J. DIFFERENTIAL GEOMETRY
34 (1991) 769-834

STABLE PSEUDOISOTOPY SPACES OF COMPACT NONPOSITIVELY CURVED MANIFOLDS

F. T. FARRELL & L. E. JONES

0. Statement of results

In this section we formulate the main result of the paper (cf. Theorem 0.4), and derive from it a number of corollaries. At the end of this section we outline very briefly the proof of our main result. Our main result states that the space of stable pseudoisotopies $\mathscr{P}(M)$ of any closed Riemannian manifold M with sectional curvature $K \leq 0$ everywhere can be computed in a simple way from the stable pseudoisotopy spectrum $\mathscr{P}_*(S^1)$ of the circle. (More generally, a similar result is true for the stable pseudoisotopy spectrum $\mathscr{P}_*(M)$.) This is a new result even for the case when M is the flat 2-torus. All the results discussed in this section have been announced in [13], and have been proven in earlier papers of the authors' for the special case when M has $K < 0$ everywhere (cf. [7], [9], [12]). The reader is referred to [14] for an expository account of the authors' work to date on the stable pseudoisotopy spectrum for any compact aspherical manifold. The formula arrived at in this paper for computing the stable pseudoisotopy spectrum $\mathscr{P}_*(M)$ in terms of the stable pseudoisotopy spectrum $\mathscr{P}_*(S^1)$ involves the space of all closed geodesics in the compact nonpositively curved manifold M. There is an equivalent purely homotopic theoretic formulation of this result which involves the space of all continuous maps $S^1 \to M$ (cf. [14, §4]). This has motivated the authors to conjecture that the stable pseudoisotopy spectrum $\mathscr{P}_*(X)$ of any aspherical space X with torsion free fundamental group can be computed in a simple way from the stable pseudoisotopy spectrum $\mathscr{P}_*(S^1)$ (cf. [14, §4] for a precise statement of this conjecture).

Before stating our main theorem we review in §§0.1 and 0.2 the concept of homology theory with coefficients in an Ω-spectrum, and we outline in §0.3 the structure of the set of all closed geodesics in M.

Received April 16, 1990 and, in revised form, October 19, 1990. Both authors were supported in part by the National Science Foundation.