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The solution to a problem of Grünbaum. (In English)

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The paper characterizes the set of all possible values for the number of lines determined by n points for n sufficiently large. For $\binom{k}{2} \leq (n - k)$, the lower bound of Kelly and Moser for the number of lines in a configuration with $n - k$ collinear points is shown to be sharp and it is shown that all values between $M_{\min}(k)$ and $M_{\max}(k)$ are assumed with the exception of $M_{\max} - 1$ and $M_{\max} - 3$. Exact expressions are obtained for the lower end of the continuum of values leading down from $\binom{n}{2} - 4$. In particular, the best value of $c = 1$ is obtained in Erdős' previous expression $cn^{3/2}$ for this lower end of the continuum.

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Classification:

05A15 Combinatorial enumeration problems

05B25 Finite geometries (combinatorics)

51E20 Combinatorial structures in finite projective spaces

Keywords:

connecting lines; lines determined by points