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K-theoretic Catalan functions

In 2008, Thomas Lam identified a family of symmetric functions known as k-Schur functions with the Schubert classes in the homology of the affine Grassmannian, in analogy with Schur functions serving as representatives for the (co)homology of the usual Grassmannian. Of additional interest, under an isomorphism between the quantum cohomology of the flag variety and the homology of the affine Grassmannian, known as the Peterson isomorphism, the quantum Schubert polynomials are sent to the k-Schur functions, up to suitable localization. Subsequently, much work had been done to carry out an analogous program in the K-theoretic generalization, but significant parts of the combinatorics of the symmetric function Schubert representatives remained elusive. In this talk, I will present how some new insights in the (co)homological setting enabled a K-theoretic refinement to give a direct understanding of some of the missing combinatorics surrounding the K-homology of the affine Grassmannian and the K-theoretic Peterson isomorphism.