Contribution ID: **2** Type: **Presentation (25 min)**

Intrinsic properties of the gamma vector and matroids

Thursday, 22 August 2024 11:20 (25 minutes)

We'll discuss the gamma vector, which is an invariant of (reciprocal) polynomials whose positivity lies somewhere between unimodality and real-rootedness. It shows up in many seemingly unrelated contexts including permutation statistics, signs of Euler characteristics vs. curvatures of (piecewise Euclidean) manifolds, and Chow rings of matroids. Before asking about positivity, a natural question to ask while trying to understand why this is the case is the question of *what* this invariant measures in the first place. While there are classes of objects collecting when positivity is observed (the second setting in particular), the invariant itself is rather poorly understood (except possibly the last component). We explore the question using an explicit formula for (an extension of) this invariant in terms of the input polynomial along with tools from algebraic geometry and geometric combinatorics. For example, we make observations that contrast with heuristics stated regarding the general lower bound behavior of h-vectors when it was originally defined. This perspective also leads to natural connections to convexity properties of polynomials specific to matroids and structures of matroid invariants coming from algebraic geometry.

Primary author: PARK, Soohyun (Hebrew University of Jerusalem)

Presenter: PARK, Soohyun (Hebrew University of Jerusalem)