Quadratic forms and manifolds

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Abstract

The local topological properties of an n-dimensional manifold M assemble to the global Poincaré duality isomorphisms $H^{n-*}(M) \cong H_*(M)$. For $n > 4$ surgery theory provides a complete obstruction theory for deciding if a space X with n-dimensional Poincaré duality $H^{n-*}(X) \cong H_*(X)$ is homotopy equivalent to an n-dimensional manifold. In the original 40-year old formulation there were two types of obstructions: a primary K-theory one involving vector bundles and a secondary L-theory one involving quadratic forms. The talk will describe the combination of these two into a single obstruction, involving generalized Witt groups.