

# Counting factorizations in complex reflection groups

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## Abstract

In this talk, I'll discuss ongoing work with Alejandro Morales generalizing a 30-year old result of Jackson, who enumerated factorizations of an  $n$ -cycle in the symmetric group  $S_n$ , keeping track of the number of cycles of each factor. The generalization we consider is to enumerate factorizations of a Coxeter element in a well generated finite complex reflection group, keeping track of the fixed space dimension of each factor. As in the case of the symmetric group, the factorization counts are ugly, so the goal is to choose a basis for the generating function in which the answer is nice. In the case of the infinite families of monomial matrices, we accomplish this via combinatorial arguments; a notion of transitivity of a factorization appears for the "type D" group  $G(m, m, n)$ . I'll also describe some puzzling partial results in the exceptional cases. No previous knowledge of complex reflection groups will be assumed.

**Keywords:** symmetric group, reflection group, Coxeter elements, monomial matrices.