On the zeroes of hypergraph independence polynomials

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Abstract

We prove that the multivariate independence polynomial of any hypergraph of maximum degree Δ has no zeroes on the complex polydisc of radius $\sim \frac{1}{e\Delta}$, centered at the origin. Up to logarithmic factors in Δ, the result is optimal, even for graphs with all edge sizes greater than 2. As a corollary, we get an FPTAS for approximating the independence polynomial in this region of the complex plane. We furthermore prove the corresponding radius for the k-uniform linear hypertrees is $\Omega(\Delta^{-1/(k-1)})$, a significant discrepancy from the graph case.

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