

TOWARDS FLAG ALGEBRAS IN ADDITIVE COMBINATORICS

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We study an analogue of the Ramsey multiplicity problem for additive structures, in particular establishing the minimum number of monochromatic 3-APs in 3-colorings of \mathbb{F}_3^n as well as obtaining the first non-trivial lower bound for the minimum number of monochromatic 4-APs in 2-colorings of \mathbb{F}_5^n . The former parallels results by Cumings et al (2013) in extremal graph theory and the latter improves upon results of Saad and Wolf (2017). The lower bounds are notably obtained by extending the flag algebra calculus of Razborov (2007) to additive structures in vector spaces over finite fields.

This work is available on arXiv: <https://arxiv.org/abs/2304.00400>

Joint work with Juanjo Rué (Universitat Politècnica de Catalunya and Centre de Recerca Matemàtica, Spain).