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Geometric invariant theory for principal three-dimensional subgroups acting on flag varieties. (English) Zbl 1369.14057

Summary: Let $G$ be a semisimple complex Lie group. In this article, we study geometric invariant theory on a flag variety $G/B$ with respect to the action of a principal three-dimensional simple subgroup $S \subset G$. We determine explicitly the GIT-equivalence classes of $S$-ample line bundles on $G/B$. We show that, under mild assumptions, among the GIT-classes there are chambers, in the sense by I. V. Dolgachev and Y. Hu [Publ. Math., Inst. Hautes Étud. Sci. 87, 5–56 (1998; Zbl 1001.14018)].

The GIT-quotients with respect to various chambers form a family of Mori dream spaces, canonically associated with $G$. We are able to determine the three important cones in the Picard group of any of these quotients: the pseudoeffective-, the movable-, and the nef cones.

For the entire collection see [Zbl 1357.14004].

MSC: 14L24 Geometric invariant theory
14C20 Divisors, linear systems, invertible sheaves
17B10 Representations of Lie algebras and Lie superalgebras, algebraic theory (weights)
14M17 Homogeneous spaces and generalizations

Keywords: flag variety; geometric invariant theory; principal SL(2)-subgroup; branching cone; Mori dream space