Mean value theorems in multiplicative systems

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Abstract

In this talk, we will discuss about additive ergodic averages in multiplicative measure-preserving systems. These objects are the natural ergodic extension of mean values of multiplicative functions, the behaviour of which is known by the celebrated mean value theorem of Halász. Consequently, the study of these objects allows us to transfer principles, ideas and theorems in multiplicative number theory from the setting of integers to the more general one of dynamics.

We will show a new mean ergodic theorem for these systems, which is a far-reaching dynamical extension of (a special case of) Halász's theorem. In addition, motivated by a number-theoretic principle asserting that, under no local obstructions, additive and multiplicative structures of the integers should be independent, we discuss correlations of such structures in dynamics. Finally, we will give some combinatorial applications.