

Seminar

Prof. Arvind Ayyer

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The combinatorics of odd and chiral partitions

Tuesday, November 21, 2017

at 15:15 h

ESI, Schrödinger Lecture Hall

Abstract: We say that a partition is odd if its dimension (computed by the hook-length formula) is odd. It turns out that the number $a(n)$ of odd partitions of a positive integer is always a power of 2. This was proven independently by Macdonald and McKay. We will show that the subposet of the Young lattice consisting of odd partitions is a binary tree, and give an explicit recursive characterisation of this tree.

We say that a partition is chiral if the associated irreducible representation composed with the determinant map gives the sign character. Denote the number of chiral partitions of n by $b(n)$. L. Solomon first considered the problem of enumeration of $b(n)$ and Stanley posed it as an open problem (level 5-) in the second volume of his book on enumerative combinatorics. We give an explicit formula for $b(n)$, thus solving the problem. We also show that the enumerations of $a(n)$ and $b(n)$ are closely related. The primary tool in our solution is J. Olsson's theory of core towers.

This is joint work with Amritanshu Prasad and Steven Spallone.

M. Drmota, C. Krattenthaler

November 17, 2017