**Meeting:** 1003, Atlanta, Georgia, SS 23A, AMS Special Session on Representations of Lie Algebras, I

1003-16-34 **Steven Glenn Jackson** (jackson@math.umb.edu), University of Massachusetts Boston, 100 Morrissey blvd, Boston, MA 02125, and **Alfred G. Noël***, University of Massachusetts Boston, 100 Morrissey blvd, Boston, MA 02125. *Prehomogeneous Spaces Associated with Nilpotent Orbits of Complex Lie Groups.*

Let $\mathfrak{g}$ be a semisimple complex Lie algebra and $G$ its adjoint group. The number of nilpotent orbits of $G$ in $\mathfrak{g}$ is finite. Let $X$ be a representative of a nilpotent orbit $\mathcal{O}$ of $G$ in $\mathfrak{g}$ then from the Jacobson-Morozov theorem $X$ can be embedded into a $\mathfrak{sl}_2$-triple $(H, X, Y)$

$\mathrm{ad}_H$ introduces a grading:

$$\mathfrak{g} = \bigoplus_{i\in\mathbb{Z}} \mathfrak{g}_i \text{ where } \mathfrak{g}_i = \{Z \in \mathfrak{g} : [H, Z] = iZ\} \text{ and } \mathfrak{g}_i \text{ is dual to } \mathfrak{g}_{-i}.$$

It is a fact that $\mathfrak{g}_0$ is a reductive Lie subalgebra of $\mathfrak{g}$. For $i \neq 0$, $\mathfrak{g}_i$ is a $G_0$-module and a theorem of Vinberg asserts that each pair $(G_0, \mathfrak{g}_i)$ is a prehomogeneous space in the sense of Sato and Kimura. In this paper we achieve two goals:

1. We compute the irreducible components of each $\mathfrak{g}_i$ as a $G_0$-module.

2. We determine the relative invariants of the above prehomogeneous spaces when $\mathfrak{g}$ is classical. (Received June 23, 2004)