Consider a partition of all primes \( \Pi = P_1 \cup \cdots P_k \), and let \( G_i \) be quasi-finite complexes such that \( (G_i)_{P_i} \), \( G_i \) localized at \( P_i \) are \( H \)-spaces, that are rationally equivalent as \( H \)-spaces.

The homotopy pullback

\[
\begin{array}{ccc}
(G_1)_{P_1} & \longrightarrow & (G_1)_0 \\
\downarrow & \simeq & \downarrow \\
(G_2)_{P_2} & \longrightarrow & (G_2)_0 \\
\downarrow & \simeq & \downarrow \\
& \vdots & \\
(G_k)_{P_k} & \longrightarrow & (G_k)_0
\end{array}
\]

is well known to be a quasifinite \( H \)-space [1]. We will say that \( X \) is obtained by Zabrodsky mixing of \( G_1, \cdots, G_k \) at \( P_1, \cdots, P_k \). Note that \( X \) depends on the rational equivalences chosen.

We consider \( H \)-spaces obtained by mixing the following types of spaces:

At the prime 2: products of Lie groups and \( S^7 \) and \( RP^7 \).

At odd primes:

(a) Lie groups, \( S^7 \), \( RP^7 \) and
(b) any stably reducible quasi-finite P. D. space with no 3-dimensional generator of the rational exterior algebra cohomology and finitely presented fundamental group, and
(c) principal \( S^3 \)-bundles with basespace a stably reducible quasi-finite P. D. space

We prove the following theorems:

**Theorem.** Let \( X \) be as above, 1-connected; then \( X \) is of the homotopy type of a parallelizable differentiable manifold.

We notice that by choosing all \( G_i \) equal, but choosing different rational equivalences we get the following:

**Corollary.** Let \( Y \) be in the genus of a simply connected Lie group \( G \) (i. e. \( Y_p \cong G_p \) for all primes \( p \)); then \( Y \) is homotopy equivalent to a parallelizable manifold.
In the nonsimply connected context we prove the following:

**Theorem.** Let \( X \) be as above; then \( X \) is of the homotopy type of a finite complex, and in the genus of \( X \) is a parallellizable differentiable manifold.

**Indication of proof.** The case where \( X(2) \cong (\mathbb{RP}^3)^k \times (S^7)^l \times (\mathbb{RP}^7)^m \) requires special arguments. In all other cases we proceed by constructing a fibration \( S^1 \to X \to Y \), where \( Y \) is a stably reducible P. D. space. The map \( p \) induces isomorphisms on fundamental groups, and the fibration is orientable. We then use [2] to compute the Wall finiteness obstruction for \( X \). The formula in this case says \( \sigma(X) = \chi((S^1) \cdot \sigma(Y)) \), \( \chi \) the euler characteristic; hence \( \sigma(X) = 0 \), so \( X \) is homotopy equivalent to a finite CW complex.

We then consider \( X \) as a P. D. boundary of the corresponding \( D^2 \)-fibration \( D^2 \to E \to Y \), and notice that the classifying map \( E \to BG \) reduces to \( BO \) since \( Y \) is stably reducible and \( S^1 \)-fibrations are equivalent to \( O(2) \)-bundles. This allows us to set up a surgery problem

\[
(M, \partial M) \to (E, Y)
\]

and we proceed to show the surgery problem \( \partial M \to Y \) has obstruction 0. The reduction of \( E \) is trivial when restricted to \( Y \); hence \( Y \) is of the homotopy type of a parallellizable differentiable manifold.

**References**


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