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The three principal aspects of combinatorial reasoning emphasized in this book are: the systematic analysis of different possibilities, the exploration of the logical structure of a problem (e. g., finding manageable subpieces or first solving the problem with three objects instead of  $n$ ), and ingenuity. Although important uses of combinatorics in computer science, operation research, and finite probability are mentioned, these applications are often used solely for motivation. Numerical examples involving the same concepts use more interesting settings such as poker probabilities or logical games.

## ***Théorie des nombres***

Nicholas M. KATZ. — **Twisted  $L$ -functions and monodromy.** — Annals of mathematics studies, No. 150. — Un vol. broché,  $15,5 \times 23,5$ , de VIII, 249 p. — ISBN 0-691-09151-X. — Prix: £25.95. — Princeton University Press, Princeton, N.J., distributed by J. Wiley, Chichester, 2002.

The past century has seen huge progress in the study of elliptic curves, from Mordell's theorem in 1922 to the work of Wiles and Taylor-Wiles in 1994. This book explores two of the remaining fundamental questions: What is the average rank of elliptic curves, and how does the rank vary in various kinds of families of elliptic curves? The author answers these questions for families of "big" twists of objects of all sorts, not just of elliptic curves in the function field case. The book explains various advanced topics ranging from recent results in finite group theory to the machinery of 1-adic cohomology and monodromy.

Igor R. SHAFAREVICH. — **Discourses on algebra.** — Universitext. — Un vol. broché,  $15,5 \times 23,5$ , de X, 276 p. — ISBN 3-540-42253-6. — Prix: €29.95. — Springer, Berlin, 2002.

The classic geometry of Euclid has attracted many for its beauty, elegance, and logical cohesion. In this book, the Russian algebraist I.R. Shafarevich argues with examples that algebra is no less beautiful, elegant, and logically cohesive than geometry. It contains an exposition of some rudiments of algebra, number theory, set theory and probability presupposing very limited knowledge of mathematics. The author is known to be one of the leading mathematicians of the 20<sup>th</sup> century, as well as one of the best mathematical writers.

Victor P. SNAITH. — **Algebraic  $K$ -groups as Galois modules.** — Progress in mathematics, vol. 206. — Un vol. relié,  $16 \times 24$ , de X, 309 p. — ISBN 3-7643-6717-2. — Prix: SFr. 146.00. — Birkhäuser, Basel, 2002.

Throughout number theory and arithmetic-algebraic geometry one encounters objects endowed with a natural action by a Galois group. In particular this applies to algebraic  $K$ -groups and étale cohomology groups. This volume is concerned with the construction of algebraic invariants from such Galois actions. Typically these invariants lie in low-dimensional algebraic  $K$ -groups of the integral group-ring of the Galois group. A central theme, predictable from the Lichtenbaum conjecture, is the evaluation of these invariants in terms of special values of the associated  $L$ -functions at a negative integer depending on the algebraic  $K$ -theory dimension. In addition, the "Wiles unit conjecture" is introduced and shown to lead both to an evaluation of the Galois invariants and to explanation of the Brumer-Coates-Sinnott conjecture.

Gisbert WÜSTHOLZ, (Editor). — **A panorama in number theory or the view from Baker's garden.** — Un vol. relié,  $15,5 \times 23,5$  de XV, 356 p. — ISBN 0-521-80799-9. — Prix: £55.00. — Cambridge University Press, Cambridge, 2002.

Alan Baker's 60th birthday in August 1999 offered an ideal opportunity to organize a conference at ETH Zürich with the goal of presenting the state of the art in number theory and

geometry. Many of the leaders in the subject were brought together to present an account of research in the last century as well as speculations for possible further research. The papers in this volume cover a broad spectrum of number theory including geometric, algebrao-geometric and analytic aspects. This volume will appeal to number theorists, algebraic geometers, and geometers with a number theoretic background and to mathematicians (research students) who are interested in being informed in the state of number theory today and in possible developments for the future.

### *Corps et polynômes*

Helmut KOCH. — **Galois theory of  $p$ -extensions**. — Springer monographs in mathematics. — Un vol. relié, 16×24, de XIII, 190 p. — ISBN 3-540-43629-4. — Prix: € 69.95. — Springer, Berlin, 2002.

First published in German in 1970 and translated into Russian in 1973, this classic now becomes available in English. After introducing the theory of pro- $p$  groups and their cohomology, it discusses presentations of the Galois groups  $G_S$  of maximal  $p$ -extensions of number fields that are unramified outside a given set  $S$  of primes. It computes generators and relations as well as the cohomological dimension of some  $G_S$ , and gives applications to infinite class field towers. The book demonstrates that the cohomology of groups is very useful for studying Galois theory of numbers fields; at the same time, it offers a down to earth introduction to the cohomological method.

### *Géométrie algébrique*

M.C. BELTRAMETTI, F. CATANESE, C. CILIBERTO, A. LANTERI, C. PEDRINI. — **Algebraic geometry: a volume in memory of Paolo Francia**. — Un vol. relié, 18×24,5, de x, 355 p. — ISBN 3-11-017180-5. — Prix: € 138.32. — Walter de Gruyter, Berlin, 2002.

The volume consists of invited refereed papers dedicated to the memory of Paolo Francia, who was an outstanding mathematician at the University of Genoa where he held a chair of geometry. The contributions cover a wide spectrum of algebraic geometry, ranging from motives theory to numerical algebraic geometry, and are mainly focused on higher dimensional varieties and minimal model program, and also on surfaces of general type. Partly the articles are based on talks given at a Conference in Memory of Paolo Francia (1951-2000) held in Genoa in September 2001. In addition to algebraic geometers, the volume will be of interest also to researchers working in differential geometry and commutative algebra.

Anatoly LIBGOBER, Mihai TIBĂR, (Editors). — **Trends in singularities**. — Trends in mathematics. — Un vol. relié, 17×24, de IX, 246 p. — ISBN 3-7643-6704-0. — Prix: SFr. 132.00. — Birkhäuser, Basel, 2002.

The collection of papers in this volume represents recent advances in the geometry and topology of singularities. Written by well-known specialists, the articles cover a broad range of topics that provide a focus for ongoing research and investigation. The contributions discuss local as well as global aspects, endowing the reader with an overview on the present state of the art. The volume is intended for a large audience in pure and applied mathematics, including researchers and graduate students working in algebraic geometry, singularity theory, topology and related fields. The reader will find up-to-date information on a wide variety of contemporary problems involving singularities.