

Nilsystems in ergodic theory and additive combinatorics

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Abstract

Much recent work in ergodic theory has been motivated by interactions with combinatorics and number theory. A highlight of this interaction has been the study of patterns in certain subsets of the integers, starting with Szemerédi's Theorem on arithmetic progressions in sets of positive upper density and Furstenberg's proof of Szemerédi's Theorem using ergodic theory. It turns out that algebraic constraints play a role in understanding related phenomenon, both in ergodic theory and in additive combinatorics. I will give an overview of the role of nilsystems in the recent developments.