Equivariant cohomology of torus orbifolds.


Torus orbifolds are certain even-dimensional orbifolds with half-dimensional torus action. They are generalizations of torus manifolds, quasitoric manifolds and toric manifolds. Even more general are GKM orbifolds which are generalizations of GKM manifolds. GKM orbifold-manifolds have a torus action whose algebraic topology, at least rationally, can be described by a labeled graph.

In this paper the integral equivariant cohomology of locally standard torus orbifolds is computed in terms of generators and relations. To do so the authors first study the integral equivariant cohomology of certain GKM orbifolds and then specialize to the case of torus orbifolds.

For GKM orbifolds with vanishing odd degree integral cohomology, their equivariant cohomology is determined by their GKM-graph: It is isomorphic to the equivariant cohomology of the graph. In case of a locally standard torus orbifold $X$ with $H^{odd}(X;\mathbb{Z}) = 0$ more information on the cohomology related to the face structure of the orbit space is obtained. This then leads to the desired presentation of $H^*_T(X;\mathbb{Z})$.

Throughout the paper the constructions are illustrated with examples and compared to the manifold case.

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MSC:

57S12 Toric topology
14M25 Toric varieties, Newton polyhedra, Okounkov bodies
55N91 Equivariant homology and cohomology in algebraic topology
57R18 Topology and geometry of orbifolds
13F55 Commutative rings defined by monomial ideals; Stanley-Reisner face rings; simplicial complexes

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References:
