

1158-05-299

Eugene Gorksy, Mazin Mikhail and Vazirani Monica*, Department of Mathematics, One Shields Ave, Davis, CA 95616. *Recursions for rational q, t -Catalan numbers.*

Catalan numbers enumerate Dyck paths and q, t -Catalan numbers refine that count with respect to the **area** and **dinv** statistics. This has a rational analogue moving from Dyck paths in a square to those in an $n \times m$ rectangle—or equivalently *normalized* n, m -invariant subsets of \mathbb{Z} . The combinatorics as well as related algebraic, geometric, and topological structures get far more complicated when n, m are not coprime. Some aspects are easier to control if one passes to the q, t -Catalan power series and one relaxes the normalization condition on invariant subsets. In particular as one reads a “window” of the subset, interpreted as a binary sequence of length $n + m$, and monitors the changes in **area** and **dinv**, one gets a recursion that computes the rational q, t -Catalan power series. This recursion is inspired by the recursion of Hogancamp-Mellit and is similar to that of Elias-Hogancamp-Mellit, obtained in their studies of the homology of n, m -torus links. (Received March 03, 2020)