

Powers of the Vandermonde determinant, Schur functions and the dimension game

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Abstract

Vandermonde determinants are ubiquitous in mathematics. Since every even power of the Vandermonde determinant is a symmetric polynomial, we would like to understand its decomposition in terms of the basis of Schur functions. Besides its obvious importance in mathematics, such a decomposition would shed light on the quantum Hall effect, in particular on the Slater decomposition of the Laughlin wave function. While we will not explore the problem from the point of view of physics, we will investigate several combinatorial properties of the coefficients in the decomposition. In particular, I will give an inductive approach of computing some of the coefficients by building them up from tetris type shapes.

I will introduce all relevant material necessary to understand the talk.