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Factoring Permutations up to Commutation. Preliminary report.

There has been much interest over the past 15 years in various enumerative aspects of permutation factorization, with a great deal of this study spawned by the intimate relationship between such combinatorial problems and algebraic geometry (more precisely, the geometry and topology of the moduli space of curves).

We shall consider an interesting combinatorial variant of the usual problem: We count decompositions of a permutation into transpositions, but do so up to an equivalence relation that allows for the commutation of adjacent disjoint factors. Our results demonstrate a surprising (and not fully understood) parallel with the rich structure of "ordinary" factorizations that may well have connections to geometry. (Received September 08, 2009)