

## Alternating sign matrices and totally symmetric plane partitions

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**Abstract:** We study the Schur polynomial expansion of a family of symmetric polynomials related to the refined enumeration of alternating sign matrices with respect to their inversion number, complementary inversion number and the position of the unique 1 in the top row. We prove that the expansion can be expressed as a sum over totally symmetric plane partitions and we are also able to determine the coefficients. This establishes a new connection between alternating sign matrices and a class of plane partitions, thereby complementing the fact that alternating sign matrices are equinumerous with totally symmetric self-complementary plane partitions as well as with descending plane partitions. As a by-product we obtain an interesting map from totally symmetric plane partitions to Dyck paths. The proof is based on a new, quite general antisymmetrizer-to-determinant formula. This is joint work with Ilse Fischer, Matjaž Konvalinka, Philippe Nadeau, and Vasu Tewari.