m-systems of Polar Spaces and Maximal Arcs in Projective Planes

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Abstract

Shult and Thas have shown in [13] that m-systems of certain finite classical polar spaces give rise to strongly regular graphs and two weight codes. The main result of this paper is to show that maximal arcs in symplectic translation planes may be obtained from certain m-systems of finite symplectic polar spaces. Many new examples of maximal arcs are then constructed. Examples of m-systems are also constructed in $Q^-(2n+1, q)$ and $W_{2n+1}(q)$. A method different from that of Shult and Thas is used to construct strongly regular graphs using "differences" of m-systems.

1 Introduction

We follow the definitions and notation of [13]. Let P be a finite classical polar space of rank $r \geq 2$. Then

$W_n(q)$ denotes the polar space arising from a symplectic polarity of $PG(n, q)$, n odd and $n \geq 3$,

$Q(2n, q)$ denotes the polar space arising from a non-singular parabolic quadric of $PG(2n, q)$, $n \geq 2$,

$Q^+(2n+1, q)$ denotes the polar space arising from a non-singular hyperbolic quadric of $PG(2n+1, q)$, $n \geq 1$,

$Q^-(2n+1, q)$ denotes the polar space arising from a non-singular elliptic quadric of $PG(2n+1, q)$, $n \geq 2$,