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*"Enumeration of parabolic double cosets for coxeter groups".*

Parabolic subgroups  $W_I$  of Coxeter systems  $(W, S)$  and their ordinary and double cosets  $W/W_I$  and  $W_I \backslash W/W_J$  appear in many contexts in combinatorics and Lie theory, including the geometry and topology of generalized flag varieties and the symmetry groups of regular polytopes. The set of ordinary cosets  $wW_I$ , for  $I \subseteq S$ , forms the Coxeter complex of  $W$ , and is well-studied. In this extended abstract, we look at a less studied object: the set of all double cosets  $W_I w W_J$  for  $I, J \subseteq S$ .

Each double coset can be presented by many different triples  $(I, w, J)$ . We describe what we call the lex-minimal presentation and prove that there exists a unique such choice for each double coset. Lex-minimal presentations can be enumerated via a finite automaton depending on the Coxeter graph for  $(W, S)$ .

In particular, we present a formula for the number of parabolic double cosets with a fixed minimal element when  $W$  is the symmetric group  $S_n$ . In that case, parabolic subgroups are also known as Young subgroups. Our formula is almost always linear time computable in  $n$ , and the formula can be generalized to any Coxeter group. (Received February 09, 2016)