Central subalgebras of the centralizer of a nilpotent element. Preliminary report.

Let $G$ be a connected and semisimple group over the field $k$, and suppose that the characteristic of $k$ is very good for $G$. Suppose that $X \in \text{Lie}(G)$ is nilpotent, write $C_G(X)$ for the centralizer of $X$, and write $Z$ for the center of $C_G(X)$.

When $X$ is even, Lawther and Testerman have shown that the dimension of $Z$ coincides with the dimension $d$ of the center of $L$, where $L$ is a Levi factor of the parabolic subgroup $P$ which is attached to $X$ (recall that $P$ is described by choosing an $\mathfrak{sl}_2$-triple in characteristic 0, and by geometric invariant theory in general).

In some recent work, we give an argument deforming the Lie algebraic center $\mathfrak{z}(\text{Lie}(L))$ to a subspace of the center of $c_0(X)$. With some further work, this deformation may be used to show that $\dim Z \geq d$. The main reason for the interest in our work is that it avoids the extensive case-checking carried out by Lawther-Testerman. (Received July 28, 2014)