Exponential Generating Functions

Fall 2026

1 Products

The coefficients of a product count the number of ways to partition $[n]$ into sets S and T, put an A-structure on S and a B-structure on T.

2 Compositions

The coefficients of a composition count the number of ways to partition $[n]$ into some number of subsets, put an A-structure on each subset and a B-structure on the collection of these subsets.

Note that a particularly useful structure here is a cycle structure (of which there are $(m-1)!$ ways to apply it to a set of size m, as a permutation on $[n]$ can be thought of as a partition into sets with a cycle structure placed on each of them.