

Commutative Algebra and Algebraic Geometry Seminar

Organizer: D. Eisenbud

Tuesday, 3:45–6:00pm, 939 Evans

Apr. 6 **3:45, Alexander Yong**

Gröbner degeneration, Schur polynomials and positivity

I will give two examples of using Gröbner degeneration to explain some positive combinatorial formulas for symmetric polynomials. The degenerations come from “geometric vertex decompositions” and allow us to interpret the formulas as counting components of a degenerated matrix Schubert variety.

For the first example, I will present a Gröbner basis for certain “ladder” determinantal ideals. Although the tableaux formula for Schur polynomials is classical, the Gröbner degeneration viewpoint has the advantage of not only providing a geometric interpretation of the formula, but also naturally leading one to a “flagged” equivariant K-theory generalization.

An important part of the theory of symmetric functions is the Littlewood-Richardson rule, which is known to geometrically count intersections of Schubert varieties in the Grassmannian. In contrast, for the second example, I will describe an ongoing project to give a natural Gröbner degeneration explanation of the Littlewood-Richardson rule, and more generally, of the “Stanley coefficients”.

This talk is based on joint work with Allen Knutson and Ezra Miller.

5:00, Allen Knutson

The variety of pairs of commuting matrices