Discrete entropy monotonicity for log-concave sums on $\mathbb{Z}$ and $\mathbb{Z}^d$

Lampros Gavalakis

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Abstract

A celebrated result of Artstein, Ball, Barthe and Naor (2004) states that the differential entropy of sums of continuous random variables increases along the central limit theorem. Although an exact analogue of this statement cannot be true for discrete random variables, Tao (2010) conjectured that an approximate version is true provided that the underlying entropies are large enough. We will present a recent proof of a special case of this conjecture for log-concave random variables on the integers and discuss current progress towards extending this result on $\mathbb{Z}^d$. For the dimensional extension, we will mention some discrete analogues of results from convex analysis that may be of independent interest.

Part of the talk is based on joint work with M. Fradelizi and M. Rapaport.