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Counting permutations by 3-descents. Preliminary report.

Given a permutation $\sigma \in \mathfrak{S}_n$, we say that σ has a *3-descent* at position i if the sequence of 3 consecutive elements of σ starting at position i forms an odd permutation. In this paper we consider the problem of counting permutations by the number of 3-descents and, more generally, by the set of positions at which a permutation has a 3-descent. We relate the number of permutations with a fixed 3-descent set to the number of permutations with a certain ordinary descent set. Then we derive a generating function enumerating permutations by length and number of 3-descents and discuss combinatorial properties of noncommutative polynomials enumerating permutations of given length by 3-descent sets.

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