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The number of connected orbit types in a G-manifold

The orbits of a compact Lie group G acting on a manifold X are classified by conjugacy classes of closed subgroups of G. The slice theorem implies that there are only finitely many orbit types if X is compact. Mann showed in 1962 that the same conclusion holds if X is orientable and of finite type.

I will present an analogous theorem for connected orbit types, where one only looks at the isotropy Lie algebras: The number of connected orbit types is finite if X has finite Betti numbers. The proof rests on fundamental properties of a suitably defined equivariant homology theory.