

On Furstenberg systems of some aperiodic multiplicative functions

Mariusz Lemańczyk

Studying arithmetic properties of multiplicative functions through the so-called Furstenberg systems became a powerful and fruitful ergodic tool when dealing with the Sarnak and Chowla conjectures. The Chowla conjecture from 1965, originally formulated for the Liouville function, was expected to hold in the class of aperiodic multiplicative functions in the sense that such functions have precisely one Furstenberg system, and this system is "as random as possible", cf. Elliot's conjecture from 1990. In 2015 Matomäki, Radziwi and Tao gave a counterexample to Elliot's conjecture by constructing aperiodic multiplicative functions (bounded by 1) for which (already) the Chowla conjecture of order 2 fails. During the talk I will try to describe recent results concerning a variety of Furstenberg systems for Matomäki, Radziwi, Tao's functions, in particular, showing that the Chowla conjecture holds for them along some subsequences and disproving a recent conjecture by Frantzikinakis and Host. The talk is based on my joint work with Alex Gomilko and Thierry de la Rue.