

Analyse combinatoire

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theory. — Jeremy Avigad and Solomon Feferman: Gödel's functional ("Dialectica") interpretation. — Anne S. Troelstra: Realizability. — Giorgi Japaridze and Dick de Jongh: The logic of provability. — Pavel Pudlák: The lengths of proofs. — Gerhard Jäger and Robert F. Stärk: A proof-theoretic framework for logic programming. — Robert L. Constable: Types in logic, mathematics and programming.

Théorie des ensembles

Carlos Augusto DI PRISCO, Jean A. LARSON, Jean BAGARIA and A.R.D. MATHIAS, (Editors) — **Set theory: techniques and applications.** — Curaçao 1995 and Barcelona 1996 conferences. — Un vol. relié, $16,5 \times 25$, de x, 226 p. — ISBN 0-7923-4905-9. — Prix: Dfl. 175.00. — Kluwer Academic Publishers, Dordrecht, 1998.

During the past 25 years, set theory has developed in several interesting directions. The most outstanding results regard the application of sophisticated techniques to problems in analysis, topology, infinitary combinatorics and other areas of mathematics. This book contains a selection of contributions, some of which are expository in nature, embracing various aspects of the latest developments. Among topics treated are forcing axioms and their applications, combinatorial principles used to construct models, and a variety of other set theoretical tools including inner models, partitions and trees.

S.M. SRIVASTAVA. — **A course on Borel sets.** — Graduate texts in mathematics, vol. 180. — Un vol. relié, 16×24 , de xvi, 261 p. — ISBN 0-387-98412-7. — Prix: DM 98.00. — Springer, New York, 1998.

This course provides a thorough introduction to Borel sets and measurable selections, and acts as a stepping stone to descriptive set theory by presenting important techniques such as universal sets, prewellordering, and scales. It is written in an easily understandable style and employs only naive set theory, general topology, analysis and algebra. A large number of interesting exercises are given throughout the text.

Analyse combinatoire

Armen S. ASRATIAN, Tristan M.J. DENLEY and Roland HÄGGKVIST. — **Bipartite graphs and their applications.** — Cambridge tracts in mathematics, 131. — Un vol. relié, $15,5 \times 23,5$, de xi, 259 p. — ISBN 0-521-59345-X. — Prix: £40.00. — Cambridge University Press, Cambridge, 1998.

Bipartite graphs are perhaps the most basic of objects in graph theory. However, until now they have been considered only as a special class in some wider context. This is the first book which deals solely with bipartite graphs. Essentially all proofs are given in full and numerous exercises of all standards have also been included. The theory is illustrated with many applications especially to problems in timetabling, chemistry, communication networks and computer science.

Béla BOLLOBÁS. — **Modern graph theory.** — Graduate texts in mathematics, vol. 184. — Un vol. broché, $16,5 \times 23,5$, de xiii, 394 p. — ISBN 0-387-98488-7. — Prix: DM 68.00. — Springer, New York, 1998.

This book is an in-depth account of graph theory. It reflects the current state of the subject and emphasizes connections with other branches of pure mathematics. The volume grew out of the author's earlier book *Graph theory: an introductory course*, but its length is well over twice

that of its predecessor, allowing it to reveal many exciting new developments in the subject such as Szemerédi's regularity lemma and its use, Shelah's extension of the Hales-Jewett theorem, the precise nature of the phase transition in a random graph process, the connection between electrical networks and random walks on graphs, and the Tutte polynomial and its cousins in knot theory. The book contains an unusually large number of exercises: over 600 in total.

Fan CHUNG, Ron GRAHAM. — **Erdős on graphs: his legacy of unsolved problems.** — Un vol. relié, 19,5×24,5, de XIII, 142 p. — ISBN 1-56881-079-2. — Prix: US\$ 30.00. — A.K. Peters, Wellesley, Mass., 1998.

This book is a tribute to Paul Erdős, the wandering mathematician once described as "the prince of problem solvers and the absolute monarch of problem posers". It examines – within the context of his unique personality and lifestyle – the legacy of open problems he left to the world of mathematics after his death in 1996. By cataloguing the unsolved problems of Erdős in a comprehensive and well-documented volume, the authors hope to continue the work of an unusual and special man who fundamentally influenced the field of mathematics.

Dietmar CIESLIK. — **Steiner minimal trees.** — Nonconvex optimization and its applications, vol. 23. — Un vol. relié, 17×24,5, de XI, 319 p. — ISBN 0-7923-4983-0. — Prix: Dfl. 260.00. — Kluwer Academic Publishers, Dordrecht, 1998.

This book is the result of 18 years of research into Steiner's problem and its relatives in theory and applications. The purpose of the book is to sum up and generalize many of these results for arbitrary finite-dimensional Banach spaces. It shows that we can create a homogeneous and general theory when we consider two dimensions of such spaces, and that we can find many facts which are helpful in attacking Steiner's problem in the higher-dimensional cases. The author examines the underlying mathematical properties of this network design problem and demonstrates how it can be attacked by various methods of geometry, graph theory, calculus, optimization and theoretical computer science.

Ulrich HUCKENBECK. — **Extremal paths in graphs: foundations, search strategies, and related topics.** — Mathematical topics, vol. 10. — Un vol. relié, 18×24,5, de 480 p. — ISBN 3-05-501658-0. — Prix: DM 168.00. — Akademie Verlag, Berlin, distributed by Wiley-VCH, Weinheim, 1997.

The central problem of this book is the search for optimal paths in graphs. The most well-known case is a network of rails or roads; the problem is to find a shortest route in this network. The book describes generalized versions of Dijkstra's algorithm, of the Ford-Bellman algorithm, and of other algorithms; these generalized search strategies find paths of minimum or almost minimum costs even if the cost function is not additive. Many modifications of optimal path problems are discussed, for example the Traveling Salesman Problem, which is *NP*-complete. Also, the book is about structural properties of cost measures for paths in graphs. Moreover, the book contains many combinatorial results about very long or very short paths in graphs.

Jiří MATOUŠEK, Jaroslav NEŠETŘIL. — **Invitation to discrete mathematics.** — Un vol. broché, 15,5×23,5, de XV, 410 p. — ISBN 0-19-850207-9. — Prix: £19.50. — Clarendon Press, Oxford, 1998.

This book is a clear, accessible, and self-contained introduction to discrete mathematics, and in particular to combinatorics and graph theory. The reader is led to an understanding of the basic principles and methods of actually doing mathematics. This book is more narrowly focused than many discrete mathematics textbooks: it treats selected topics in unusual depth and from several points of view. More than 400 exercises, ranging widely in difficulty and many accompanied by hints for solution, support this approach.

O. MELNIKOV, V. SARVANOV, R. TYSHKEVICH, V. YEMELICHEV and I. ZVEROVICH, (Editors). — **Exercises in graph theory.** — Kluwer texts in the mathematical sciences, vol. 19. — Un vol. relié, 17×25, de VIII, 354 p. — ISBN 0-7923-4906-7. — Prix: Dfl. 265.00. — Kluwer Academic Publishers, Dordrecht, 1998.

This volume covers the principal branches of graph theory in more than a thousand exercises of varying complexity. Each section starts with the main definitions and a brief theoretical discussion, which will serve as a reminder when solving the problems. Answers and hints are supplied separately. Topics include trees, independence and coverings, matching, tours, planarity, colourings, degree sequences, connectivity, digraphs and hypergraphs.

W.T. TUTTE. — **Graph theory as I have known it.** — Oxford lecture series in mathematics and its applications, vol. 11. — Oxford science publications. — Un vol. relié, 16×24, de 156 p. — ISBN 0-19-850251-6. — Prix: £27.50. — Clarendon Press, Oxford, 1998.

The book provides a unique and unusual introduction to graph theory by one of the founding fathers of the subject. The opening chapter tells of the first problems worked on by the author and his colleagues. Their interest in graph theory was aroused by a problem in a mathematical puzzle book. Beginning with an account of their work on the construction of perfect squares and rectangles, the subsequent chapters describe the development of the author's ideas: the disproof of Tait's conjecture on Hamiltonian circuits, "factorizing" graphs, algebra in graph theory, symmetry in graphs, graphs on spheres, and chromatic eigenvalues.

Théorie des nombres

G.E. BERGUM, A.N. PHILIPPOU, A.F. HORADAM, (Editors). — **Applications of Fibonacci numbers, vol. 7.** — Proceedings of the Seventh International Research Conference on Fibonacci Numbers and their Applications, Technische Universität, Graz, Austria, July 15-19, 1996. — Un vol. relié, 17×25, de XXXVI, 484 p. — ISBN 0-7923-5022-7. — Prix: Dfl. 395.00. — Kluwer Academic Publishers, Dordrecht, 1998.

This volume includes a carefully refereed collection of papers dealing with number patterns, linear recurrences and the application of the Fibonacci numbers to probability, statistics, differential equations, cryptography, computer science and elementary number theory. This volume provides a platform for recent discoveries and encourages further research. It is a continuation of the work presented in the previously published proceedings of the earlier conferences, and shows the growing interest in, and importance of, the pure and applied aspects of Fibonacci numbers in many different areas of science.

Bruce C. BERNDT, Ronald J. EVANS, Kenneth S. WILLIAMS. — **Gauss and Jacobi sums.** — Canadian Mathematical Society series of monographs and advanced texts, vol. 21. — A Wiley interscience publication. — Un vol. relié, 16×24,5, de XI, 583 p. — ISBN 0-471-12807-4. — Prix: £45.50. — John Wiley & Sons, New York, 1998.

The theme, Gauss and Jacobi sums, could be approached in a variety of ways. In this book the focus is on examining basic properties of Gauss and Jacobi sums, providing systematic and explicit evaluations of these sums, and providing applications. This book develops the explicit evaluation of Gauss and Jacobi sums, and the application of these evaluations to the determination of other character sums, such as Jacobsthal, Eisenstein and Brewer sums, the determination of the number of solutions of congruences and residual difference sets, reciprocity laws. The main prerequisites for the book are knowledge of undergraduate modern algebra (including finite fields) and basic material in elementary and algebraic number theory.