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T. Kyle Petersen* (tkpeters@brandeis.edu), Department of Mathematics, MS 050, Brandeis University, Waltham, MA 02454. *P-partitions and descent algebras, enriched P-partitions and peak algebras*. Preliminary report.

As first shown by Gessel, Stanley's theory of P -partitions provides a way to describe the structure of descent algebras of the symmetric group. The quasisymmetric generating functions related to P -partitions give us the structure of Solomon's descent algebra (the span of sums of permutations with the same set of descents). Specializations of the generating functions called order polynomials give the structure of the Eulerian descent algebra (the span of sums of permutations with the same number of descents). We can use variations on Stanley's P -partitions to give analogous results for type B, and for subalgebras related to the notion of cyclic descent.

Peak algebras are subalgebras of the group algebra defined as the span of sums of permutations with the same set of peaks (where an ascent is followed immediately by a descent). There are also "Eulerian" peak algebras formed by sums of permutations with the same number of peaks. We use Stembridge's enriched P -partitions to carry out an investigation of peak algebras parallel to that of the descent algebras. We have quasisymmetric generating functions that give the structure of the peak algebras, and certain specializations give the structure of the Eulerian peak algebras. Similar results hold for type B. (Received August 03, 2005)