Meeting: 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-05-1115 **Rebecca N. Smith*** (smithr@math.ufl.edu), Department of Mathematics, 358 Little Hall, University of Florida, Gainesville, FL 32611. *Algorithms generating restricted permutations.*

A permutation $p = p_1p_2...p_n$ is said to avoid a pattern $q = q_1q_2...q_k$ if there is no sequence $\alpha_1, \alpha_2, ..., \alpha_k$ such that $0 < \alpha_1 < \alpha_2 < \alpha_k < n+1$ and $p_{\alpha_i} < p_{\alpha_j}$ if and only if $q_i < q_j$. As more research is done in pattern avoidance, it would be nice to have a way to efficiently generate permutations of a given length n that avoid certain patterns rather than check each permutation to see whether or not it meets the criteria.

There is already an algorithm that generates permutations of length n that avoid 231 (and likewise 132, 213, and 312) using the fact that the largest element of the pattern to be avoided is in the middle. However, that algorithm cannot be adjusted to give us a direct way to generate permutations that avoid 123 (or 321).

Using left-to-right minima, we can create an order on permutations that avoid 123. Then with this order, we can directly generate all permutations of a length n that avoid 123. Also, continuing to use left-to-right minima as well as defining left-to right minima of rank two will allow us to extend this method to generate all permutations of length n that avoid 1234. (Received October 04, 2004)