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RESEARCH ANNOUNCEMENTS

CLASSIFYING G SPHERES[1]

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Introduction. Let G be a finite group. The results announced here come from a study of the following general question: Classify all G actions on a sphere S, G homotopic to a given linear action.

This question has smooth, piecewise linear, and topological versions. Wall [W] solved the pl and topological problem, for free actions, when G is cyclic of odd order, and the dimension of the sphere is greater than 3. There are many partial results in the nonfree case. For example, if S is locally smooth, if dimension $S^G \geqslant 5$ and S satisfies the *mild gap condition* i.e. dimension S^{H_1} − dimension $S^{H_2} > 2$, for both nonempty and $H_1 \subsetneqq H_2$, then by G engulfing [I] S is topologically linear, and further if S is a pl G manifold, by G s-cobordism theorem [R] S is equivariantly pl determined by a generalized Whitehead torsion invariant.

In this note we announce some new results on this question.

Statements of results. In what follows G will always represent a cyclic group of odd order. We work in the locally linear i.e. locally smooth topological or pl category.

THEOREM A. *Locally linear* pl *or* top *G-vector bundles are oriented with respect to $KO_G(\ ) \otimes Z[\frac{1}{2}]$.*

From this, the methods of Schultz-Sullivan, cf. [S] and character theory one deduces easily the answer to the specific question which motivated our work.

THEOREM B. *Topologically conjugate representations of groups of odd order are linearly conjugate.*

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[2]This paper was scheduled to appear in the May 1982 issue of this *Bulletin*, simultaneously with the closely related paper "Orthogonal transformations for which topological equivalence implies linear equivalence" by W.-C. Hsiang and William Pardon (Bull. Amer. Math. Soc. (N.S.) 6 (1982), 459–461). However, the galleys were returned too late for the paper to appear in that issue owing to a misunderstanding concerning the deadline for the return of galley proof.

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