The equivariant cohomology and K-theory of a cohomogeneity-one action

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We compute the Borel equivariant cohomology and equivariant K-theory of a cohomogeneity-one action of a connected, compact Lie group on a topological space M, obtaining more explicit expressions in the event M is a manifold.

The K-theoretic result requires the principal isotropy groups be connected with torsion-free fundamental group, but does not require extension to rational coefficients. Along the way we are forced to something close to a classification of the permissible systems of isotropies of such an action. We also unexpectedly obtain results regarding the Mayer–Vietoris sequence and cohomology of a mapping torus in an arbitrary multiplicative equivariant cohomology theory.

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