

Théorie des nombres

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Abelian group. — P. Hell: Algorithmic aspects of graph homomorphisms. — V. Kaibel and G.M. Ziegler: Counting lattices triangulations. — I. Leader: Partition regular equations. — K. Nelsen and A. Ram: Kostka-Foulkes polynomials and Macdonald spherical functions.

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Jean-Paul ALLOUCHE, Jeffrey SHALLIT. — **Automatic sequences: theory, applications, generalizations.** — Un vol. relié, 18×26 , de xvi, 571 p. — ISBN 0-521-82332-3. — Prix: £37.50. — Cambridge University Press, Cambridge, 2003.

Uniting dozens of disparate results from different fields, this book combines concepts from mathematics and computer science to present the first integrated treatment of sequences generated by the simple model of computation called the finite automaton. The authors develop the theory of automatic sequences and their generalizations, such as Sturmian words and k -regular sequences. Further, they discuss applications to number theory (particularly formal power series and transcendence in finite characteristic), physics, computer graphics, and music. Results are presented from first principles where feasible, and the book is supplemented by a collection of 460 exercises, 85 open problems, and more than 1600 citations to the literature. Thus, this book is suitable for graduate students or advanced undergraduates, as well as for mature researchers wishing to know more about this fascinating subject.

Joseph BERNSTEIN, Stephen GELBART, (Editors). — **An introduction to the Langlands program.** — Un vol. broché, $15 \times 23,5$, de viii, 281 p. — ISBN 0-8176-3211-5. — Prix: SFr. 72.00. — Birkhäuser, Basel, 2003.

This monograph presents a broad, user-friendly introduction to the Langlands program, that is, the theory of automorphic forms and its connection with the theory of L -functions and other fields of mathematics. — *Key features:* Basic zeta function of Riemann and its generalizations to Dirichlet and Hecke L -function, class field theory and some topics on classical automorphic functions (E. Kowalski). — A study of the conjectures of Artin and Shimura-Taniyama-Weil (E. de Shalit). — An examination of classical modular (automorphic) L -functions as $GL(2)$ functions, bringing into play the theory of representations (S. Kudla). — Selberg's theory of the trace formula, which is a way to study automorphic representations (D. Bump). — Discussion of cuspidal automorphic representations of $GL(2)$ leads to Langlands theory for $GL(n)$ and the importance of the Langlands dual group (J. Cogdell). — An introduction to the geometric Langlands program, a new and active area of research that permits using powerful methods of algebraic geometry to construct automorphic sheaves (D. Gaitsgory).

Shigeru KANEMITSU, Chaohua JIA, (Editor). — **Number theoretic methods: future trends.** — Developments in mathematics, vol. 8. — Un vol. relié, $16,5 \times 24,5$, de x, 439 p. — ISBN 1-4020-1080-X. — Prix: € 173.00. — Kluwer, Dordrecht, 2003.

This volume contains the proceedings of the very successful second China-Japan Seminar held in Iizuka, Fukuoka, Japan, during March 12-16, 2001 under the support of the Japan Society for the Promotion of Science (JSPS) and the National Science Foundation of China (NSFC), and some invited papers of eminent number-theorists who visited Japan during 1999-2001 at the occasion of the Conference at the Research Institute of Mathematical Science (RIMS), Kyoto University. The book, in keeping with the spirit of the earlier volume, *Number Theory and its Applications* (Developments in mathematics, vol. 4), presents various topics in number theory from current and future research in a unified manner with a collection of state-of-the-art research

as well as survey papers which provide the reader with an overview of past and future developments in the field.

Jeffrey STOPPLE. — **A primer of analytic number theory: from Pythagoras to Riemann.** — Un vol. broché, 15×23 , de XIII, 383 p. — ISBN 0-521-01253-8 (relié: 0-521-81309). — Prix: US\$35.00 (relié: US\$95.00). — Cambridge University Press, Cambridge, 2003.

This undergraduate introduction to analytic number theory develops analytic skills in the course of a study of ancient questions on polygonal numbers, perfect numbers, and amicable pairs. The question of how the primes are distributed among all integers is central in analytic number theory. This distribution is determined by the Riemann zeta function, and Riemann's work shows how it is connected to the zeros of his function and the significance of the Riemann hypothesis. Starting from a traditional calculus course and assuming no complex analysis, the author develops the basic ideas of elementary number theory. The text is supplemented by a series of exercises to further develop the concepts and includes brief sketches of more advanced ideas, to present contemporary research problems at a level suitable for undergraduates.

Corps et polynômes

Leila SCHNEPS, (Editor). — **Galois groups and fundamental groups.** — Mathematical Sciences Research Institute publications, vol. 41. — Un vol. relié, $16,5 \times 24$, de XIV, 467 p. — ISBN 0-521-80831-6. — Prix: £50.00. — Cambridge University Press, Cambridge, 2003.

This book explores recent research underlining the remarkable connections between the algebraic and arithmetic world of Galois theory and the topological and geometric world of fundamental groups. B.H. Matzat and M. van der Put introduce differential Galois theory and solve the differential inverse Galois problem over global fields in positive characteristic; D. Harbater gives a comparative exposition of formal and rigid patching starting from the familiar complex case. S. Mochizuki discusses aspects of Grothendieck's famous anabelian geometry, while the articles by R. Guralnick, A. Tamagawa, and F. Pop and M. Saïdi investigate the structure of the fundamental groups of curves over different kinds of characteristic p fields. M. Imbert and L. Schneps study the structure of the Hurwitz spaces and moduli spaces of curves, which are of great importance to Galois theory because of the Galois action on their fundamental groups. The first interesting such group is $SL_2(\mathbb{Z})$, a family of special subgroups of which is studied by F. Bogomolov and Y. Tschinkel. Finally, R. Hain and M. Matsumoto present their result proving part of a conjecture by Deligne on the structure of the Lie algebra associated to the Galois action on the fundamental group of the thrice-punctured projective plane.

Géométrie algébrique

Igor DOLGACHEV. — **Lectures on invariant theory.** — London Mathematical Society lecture note series, vol. 296 — Un vol. broché, 15×23 , de XVI, 220 p. — ISBN 0-521-52548-5 — Prix: £29.95. — Cambridge University Press, Cambridge, 2003.

The primary goal of this book is to give a brief introduction to the main ideas of algebraic and geometric invariant theory. It assumes only a minimal background in algebraic geometry, algebra and representation theory. Topics covered include the symbolic method for computation of invariants on the space of homogeneous forms, the problem of finite generatedness of the algebra of invariants, the theory of covariants and constructions of categorical and geometric quotients.