Entropy of random substitution systems

Abstract:

Random substitutions are generalisations of substitutions, where letters are mapped randomly and independently to one of a finite set of possible words. This typically gives rise to dynamical systems with a hierarchical structure, mixed spectral type, and a higher complexity than classical substitution systems. In fact, random substitution systems usually have positive entropy.

Among the many ergodic measures, a special role is played by the measures that maximise the entropy - if there is a unique such measure the system is called intrinsically ergodic. We show that for certain random substitution systems, the measures of maximal entropy are precisely those that are invariant under the so called "shuffle group", introduced in previous work of Fokkink-Rust-Salo. This leads to an equivalent criterion for intrinsic ergodicity in terms of an associated Markov chain. Finally, we illustrate the richness of this class by providing an example with several measures of maximal entropy (joint work with A. Mitchell).