Equivalent definitions for Cameron-Liebler sets in geometrical settings

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Cameron-Liebler sets are one of the types of substructures in finite projective spaces, presently receiving a lot of attention. One of the nice aspects of Cameron-Liebler sets is that they can be defined in many equivalent ways; thus showing their intrinsic geometric relevance.

After a large number of results regarding Cameron-Liebler sets of lines in the 3-dimensional projective space $\text{PG}(3, q)$ [2], Cameron-Liebler sets of $k$-spaces in the $(2k + 1)$-dimensional projective space $\text{PG}(2k + 1, q)$ were defined [4]. Here, links to Erdős-Ko-Rado results were used to obtain results on these Cameron-Liebler sets of $k$-spaces in $\text{PG}(2k + 1, q)$ [3].

These links motivated to initiate research aimed at defining Cameron-Liebler sets in finite classical polar spaces [1]. When defining Cameron-Liebler sets in a new setting, the first aim is to find a substructure which can be defined in similar equivalent ways as in the projective space setting. The second aim is to find examples and characterization results on these Cameron-Liebler sets in those new settings.

This talk will discuss Cameron-Liebler sets in finite projective spaces and in finite classical polar spaces. We present new equivalent definitions of these Cameron-Liebler sets. We present existence and non-existence results on Cameron-Liebler sets. One of the new aims is to use the newly discovered equivalent definitions of Cameron-Liebler sets to improve known results on Cameron-Liebler sets.

References

