

A Categorical Approach to Additive Combinatorics

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Motivated by the definition of Freiman homomorphism we explore the possibilities of formulating some basic notions and techniques of additive combinatorics in a categorical language. We show that additive sets and Freiman homomorphisms form a category and we study several limit and colimit objects in this and an interesting subcategory of this category. Moreover, we study the additive structure of these (co)limit objects using additive doubling constant. We relate this category to that of finite sets and mappings, and abelian groups and group homomorphisms. It is shown that Lev-Konyagin result on universal ambient groups is an instance of adjunction.

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