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*A quotient criterion for syzygies in equivariant cohomology*

We start by reviewing the theory of syzygies in equivariant cohomology for actions of a compact connected Lie group $G$ as initiated by Allday, Puppe and the speaker. Among other things, it permits to characterize the $G$-spaces for which a GKM-type description of equivariant cohomology holds. We will highlight the role played by a suitably defined equivariant homology, and we will discuss big polygon spaces as non-trivial examples.

We finally present a criterion that permits to read off the syzygy order of the equivariant cohomology of a manifold with a torus action from the orbit space. This criterion unifies and generalizes several results about the freeness and torsion-freeness of equivariant cohomology for various classes of such manifolds.