1077-68-973 **Amanda Pascoe Streib*** (apascoe3@math.gatech.edu). *Markov chains for sampling weighted permutations.*

The question of sampling permutations is very natural, and has been widely studied. For example, it is known that the following Markov chain is efficient for sampling from the uniform distribution over permutations; the Markov chain M selects neighboring elements i and j in the permutation and swaps them. Benjamini et al. studied a biased version of M in which the probability $p_{i,j}$ of putting a neighboring pair (i, j) in increasing order is proportional to some parameter p. A natural question is whether M is efficient when the probability $p_{i,j}$ of putting i and j in order is allowed to vary depending on i and j.

We provide a simple new proof that the local Markov chain M is rapidly mixing in the above two cases (the uniform distribution and the distribution where the biases are all equal to p) as well as the case that $p_{i,j}$ depends only on $\min\{i, j\}$. That is, $p_{i,j} = p_{i,k}$ if $i < j, i < k$. In our proof, we introduce a new Markov chain which operates on the inversion table of a permutation. We also identify a wider class of $p_{i,j}$'s where we can infer rapid mixing from the above analysis, together with a decomposition of the local Markov chain into a cross-product of disjoint copies of a simpler instance of the problem. (Received September 15, 2011)