

Généralités

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BULLETIN BIBLIOGRAPHIQUE

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Howard ANTON. — **Calculus, vol. 1.** — 6th edition. — Un vol. broché, 21,5×26, de xxxi, 560 p. + 1 CD-ROM. — ISBN 0-471-24331-0. — Prix: £17.99. — John Wiley & Sons, New York, 1998.

This is a major revision. In keeping with current trends in calculus, the goal for this edition is to focus on conceptual understanding and applicability of the subject matter. This edition is designed to ensure that the book is sufficiently flexible that it will continue to meet the needs of those using the last edition and at the same time provide a fresh approach for those instructors who are taking their calculus course in a new direction. An internet experimental site has been established to complement the text. The joined CD-ROM for IBM compatibles and Macintosh provides students with an electronic form of detailed solutions to odd-numbered exercises, sample tests, pre-calculus review material, a brief introduction to some aspects of linear algebra.

Alan L. CARAY, Michael K. MURRAY, (Editors). — **Geometric analysis and Lie theory in mathematics and physics.** — Australian Mathematical Society lecture series, vol. 11. — Un vol. broché, 15,5×23, de ix, 290 p. — ISBN 0-521-62490-8. — Prix: £24.95. — Cambridge University Press, Cambridge, 1997.

This book brings together a selection of the best lectures from many graduate workshops held at the Australian National Institute for Theoretical Physics in Adelaide. The lectures presented here describe subjects currently of great interest, generally at the interface between mathematics and physics. Topics covered include quantum groups, the operator algebra approach to the integer quantum Hall effect, solvable lattice models and Hecke algebras, Yangians, equivariant cohomology and symplectic geometry, and von Neumann invariants of covering spaces.

Eric CONNALLY, Deborah HUGHES-HALLETT. — **Functions modeling change: a preparation for calculus, preliminary edition.** — Student solutions manual. — Un vol. broché, 21,5×28, de 173 p. — ISBN 0-471-23781-7. — Prix: £22.50. — John Wiley & Sons, New York, 1998.

This book contains the solutions of exercises provided in the manual with the same title. The central theme of the manual is functions as models of change. The authors emphasize that functions can be grouped into families and that functions can be used as models for real-world behavior. Because linear, exponential, power, and periodic functions are more frequently used to model physical phenomena, they are introduced before polynomial and rational functions. Once introduced, a family of functions is compared and contrasted with other families of functions.

Peter J. ECCLES. — **An introduction to mathematical reasoning: numbers, sets and functions.** — Un vol. broché, $15,5 \times 23$, de XII, 350 p. — ISBN 0-521-59718-8. — Prix : £ 14.95 (relié : £ 40.00). — Cambridge University Press, Cambridge, 1997.

The purpose of this book is to introduce the basic ideas of mathematical proof to students embarking on university mathematics. The emphasis is on helping the reader in understanding and constructing proofs and writing clear mathematics. This is achieved by exploring set theory, combinatorics and number theory, topics which include many fundamental ideas which are part of the tool kit of any mathematician. There are over 250 problems which include questions to interest and challenge the most able student but also plenty of routine exercises to help familiarize the reader with the basic ideas.

A.C. FOWLER. — **Mathematical models in the applied sciences.** — Cambridge texts in applied mathematics. — Un vol. broché, $17,5 \times 24,5$, de XIV, 402 p. — ISBN 0-521-46703-9. — Prix : £ 24.95 (relié : £ 65.00). — Cambridge University Press, Cambridge, 1997.

This book illustrates how models of continuous processes in a variety of applications can be derived, simplified, and analyzed. Using examples from an impressive array of disciplines, including industrial, environmental, and biological sciences, the presentation emphasizes the uniformity of the approach used by the applied mathematical grounding in calculus and analysis and provides a wealth of examples for students of mathematics, engineering, and the range of applied sciences.

Bernard GOSTIAUX. — **Exercices de mathématiques spéciales, t. 1: Algèbre.** — Collection «Mathématiques». — Un vol. broché, $15 \times 21,5$, de XI, 248 p. — ISBN 2-13-048727-0. — Prix : FF 198.00. — Presses universitaires de France, Paris, 1997.

L'auteur s'est efforcé en rédigeant ces exercices, de répondre à la question qui se pose à tous les candidats au concours de grandes écoles : comment organiser rationnellement la recherche de la solution d'un problème ? Dans cet esprit, le présent ouvrage ne se limite pas à l'énoncé d'une collection de résultats à connaître, mais se veut constituer un essai d'exposition par l'exemple d'une méthode de travail.

Bernard GOSTIAUX. — **Exercices de mathématiques spéciales, t. 2: Topologie, analyse.** — Collection «Mathématiques». — Un vol. broché, $15 \times 21,5$, de 305 p. — ISBN 2-13-048728-9. — Prix : FF 218.00. — Presses universitaires de France, Paris, 1997.

Ces exercices de topologie et d'analyse ont été choisis avec le souci de montrer comment faire usage de parties partout denses dans un espace, pour ramener la vérification d'une propriété ponctuelle sur l'espace à une telle partie, en présence de stabilité par continuité. Ce type de méthode présente certaines analogies avec l'utilisation de parties génératrices pour caractériser les morphismes en algèbre. La notion de connexité a été développée pour mettre en évidence ses applications.

Bernard GOSTIAUX. — **Exercices de mathématiques spéciales, t. 3: Géométrie, géométrie différentielle.** — Collection «Mathématiques». — Un vol. broché, $15 \times 21,5$, de 325 p. — ISBN 2-13-048729-7. — Prix : FF 218.00. — Presses universitaires de France, Paris, 1997.

Si l'utilisation de logiciels performants rend caducs de nombreux exercices de construction de courbes, elle ne dispense pas pour autant le candidat aux concours des grandes écoles de justifications rigoureuses. Le texte met en évidence la manière selon laquelle l'algèbre ou la topologie peuvent intervenir pour décomposer la résolution d'un travail compliqué en étapes simples. L'auteur a privilégié l'étude de questions où la géométrie analytique nécessite l'étude du mode de représentation et du choix du repère.

Jeremy GUNAWARDENA, (Editor). — **Idempotency**. — Publications of the Newton Institute, vol. 11. — Un vol. relié, $16 \times 23,5$, de xii, 443 p. — ISBN 0-521-55344-X. — Prix: £55.00. — Cambridge University Press, Cambridge, 1998.

Certain nonlinear optimisation problems arising in such disparate areas as the theory of computation, pure and applied probability, and mathematical physics can be solved by linear methods, provided one replaces the usual number system with one in which addition satisfies the idempotent law. Only recently has a systematic study of the subject emerged. This volume is a record of a workshop organised by Hewlett-Packard's Basic Research Institute in the Mathematical Sciences (BRIMS), which brought together for the first time many leading researchers in the area. It includes also a broad introduction to idempotency, and a bibliography of the subject.

Jürgen JOST. — **Postmodern analysis**. — Universitext. — Un vol. broché, 16×24 , de xv, 353 p. — ISBN 3-540-63485-1. — Prix: DM 58.00. — Springer, Berlin, 1998.

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

François LE LIONNAIS. — **Les grands courants de la pensée mathématique**. — Avec un avant-propos de Jean Ballard et une lettre inédite de Paul Valéry, préface de Bernard Teissier. — Collection Histoire de la pensée. — Un livre broché, 14×21 , de 533 p. — ISBN 2-7056-6332-0. — Prix: FF 180.00. — Hermann, Paris, 1998.

Ce livre a été l'un des ouvrages préférés de plusieurs générations de mathématiciens. Malgré les progrès des mathématiques pendant les dernières décennies, il reste fascinant; il aura juste cinquante ans en 1998. L'ouvrage est consacré aux mathématiques, mais ses lecteurs n'ont pas besoin d'être mathématiciens. On y trouve une idéologie des mathématiques, insensible au déclin des idéologies. C'est un livre collectif et la pérennité de tels livres est inhabituelle. C'est donc mieux qu'un classique: un livre rare.

Frank MORGAN. — **Calculus lite**. — Second edition. — Un vol. relié, $16 \times 23,5$, de xiv, 299 p. — ISBN 1-56881-070-9. — Prix: US\$ 59.90. — A.K. Peters, Wellesley, Massachusetts, 1997.

Already used with great success at a variety of prestigious schools, this concise book would be an excellent foundation for any calculus course, allowing teachers to mold the material to their individual needs. This lean text covers single-variable calculus in less than 300 pages by getting right to the point, and stopping there, introducing some standard preliminary topics, such as trigonometry and limits, by using them in the calculus. This second edition includes a quick introduction to multivariable calculus: partial derivatives, double integrals, maximum-minimum problems. Earlier sections have been improved.

Hans-Heinrich NAEGELI. — **Mathématiques discrètes 1: fondements et arithmétique entière**. — Collection informatique. — Un vol. broché, 16×24 , de xvii, 275 p. — ISBN 2-88074-356-7. — Prix: SFr. 69.60. — Presses polytechniques et universitaires romandes, Lausanne, 1998.

Le 1^{er} tome de cet ouvrage traite les fondements des mathématiques discrètes, notamment les nombres naturels et entiers avec leur arithmétique, le mécanisme de l'induction, et il esquisse quelques applications de la matière présentée, comme la cryptographie et les codes utilisés en

télécommunications. L'originalité de ce livre consiste dans le fait qu'il propose d'allier une compréhension guidée par l'intuition à une démarche rigoureuse. Il comprend de nombreux exercices ainsi que des dialogues fictifs entre un étudiant et son professeur permettant de mieux cerner les pièges et les difficultés particulières.

Michael C. REED. — **Fundamental ideas of analysis.** — Un vol. relié, $18,5 \times 26$, de XII, 413 p. — ISBN 0-471-15996-4. — Prix: £24.95. — John Wiley, Chichester, 1998.

The ideas and methods of mathematics, long central to the physical sciences, now play an increasingly important role in a wide variety of disciplines. Analysis provides theorems that prove that results are true and provides techniques to estimate the errors in approximate calculations. The ideas and methods of analysis play a fundamental role in ordinary differential equations, probability theory, differential geometry, numerical analysis, complex analysis, partial differential equations, as well as in most areas of applied mathematics. — *Contents*: Sequences. The Riemann Integral. Differentiation. Sequences of Functions. Series of Functions. Differential Equations. Complex Analysis. Fourier Series. Probability Theory.

Joseph G. ROSENSTEIN, Deborah S. FRANZBLAU, Fred S. ROBERTS, (Editors). — **Discrete mathematics in the schools.** — DIMACS series in discrete mathematics and theoretical computer science, vol. 36. — Un vol. relié, 19×26 , de xxxiii, 452 p. — ISBN 0-8218-0448-0. — Prix: £21.00. — American Mathematical Society, Providence, distributed by Oxford University Press, Oxford, 1998.

This volume is a collection of articles written by experienced primary, secondary, and collegiate educators. It explains why discrete mathematics should be taught in school classrooms and offers practical guidance on how to do so. Teachers of all levels will find a great deal of valuable material to help them. One main article provides a comprehensive and detailed view of discrete mathematics. Another surveys the resources that are available for teachers. School and district curriculum leaders will find material that addresses how discrete mathematics can be introduced into their curricula. College faculty members will find ideas and topics that can be incorporated into a variety of courses.

Gabor TOTH. — **Glimpses of algebra and geometry.** — Undergraduate texts in mathematics. Readings in mathematics. — Un vol. relié, 18×24 , de xviii, 308 p. — ISBN 0-387-98213-2. — Prix: DM 68.00. — Springer, New York, 1998.

The purpose of this book is to fill a gap between undergraduate and graduate mathematics studies. It is one of the few undergraduate texts to explore the subtle and sometimes puzzling connections between number theory, classical geometry, and modern algebra in a clear and easily understandable style. Over 160 computer-generated images, accessible to readers via the World Wide Web, facilitate an understanding of mathematical concepts and proofs even further.

Thomas TYMOCZKO, (Editor). — **New directions in the philosophy of mathematics: an anthology.** — Revised and expanded edition. — Un vol. broché, $15,5 \times 23,5$, de xvii, 436 p. — ISBN 0-691-03498-2. — Prix: US\$24.95. — Princeton University Press, Princeton, 1998.

This provocative book goes beyond foundationalist questions to offer what has been called a "postmodern" assessment of the philosophy of mathematics – one that addresses issues of theoretical importance in terms of mathematical experience. By bringing together essays of leading philosophers, mathematicians, logicians, and computer scientists, the author reveals an evolving effort to account for the nature of mathematics in relation to other human activities. These accounts include such topics as the history of mathematics as a field of study, predictions about how computers will influence the future organization of mathematics, and what processes a proof undergoes before it reaches publishable form.