BRIAN MARCUS, University of British Columbia

Limiting Entropy and Independence Entropy of d-dimensional shift spaces I

Topological entropy is a fundamental invariant for Z^d-shift spaces. When $d = 1$ and the shift space is a shift of finite type (SFT), it is easy to compute the topological entropy. In higher dimensions, it is much more difficult to compute, and exact values are known in only a handful of cases. However, a limiting entropy, as the dimension $d \to \infty$, defined as follows, can be computed in many more cases.

A 1-dimensional shift space X determines Z^d-shift spaces $X^{\otimes d}$ for each d; namely, $X^{\otimes d}$ is the Z^d-shift space where every "row" in every coordinate direction satisfies the constraints of X. Let $h_d(X)$ denote the topological entropy of $X^{\otimes d}$. Then $h_d(X)$ is non-increasing in d and its limit is denoted $h_\infty(X)$.

We introduce a notion of "independence entropy" denoted $h_{ind}(X)$, which is explicitly computable if X is a 1-dimensional SFT. We show that $h_\infty(X) \geq h_{ind}(X) = h_{ind}(X^{\otimes d})$ for all d. We can prove that equality holds in many cases, and it may well hold in general.

(joint work with Erez Louidor and Ronnie Pavlov)