

1123-05-46

David Galvin* (dgalvin1@nd.edu), Department of Mathematics, University of Notre Dame, Notre Dame, IN 46556. *Restricted Stirling and Lah numbers, and their inverses.*

The matrix of Stirling numbers of the second kind (counting partitions of a set into non-empty blocks) is lower triangular with integer entries and 1's down the diagonal, so its inverse shares the same properties. It's well-known that the entries in the inverse matrix have a nice combinatorial meaning — they are Stirling numbers of the first kind (counting permutations by number of cycles).

We explore restricted Stirling numbers of the second kind, in which the block sizes are required to lie in some specified set. As long as this set contains 1, the matrix of these restricted Stirling numbers has an inverse with integer entries, so it is natural to ask, do these integers count things?

In many cases, we find that they do. In particular, we give a combinatorial interpretation of the inverse r -restricted Stirling numbers of the second kind (all blocks must have size at most r) for all even r , settling a question posed by Choi, Long, Ng and Smith in 2006. Our interpretations involve counts of trees and forests.

We carry out an analogous project for restricted Lah numbers (counting partitions of a set into non-empty lists). There are plenty of open questions. All this is joint work with John Engbers (Marquette) and Cliff Smyth (UNC Greensboro). (Received August 09, 2016)