

Ehrhart Positivity of Panhandle Matroids and a Bound for Paving Matroids

Panhandle matroids are a specific lattice-path matroid corresponding to panhandle-shaped Ferrers diagrams. Their matroid polytopes are the subpolytopes carved from a hypersimplex to form matroid polytopes of paving matroids. It has been an active area of research to determine which families of matroid polytopes are Ehrhart positive. In joint work with Daniel McGinnis and Andrés R Vindas-Meléndez, we prove Ehrhart positivity for panhandle matroid polytopes, thus confirming a conjecture of Hanely, Martin, McGinnis, Miyata, Nasr, Vindas-Meléndez, and Yin (2023). Our proofs rely solely on combinatorial techniques which involve determining intricate interpretations of certain set partitions. With similar techniques, we verify a conjecture of Ferroni (2022), which asserts that the coefficients of the Ehrhart polynomial of a connected matroid are bounded above by those of the corresponding uniform matroid, for the class of paving matroids.