Flannery, D. L.

Calculation of cocyclic matrices. (English) Zbl 0867.20043

J. Pure Appl. Algebra 112, No. 2, 181-190 (1996).

Let G be a finite group, U be a G-module and $H^2(G,U)$ the second cohomology group of G with coefficients in U. Note that a 2-cocycle ψ is naturally displayed as a cocyclic matrix whose rows and columns are indexed by the elements of G and whose entry in the position (g,h) is $\psi(g,h)$. The cocyclic matrices with coefficients in $\mathbb{Z}_2$ are closely related to Hadamard matrices and may consequently provide a new way of generating designs, see *K. J. Horadam* and *W. de Launey* [J. Algebr. Comb. 2, No. 3, 267-290 (1993; Zbl 0785.05019)].

In this paper the author provides a method of explicitly determining cocyclic matrices of representatives for all 2-cocycle classes in $H^2(G,U)$, when U is a finitely generated G-module trivial under the action of G. The method is based on the Universal Coefficient Theorem. Also symmetry properties of cocyclic matrices are investigated.

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MSC:

20J06 Cohomology of groups
05B20 Combinatorial aspects of matrices (incidence, Hadamard, etc.)

Cited in **1** Review
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