Labeled binary trees, sub arrangements of the Catalan arrangements, and Schur-positivity

Abstract:
In 1995, Gessel introduced a multivariate formal power series $G$ tracking the distribution of ascents and descents in labeled binary trees. In addition to showing the $G$ is a symmetric function, he conjectured that $G$ is Schur-positive. In this talk, we’ll see how to expand $G$ positively in terms of ribbon Schur functions. Moreover, we’ll see how certain specializations of $G$ relate to actions on hyperplane arrangements. As an application of our work, we get a proof of gamma-positivity of the distribution of right edges over the set of local binary search trees.

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