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Cameron-Liebler sets of generators in polar spaces

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In [1] Cameron and Liebler studied the orbits of the projective groups $\mathrm{PGL}(n+1,q)$. For this purpose they introduced line classes in the projective space $\mathrm{PG}(3,q)$ with a specific property, which afterwards were called *Cameron-Liebler line classes*. Many equivalent characterisations of these Cameron-Liebler classes are known, relating them to line spreads, to the row space of the point-line incidence matrix, to the eigenspaces of the Grassmann scheme, ... Next to proving several equivalent characterisations, the main problem is the classification problem.

Cameron-Liebler line classes were also introduced for $\mathrm{PG}(n,q)$, $n \geq 4$ (see [3] for an overview). Recently Cameron Liebler k-classes in $\mathrm{PG}(2k+1,q)$ were introduced ([4]) generalising Cameron-Liebler line classes in $\mathrm{PG}(3,q)$ to sets of k-dimensional subspaces. Cameron-Liebler classes were also defined and classified for finite sets ([2]).

In this talk I will discuss the newly introduced Cameron-Liebler sets of generators in polar spaces. I will present several characterisations of these Cameron-Liebler sets, which vary dependent on the polar space. Moreover I will present the classification of Cameron-Liebler sets of generators in polar spaces with a small parameter.

References

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