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*Monochromatic and zero-sum sets of nondecreasing diameter.* (In English)

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The authors consider a van der Waerden type number  $f(m, r)$ , which is the minimum integer  $n$  such that for every coloring of the integers  $\{1, 2, \dots, n\}$  with  $r$  colors, there exist two monochromatic subsets  $B_1$  and  $B_2$  each with  $m$  integers such that each element of  $B_1$  is less than each element of  $B_2$  and that the diameter of  $B_1$  is less than or equal to the diameter of  $B_2$ . They verify that  $f(m, 2) = 5m - 3$ ,  $f(m, 3) = 9m - 7$ ,  $12m - 9 \leq f(m, 4) \leq 13m - 11$ , and asymptotically,  $c_1mr \leq f(m, r) \leq c_2mr \log_2 r$ . Similar questions are considered when the elements of  $\mathbb{Z}_m$  are used as colors and zero-sum sets are required.

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Classification:

05C55 Generalized Ramsey theory

Keywords:

van der Waerden number; coloring; monochromatic subsets; diameter; zero-sum sets