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Refined Inversion Statistics on Permutations.

We study functions from permutations to integers, called statistics, that focus on properties of inversions or non-inversions of the permutation. Inversion statistics that we introduce are k -step inversions, which count the number of inversions with fixed position differences, and non-inversion sums, which take the sum of the differences of positions of the non-inversions of a permutation. We use non-inversion sums to show that for every number $n > 34$, there is a permutation such that the dot product of that permutation and the identity permutation (of the same length) is n . We also provide a distribution function for non-inversion sums and a distribution function for k -step inversions that relates to the Eulerian polynomials. (Received September 22, 2011)