

The Smooth torus orbit closures in the Grassmannians

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Abstract

It is known that for the natural algebraic torus actions on the Grassmannians, the closures of torus orbits are toric varieties, and that these toric varieties are smooth if and only if the corresponding matroid polytopes are simple. We prove that simple matroid polytopes are products of simplices and smooth torus orbit closures in the Grassmannians are products of complex projective spaces. Moreover, it turns out that the smooth torus orbit closures are uniquely determined by the corresponding simple matroid polytopes. In this talk, we will explain an idea of the proof.