Geometry of Peterson Varieties in Lie Type A

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Abstract

Building on work done by Chang and Skjelbred, Goresky, Kottiwtcz, and MacPherson (GKM) give conditions on a T-space X that when satisfied give a combinatorial description of the T-equivariant cohomology of X, $H_T^*(X; \mathbb{C})$. Flag varieties are examples of GKM spaces, and Peterson varieties are subvarieties of complete flag manifolds; however they do not satisfy the GKM conditions. Harada and Tymoczko prove it is still possible to compute the S^1-equivariant cohomology of a Peterson variety combinatorially using the structure it inherets as a subvariety of a complete flag manifold. An introduction/review will be given of GKM conditions, flag manifolds, and Peterson varieties as well as recent developments and work in progress.

Keywords: flag variety, flag manifold, complete flag manifold.