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proved and the main conjectures on the subject are stated. The proof of Bloch's conjecture is given for certain types of surfaces. The book concludes with the example of cycles on Abelian varieties, where some results of Bloch and Beauville, for example, are expounded. The text is complemented by exercises which provide useful results in complex algebraic geometry.

## *Anneaux et algèbres*

TOMASZ BRZEZINSKI, ROBERT WISBAUER. — **Corings and comodules.** — London Mathematical Society lecture note series, vol. 309. — Un vol. broché,  $15 \times 23$ , de x, 476 p. — ISBN 0-521-53931-5. — Prix: £37.95. — Cambridge University Press, Cambridge, 2003.

This is the first extensive treatment of the theory of corings and their comodules. In the first part, the module-theoretic aspects of coalgebras over commutative rings are described. Corings are then defined as coalgebras for noncommutative rings. Topics covered include: module-theoretic aspects of corings, such as the relation of comodules to special subcategories of the category of modules (sigma-type categories); connections between corings and extensions of rings; properties of new examples of corings associated to entwining structures; generalisations of bialgebras such as bialgebroids and weak bialgebras; and the appearance of corings in noncommutative geometry.

ANTONIO GIAMBRUNO, AMITAI REGEV, MIKHAIL ZAICEV, (Editors). — **Polynomial identities and combinatorial methods.** — Lecture notes in pure and applied mathematics, vol. 235. — Un vol. broché,  $18 \times 25$ , de ix, 421 p. — ISBN 0-8247-4051-3. — Prix: US\$175.00. — Marcel Dekker, New York, 2003.

Presenting a wide range of perspectives on topics ranging from ring theory and combinatorics to invariant theory and associative algebras, this reference covers current breakthroughs and strategies impacting research on polynomial identities – identifying new concepts in algebraic combinatorics, invariant and representation theory, and Lie algebras and superalgebras for novel studies in the field. It provides intensive discussions on various methods and techniques relating the theory of polynomial identities to other branches of algebraic study. The book examines Hopf algebras and quantum polynomials... free algebras and Scheier varieties... group-graded algebras... combinatorics of Young diagrams... Lie and Leibniz algebras... the theory of superalgebras... exponential functions and growth of varieties... group actions... and Poincaré series and Schur functions.

W. KEITH NICHOLSON, MOHAMED F. YOUSIF. — **Quasi-Frobenius rings.** — Cambridge tracts in mathematics, vol. 158. — Un vol. relié,  $16 \times 24$ , de xvii, 307 p. — ISBN 0-521-81593-2. — Prix: £55.00. — Cambridge University Press, Cambridge, 2003.

This book makes no attempt to be encyclopedic but provides an elementary account of the basic facts about these rings at a level allowing researchers and graduate students to gain entry to the field. Many earlier results about self-injective rings are extended to the much wider class of mininjective rings; the methods used unify and simplify what is known in the area and so bring the reader up to current research. Sufficient background knowledge can be found in standard texts on noncommutative rings. However, appendices on Morita equivalence; on perfect, semiperfect, and semiregular rings; and on the Cops-Dicks theorem are included to make the book self-contained. After the basic results are established, recent work is reviewed on three open problems in the field (the Faith conjecture, the FGF-conjecture, and the Faith-Menal conjecture). Some new results are provided, and new and old methods for attacking these problems are outlined in an easily accessible format.

Jerzy WEYMAN. — **Cohomology of vector bundles and syzygies.** — Cambridge tracts in mathematics, vol. 149. — Un vol. relié,  $16 \times 23$ , de XIV, 371 p. — ISBN 0-521-62197-6. — Prix: £55.00. — Cambridge University Press, Cambridge, 2003.

The central theme of this book is an exposition of the geometric technique of calculating syzygies. It is written from the point of view of commutative algebra; without assuming any knowledge of representation theory, the calculation of syzygies of determinantal varieties is explained. The starting point is a definition of Schur functors, and these are discussed from both an algebraic and a geometric point of view. Then a chapter on various versions of Bott's theorem leads to a careful explanation of the technique itself, based on a description of the direct image of a Koszul complex. Applications to determinantal varieties follow. There are also chapters on applications of the technique to rank varieties for symmetric and skew symmetric tensors of arbitrary degree, closures of conjugacy classes of nilpotent matrices, discriminants, and resultants. Numerous exercises are included to give the reader insight into how to apply this important method.

## ***K-théorie***

Guido MISLIN, Alain VALETTE. — **Proper group actions and the Baum-Connes conjecture.** — Advanced courses in mathematics, CRM Barcelona. — Un vol. broché,  $17 \times 24$ , de VII, 131 p. — ISBN 3-7643-0408-1. — Prix: SFr. 44.00. — Birkhäuser, Basel, 2003.

This book contains a concise introduction to the techniques used to prove the Baum-Connes conjecture. The Baum-Connes conjecture predicts that the  $K$ -homology of the reduced  $C^*$ -algebra of a group can be computed as the equivariant  $K$ -homology of the classifying space for proper actions. The approach is expository, but it contains proofs of many basic results on topological  $K$ -homology and the  $K$ -theory of  $C^*$ -algebras. It features a detailed introduction to Bredon homology for infinite groups, with applications to  $K$ -homology. It also contains a detailed discussion of naturality questions concerning the assembly map, a topic not well documented in the literature.

## ***Théorie des groupes et généralisations***

Jung Rae CHO, Jens MENNICKE, (Editors). — **Recent advances in group theory and low-dimensional topology.** — Research and exposition in mathematics, vol. 27. — Un vol. broché,  $17 \times 24$ , de 181 p. — ISBN 3-88538-227-X. — Prix: €30.00. — Heldermann Verlag, Lemgo, 2003.

This volume presents a selection of worked-out lectures that were held at the 2<sup>nd</sup> German-Korean Workshop on Algebra and Topology which took place at Pusan, Korea, in August 2000. The papers present surveys and new results that have not been published elsewhere. — *Contents*: P. Ackermann, M. Näätänen, G. Rosenberger: The arithmetic Fuchsian groups with signature  $(0; 2, 2, 2, q)$ . — R. Brown, M. Bullejos, T. Porter: Crossed complexes, free crossed resolutions and graph products of groups. — C.M. Campbell, P.P. Campbell, B.T.K. Hopson, E.F. Robertson: On the efficiency of direct powers of  $PGL(2p)$ . — D.A. Derevnin, Ann Chi Kim: The Coxeter prism in  $H^3$ . — D. Hennig, G. Rosenberger: Recent developments in the theory of Fuchsian and Kleinian groups. — Ann Chi Kim, Yangkok Kim: On generalized Whitehead links and 3-manifolds. — Jae-Ryong Kim, Moo Ha Woo: Topology fields and fixed points of flows. — E. Kudryavtseva, R. Weidmann, H. Zieschang: Quadratic equations in free groups and topological applications. — A. Mednykh, A. Vesnin: Colourings of polyhedra and hyperelliptic