

Analyse combinatoire

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puter science. A revealing analysis of the natural order of decidable and undecidable cases is given. The complete classification of the solvable and unsolvable standard cases of the classical decision problem will be of particular interest to the reader. The classification comes complete with the complexity analysis of the solvable cases, with the comprehensive treatment of the reduction method, and with the model-theoretical analysis of solvable cases. Many cases are treated here for the first time, and a great number of simple proofs and exercises have been included.

Rod DOWNEY, Denis HIRSCHFELDT, (Editors). — **Aspects of complexity: minicourses in algorithmics, complexity and computational algebra.** — Mathematics Workshop, Kaikoura, January 7-15, 2000. — De Gruyter series in logic and its applications, vol. 4. — Un vol. relié, 18×25, de vi, 172 p. — ISBN 3-11-016810-3. — Prix : € 98.00. — Walter de Gruyter, Berlin, 2001.

The book contains eight detailed expositions of the lectures given at the Kaikoura 2000 Workshop on Computability, Complexity, and Computational Algebra. Topics covered include basic models and questions of complexity theory, the Blum–Shub–Smale model of computation, probability theory applied to algorithmics (randomized algorithms), parametric complexity, Kolmogorov complexity of finite strings, computational group theory, counting problems, and canonical models of ZFC providing a solution to the continuum hypothesis. The text addresses students in computer science or mathematics, and professionals in these areas who seek a complete, but gentle introduction to a wide range of techniques, concepts, and research horizons in the area of computational complexity in a broad sense.

Martin ZEMAN. — **Inner models and large cardinals.** — De Gruyter series in logic and its applications, vol. 5. — Un vol. relié, 18×25, de xi, 369 p. — ISBN 3-11-016368-3. — Prix : € 138.00. — Walter de Gruyter, Berlin, 2002.

This volume is an introduction to inner model theory, an area of set theory which is concerned with fine structural inner models reflecting large cardinal properties of the set theoretic universe. The monograph contains a detailed presentation of general fine structure theory as well as a modern approach to the construction of small core models, namely those models containing at most one strong cardinal, together with some of their applications. The final part of the book is devoted to a new approach encompassing large inner models which admit many Woodin cardinals. The exposition is self-contained and does not assume any special prerequisites, which should make the text comprehensible not only to specialists but also to advanced students in mathematical logic and set theory.

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Louis FRÉCON. — **Éléments de mathématiques discrètes.** — Informatique INSA Lyon 2^e cycle. — Collection des sciences appliquées de l'INSA de Lyon. — Un vol. broché, 16×24, de xiv, 378 p. — ISBN 2-88074-479-2. — Prix : SFr. 71.00. — Presses polytechniques et universitaires romandes, Lausanne, 2002.

Indissociables du monde des ordinateurs et indispensables à tout processus de modélisation informatique, les mathématiques discrètes fédèrent diverses disciplines ardues telles que l'algèbre, la logique et la théorie des langages. C'est cependant de manière simple et didactique que l'auteur de cet ouvrage traite de cet univers mathématique. Organisé en trois parties (fondements, graphes et algèbre), exposé sous la forme de deux niveaux de lecture et complété de nombreux exercices, problèmes et thèmes de réflexion, l'ouvrage se pose en synthèse exhaustive des mathématiques discrètes, à la convergence entre théorie et applications. Un ouvrage clair, précis, rigoureux et pédagogique, et une nouvelle référence en la matière.

M. LOTHAIRE. — **Algebraic combinatorics on words.** — Encyclopedia of mathematics and its applications, vol. 90. — Un vol. relié, $16 \times 23,5$, de XIII, 504 p. — ISBN 0-521-81220-8. — Prix: £60.00. — Cambridge University Press, Cambridge, 2002.

Combinatorics on words has arisen independently within several branches of mathematics, for instance number theory, group theory and probability, and appears frequently in problems related to theoretical computer science. The first unified treatment of the area was given in Lothaire's book *Combinatorics on Words*. Since its publication, the area has developed and the author now aims to present several more topics as well giving deeper insights into subjects that were discussed in the previous volume. This book is both a comprehensive introduction to the subject and a valuable reference source for researchers. There are numerous examples, full proofs whenever possible and note sections discussing further developments in the area.

J.H. VAN LINT, R. M. WILSON. — **A course in combinatorics.** — Second edition. — Un vol. broché, 18×25 , de XIV, 602 p. — ISBN 0-521-00601-5. — Prix: £24.95. — Cambridge University Press, Cambridge, 2001.

This is the second edition of a popular book on combinatorics, a subject dealing with ways of arranging and distributing objects, and which involves ideas from geometry, algebra and analysis. The breadth of the theory is matched by that of its applications, which include topics as diverse as codes, circuit design and algorithm complexity. It has thus become essential for workers in many scientific fields to have some familiarity with the subject. The authors have tried to be as comprehensive as possible, dealing in a unified manner with, for example, graph theory, extremal problems, designs, colorings and codes. The depth and breadth of the coverage make the book a unique guide to the whole of the subject.

Ordre, treillis

B. A. DAVEY, H. A. PRIESTLEY. — **Introduction to lattices and order.** — Second edition. — Un vol. broché, 23×15 , de XII, 298 p. — ISBN 0-521-78451-4. — Prix: £19.95. — Cambridge University Press, Cambridge, 2002.

This new edition presents a radical reorganization and updating of the content of the successful first (1990) edition. The primary aim of the original – to serve as a textbook devoted to ordered sets and lattices and to their contemporary applications – is unchanged. The explosive development of theoretical computer science in recent years has, in particular, influenced the book's evolution: a fresh treatment of fixpoint theorems testifies to this and Galois connections now feature prominently. Concept analysis, a methodology for data analysis, has been moved forward, so as to allow an early presentation of both a concrete foundation for the subsequent theory of complete lattices and an application of order theory which is of commercial value in social science.

Théorie des nombres

Michal KRÍŽEK, Florian LUCA, Lawrence SOMER. — **17 lectures on Fermat numbers: from number theory to geometry.** — With foreword by Alena Šolcová. — CMS books in mathematics. Ouvrages de mathématiques de la SMC, vol. 9. — Un vol. relié, 24×16 , de XXIV, 257 p. — ISBN 0-387-95332-9. — Prix: € 69.95. — Springer, New York, 2001.

The purpose of this book is to provide readers with an overview of the many properties of Fermat numbers and to demonstrate their numerous appearances and applications in areas such as number theory, probability theory, geometry, and signal processing. This book introduces a general mathematical audience to basic mathematical ideas and algebraic methods connected with the Fermat numbers and provides invaluable reading for amateur and professional alike.