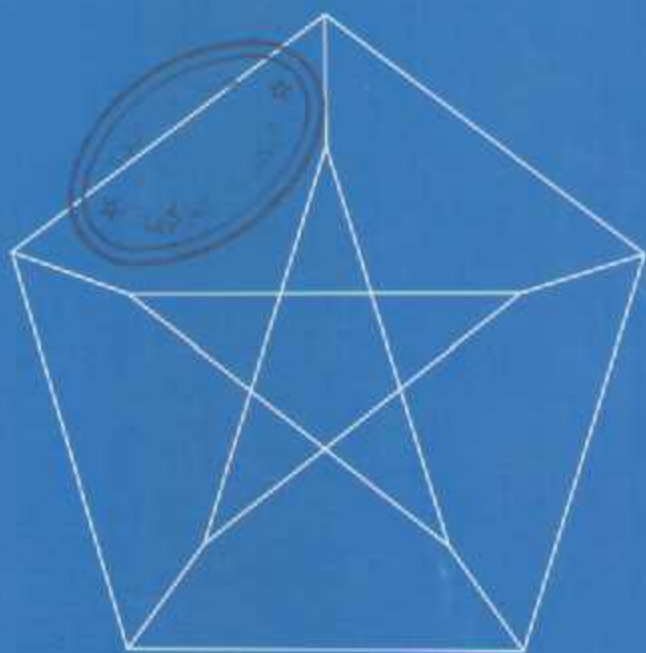




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The twisted cubic in $PG(3, q)$ and translation spreads in $H(q)^2$

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Abstract

Using the Galois field automorphisms induced by the classical generalized hexagon $H(q)$ and the translation of $PG(3, q)$ with respect to the plane π , Casazza [2] (2001) [M1–M7] has proved that $H(q)$ is translation equivalent to $H(q^2)$ if and only if $q \equiv 1 \pmod{6}$. In this paper we give a new proof of this result.

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Keywords: Generalized hexagon; Spread; Translation

1. Introduction

In [14] Casazza et al. prove that each translation spread with respect to a line of the generalized hexagon $H(q)$ is also a spread satisfying \mathcal{F}_q , defined as \mathcal{F}_q lines subset \mathcal{F} of $H(q)$, \mathcal{F} is a set of lines in which every point belongs to precisely one line of \mathcal{F} , and every ℓ of $H(q)$ is \mathcal{F} -line. This construction has motivated the study of \mathcal{F}_q linear sets of $PG(3, q)$ of rank 3, with the main hypothesis

(H) the authors prove that if $q \equiv 1 \pmod{6}$, then each translation set of \mathcal{F} is an \mathcal{F}_q linear set of rank 3 of $PG(3, q)$ with respect to the plane π of a twisted cube \mathcal{C} of $PG(3, q)$ satisfying the hypothesis of \mathcal{F}_q (definition 1.1) of [14].

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