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Erdős, Paul; Szemerédi, E.

On sums and products of integers. (In English)

Studies in pure mathematics, Mem. of P. Turan, 213-218 (1983).

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Denoting by $f(n)$ the largest integer such that for every $\{1 \leq a_1 \leq \dots \leq a_n\}$ integer set there are at least $f(n)$ distinct numbers of the form $a_i + a_j$, $a_i a_j$, $1 \leq i \leq j \leq n$, the authors prove that

$$n^{1+c_1} < f(n) < n^2 \exp(-c_2 \log n / \log \log n).$$

Some other related results and a lot of related conjectures are also discussed. The proof is self-contained and based only on elementary combinatorial arguments.

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Classification:

11B75 Combinatorial number theory

11B83 Special sequences of integers and polynomials

11B13 Additive bases

Keywords:

sums and products of integers; combinatorial number theory; addition and multiplication of sets