1014-05-849 **Rebecca N Smith*** (rnsmith@brockport.edu), Department of Mathematics, SUNY Brockport, 350 New Campus Dr, Brockport, NY 14420. *Permutation Reconstruction.*

A well known problem in graph theory is graph reconstruction. The question is: If in all possible ways, one eliminates a single vertex of a graph containing at least three vertices, can the original graph be reconstructed from this multiset of minors? We consider the corresponding problem using permutations and their entries instead of graphs and their vertices.

Let p be a permutation of length n. In all possible ways, delete k entries of p. Then renumber (retaining the order) the obtained $\binom{n}{k}$ strings as permutations (so their entries are from 1 through $n-k$). Call the multiset of these permutations the $(n-k)$-*minor multiset of* p and denote it $M_{n-k}(p)$.

Let N_k be the smallest number such that if given $M_{n-k}(p)$, where p is a permutation of length $n \geq N_k$, we can figure out what p must have been. That is, each permutation of length $n \geq N_k$ gives a unique multiset of $(n-k)$-minors, but there is a pair of permutations p and q each of length $N_k - 1$ where $M_{n-k}(p) = M_{n-k}(q)$.

It can be shown that $N_1 = 5$ and that $N_2 = 6$. For larger values of k there is some information, most notably a lower bound, but the more general problem has not been solved in any of these cases. (Received September 25, 2005)