

## Searching for designs over finite fields with non-trivial automorphism groups

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A design over the finite field  $\mathbb{F}_q$  with parameters  $t$ - $(v, k, \lambda)_q$  is a pair  $(\mathcal{V}, \mathcal{B})$  where  $\mathcal{V}$  is the  $v$ -dimensional vector space over  $\mathbb{F}_q$  and  $\mathcal{B}$  is a collection of  $k$ -dimensional subspaces of  $\mathcal{V}$ , such that each  $t$ -dimensional subspace of  $\mathcal{V}$  is contained in precisely  $\lambda$  members of  $\mathcal{B}$ . We follow the trend of finding  $q$ -analogues of statements valid for classical combinatorial designs. In particular, we focus on necessary conditions on the existence of designs over finite fields with an assumed automorphism group. We give insight into the problems we encountered as well as results we obtained.