

# Théorie des nombres et théorie algébrique des nombres

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Geña 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  $\Gamma$  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.

Gareth A. JONES and J. Mary JONES. — **Elementary number theory.** — Springer undergraduate mathematics series. — Un vol. broché,  $17 \times 24$ , de xiv, 301 p. — ISBN 3-540-76197-7. — Prix: DM 49.00. — Springer, London, 1998.

The first few chapters of the book, covering divisibility, prime numbers and modular arithmetic, assume only basic school algebra. Elementary ideas about groups and rings are then used to study groups of units, quadratic residues and arithmetic functions with applications to enumeration and cryptography. The final part uses ideas from algebra, analysis, calculus and geometry to study more advanced topics such as Dirichlet series and sums of squares; in particular, the last chapter gives a concise account of Fermat's Last Theorem from its origin to its recent proof by Andrew Wiles.

Y. MOTOHASHI, (Editor). — **Analytic number theory.** — London Mathematical Society lecture notes series, vol. 247. — Un vol. broché,  $15 \times 23$ , de vi, 382 p. — ISBN 0-521-62512-2. — Prix: £27.95. — Cambridge University Press, Cambridge, 1997.

This volume presents an authoritative, up-to-date review of analytic number theory. It contains outstanding contributions from leading international figures in this field. Core topics discussed include the theory of zeta functions, spectral theory of automorphic forms, classical problems in additive number theory such as the Goldbach conjecture, and Diophantine approximations and equations. This will be a valuable book for graduates and researchers working in number theory.

M. Ram MURTY, V. Kumar MURTY. — **Non-vanishing of  $L$ -functions and applications.** — Progress in mathematics, vol. 157. — Un vol. relié,  $16 \times 24$ , de x, 196 p. — ISBN 3-7643-5801-7. — Prix: SFr. 68.00. — Birkhäuser Verlag, Basel, 1997.

This book systematically develops some methods for proving the non-vanishing of certain  $L$ -functions at points in the critical strip. Researchers in number theory, graduate students who wish to enter into the area and non-specialists who wish to acquire an introduction to the subject will benefit by a study of this book. One of the most attractive features of the monograph is that it begins at a very basic level and quickly develops enough aspects of the theory to bring the reader to a point where the latest discoveries as are presented in the final chapters can be fully appreciated.

Donald J. NEWMAN. — **Analytic number theory.** — Graduate texts in mathematics, vol. 177. — Un vol. relié,  $16,5 \times 24,5$ , de viii, 76 p. — ISBN 0-387-98308-2. — Prix: DM 59.00. — Springer, New York, 1998.

This book presents some of the central topics in number theory in a simple and concise fashion. It covers an amazing amount of material, despite the leisurely pace and emphasis on readability. The author's heartfelt enthusiasm enables readers to see what is magical about the subject. Topics included are: the partition function, the Erdős-Fuchs theorem, sequences without arithmetic progressions, the Waring problem, a "natural" proof of the non-vanishing of  $L$ -series, and a simple analytic proof of the prime number theorem.

Jean-Pierre SERRE. — **Abelian  $l$ -adic representations and elliptic curves.** — Research notes in mathematics, vol. 7. — Un vol. relié,  $16 \times 23,5$ , de xviii, pagination diverse. — ISBN 1-56881-077-6. — Prix: US\$ 32.00. — A.K. Peters, Wellesley, Massachusetts, 1998.

This book contains an introduction to "systems of  $l$ -adic representations", a topic of increasing importance in number theory and algebraic geometry, as reflected by the spectacular recent developments on the Taniyama-Weil conjecture and Fermat's Last Theorem. The initial

chapters are devoted to the Abelian case (complex multiplication), where one finds a nice correspondence between the  $l$ -adic representations and the linear representations of some algebraic groups (now called “Taniyama groups”). The last chapter handles the case of elliptic curves with no complex multiplication, the main result of which is that the image of the Galois group (in the corresponding  $l$ -adic representation) is large.

John STILLWELL. — **Numbers and geometry.** — Undergraduate texts in mathematics. Readings in mathematics. — Un vol. relié,  $16 \times 24$ , de XIV, 337 p. — ISBN 0-387-98289-2. — Prix: DM 68.00. — Springer, New York, 1997.

The book is an elementary account of mathematics where three main fields – algebra, analysis, and geometry – meet. The aim of this book is to give a broad view of these subjects at the level of calculus, without being a calculus (or a pre-calculus) book. Its roots are in arithmetic and geometry, the two opposite poles of mathematics, and the source of historic conceptual conflict. The resolution of this conflict, and its role in the development of mathematics, is one of the main stories in the book. The key is algebra, which brings arithmetic and geometry together, and allows them to flourish and branch out in new directions. The author elegantly combines mathematical history with mathematics.

## *Corps et polynômes*

Mohamed AYAD. — **Théorie de Galois: 122 exercices corrigés, niveau I.** — Un vol. broché,  $17,5 \times 26$ , de VIII, 181 p. — ISBN 2-7298-4796-0. — Prix: FF 120.00. — Ellipses, Paris, 1997.

Ce livre s'adresse aux étudiants de Licence-Maîtrise de mathématiques, ainsi qu'à ceux inscrits à un concours de recrutement de professeurs (CAPES, Agrégation). Il contient 122 exercices corrigés sur la théorie de Galois classique et moderne. La plupart des énoncés proposent de travailler sur des situations concrètes. Beaucoup d'énoncés illustrent le phénomène de séparabilité pour lequel peu d'exercices existent dans la littérature. Pour certaines questions, plusieurs méthodes de résolutions sont données.

Mohamed AYAD. — **Théorie de Galois: 115 exercices corrigés, niveau II.** — Un vol. broché,  $17,5 \times 26$ , de VIII, 245 p. — ISBN 2-7298-6750-3. — Prix: FF 150.00. — Ellipses, Paris, 1997.

Les énoncés proposés dans ce volume s'adressent aux étudiants de Maîtrise, D.E.A. de mathématiques ainsi qu'à ceux préparant l'Agrégation. En plus des exercices classiques, on trouvera des énoncés sur la construction de certaines extensions dont le groupe de Galois est donné, ainsi que l'exposé d'une méthode récente sur le calcul du groupe de Galois d'un polynôme. On trouvera aussi un énoncé sur l'application des bases de Gröbner au calcul du polynôme minimal. Certains énoncés illustrent des applications de la théorie de Galois à l'analyse diophantienne, à la théorie des nombres et aux polynômes à plusieurs indéterminées.

Maureen H. FENRICK. — **Introduction to the Galois correspondence.** — Second edition. — Un vol. relié,  $16 \times 24$ , de IX, 235 p. — ISBN 0-8176-4026-6. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1998.

This monograph is a self-contained text book. The introductory chapter covers such topics as Sylow  $p$ -subgroups, solvable groups, and the structures of finite, abelian groups, thus providing the student with a firm foundation for the study of Galois correspondence. The Galois