

# Catégories, algèbre homologique, cohomologie des groupes

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Mitsuyasu HASHIMOTO. — **Auslander-Buchweitz approximations of equivariant modules.** — London Mathematical Society lecture note series, vol. 282. — Un vol. broché, 15×23, de xvi, 281 p. — ISBN 0-521-79696-2 — Prix: £27.95. — Cambridge University Press, Cambridge, 2000.

This book focuses on homological aspects of equivariant modules. It presents a new homological approximation theory in the category of equivariant modules, unifying the Cohen-Macaulay approximations in commutative ring theory and Ringel's theory of delta-good approximations for quasi-hereditary algebras and reductive groups. The book provides a detailed introduction to homological algebra, commutative ring theory and homological theory of comodules of coalgebras over an arbitrary base. It aims to overcome the difficulty of generalising known homological results in representation theory. This book will be of interest to researchers and graduate students in algebra, specialising in commutative ring theory and representation theory.

Henning KRAUSE, Claus Michael RINGEL, (Editors). — **Infinite length modules.** — Trends in mathematics. — Un vol. relié, 17×24, de ix, 439 p. — ISBN 3-7643-6413-0. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2000.

This book is concerned with the role played by modules of infinite length when dealing with problems in the representation theory of groups and algebras, but also in topology and geometry, showing the intriguing interplay between finite and infinite length modules. The volume presents the invited lectures of a conference held in Bielefeld in September 1998, which brought together experts from quite different schools in order to survey surprising relations between algebra, topology and geometry. Some additional reports have been included in order to establish a unified picture. The collection of articles, written by well-known experts from all parts of the world, is conceived as a sort of handbook which provides an easy access to the present state of knowledge and its aim is to stimulate further development.

R. Y. SHARP. — **Steps in commutative algebra.** — Second edition. — London Mathematical Society student texts, vol. 51. — Un vol. broché, 15×23, de xi, 355 p. — ISBN 0-521-64623-5. — Prix: £17.95. — Cambridge University Press, Cambridge, 2000.

This introductory account of commutative algebra is aimed at advanced undergraduates and first year graduate students. Assuming only basic abstract algebra, it provides a good foundation in commutative ring theory, from which the reader can proceed to more advanced works in commutative algebra and algebraic geometry. The style throughout is rigorous but concrete, with exercises and examples given within chapters, and hints provided for the more challenging problems used in the subsequent development. After reminders about basic material on commutative rings, ideals and modules are extensively discussed, with applications including canonical forms for square matrices. The core of the book discusses the fundamental theory of commutative Noetherian rings. Affine algebras over fields, dimension theory and regular local rings are also treated, and for this second edition two further chapters, on regular sequences and Cohen-Macaulay rings, have been added.

### *Catégories, algèbre homologique, cohomologie des groupes*

Amnon NEEMAN. — **Triangulated categories.** — Annals of mathematics studies, vol. 148. — Un vol. broché, 15,5×23,5, de vii, 449 p. — ISBN 0-691-08686-9. — Prix: US\$35.00. — Princeton University Press, Princeton, N.J., 2001.

The first two chapters of this book offer a modern, self-contained exposition of the elementary theory of triangulated categories and their quotients. The simple, elegant presentation of

these known results makes these chapters eminently suitable as a text for graduate students. The remainder of the book is devoted to new research, providing, among other material, some remarkable improvements on Brown's classical representability theorem. In addition, the author introduces a class of triangulated categories — the “well generated triangulated categories” — and studies their properties. This exercise is particularly worthwhile in that many examples of triangulated categories are well generated, and the book proves several powerful theorems for this broad class. These chapters will interest researchers in the fields of algebra, algebraic geometry, homotopy theory and mathematical physics.

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

Hyman BASS, Alexander LUBOTZKY. — **Tree lattices.** — With appendices by H. Bass, L. Carbone, A. Lubotzky, G. Rosenberg, and J. Tits. — Progress in mathematics, vol. 176. — Un vol. relié, 16,5 × 24, de XII, 233 p. — ISBN 0-8176-4120-3. — Prix: SFr. 88.00. — Birkhäuser, Boston, 2001.

Group actions on trees furnish a unified geometric way of recasting the chapter of combinatorial group theory dealing with free groups, amalgams, and HNN extensions. Some of the principal examples arise from rank one simple Lie groups over a non-Archimedean local field acting on their Bruhat-Tits trees. In particular this leads to a powerful method for studying lattices in such Lie groups. The book presents a coherent survey of the results on uniform tree lattices, and a (previously unpublished) development of the theory of non-uniform tree lattices. The latter is much more complicated than the uniform case, so a good deal of attention is given to the construction and study of diverse examples. The fundamental technique is the encoding of tree actions in terms of the corresponding quotient ‘graphs of groups’.

William M. KANTOR, Akos SERESS, (Editors). — **Groups and computation III: proceedings of the International Conference at the Ohio State University, June 15-19, 1999.** — Ohio State University Mathematical Research Institute publications, vol. 8. — Un vol. relié, 17,5 × 24,5, de VIII, 368 p. — ISBN 3-11-016721-2. — Prix: DM 248.00. — Walter de Gruyter, Berlin, 2001.

This conference was the successor of two workshops on “Groups and Computation” held at DIMACS in 1991 and 1995. There are papers on permutation group algorithms, finitely presented groups, polycyclic groups, and parallel computation, providing a representative sample of the breadth of computation group theory. On the other hand, more than one third of the papers deal with computations in matrix groups, giving an in-depth treatment of the currently most active area of the field. The points of view of the papers range from explicit computations to group-theoretic algorithms to group-theoretic theorems needed for algorithm development.

Kevin P. KNUDSON. — **Homology of linear groups.** — Progress in mathematics, vol. 193. — Un vol. relié, 16,5 × 24, de XI, 192 p. — ISBN 3-7643-6415-7. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2001.

The text traces the homology theory of linear groups from the fundamental results of Quillen, Suslin, van der Kallen and others to recent results on rank one groups. A chapter on the Friedlander-Milnor conjecture concerning the homology of algebraic groups made discrete is also included. This marks the first time that these results have been collected in a single volume. The book will be of interest to researchers and can be used as a textbook on graduate courses in  $K$ -theory and group cohomology.