Let $G$ be a semisimple group over an algebraically closed field. Steinberg has associated to a Coxeter element $w$ of minimal length $r$ a subvariety $V$ of $G$ isomorphic to an affine space of dimension $r$ which meets the regular unipotent class $Y$ in exactly one point. In this paper this is generalized to the case where $w$ is replaced by any elliptic element in the Weyl group of minimal length $d$ in its conjugacy class, $V$ is replaced by a subvariety $V'$ of $G$ isomorphic to an affine space of dimension $d$, and $Y$ is replaced by a unipotent class $Y'$ of codimension $d$ in such a way that the intersection of $V'$ and $Y'$ is finite. The proofs use quantum groups and canonical bases. The base ring is often just a commutative ring $A$ and an affine space of dimension $d$ is treated through the set $A^d$ of its $A$-valued points. Relevant maps between affine spaces are described by polynomials with integral coefficients. Thus one gets a version over $\mathbb{Z}$. Some twisted cases are treated also.

Reviewer: Wilberd van der Kallen (Utrecht)

MSC:

- 20G99 Linear algebraic groups and related topics
- 20G05 Representation theory for linear algebraic groups
- 14R10 Affine spaces (automorphisms, embeddings, exotic structures, cancellation problem)
- 14L30 Group actions on varieties or schemes (quotients)

Keywords:

Coxeter elements; elliptic elements; unipotent classes; cross sections; semisimple groups; affine spaces; Weyl groups

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References:


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