JUSTINE FALQUE, LIGM, Univ. Marne-la-Vallée

3-dimensional Catalan objets: a (partial) overview and a new bijection

A variant of the famous Catalan numbers, the sequence of 3-dimensional Catalan numbers counts the standard Young tableaux of shape (n,n,n) (whereas the classical Catalan numbers count those of shape (n,n)).

This talk will dwell on three combinatorial objects that are counted by the 3-dimensional Catalan numbers: first, 1234-avoiding up-down permutations; second, a certain class of weighted Dyck paths; and finally, product-coproduct prographs (introduced by Borie). We will outline how these objects relate to each other, and present a recently discovered bijection between the former two. Depending on the time left, we will discuss how the geometrical nature of PC prographs could be exploited to try to obtain a poset or even lattice structure on these objects.