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Finite Abelian group cohesion. (In English)

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Let G be a finite Abelian group with $\#G = p$. For $A, b \subset G$ let $m(x, A, B) = \#\{(a, b) : a + b = x, a \in A, b \in B\}$. For $E \subset G$ let E' denote its complement. The authors prove the following results:

(i) (Cohesion equation)

$$\sum_{c \in G} |m(x, E, E) + m(x, E', E') - m(x, E, E') - m(x, E', E)|^2 = \sum_{c \in G} |m(x, E, -E) + m(x, E', -E') - m(x, E, -E') - m(x, E', -E)|^2$$

(ii) $\min_{E \subset G} \max_{x \in G} |m(x, E, E) + m(x, E', E') - 2m(x, E, E')| \geq p^{1/2}$

If $\lambda > \frac{1}{2}$ and G contains no element of order 2, then

(iii) $\min_{E \subset G} \max_{x \in G} |m(x, E, E) + m(x, E', E') - 2m(x, E, E')| \geq K \cdot p^\lambda$

Here K depends only on λ .

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Classification:

20K01 Finite abelian groups

20D60 Arithmetic and combinatorial problems on finite groups

11P99 Additive number theory

20P05 Probability methods in group theory

11B05 Topology etc. of sets of numbers

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finite Abelian group; sum set; Cohesin equation