

Géométrie algébrique

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Corps et polynômes

Francis BORCEUX, George JANELIDZE. — **Galois theories.** — Cambridge studies in advanced mathematics, vol. 72. — Un vol. relié, $16 \times 23,5$, de XIV, 341 p. — ISBN 0-521-80309-8. — Prix: £ 50.00. — Cambridge University Press, Cambridge, 2001.

Starting from the classical finite dimensional Galois theory of fields, this book develops Galois theory in a much more general context, presenting work by Grothendieck in terms of separable algebras and then proceeding to the infinite dimensional case, which requires considering topological Galois groups. In the core of the book, the authors first formalize the categorical context in which a general Galois theorem holds, and then give some applications, to the topological theory of covering maps and to a Galois theorem for toposes. The book is designed to be accessible to a wide audience: the prerequisites are first courses in algebra and general topology, together with some familiarity with the categorical notions of limit and adjoint functors.

Jean-Pierre ESCOPIER. — **Théorie de Galois: cours et exercices corrigés.** — 2^e édition. — Sciences sup, cours 2^e cycle. — Un vol. broché, 17×24 , de XVI, 238 p. — ISBN 2-10-005312-4. — Prix: FF 165.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Les idées géniales d'Évariste Galois ont profondément influencé le développement de l'algèbre. Les premiers chapitres exposent la théorie à un niveau élémentaire dans le cas fondamental des extensions de degré fini du corps $\mathbf{Q}$. Ils détaillent les applications aux racines n -ièmes de l'unité et à la résolubilité des équations par radicaux, problème central des mathématiques d'avant Galois. Les derniers chapitres décrivent la théorie de Galois pour les corps finis et abordent des questions récentes. Pour finir, l'auteur fait le point sur l'algèbre avant 1640, les constructions à la règle et au compas, et évoque la vie dramatique d'Évariste Galois. Ce cours est complété de nombreux exercices corrigés, dont certains montrent de belles applications de la théorie. Dans cette seconde édition entièrement révisée, les exercices ont été réactualisés.

Jean-Pierre ESCOPIER. — **Galois theory.** — Graduate texts in mathematics, vol. 204. — Un vol. relié, $16,5 \times 24,5$, de XIV, 280 p. — ISBN 0-387-98765-7. — Prix: DM 119.00. — Springer, New York, 2001.

This book covers the standard basic material-symmetric polynomials, field extensions, normal and Galois extensions, the Galois correspondence, cyclotomic extensions, solvable groups, finite fields, and separable and inseparable extensions. However, it also contains the following original features: a sketch of the early history of the subject, containing a large number of excerpts from original works and a discussion of the problems of notation, discovery, mathematical habits, and disputes of former times; a complete chapter on explicit constructions with ruler and compass; a chapter on the life of Evariste Galois; and a chapter on recent developments that attempts to give an idea of what researchers in Galois theory are working on today. This book is refreshingly different from many books on the same subject already on the market.

Géométrie algébrique

Yves ANDRÉ, Francesco BALDASSARRI. — **De Rham cohomology of differential modules on algebraic varieties.** — Progress in mathematics, vol. 189. — Un vol. relié, $16,5 \times 24$, de VII, 214 p. — ISBN 3-7643-6348-7. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2001.

The book offers a systematic treatment of the theory of differential modules algebraic varieties over a field of characteristic 0. Its final purpose is to give a proof of a conjecture of

Baldassarri comparing the algebraic and p -adic analytic de Rham cohomologies of such a module. Along the way, the authors present an algebraic treatment of the theory of regularity and irregularity in several variables, give original elementary proofs of the main results on de Rham cohomology of differential modules, and then develop a new approach to the classical algebraic/analytic comparison theorems (concerning regular modules) which unifies the complex and p -adic situations and avoids resolution of singularities.

Lucian BĂDESCU. — **Algebraic surfaces.** — Translated by Vladimir Maşek. — Universitext. — Un vol. relié, $16,5 \times 24,5$, de x, 258 p. — ISBN 0-387-98668-5. — Prix: DM 79.00. — Springer, New York, 2001.

The main aim of this book is to present a completely algebraic approach to the Enriques classification of smooth projective surfaces defined over an algebraically closed field of arbitrary characteristic. This algebraic approach is one of the novelties in comparison to existing textbooks on the subject. In the new edition of this book, two chapters as well as exercises at the end of each chapter have been added. One new chapter deals with various applications of the Zariski decomposition of an effective divisor, and the other discusses some results on surfaces that were found after the publication of the first edition.

Sara BILLEY, V. LAKSHMIBAI. — **Singular loci of Schubert varieties.** — Progress in mathematics, vol. 182. — Un vol. relié, 16×24 , de xii, 251 p. — ISBN 0-8176-4092-4. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2000.

Singular Loci of Schubert Varieties is a unique work at the crossroads of representation theory, algebraic geometry, and combinatorics. Over the past 20 years, many research articles have been written on the subject in notable journals. In this work, Billey and Lakshmibai have recreated and restructured the various theories and approaches of those articles and present a clearer understanding of this important subdiscipline of Schubert varieties - namely singular loci. The main focus, therefore, is on the computations for the singular loci of Schubert varieties and corresponding tangent spaces. The methods used include standard monomial theory, the nil Hecke ring, and Kazhdan-Lusztig theory. New results are presented with sufficient examples to emphasize key points. A comprehensive bibliography, index, and tables - the latter not to be found elsewhere in the mathematics literature - round out this concise work.

Carel FABER, Gerard VAN DER GEER, Frans OORT, (Editors). — **Moduli of Abelian varieties.** — Progress in mathematics, vol. 195. — Un vol. relié, 17×24 , de xii, 518 p. — ISBN 3-7643-6517-X. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

Abelian varieties and their moduli are a central topic of increasing importance in today's mathematics. Applications range from algebraic geometry and number theory to mathematical physics. The present collection of 17 refereed articles originates from the third "Texel Conference" held in 1999. Leading experts discuss and study the structure of the moduli spaces of Abelian varieties and related spaces, giving an excellent view of the state of the art in this field. The book will appeal to pure mathematicians, especially algebraic geometers and number theorists, but will also be relevant for researchers in mathematical physics.

Jürgen HERZOG, Gaetana RESTUCCIA, (Editors). — **Geometric and combinatorial aspects of commutative algebra.** — Lecture notes in pure and applied mathematics, vol. 217. — Un vol. broché, $17,5 \times 25,5$, de xix, 391 p. — ISBN 0-8247-0567-X. — Prix: US\$ 175.00. — Marcel Dekker, New York, 2001.

Based on lectures presented at the International Conference of Commutative Algebra and Algebraic Geometry held recently in Messina, Italy, this fascinating reference provides the latest

developments and recent advances in commutative algebra, algebraic geometry, and combinatorics — highlighting the theory of projective schemes, the geometry of curves in P^n , determinantal and stable ideals, and free resolutions. With contributions by over 40 leading international mathematicians, the book thoroughly discusses current trends in singularity and tight closure theory... Hilbert functions of squarefree Veronese rings... Gröbner bases as characteristic sets... local monomialization... families of Wronskian correspondences... and more.

Karen E. SMITH, Lauri KAHANPÄÄ, Pekka KEKÄLÄINEN, William TRAVES. — **An invitation to algebraic geometry.** — Universitext. — Un vol relié, 16×24 , de XII, 155 p. — ISBN 0-387-98980-3. — Prix : DM 64.00. — Springer, New York, 2000.

The aim of this book is to describe the underlying principles of algebraic geometry, some of its important developments in the twentieth century, and some of the problems that occupy its practitioners today. It is intended for the working or the aspiring mathematician who is unfamiliar with algebraic geometry but wishes to gain an appreciation of its foundations and its goals with a minimum of prerequisites. Few algebraic prerequisites are presumed beyond a basic course in linear algebra.

Arno VAN DEN ESSEN. — **Polynomial automorphisms and the Jacobian conjecture.** — Progress in mathematics, vol. 190. — Un vol. relié, 16×24 , de XVIII, 329 p. — ISBN 3-7643-6350-9. — Prix : SFr. 98.00. — Birkhäuser, Basel, 2000.

Motivated by some notorious open problems, such as the Jacobian conjecture and the tame generators problem, the subject of polynomial automorphisms has become a rapidly growing field of interest. This book, the first in the field, collects many of the results scattered throughout the literature. It introduces the reader to a fascinating subject and brings him to the forefront of research in this area. Some of the topics treated are invertibility criteria, face polynomials, the tame generators problem, the cancellation problem, exotic spaces, DNA for polynomial automorphisms, the Abhyankar-Moh theorem, stabilization methods, dynamical systems, the Markus-Yamabe conjecture, group actions, Hilbert's 14th problem, various linearization problems and the Jacobian conjecture. The work is essentially self-contained and aimed at the level of beginning graduate students. Exercises are included at the end of each section. At the end of the book there are appendices to cover used material from algebra, algebraic geometry, D-modules and Gröbner basis theory. A long list of «strong» examples and an extensive bibliography conclude the book.

Anneaux et algèbres

Sorin DĂSCĂLESCU, Constantin NĂSTĂSESCU, Șerban RAIANU. — **Hopf algebras: an introduction.** — Pure and applied mathematics, vol. 235. — Un vol. relié, $15,5 \times 23,5$, de IX, 401 p. — ISBN 0-8247-0481-9. — Prix : US\$ 150.00. — Marcel Dekker, New York, 2000.

Addressing a wide array of algebraic properties related to Hopf algebras, this introductory reference text summarizes key topics, theories, and relevant features in the field utilizing the easy-to-understand language of category theory... Covering an extensive range of material with clarity and precision, *Hopf Algebras* features in-depth discussions of basic concepts, classes, and theories for algebras, coalgebras, and comodules... the categories, integrals, actions, and coactions of Hopf algebras... special classes of coalgebras such as semiperfect, co-Frobenius, cosemisimple, and pointed algebras... different sets of behavior for dual notions of coalgebras and comodule... the Nichols-Zoeller, Taft-Wilson, and Kac-Zhu theorems... and more.