Local spectral estimates and quantitative weak mixing for substitution Z-actions

Boris Solomyak

Abstract: Substitutions serve as models and test cases for many classes of parabolic systems; in particular, they include codings of self-similar interval exchange transformations. We study (local) spectral properties and related questions of quantitative weak mixing for substitution Z-actions, building on our earlier work on suspensions and translation flows. In particular, we show that in the case when the substitution matrix is irreducible over the rationals and has no eigenvalues of modulus one, weak mixing implies that the spectral measures of "nice" test functions are (at least) uniformly log-Hoelder regular, and hence the Z-action admits power-logarithmic bounds for the rate of weak mixing. On the other hand, for substitutions of Salem type, the spectral measures are shown to have Hoelder upper bounds at the spectral parameters from the number field generated by the Salem number, but the Hoelder exponent at those parameters cannot be chosen uniformly. This is a joint with A. I. Bufetov and J. Marshall-Maldonaldo.