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Nima Anari, Kuikui Liu, Shayan Oveis Gharan and Cynthia Vinzant*

(clvinzan@ncsu.edu). *Completely log-concave polynomials, expanders, and matroids.*

Completely log-concavity is a functional property of real multivariate polynomials that translates to strong and useful conditions on its coefficients. In particular, from such a polynomial, one define a random walk on its monomials that mixes quickly and for which the associated graph has good expansion properties. I will introduce the class of completely log-concave polynomials in elementary terms, discuss the beautiful real and combinatorial geometry underlying these polynomials, and describe applications to random walks on simplicial complexes. One nice consequence of this theory is a proof of the Mihail-Vazirani conjecture that the basis exchange graph of a matroid has expansion at least one. This is based on joint work with Nima Anari, Kuikui Liu, and Shayan Oveis Gharan. (Received September 09, 2019)