

The Möbius disjointness conjecture of Sarnak for ergodic weights

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The Möbius function is a multiplicative function which encodes important information related to distributional properties of the prime numbers. It is widely believed that its non-zero values fluctuate between plus and minus one in such a random way that forces non-correlation with any “reasonable” sequence of complex numbers. One conjecture in this direction, formulated by Sarnak, states that the Möbius function does not correlate with any bounded deterministic sequence, meaning, any sequence that is produced by a continuous function evaluated along the orbit of a point in a zero entropy topological dynamical system. I will describe the proof of the logarithmically averaged variant of this conjecture for a wide class of dynamical systems, which includes all uniquely ergodic ones. Our approach is to study structural properties of measure preserving systems naturally associated with the Möbius function. I will explain how these structural results are obtained using a combination of tools from ergodic theory and analytic number theory, and how we use them for our purposes.

This is a joint work with Bernard Host.