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compactness is restored by means of a proper, co-compact action of a group  $\Gamma$ ). Like the Atiyah-Singer theorem, the Baum-Connes conjecture states that a purely topological object coincides with a purely analytical one. For a given group  $\Gamma$ , the topological object is the equivariant  $K$ -homology of classifying space for proper actions of  $\Gamma$ , while the analytical object is the  $K$ -theory of the  $C^*$ -algebra associated with  $\Gamma$  in its regular representation. The Baum-Connes conjecture implies several other classical conjectures, ranging from differential topology to pure algebra. It has also strong connections with geometric group theory, as the proof of the conjecture for a given group  $\Gamma$  usually depends heavily on geometric properties of  $\Gamma$ . This book is intended for graduate students and researchers in geometry (commutative or not), groups theory, algebraic topology, harmonic analysis, and operator algebras. It presents, for the first time in book form, an introduction to the Baum-Connes conjecture.

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

William G. DWYER, Hans-Werner HENN. — **Homotopy theoretic methods in group cohomology.** — Advanced courses in mathematics CRM Barcelona. — Un vol. broché,  $24 \times 17$ , de IX, 98 p. — ISBN 3-7643-6605-2. — Prix: SFr. 34.00. — Birkhäuser, Basel, 2001.

This book looks at group cohomology with tools that come from homotopy theory. These tools give both decomposition theorems (which rely on homotopy colimits to obtain a description of the cohomology of a group in terms of the cohomology of suitable subgroups) and global structure theorems (which exploit the action of the ring of topological cohomology operations). The approach is expository and thus suitable for graduate students and others who would like an introduction to the subject that organizes and adds to the relevant literature and leads to the frontier of current research. The book should also be interesting to anyone who wishes to learn some of the machinery of homotopy theory (simplicial sets, homotopy colimits, Lannes' T-functor, the theory of unstable modules over the Steenrod algebra) by seeing how it is used in a practical setting.

C.R. LEEDHAM-GREEN, S. MCKAY. — **The structure of groups of prime power order.** — London Mathematical Society monographs. New series, vol. 27. — Un vol. relié,  $16 \times 24$ , de XII, 334 p. — Prix: £60.00. — Oxford University Press, Oxford, 2002.

First account of the modern theory of finite  $p$ -groups, this book introduces important material on cohomology of groups, spectral sequences, and representation theory. It develops the theory of pro- $p$  groups. New material on the Nottingham and Grigorchuk groups is presented and exercises are provided throughout. — *Contents:* Preliminaries. New groups from old.  $p$ -groups of maximal class. Finite  $p$ -groups acting uniserially. Using Lie algebra theory to find bounds. The proof of Conjecture A using powerful  $p$ -groups. Pro- $p$ -groups. Constructing finite  $p$ -groups. Homological algebra. Uniserial  $p$ -adic space groups. The structure of finite  $p$ -groups. Beyond coclass.

César Polcino MILES, Sudarshan K. SEHGAL. — **An introduction to group rings.** — Algebras and applications, vol. 1. — Un vol. relié,  $17 \times 24,5$ , de xi, 371 p. — ISBN 1-4020-0238-6. — Prix: € 133.00. — Kluwer, Dordrecht, 2002.

Group rings play a central role in the theory of representations of groups and are very interesting algebraic objects in their own right. In their study, many branches of algebra come to a rich interplay. This book takes the reader from beginning to research level and contains many topics that, so far, were only found in papers published in scientific journals and, whenever possible, offers new proofs of known results. It also includes many historical notes and some applications.

Christopher PARKER, Peter ROWLEY. — **Symplectic amalgams.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de xi, 361 p. — ISBN 1-85233-430-4. — Prix: € 79.95. — Springer, London, 2002.

The latter half of the twentieth century saw dramatic advances in group theory, particularly in finite group theory. During this time, the amalgam method emerged as the most powerful and promising tool and is playing a central role in the revision of the classification of finite simple groups. In this book, the authors chart the rise of the “amalgam method” and aim to classify symplectic amalgams with the intention of providing a complete overview of research in the field that will be accessible to both specialist and non-specialist alike. The aim of this book is the classification of symplectic amalgams – structures which are intimately related to the finite simple groups. In all there are sixteen infinite families of symplectic amalgams together with 62 more exotic examples. The classification touches on many important aspects of modern group theory:  $p$ -local analysis; the amalgam method; representation theory over finite simple groups.

Lluís PUIG. — **Blocks of finite groups: the hyperfocal subalgebra of a block.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de 213 p. — ISBN 3-540-43514-X. — Prix: SFr. 116.50. — Springer, Berlin, 2002.

About sixty years ago, Richard Brauer introduced the blocks in the study of the group algebra  $kG$  of a finite group  $G$  over a field  $k$  of nonzero characteristic. The most remarkable discovery might be the families of infinitely many nonisomorphic groups having a block in common. This book is an introduction to block theory including most of the main results about this discovery. From common knowledge on algebras and elementary knowledge of linear group representations, it starts by doing  $p$ -adic completion and lifting idempotent results, and reaches a complete proof of the existence and uniqueness of the hyperfocal subalgebra of a block.

Jacques TITS, Richard M. WEISS. — **Moufang polygons.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de ix, 535 p. — ISBN 3-540-43714-2. — Prix: € 79.95. — Springer, Berlin, 2002.

This book gives the complete classification of Moufang polygons. It also contains a new proof of the classification of irreducible spherical buildings of rank at least three based on the observation that all the irreducible rank two residues of such a building are Moufang polygons. In an appendix, the connection between spherical buildings and algebraic groups is recalled and used to describe an alternative existence proof for the exceptional Moufang polygons.

## ***Groupes topologiques: groupes et algèbres de Lie***

Ignacio BAJO, Esperanza SANMARTÍN, (Editors). — **Recent advances in Lie theory.** — Research expositions in mathematics, vol. 25. — Un vol. broché, 17×24, de 398 p. — ISBN 3-88538-225-3. — Prix: € 44.00. — Heldermann Verlag, Lemgo, Allemagne, 2002.

Lie theory is known to play a crucial role in many fields of mathematics and physics. Apart from their obvious geometric and algebraic importance, Lie groups and Lie algebras have turned out to be of fundamental significance in differential equations, quantum mechanics, algebraic geometry, topology and the theory of special functions. The aim of this book is to provide the reader with a general view of recent research directions, represented in 23 articles, in most of these topics. The papers collected in this volume are updated versions of selected contributions to the “Colloquium on Lie Theory and Applications”, which took place at the University of Vigo, Spain, in July 2000. The programme of the colloquium included three short courses delivered by Prof. D.V. Alekseevsky, A.T. Fomenko and M. Scheunert. The corresponding papers appear at the beginning of this book.