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A refined sign-balance of simsun permutations. (English) Zbl 1284.05008

Summary: We present a refined sign-balance result for simsun permutations. On the basis of our previously established bijection between simsun permutations and increasing 1-2 trees, we deduce the recurrence relation and exponential generating function for the sign-balance of simsun permutations of length $n$ with $k$ descents. For odd lengths, the distribution turns out to be (shifted) second-order Eulerian numbers. For even lengths, the distribution forms a signed triangle whose row sums are all zeros. Meanwhile, we obtain two Pólya frequency sequences, one of which refines the double factorial of the odd numbers and the other, that of the even numbers.

MSC:
05A05 Permutations, words, matrices
05A15 Exact enumeration problems, generating functions

Keywords:
exponential generating function; Pólya frequency sequences

Software:
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References:


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