Deletion-Contraction Polynomials

ABSTRACT

Let $M$ be a matroid with rank function $r$, and let $e \in E(M)$. The deletion-contraction polymatroid with rank function $f = r_{M \setminus e} + r_{M/e}$ will be denoted $P_e(M)$. The polymatroid $P_e(M)$ is uniquely determined by $M$ and $e$. Similarly, a deletion-contraction polymatroid determines $M$, unless $e$ is a loop or coloop. This talk will characterize all polymatroids of this deletion-contraction form by giving the set of excluded minors. Vertigan conjectured that the class of $GF(q)$-representable deletion-contraction polymatroids is well-quasi-ordered. From this attractive conjecture, both Rota’s Conjecture and the WQO Conjecture for $GF(q)$-representable matroids would follow.