

Avoiding Monochromatic Sequences With Special Gaps

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Abstract

For S a set of positive integers, and k and r fixed positive integers, denote by $f(S, k; r)$ the least positive integer n (if it exists) such that within every r -coloring of $\{1, 2, \dots, n\}$ there must be a monochromatic sequence $\{x_1, x_2, \dots, x_k\}$ with $x_i - x_{i-1} \in S$ for $2 \leq i \leq k$. We consider the existence of $f(S, k; r)$ for various choices of S , as well as upper and lower bounds on this function. In particular, we show that this function exists for all k if S is an odd translate of the set of primes and $r = 2$.