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Algebraic torus actions, Kempf-Ness sets and real quadrics in \mathbb{C}^m

In the theory of algebraic group actions on affine varieties, the concept of a Kempf-Ness set is used to replace the categorical quotient by the quotient with respect to a maximal compact subgroup. We show that an appropriate notion of Kempf-Ness set exists for a class of algebraic torus actions on quasiaffine varieties (coordinate subspace arrangement complements) arising in the “geometric invariant theory” approach to toric varieties. These “toric” Kempf-Ness sets are known to toric topologists as moment-angle complexes. In the case of projective toric variety, the Kempf-Ness set is the level surface for the appropriate moment map and can be realised as a complete intersection of real quadrics in \mathbb{C}^m . We proceed by studying the cohomology of these toric Kempf-Ness sets.