Abstract

A closed topological $n$-manifold $M^n$ is of $S^1$-category 2 if it can be covered by two open subsets $W_1, W_2$ such that the inclusions $W_i \to M^n$ factor homotopically through maps $W_i \to S^1$. We show that for $n > 3$, if $\text{cat}_{S^1}(M^n) = 2$ then $M^n \approx S^n$ or $M^n \approx S^{n-1} \times S^1$ or the non-orientable $S^{n-1}$-bundle over $S^1$. \footnote{AMS classification numbers: 57N10, 57N13, 57N15, 57M30} \footnote{Key words and phrases: Lusternik-Schnirelmann category, coverings of $n$-manifolds with open $S^1$-contractible subsets}