UNIVERSITY AT ALBANY
State University of New York

College of Arts and Sciences
Department of Mathematics and Statistics

Algebra/Topology Seminar

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Flipping Non-Crossing Spanning Trees

Thursday, September 19, 2024
3:00 p.m. in BB-B012

Abstract. For a set P of n points in general position in the plane, the flip graph $\mathcal{F}(P)$ has a vertex for each non-crossing spanning tree on P and an edge between any two spanning trees that can be transformed into each other by one edge flip, i.e., the deletion and addition of exactly one edge. For P in convex position, we study the diameter $\operatorname{diam}(\mathcal{F}(P))$ of this flip graph; that is, the number of flips needed to get from a tree to another in the worst case. Modulo an additive term of size $o(n)$, a lower bound of $1.5n$ and an upper bound of $2n$ from 1999 were not improved until $\operatorname{diam}(\mathcal{F}(P)) < 1.9512n$ was shown last year. We improve the lower bound to $1.\overline{5}n - O(1) = \frac{14}{9}n - O(1)$ and the upper bound to $1.\overline{6}n - 3 = \frac{15}{9}n - 3$. The lower bound disproves the conjecture that $\operatorname{diam}(\mathcal{F}(P)) \leq 1.5n$ holds for all P in general position.

Joint work with Linda Kleist, Torsten Ueckerdt, and Birgit Vogtenhuber.