

Exponential Generating Functions

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Example 1. What is the number of derangements of $[n]$?

Example 2. What is the average number of cycles in a permutation of $[n]$?

Example 3. What is the number of permutations of $[n]$ with only odd-length/only even-length cycles?

Example 4. What is the egf for alternating permutations (ones that alternate between increases and decreases)?

Example 5. What is the number of rooted labeled trees on n vertices? Rooted labeled binary trees?