

On Cameron-Liebler line classes with large parameter

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A *Cameron-Liebler* line class in $\text{PG}(3, q)$ is a set \mathcal{L} of $x(q^2 + q + 1)$ lines of $\text{PG}(3, q)$ with the property that any spread of $\text{PG}(3, q)$ shares exactly x lines with \mathcal{L} .

In the talk, we will overview some non-existence results of Cameron-Liebler line classes for relatively small parameter x . Then we continue with reporting on attempts to construct (several) infinite families of examples for parameter $x \in \mathcal{O}(q^2)$, for different values of q , based on the assumption that a group of order $q^2 + q + 1$ acts as an automorphism group on the line class, using the initial information we got from [1, 2]. We will discuss how the representation of $\text{AG}(3, q)$ as \mathbb{F}_{q^3} was used to geometrically understand the orbits of the points of $\text{PG}(3, q)$ under the group, and we overview the state of the art of the currently known examples.

References

- [1] M. Rodgers. Private communication.
- [2] M. Rodgers. Some new examples of cameron-liebler line classes in $\text{PG}(3, q)$. *Des. Codes Cryptogr.*, to appear.