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Witold Kraskiewicz, Institute of Mathematics UMK, 12/18 Chopin st., Torun, Poland, and
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Boston, MA 02115. *Orbit closures in representations with finitely many orbits.*

Let L be a simple Lie algebra, and α in L a simple root. The root α defines a \mathbb{Z} -grading on L . We are interested in the action of the adjoint group G_0 of a Lie algebra L_0 on the space L_1 . Such representations are closely related to irreducible representations of simple Lie algebras with finitely many orbits. It is well known that the action of $G_0 \times \mathbb{C}^*$ on L_1 has finitely many orbits. By using geometric invariant theory we calculate Hilbert polynomials of (normalizations) of orbit closures. In many cases we can deduce normality, Cohen–Macaulay and Gorenstein properties of the orbit closures. (Received September 14, 2010)