

Diffeomorphisms of elliptic 3-manifolds

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Abstrak

This work concerns the diffeomorphism groups of 3-manifolds, in particular of elliptic 3-manifolds. These are the closed 3-manifolds that admit a Riemannian metric of constant positive curvature, now known to be exactly the closed 3-manifolds that have a finite fundamental group. The (Generalized) Smale Conjecture asserts that for any elliptic 3-manifold M , the inclusion from the isometry group of M to its diffeomorphism group is a homotopy equivalence. The original Smale Conjecture, for the 3-sphere, was proven by J. Cerf and A. Hatcher, and N. Ivanov proved the generalized conjecture for many of the elliptic 3-manifolds that contain a geometrically incompressible Klein bottle.

The main results establish the Smale Conjecture for all elliptic 3-manifolds containing geometrically incompressible Klein bottles, and for all lens spaces $L(m,q)$ with m at least 3. Additional results imply that for a Haken Seifert-fibered 3 manifold V , the space of Seifert fiberings has contractible components, and apart from a small list of known exceptions, is contractible.