
THE WEIZMANN INSTITUTE OF SCIENCE
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
Algebraic Geometry and Representation Theory Seminar

Room 261 ,Feinberg Graduate School Building
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Catalan Numbers and Labelled Graphs

Abstract:

The Catalan numbers form a sequence of integers C_t . A collection of sets H_t with $|H_t|=C_t$ for all t is called a Catalan set. Many examples of Catalan sets are known; the triangulations of the $(t+2)$ -gon, the Dyck paths from $(0,0)$ to $(0, 2t)$ and the nilpotent ideals in the Borel subalgebra of sl_t to name but a few. In my talk I will present a new example of a Catalan set, which has a remarkable property: for all t , H_t decomposes into a (non-disjoint) union of C_{t-1} distinct subsets each of cardinality 2^{t-1} . Moreover, one may define certain interesting labelled graphs for H_t and obtain the above decomposition in a natural way. The subgraphs corresponding to the aforementioned subsets are labelled hypercubes with some edges missing. The motivation of this work was the study of the additive structure of the Kashiwara crystal $B(\infty)$.