

Partial Spreads of $T_2(\mathcal{O})$

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A detailed study of spreads of the generalized quadrangle $T_2(\mathcal{O})$ arising from an oval \mathcal{O} in $\text{PG}(2, q)$ was made by M. R. Brown *et al.* in [2]. We will discuss partial spreads of $T_2(\mathcal{O})$.

Assuming the partial spread of size $q^2 + 1 - \delta$ is maximal and using results on minihypers, which are closely related to blocking sets in $\text{PG}(2, q)$, we obtain minimal values for the deficiency δ of the maximal partial spread.

In the case q even and using extendability results on arcs in $\text{PG}(2, q)$, we can prove that a maximal partial spread of $T_2(\mathcal{O})$ which does not cover (∞) does not exist if $\delta \leq q - 1$. When \mathcal{O} is a conic, this result improves the result of G. Tallini for $T_2(\mathcal{O}) \cong \text{Q}(4, q)$ ([3]), and, furthermore, this result is sharp since there exist maximal partial spreads with deficiency $\delta = q$. Also examples of maximal partial spreads of $T_2(\mathcal{O})$ will be given.

References

- [1] M. R. Brown, J. De Beule and L. Storme. Maximal partial spreads of $T_2(\mathcal{O})$ and $T_3(\mathcal{O})$. (In preparation).
- [2] M. R. Brown, C. M. O’Keefe, S. E. Payne, T. Penttila and G. F. Royle. Spreads of $T_2(\mathcal{O})$, α -flocks and ovals. Preprint.
- [3] G. Tallini. Blocking sets with respect to planes in $\text{PG}(3, q)$ and maximal spreads of a nonsingular quadric in $\text{PG}(4, q)$. In *Proceedings of the First International Conference on Blocking Sets (Giessen, 1989)*, *Mitt. Math. Sem. Giessen*, number 201, pages 141–147, 1991.