Title:	Toric Varieties and the Kempf-Ness Theorem
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Abstract:	Quotients are a primary construction in mathematics. These allow one to construct new objects in a category from existing objects. A common way to construct quotients is to use group actions. Orbit spaces of these actions can be constructed, leading to new objects. One would like to continue doing such things for group actions on symplectic and algebraic geometry. We would also want these quotients to remain in the category. This implies that in the case of algebraic geometry, these quotients have to separated. This would require us to weed out points in the variety X, and the criterion used to decide such points in stability. In the case of symplectic geometry such quotients are described using the Marsden-Weinstein Quotient Theorem, which depends on the moment map. To equate these two quotients, one has to compare the definition of stability and zeroes of the moment map. This is done by the Kempf-Ness Theorem which states that every polystable orbit contains a zero of the moment map. This can be used to show the equivalence of both symplectic and Algebraic Quotients. Stability criterions usually are difficult to explicitly determine. For this, toric varieties act as a fertile ground for getting a hands-on perspective. For toric varieties, the Delzant polytope can be used to understand the symplectic side and Fans to understand the algebraic analogues.
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