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Group algebra series and coboundary modules. (English) Zbl 1201.20003
J. Pure Appl. Algebra 214, No. 7, 1291-1300 (2010).

The shift action on the 2-cocycle group $Z^2(G, C)$ of a finite group G with coefficients in a finitely generated Abelian group C , introduced by the third author [J. Pure Appl. Algebra 188, No. 1-3, 127-143 (2004; Zbl 1043.20026)], has several useful applications in combinatorics and digital communications, arising from the invariance of a uniform distribution property of cocycles under the action.

In this article, the authors study the shift orbit structure of the coboundary subgroup $B^2(G, C)$ of $Z^2(G, C)$. The study is placed within a well-known setting involving the Loewy and socle series of a group algebra over G . They prove new bounds on the dimensions of terms in such series. Asymptotic results on the size of shift orbits are also derived; for example, if C is an elementary Abelian p -group, then almost all shift orbits in $B^2(G, C)$ are maximal-sized for large enough finite p -groups G of certain classes.

Reviewer: **János Kurdics (Nyíregyháza)**

MSC:

20C05 Group rings of finite groups and their modules (group-theoretic aspects) Cited in 1 Document
20J06 Cohomology of groups
16S34 Group rings

Keywords:

group algebras; Loewy series; socle series; cohomology; 2-cocycles; coboundaries; shift actions; modules; finite p -groups

Software:

Magma

Full Text: [DOI](#)

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