1077-05-686   **Benjamin J. Wyser*** (`bwyser@math.uga.edu`), Department of Mathematics, University of
Georgia, Boyd Graduate Studies Research Center, Athens, GA 30602-7403. *Symmetric subgroup
orbit closures on the flag variety, Richardson varieties, and Schubert structure constants for
(p, q)-pairs.*

We describe recent results regarding $GL(p, \mathbb{C}) \times GL(q, \mathbb{C})$-orbit closures on the flag variety $GL(p + q, \mathbb{C})/B$, as well as a connection between these results and Schubert calculus. Specifically, we observe that a number of these orbit closures (namely, those obeying an easily stated pattern avoidance condition) are Richardson varieties. This observation, combined with a theorem of M. Brion on the decomposition of the cohomology class of such an orbit closure in the Schubert basis, leads to a positive description of Schubert constants $c_{u,v}^w$ in the case that u, v form what we call a "(p, q)-pair". The rule is multiplicity-free, meaning that all such constants are either 0 or 1. The case 0 or 1 is determined by computation of a monoidal action on the "(p, q)-clan" parametrizing the orbit closure. This action is easily described combinatorially, so in the end the rule for $c_{u,v}^w$ boils down to an elementary combinatorial check. Time permitting, we will also discuss analogous results in Lie types C and D. (Received September 10, 2011)