Anneaux et algèbres

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which in turn lends itself to further theoretical development tuned to computation. This first book in a trilogy is devoted to the new approach. It is a handbook covering the classical theory of finding roots of a univariate polynomial, emphasising computational aspects, especially the representation and manipulation of algebraic numbers, enlarged by more recent representations like the Duval Model and the Thom Codification. Mora aims to show that solving a polynomial equation really means finding algorithms that help one manipulate roots rather than simply computing them; to that end he also surveys algorithms for factorizing univariate polynomials.

Géométrie algébrique

David M. GOLDSCHMIDT. — **Algebraic functions and projective curves.** — Graduate texts in mathematics, vol. 215. — Un vol. relié, 16×24, de XVI, 179 p. — ISBN 0-387-95432-5. — Prix : €44.95. — Springer, New York, 2002.

This book provides a self-contained exposition of the theory of algebraic curves without requiring any of the prerequisites of modern algebraic geometry. The self-contained treatment makes this important and mathematically central subject accessible to non specialists. At the same time, specialists in the field may be interested to discover several unusual topics. Among these are Tate's theory of residues, higher derivatives and Weierstrass points in characteristic p, the Stohr-Voloch proof of the Riemann hypothesis, and a treatment of inseparable residue field extensions. Although the exposition is based on the theory of function fields in one variable, the book is unusual in that it also covers projective curves, including singularities and a section on plane curves.

Claire VOISIN. — **Hodge theory and complex algebraic geometry, vol. 1.** — Cambridge studies in advanced mathematics, vol. 76. — Un vol. relié, 15,5×23,5, de IX, 322 p. — ISBN 0-521-80260-1. — Prix : £55.00. — Cambridge University Press, Cambridge, 2002.

This first volume provides a modern introduction to Kählerian geometry and Hodge theory. It starts with basic material on complex variables, complex manifolds, holomorphic vector bundles, sheaves, and cohomology theory, the latter being treated in more theoretical way than is usual in geometry, and culminates with the Hodge decomposition theorem. In between, the author proves the Kähler identities, which leads to the hard Lefschetz theorem and the Hodge index theorem. The second part of the book investigates the meaning of these results in several directions. It introduces the notion of Hodge structure, the (logarithmic) de Rham complex, Frölicher spectral sequences, and mixed Hodge structures. The book ends with a treatment of deformations of the complex structure, Gauss-Manin connection, and variations of Hodge structure, on the one hand, and the study of algebraic cycles on the other. These topics will be further developed in the next volume.

Anneaux et algèbres

Ivan CHAJDA, Günther EIGENTHALER, Helmut LÄNGER. — **Congruence classes in universal algebra.** — Research and exposition in mathematics, vol. 26. — Un vol. broché, 17×24, de X, 217 p. — ISBN 3-88538-226-1. — Prix : €28.00. — Heldermann Verlag, Lemgo, Germany, 2003.

Congruence relations play an important role when investigating universal algebras. On the one hand, the structure of the congruence lattice of a given algebra reveals much information on

the underlying algebra. On the other hand, via congruence relations quotient algebras can be formed which may have "nicer" properties than the original algebras. Moreover, in many cases congruences are determined by some of their classes. For instance in the case of groups, rings and Boolean algebras, congruences are determined by each single one of their classes. The aim of this book is to present the most important results concerning congruence classes, dependences between them as well as connections to subalgebras.

Leonid VAINERMAN, (Editor). — **Locally compact quantum groups and groupoids: proceedings of the Meeting of Theoretical Physicists and Mathematicians, Strasbourg, 2002.** — IRMA lectures in mathematics and theoretical physics, vol. 2. — Un vol. broché, 17×24, de 247 p. — ISBN 3-11-017690-4. — Prix: €34.53. — Walter de Gruyter, Berlin, 2003.

This proceedings book contains seven refereed research papers on locally compact quantum groups and groupoids by leading experts in the respective fields. Topics covered are: constructions and examples of locally compact quantum groups and their multiplicative unitaries; duality theory for locally compact quantum groups; quantum groupoids, especially coming from extensions of operator algebras and rings. Many mathematical results are motivated by problems in theoretical physics. Historical remarks set the results presented in perspective.

Théorie des groupes et généralisations

Alexander LUBOTZKY, Dan SEGAL. — **Subgroup growth.** — Progress in mathematics, vol. 212. — Un vol. relié, 16×24, de XXI, 453 p. — ISBN 3-7643-6989-2. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2003.

Subgroup growth studies the distribution of subgroups of finite index in a group as a function of the index. In the last two decades this topic has developed into one of the most active areas of research in infinite group theory; this book is a systematic and comprehensive account of the substantial theory which has emerged. As well as determining the range of possible "growth types", for finitely generated groups in general and for groups in particular classes such as linear groups, a main focus of the book is on the tight connection between the subgroup growth of a group and its algebraic structure. A wide range of mathematical disciplines play a significant role in this work; as well as various aspects of infinite group theory, these include finite simple groups and permutation groups, profinite groups, arithmetic groups and strong approximation, algebraic and analytic number theory, probability, and p-adic model theory. The book concludes with a list of over 60 challenging open problems that will stimulate further research in this rapidly growing subject.

Katrin TENT, (Editor). — **Tits buildings and the model theory of groups.** — London Mathematical Society lecture note series, vol. 291. — Un vol. broché, 15×23, de X, 298 p. — ISBN 0-521-01063-2. — Prix: £29.95. — Cambridge University Press, Cambridge, 2003.

This volume contains selected papers by leading researchers from a conference held in Würzburg in 2000. The first part of the book provides a general introduction to many aspects of buildings and their geometries, based on short lecture courses given at the conference. The rest of the book comprises survey and research articles on model theoretic results and techniques, showing the vitality and richness of these branches of mathematics. Among the most fruitful techniques, amalgamation constructions à la Hrushovski are explained and classified as they continue to play an important role both in model theory and geometry. The articles succeed in demonstrating the close connection between geometry, group theory an model theory.