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## Variations of hyperoctahedral descent algebras

A *descent* of a permutation $a_1 \cdots a_n$ of $\{1, 2, \ldots, n\}$ is an $i$ such that $a_i > a_{i+1}$. We define descents of signed permutations similarly, but we also count 0 as a descent if $a_1 < 0$. The *descent set* of a (signed) permutation is the set of its descents, and the set of all permutations with a given descent set is a *descent class*. For both ordinary permutations (the symmetric group) and signed permutations (the octahedral group), the set of sums of descent classes spans a subalgebra of the group algebra, called the *descent algebra*. Moreover, the set of sums of permutations with a given number of descents spans a commutative subalgebra of the descent algebra, in which the multiplication constants are given by a simple generating function.

I will discuss some variations of these results when the definition of descents for signed permutations is modified so that $n$ is considered a descent if $a_n > 0$.