1106-05-2394 **John R Greene*** (jgreene@d.umn.edu), Department of Mathematics and Statistics, University of Minnesota Duluth, Duluth, MN 55812. *Combinatorial properties of traces of matrix products.* Preliminary report.

Given two noncommuting matrices, A and B, it is well known that AB and BA have the same trace. This extends to cyclic permutations of products of A's and B's. Thus, for example, $AAAABB$, $BAAAAB$, $BBAAAA$, $ABBAAA$, $AABBAA$ and $ABABBA$ all have the same trace. This means that if A and B are fixed matrices then products of four A's and two B's can have 3 possible traces. For 2×2 matrices A and B we show that there are restrictions on the relative sizes of these traces. For example, if $M_1 = A^4B^2$, $M_2 = A^3BAB$ and $M_3 = A^2BA^2B$ then it is never the case that $Trace(M_1) > Trace(M_3) > Trace(M_2)$. For larger collections of A's and B's, forbidden orders become much more common. In this talk, these and similar results are discussed. (Received September 16, 2014)