Lehrer, G. I.; **Springer, T. A.**
Intersection multiplicities and reflection subquotients of unitary reflection groups. I. (English) Zbl 0945.51005
Cossey, John (ed.) et al., Geometric group theory down under. Proceedings of a special year in geometric group theory, Canberra, Australia, July 14-19, 1996. Berlin: de Gruyter. 181-193 (1999).

Let G be a finite complex n-dimensional reflection group. Let $f_1, \dots, f_n$ be basic homogeneous polynomial invariants for G of degree $d_1, \dots, d_n$, respectively. Fix a positive integer d. Let E be an irreducible component of the variety $\bigcap_{d \nmid d_i} f_i^{-1}(0)$. Then E is a linear subspace of $\mathbb{C}^n$ and every other irreducible component is conjugate to E under G. The restriction to E of the stabilizer in G of E is a complex reflection group on E, with basic homogeneous polynomial invariants $f_i|_E$ for i such that $d|d_i$. This is the main result of the paper.

Apart from the authors' proof using intersection multiplicities, a proof by Looijenga using only basic algebraic geometry is given. The result extends parts of Springer's earlier work on regular elements in [*T. A. Springer*, Invent. Math. 25, 159-198 (1974; Zbl 0287.20043)]. Some indications of applications, such as the decomposition of induced cuspidal representations of reductive groups over finite fields, are given.

For the entire collection see [Zbl 0910.00040].

Reviewer: A.A.M.Cohen (Amsterdam)

MSC:

51F15	Reflection groups, reflection geometries
20H15	Other geometric groups, including crystallographic groups
20F55	Reflection and Coxeter groups (group-theoretic aspects)
14C17	Intersection theory, characteristic classes, intersection multiplicities in algebraic geometry
20G40	Linear algebraic groups over finite fields

Keywords:

finite complex reflection groups; Hecke algebra; representations of reductive groups over finite fields