, the four themes are combined and developed to tackle real problems in computational genomics. As the first book in this exciting and dynamic area, it will be welcomed as a text for self-study or for advanced undergraduate and beginning graduate courses.

Rand R. WILCOX. — **Introduction to robust estimation and hypothesis testing.** — Second edition. — Un vol. relié, 16×23,5, de XIX, 588 p. — ISBN 0-12-751542-9. — Prix: €79.95. — Elsevier Academic Press, Amsterdam, 2005.

*Introduction to Robust Estimation and Hypothesis Testing* focuses on the practical applications of modern, robust methods which can greatly enhance our chance of detecting true differences among groups and true associations among variables. This book provides a thorough, up-to-date explanation of the foundation of robust methods for beginners. It guides the reader through the basic strategies used for practical solutions to problems, and includes helpful updates which are available free of charge via an FTP site. The book also provides a brief background on the foundations of modern methods, placing the new

methods in historical context. New to this edition: Covers latest improvements in ANOVA (analysis of variance). — Includes newest rank-based methods. — Covers recent advances in regression. — Describes and illustrates easy-to-use software.

## *Informatique*

Brian R. HUNT, Ronald L. LIPSMAN, Jonathan M. ROSENBERG, Kevin R. COOMBES, John E. OSBORN, Garett J. STUCK. — **A guide to MATLAB®: for beginners and experienced users.** — Second edition. — Un vol. broché, 17,5×24,5, de XV, 311 p. — ISBN 0-521-61565-8. — Prix : £29.99. — Cambridge University Press, Cambridge, 2006.

This is a short, focused introduction to MATLAB, a comprehensive software system for mathematical and technical computing. It contains concise explanations of essential MATLAB commands, as well as easily understood instructions for using MATLAB's programming features, graphical capabilities, simulation models, and rich desktop interface. Written for MATLAB 7, it can also be used with earlier (and later) versions of MATLAB. This book teaches how to graph functions, solve equations, manipulate images, and much more. It contains explicit instructions for using MATLAB's companion software, Simulink, which allows graphical models to be built for dynamical systems. MATLAB's new 'publish' feature is discussed, which allows mathematical computations to be combined with text and graphics, to produce polished, integrated, interactive documents. For the beginner it explains everything needed to start using MATLAB, while experienced users making the switch to MATLAB 7 from an earlier version will also find much useful information here.

Hans Petter LANGTANGEN. — **Python scripting for computational science.** — Second edition. — Texts in computational science and engineering, vol. 3. — Un vol. relié, 16,5×24, de XXIV, 736 p. — ISBN 3-540-29415-5. — Prix : €53.45. — Springer, Berlin, 2006.

The goal of this book is to teach computational scientists how to develop tailored, flexible, and human-efficient working environments built from small programs (scripts) written in the easy-to-learn, high-level language Python. The focus is on examples and applications of relevance to computational scientists: gluing existing applications and tools, e.g. for automating simulation, data analysis, and visualization; steering simulations and computational experiments; equipping old programs with graphical user interfaces; making computational Web applications; and creating interactive interfaces with a Maple/Matlab-like syntax to numerical applications in C/C++ or Fortran. In short, scripting with Python makes you much more productive, increases the reliability of your scientific work and lets you have more fun – on Unix, Windows and Macintosh. All the tools and examples in this book are open source codes. The second edition features new material, reorganization of text, improved examples and tools, updated information, and correction of errors.

David MCMAHON, Daniel M. TOPA. — **A beginner's guide to Mathematica.** — Un vol. broché, 15,5×23,5, de IX, 725 p. — ISBN 1-58488-467-3. — Prix : US$69.95. — Chapman & Hall/CRC, Boca Raton, FL, 2006.

*A Beginner's Guide to Mathematica* offers a simple, step-by-step, approach to help math-savvy newcomers build the skills needed to use software in practice. Concise and easy to use, this book teaches by example and points out potential pitfalls along the way. The presentation starts with simple problems and discusses multiple solution paths, ranging from basic to

elegant, to gradually introduce the *Mathematica* toolkit. More challenging and eventually cutting-edge problems follow. The authors place high value on notebook and file system organization, cross-platform capabilities, and data reading and writing. The text features an array of error messages you will likely encounter and clearly describes how to deal with those situations. This book offers a non-threatening introduction to *Mathematica* that teaches the aspects of the software needed for many practical applications. It will get you started on performing specific, relatively simple tasks and enable you to build on this experience and move on to more real-world problems

Michael TROTT. — **The Mathematica guidebook for symbolics.** — Un vol. relié, 19,5×24, de XXXVIII, 1453 p. — ISBN 0-387-95020-6. — Prix: €67.36. — Springer, New York, 2006.

*The Mathematica Guidebook for Symbolics* (code and text fully tailored for Mathematica 5.1) deals with Mathematica's symbolic mathematical capabilities. Structural and mathematical operations on single and systems of polynomials are fundamental to many symbolic calculations and they are covered in considerable detail. The solution of equations and differential equations, as well as the classical calculus operations (differentiation, integration, summation, series expansion, limits) are exhaustively treated. Generalized functions and their uses are discussed. In addition, this volume discusses and employs the classical orthogonal polynomials and special functions of mathematical physics. To demonstrate the symbolic mathematics power, a large variety of problems from mathematics and physics are discussed. — *Unique features:* Familiarizes the reader with symbolic mathematics functions in Mathematica for algebra, analysis, as well as orthogonal polynomials and the special functions of mathematical physics and shows how to use them effectively.— Detailed discussions of the most frequent symbolic operations: equation solving, differentiation, series expansion, integration and organizing and performing symbolic calculations in Mathematica, as compared to paper-and-pencil calculations.— Numerous examples from mathematics, physics, and computer science.— Clear organization, complete topic coverage, and accessible exposition for both novices and experts.— Website for book with additional materials and updates: http://www.mathematicaguidebooks.org. — Accompanying DVD contains all material in the form of hyperlinked Mathematica note books that can be edited and manipulated; striking color graphics and animations are included on the DVD.

John VINCE. — **Mathematics for computer graphics.** — Second edition. — Un vol. broché, 15,5×23,5, de XIV, 248 p. — ISBN 1-84628-034-6. — Prix: €32.95. — Springer, London, 2006.

Baffled by maths? Then don't give up hope. John Vince will show you how to understand many of the mathematical ideas used in computer animation, virtual reality, CAD, and other areas of computer graphics. In thirteen chapters you will rediscover – and hopefully discover for the first time a new way of understanding – the mathematical techniques required to solve problems and design computer programs for computer graphic applications. Each chapter explores a specific mathematical topic and takes you forward into more advanced areas until you are able to understand 3D curves and surface patches, and solve problems using vectors. After reading the book, you should be able to refer to more challenging books with confidence and develop a greater insight into the design of computer graphics software. Get to grips with mathematics fast – numbers, algebra, trigonometry, coordinate geometry, transforms, vectors, curves and surfaces, barycentric coordinates, analytic geometry.

## *Mécanique des fluides, acoustique*

Marwan MOUBACHIR, Jean-Paul ZOLÉSIO. — **Moving shape analysis and control: applications to fluid structure interactions.** — Pure and applied mathematics, vol. 277. — Un vol. relié, 16×24, de XIX, 291 p. — ISBN 1-58488-611-0. — Prix : US$99.95. — Chapman & Hall/CRC, Boca Raton, Florida, 2006.

Problems involving the evolution of two- and three-dimensional domains arise in many areas of science and engineering. These range from free surface flows, phase changes, and fracture and contact problems to applications in civil engineering constructions, bio-mechanical systems, and computer vision. Emphasizing an Eulerian approach, *Moving Shape Analysis and Control : Applications to Fluid Structure Interactions* presents valuable tools for the mathematical analysis of evolving domains. This book illustrates the efficiency of the tools presented through different examples connected to the analysis of noncylindrical partial differential equations, such as the Navier-Stokes equations for incompressible fluids in moving domains. The authors begin by providing all of the details of existence and uniqueness of the flow in both strong and weak cases. After establishing several important principles and methods, they devote several chapters to demonstrating Eulerian evolution and derivation tools for the control of systems involving fluids and solids. The book concludes with boundary control of fluid-structure interaction systems, followed by helpful appendices that review some of the advanced mathematics used throughout the text.

## *Mécanique quantique*

Michel LE BELLAC. — **Quantum physics.** — Translated by Patricia de Frocrand-Millard. — Un vol. broché, 18×25,5, de XIX, 585 p. — ISBN 0-521-85277-3. — Prix : £45.00. — Cambridge University Press, Cambridge, 2006.

Throughout the book, Le Bellac teaches the fundamentals of quantum physics using an original approach that relies primarily on an algebraic treatment, and on the systematic use of symmetry principles. In addition to the standard topics such as one-dimensional potentials, angular momentum, and scattering theory, the reader is introduced to more recent developments at an early stage. These include a detailed account of entangled states and their applications, the optical Bloch equations, the theory of laser cooling and of magneto-optical traps, vacuum Rabi oscillations, and an introduction to open quantum systems. This is a textbook for a modern course on quantum physics, written for advanced undergraduate and graduate students. Solutions for instructors (password protected) are available online at www.cambridge.org.

Stephanie Frank SINGER. — **Linearity, symmetry, and prediction in the hydrogen atom.** — Undergraduate texts in mathematics. — Un vol. relié, 16×24, de XIV, 397 p. — ISBN 0-387-24637-1. — Prix : €39.95. — Springer, New York, 2005.

The predictive power of mathematics in quantum phenomena is one of the great intellectual successes of the 20th century. This textbook, which is aimed at undergraduate or graduate level students concentrates on how to make predictions about the numbers of each kind of basic state of a quantum system from only two ingredients : the symmetry and the linear model of quantum mechanics. This method, involving the mathematical area of

representation theory or group theory, combines three core mathematical subjects, namely, linear algebra, analysis and abstract algebra. Wide applications of this method occur in crystallography, atomic structure, classification of manifolds with symmetry, and other areas. The topics unfold systematically, introducing the reader first to an important example of a quantum system with symmetry, the single electron in a hydrogen atom. Then the reader is given just enough mathematical tools to make predictions about the numbers of each kind of electronic orbital based solely on the physical spherical symmetry of the hydrogen atom. The final chapters address the related ideas of quantum spin, measurement and entanglement. This user-friendly exposition, driven by numerous examples and exercises, requires a solid background in calculus and familiarity with either linear algebra or advanced quantum mechanics.

## *Physique statistique, structure de la matière*

Anton BOVIER. — **Statistical mechanics of disordered systems: a mathematical perspective.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18×25,5, de XIV, 312 p. — ISBN 0-521-84991-8. — Prix: £45.00. — Cambridge University Press, Cambridge, 2006.

Our mathematical understanding of the statistical mechanics of disordered systems is going through a period of stunning progress. This self-contained book is a graduate-level introduction for mathematicians and physicists interested in the mathematical foundations of the field, and can be used as a textbook for a two-semester course on mathematical statistical mechanics. It assumes only some basic knowledge of classical physics; on the mathematics side, the reader should have a good working knowledge of graduate-level probability theory. — *Contents:* Statistical mechanics: Introduction. Principles of statistical mechanics. Lattice gases and spin systems. Gibbsian formalism for lattice spin systems. Cluster expansions. — Disordered systems: lattice models: Gibbsian formalism and metastates. The random-field Ising model. — Disordered systems: mean-field models: Disordered mean-field models. The random energy model. Derrida's generalized random energy models. The SK models and the Parisi solution. Hopfield models. The number partitioning problem.

## *Information, communication, circuits*

Ron M. ROTH. — **Introduction to coding theory.** — Un vol. relié, 18×25,5, de XI, 566 p. — ISBN 0-521-84504-1. — Prix: £40.00. — Cambridge University Press, Cambridge, 2006.

This book introduces the reader to the theoretical foundations of error-correcting codes, with an emphasis on Reed-Solomon codes and their derivative codes. After reviewing linear codes and finite fields, the author describes Reed-Solomon codes and various decoding algorithms. Cyclic codes are presented, as are MDS codes, graph codes, and codes in the Lee metric. Concatenated, trellis, and convolutional codes are also discussed in detail. Homework exercises introduce additional concepts such as Reed-Muller codes, and burst error correction. The end-of-chapter notes often deal with algorithmic issues, such as the time complexity of computational problems. While mathematical rigor is maintained, the text is designed to be accessible to a broad readership, including students of computer science, electrical engineering, and mathematics, from senior undergraduate to graduate level.

John TALBOT, Dominic WELSH. — **Complexity and cryptography: an introduction.** — Un vol. broché, 15,5 × 23, de XII, 292 p. — ISBN 0-521-61771-5 (relié: 0-521-85231-5). — Prix: £23.99 (relié: £55.00). — Cambridge University Press, Cambridge, 2006.

Cryptography plays a crucial role in many aspects of today's world, from internet banking and e-commerce to e-mail and web-based business processes. Understanding the principles on which it is based is an important topic that requires a knowledge of both computational complexity and a range of topics in pure mathematics. This book provides that knowledge, combining an informal style with rigorous proofs of the key results to give an accessible introduction. It comes with plenty of examples and exercises (many with hints and solutions), and is based on a highly successful course developed and taught over many years to undergraduate and graduate students in mathematics and computer science.