RC-Graphs and Schubert Polynomials

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Abstract

Using a formula of Billey, Jockusch and Stanley, Fomin and Kirillov have introduced a new set of diagrams that encode the Schubert polynomials. We call these objects rc-graphs. We define and prove two variants of an algorithm for constructing the set of all rc-graphs for a given permutation. This construction makes many of the identities known for Schubert polynomials more apparent, and yields new ones. In particular, we give a new proof of Monk's rule using an insertion algorithm on rc-graphs. We conjecture two analogs of Pieri's rule for multiplying Schubert polynomials. We also extend the algorithm to generate the double Schubert polynomials.