ON SPECIAL PIECES IN THE UNIPOTENT VARIETY

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Abstract. This article is the result of experiments performed using computer programs written in the GAP language. We describe an algorithm which computes a set of rational functions attached to a finite Coxeter group W. Conjecturally, these rational functions should be polynomials, and in the case where W is the Weyl group of a Chevalley group G defined over $\mathbb{F}_q$, the values of our polynomials at q should give the number of $\mathbb{F}_q$-rational points of Lusztig's special pieces in the unipotent variety of G. The algorithm even works for complex reflection groups. We give a number of examples which show, in particular, that our conjecture is true for all types except possibly B_n and D_n.