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Quasisymmetric and noncommutative Schur functions

In recent work, Haglund, Mason, van Willigenburg, and this author introduced a family of quasisymmetric functions which we call quasisymmetric Schur (QS) functions. These naturally refine the (symmetric) Schur functions and form a $\mathbb{Z}$-basis of QSym, the quasisymmetric function algebra. We showed that this basis has interesting properties such as a Littlewood–Richardson rule for the product of a symmetric Schur with a QS function.

We extend the definition of QS functions to skew QS functions, which are counterparts to the classical skew Schur functions. Intimately related to these are the duals of the QS functions, which form a $\mathbb{Z}$-basis of NSym, the graded Hopf algebra which is dual to QSym. The dual QS functions are noncommutative analogs of the classical Schur functions, having properties such as a Littlewood–Richardson rule and relationship to a poset of compositions which is analogous to Young's lattice of partitions.

This is joint work with Christine Bessenrodt and Stephanie van Willigenburg.