

Complete arcs in projective planes

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Let $PG(2, q)$ be the projective plane over the field $GF(q)$. A k -arc in $PG(2, q)$ is a set of k points, no three of which are collinear. A k -arc in $PG(2, q)$ is called complete if it is not contained in a $(k + 1)$ -arc in $PG(2, q)$. A k -arc corresponds to a $[k, 3, k - 2]$ maximum distance separable code (MDS code); a complete arc corresponds to a code that cannot be extended. Then, coding theory motivates us to the study of complete k -arc in $PG(2, q)$.

In this talk, we present some constructions of k -arcs. A typical approach for finding infinite families of complete k -arcs is considering orbits of a large projectivity group. Moreover, we discuss the problem of determining the spectrum of values of k for which a complete k -arc exists. In particular, we are interested in the (open) problem of determining the size of the smallest complete k -arc in $PG(2, q)$.

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