

# Géométrie algébrique

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correspondence itself is presented with many well constructed, concrete examples and exercises of varying degrees of difficulty. Some of the diverse applications of the Galois correspondence are presented, including the Fundamental Theorem of Algebra, the unsolvability of the general quintic, classical constructibility problems, etc...

V.V. ISHKHANOV, B.B. LUR'E, D.K. FADDEEV. — **The embedding problem in Galois theory.** — Translations of mathematical monographs, vol. 165. — Un vol. relié,  $18,5 \times 26$ , de XI, 182 p. — ISBN 0-8218-4592-6. — Prix: £65.00. — American Mathematical Society, Providence, distributed by Oxford University Press, Oxford, 1997.

The central problem of modern Galois theory involves the inverse problem: given a field  $k$  and a group  $G$ , construct an extension  $L/k$  with Galois group  $G$ . The embedding problem for fields generalizes the inverse problem and consists in finding the conditions under which one can construct a field  $L$  normal over  $k$ , with group  $G$ , such that  $L$  extends a given normal extension  $K/k$  with Galois group  $G/A$ . Moreover, the requirements applied to the object  $L$  to be found are usually weakened: it is not necessary for  $L$  to be a field, but  $L$  must be a Galois algebra over the field  $k$ , with group  $G$ . The embedding problem is a fruitful approach to the solution of the inverse problem in Galois theory.

## *Géométrie algébrique*

Shreeram S. ABHYANKAR. — **Resolution of singularities of embedded algebraic surfaces.** — Second enlarged edition. — Springer monographs in mathematics. — Un vol. relié,  $16 \times 24$ , de XII, 311 p. — ISBN 3-540-63719-2. — Prix: DM 128.00. — Springer, Berlin, 1998.

This new edition describes the geometric part of the author's 1965 proof of desingularization of algebraic surfaces and solids in nonzero characteristic. The book also provides a self-contained introduction to birational algebraic geometry, based only on basic commutative algebra. In addition, it gives a short proof of analytic desingularization in characteristic zero for any dimension found in 1996 and based on a new avatar of an algorithmic trick employed in the original edition of the book.

M.P. BRODMANN & R.Y. SHARP. — **Local cohomology: an algebraic introduction with geometric applications.** — Cambridge studies in advanced mathematics, vol. 60. — Un vol. relié,  $16 \times 24$ , de XV, 416 p. — ISBN 0-521-37286-0. — Prix: £45.00. — Cambridge University Press, Cambridge, 1998.

The book provides a careful and detailed algebraic introduction to Grothendieck's local cohomology theory, and provides many illustrations of applications of the theory in commutative algebra and in the geometry of quasi-affine and quasi-projective varieties. Topics covered include Castelnuovo-Mumford regularity, the Fulton-Hansen connectedness theorem for projective varieties, and connections between local cohomology and both reductions of ideals and sheaf cohomology.

Robert FRIEDMAN. — **Algebraic surfaces and holomorphic vector bundles.** — Universitext. — Un vol. relié,  $16 \times 24$ , de IX, 328 p. — ISBN 0-387-98361-9. — Prix: DM 88.00. — Springer, New York, 1998.

A novel feature of the book is its integrated approach to algebraic surface theory and the study of vector bundle theory on both curves and surfaces. While the two subjects remain separate though the first few chapters, and are studied in alternate chapters, they become much

more tightly interconnected as the book progresses. Thus vector bundles over curves are studied to understand ruled surfaces, and then reappear in the proof of Bogomolov's inequality for stable bundles, which is itself applied to study canonical embeddings of surfaces via Reider's method. Similarly, ruled and elliptic surfaces are discussed in detail, and then the geometry of vector bundles over such surfaces is analyzed.

K.H. KAMPS, T. PORTER. — **Abstract homotopy and simple homotopy theory.** — Un vol. relié, 16,5 × 22,5, de IX, 462 p. — ISBN 981-02-1602-5. — Prix: £61.00. — World Scientific, Singapore, 1997.

The book is designed to allow entry into a beautifully rich area which can be loosely called abstract homotopy theory. It can also provide a non-conventional approach to ordinary homotopy theory as the authors feel it makes explicit parts of that theory that are obscured by the particularities in the topological setting. The authors have tried to make it reasonably accessible to a beginning graduate student and to make it enjoyable.

Goro SHIMURA. — **Abelian varieties with complex multiplication and modular functions.** — Princeton mathematical series, vol. 46. — Un vol. relié, 16 × 24, de XIV, 217 p. — ISBN 0-691-01656-9. — Prix: US\$55.00. — Princeton University Press, Princeton, 1998.

Reciprocity laws of various kinds play a central role in number theory. In the easiest case, one obtains a transparent formulation by means of roots of unity, which are special values of exponential functions. A similar theory can be developed for special values of elliptic or elliptic modular functions, and is called complex multiplication of such functions. In this book, the author provides the most comprehensive generalizations of this type by stating several reciprocity laws in terms of abelian varieties, theta functions, and modular functions of several variables, including Siegel modular functions. This subject is closely connected with the zeta function of an abelian variety, which is also covered as a main theme in the book. The third topic explored is the various algebraic relations among the periods of abelian integral.

Kenji UENO. — **An introduction to algebraic geometry.** — Translated by Katsumi Nomizu. — Translations of mathematical monographs, vol. 166. — Un vol. relié, 18 × 26, de XII, 246 p. — ISBN 0-8218-0589-4. — Prix: £60.00. — American Mathematical Society, Providence R.I., distributed by Oxford University Press, Oxford, 1997.

This introduction to algebraic geometry allows readers to grasp the fundamentals of the subject with only linear algebra and calculus as prerequisites. After a brief history of the subject, the book introduces projective spaces and projective varieties, and explains plane curves and resolution of their singularities. The volume further develops the geometry of algebraic curves and treats congruence zeta functions of algebraic curves over a finite field. It concludes with a complex analytical discussion of algebraic curves. The author emphasizes computation of concrete examples rather than proofs.

## ***Algèbre linéaire et multilinéaire, théorie des matrices***

Sheldon AXLER. — **Linear algebra done right.** — Undergraduate texts in mathematics. — Un vol. broché, 19,5 × 23,5, de XV, 251 p. — ISBN 0-387-98258-2. — Prix: DM 46.00. — Springer, New York, 1997.

The novel approach taken here banishes determinants to the end of the book and focuses on the central goal of linear algebra: understanding the structure of linear operators on vector spaces. The author has taken unusual care to motivate concepts and to simplify proofs. A variety of