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A linear programming approach to Fuglede's conjecture in \mathbb{Z}_p^3

ROMANOS DIOGENES MALIKIOSIS

Aristotle University of Thessaloniki

Delsarte's method on linear programming bounds is a very powerful tool which provides an upper bound on the size of a set A in an additive group G , whose difference set $A - A$ avoids a given set E . This tool may have limitations, but has been used successfully in various settings, most notably in the sphere packing problem in 8 and 24 dimensions.

Here, we will present an application of this method to Fuglede's conjecture in $G = \mathbb{Z}_p^3$, providing the following partial result: a set $A \subset G$ with cardinality

$$p(p - \sqrt{p} - \frac{1}{\sqrt{p}}) < |A| < p^2,$$

cannot be spectral.