

Schubert calculus, Schubert structure operators, and positivity

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Abstract:

Schubert calculus is the study of certain intersections of varieties on homogeneous spaces, also known as flag varieties. These intersections are positive in the differential-geometric sense, but they also have “positivity properties” in several associated rings, notably equivariant cohomology and equivariant K-theory. We show how one can get new and old formulas for the structure constants in these rings. We introduce new operators whose coefficients compute Schubert structure constants (in a manifestly polynomial, but not positive, way), resulting in a formula that generalizes the positive AJS/Billey formula. Our proof involves Bott-Samelson manifolds (which we will define), and in particular, the cohomology basis dual to the homology basis of classes of sub-Bott-Samelson manifolds.