Analyse combinatoire

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Théorie des ensembles

Iain T. ADAMSON. — **A set theory workbook.** — Un vol. broché, 15,5×23,5, de VIII, 154 p. — ISBN 0-8176-4028-2. — Prix: SFr. 58.00. — Birkhäuser, Boston, 1998.

The plan of the book is unconventional. Part One gives a quick and clear overview of the basic definitions of the subject, interspersed with a large number of problems. Some of them are simple illustrations, others easy exercises, and still others the fundamental theorems of set theory. Part Two contains complete solutions to all the exercises and proofs of the theorems. The main purpose of this approach is to encourage readers, in the well known educational method of R.L. Moore, to try hard to prove results for themselves. Secondarily, it gives an easily accessible reference to the main results of the theory.

Krzysztof CIESIELSKI. — **Set theory for the working mathematician.** — London Mathematical Society student texts, vol. 39. — Un vol. broché, 15×23, de XI, 236 p. — ISBN 0-521-59465-0. — Prix: £13.95 (relié: £37.50). — Cambridge University Press, Cambridge, 1997.

This text presents methods of modern set theory as tools that can be usefully applied to other areas of mathematics. The author describes numerous applications in abstract geometry and real analysis and, in some cases, in topology and algebra. The book begins with a tour of the basics of set theory, culminating in a proof of Zorn's lemma and a discussion of some of its applications. The author then develops the notions of transfinite induction and descriptive set theory, with applications to the theory of real functions. The final part of the book presents the tools of modern set theory: Martin's axiom, the diamond principle, and elements of forcing.

Thomas JECH. — **Set theory.** — Second corrected edition. — Perspectives in mathematical logic. — Un vol. relié, 16,5×24, de XIV, 634 p. — ISBN 3-540-63048-1. — Prix: DM 168.00. — Springer, Berlin, 1997.

The book covers major areas of modern set theory: cardinal arithmetic, constructible sets, forcing and Boolean-valued models, large cardinals and descriptive set theory. It contains results on various topics, including properties of the reals, infinitary combinatorics, ultrapowers, Suslin's problem and Martin's axiom, measurable cardinals, axiom of determinacy and many others. The book is aimed primarily at graduate students and researchers in set theory. It can serve as textbook and reference book.

Analyse combinatoire

François BERGERON, Gilbert LABELLE, Pierre LEROUX. — **Combinatorial species and tree-like structures.** — Encyclopedia of mathematics and its applications, vol. 67. — Un vol. relié, 17×24,5 de XX, 457 p. — ISBN 0-521-57323-8. — Prix: £55.00. — Cambridge University Press, Cambridge, 1998.

This book is the first complete presentation in English of the combinatorial theory of species, introduced by A. Joyal in 1980. It gives a unified understanding of the use of generating functions for both labeled and unlabeled structures and also provides a tool for the specification and analysis of these structures. Of particular importance is the capacity of combinatorial species to transform recursive definitions of tree-like structures into functional or differential equations, and conversely.

Geňa HAHN and Gert SABIDUSSI, (Editors). — **Graph symmetry: algebraic methods and applications.** — NATO ASI series. Series C, Mathematical and physical sciences, vol. 497. — Un vol. relié, 16,5×24,5, de XIX, 418 p. — ISBN 0-7923-4668-8. — Prix: Dfl. 295.00. — Kluwer Academic Publishers, Dordrecht, 1997.

B. Alspach: Isomorphism and Cayley graphs on abelian groups. — P.J. Cameron: Oligomorphic groups and homogeneous graphs. — A. Chan and C.D. Godsil: Symmetry and eigenvectors. — G. Hahn and C. Tardif: Graph homomorphisms: structure and symmetry. — M.-C. Heydemann: Cayley graphs and interconnection networks. — B. Mohar: Some applications of Laplace eigenvalues of graphs. — C.E. Praeger: Finite transitive permutation groups and finite vertex-transitive graphs. — R. Scapellato: Vertex-transitive graphs and digraphs. — M.E: Watkins: Ends and automorphisms of infinite graphs.

Teresa W. HAYNES, Stephen T. HEDETNIEMI, Peter J. SLATER. — **Fundamentals of domination in graphs.** — Pure and applied mathematics, vol. 208. — Un vol. relié, 16×23,5, de XI, 446 p. — ISBN 0-8247-0033-3. — Prix: US$165.00. — Marcel Dekker, New York, 1998.

Appropriate for use at different levels, the book includes chapters on basic results and types of domination, domination algorithms and complexity, and frameworks for domination, as well as a host of pedagogical features, such as basic definitions and preliminary graph theoretic results, end-of-chapter exercises and problems and noteworthy open research problems, real-world applications in fields from social sciences, optimization, and computer and communication networks to computational complexity and algorithm design. Nearly 400 examples, equations, drawings, and tables illustrate complex concepts. It contains a comprehensive bibliography of more than 1400 published papers.

Edward R. SCHEINERMAN, Daniel H. ULLMAN. — **Fractional graph theory: a rational approach to the theory of graphs.** — With a foreword by Claude Berge. — Wiley-Interscience series in discrete mathematics and optimization. — Un vol. relié, 16×24, de XVII, 211 p. — ISBN 0-471-17864-0. — Prix: £39.95. — John Wiley & Sons, New York, 1997.

Professors Scheinerman and Ullman begin by developing a general fractional theory of hypergraphs and move on to provide in-depth coverage of fundamental and advanced topics, including fractional matching, fractional coloring, and fractional edge coloring; fractional arboricity via matroid methods, and fractional isomorphism. The final chapter is devoted to a variety of additional issues, such as fractional topological graph theory, fractional cycle double covers, fractional domination, fractional intersection number, and fractional aspects of partially ordered sets.

Théorie des nombres et théorie algébrique des nombres

Armand BOREL. — **Automorphic forms on $SL_2(\mathbf{R})$.** — Cambridge tracts in mathematics, vol. 130. — Un vol. relié, 16×23,5, de X, 192 p. — ISBN 0-521-58049-8. — Prix: £32.50. — Cambridge University Press, Cambridge, 1997.

The book provides an introduction to some aspects of the analytic theory of automorphic forms on $G=SL_2(\mathbf{R})$ or the upper half-plane $\mathbf{X}$, with respect to a discrete subgroup Γ of G of finite covolume. The point of view is inspired by, but does not assume knowledge of, the theory of infinite dimensional unitary representations of G – until the last sections, whose purpose is to introduce this theory and relate it to automorphic forms. The main prerequisites are some results in functional analysis (reviewed, with references) and some familiarity with the elementary theory of Lie groups and Lie algebras, used only for G and its analytic subgroups.