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Spherical Subgroups and Double Coset Varieties

Let G be a connected reductive algebraic group, $H \subset G$ a reductive subgroup and $T \subset G$ a maximal torus. It is well known that if charactersitic of the ground field is zero, then the homogeneous space G/H is a smooth affine variety, but never an affine space. The situation changes when one passes to double coset varieties $F\backslash\backslash G/\!\!/H$. In this paper we consider the case of G classical and H connected spherical and prove that either the double coset variety $T\backslash\backslash G/\!\!/H$ is singular, or it is an affine space. We also list all pairs $H \subset G$ such that $T\backslash\backslash G/\!\!/H$ is an affine space.

Keywords: Double coset varieties.

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