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A lower bound on the size of linear sets on a projective line of finite order

A set S of points of the finite projective space $\mathrm{PG}(\mathbb{F}_q^{n+1})$ is a *linear set* of rank t if $S = \{\langle u\rangle_F | u \in U\}$ for some set $U \subset \mathbb{F}_q^{n+1}$ that is a t-dimensional vector space over a subfield of $\mathbb{F}_q$.

The following result was obtained jointly with Geertrui Van de Voorde: *An $\mathbb{F}_q$-linear set of rank $k \leq n$ in $\mathrm{PG}(1, q^n)$ which contains at least one point of weight one, contains at least $q^{k-1} + 1$ points.*

This result, its connection with direction problems in affine spaces, and some applications will be discussed.