

1107-05-500

**Sam A Miner\*** ([samminer@math.ucla.edu](mailto:samminer@math.ucla.edu)), UCLA Mathematics Department, Box 951555, Los Angeles, CA 90095. *The limit shape of Grassmannian permutations*. Preliminary report.

Grassmannian permutations, permutations which contain at most one ascent, were first defined by Lascoux and Schutzenberger in the context of Schubert polynomials. Since, the class of Grassmannian permutations of length  $n$  has been enumerated and found to be in bijection with Dyck paths of semilength  $n$  with at most one long ascent, among other combinatorial objects.

We view Grassmannian permutations as permutation matrices in  $M_n(\{0, 1\})$ , and consider the probability distribution created when we choose a Grassmannian permutation of length  $n$  uniformly at random. As  $n \rightarrow \infty$ , and as we scale the dimensions of the matrix to keep its side lengths constant, the probability distribution approaches a "limit shape". We prove detailed results about the limit shape of Grassmannian permutations, as well as the expected behavior of certain statistics on such a permutation.

As a corollary, we obtain the limit shape for **321**-avoiding vexillary permutations, first analyzed by Billey, Jockusch, and Stanley. Somewhat surprisingly, this shape is substantially different from that of **321**-avoiding permutations. The proofs come from asymptotic and bijective combinatorics - we will sketch the reasoning behind these proofs and mention potential generalizations. (Received January 20, 2015)