

Additive Combinatorics
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Ergodic methods in combinatorial number theory

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Abstract

Shortly after Szemerédi's proof that a set of positive upper density contains arbitrarily long arithmetic progressions, Furstenberg gave a new proof using ergodic theory. This led to the field of ergodic Ramsey Theory, in which the problems are motivated by additive combinatorics and the proofs use ergodic theory. This has led to new combinatorial results, some of which have yet to be obtained by other means, and to a deeper understanding of the structure of measure preserving systems. I will outline the ergodic theory background needed to understand these results, with an emphasis on recent developments in ergodic theory.