1067-13-1777 **Witold Kraskiewicz**, Instytut Matematyki UMK, ul. Chopina 12/18, 87100 Torun, Poland, and **Jerzy Weyman***, 360 Huntington Av., Boston, MA 02115. *Finite free resolutions of varieties with symmetries.* Preliminary report.

Let g be a simple Lie algebra, and α in g a simple root. The root α defines a grading on g. We are interested in the action of group G_0 of the Lie algebra g_0 on the space g_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 $G_0 \times C^*$ on g_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. This technique gives several cases of interesting pure resolutions. I will also describe the link of such constructions to the structure theorems on finite free resolutions of length three. (Received September 21, 2010)