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*Designs constructed from 2-transitive groups*

In this talk, we will explore the Key-Moori Method, a powerful technique for constructing designs that are invariant under finite primitive groups, with a focus on 2-transitive groups. We will apply this method to several families of finite simple groups, as well as the affine group  $AGL(n, q)$ .

For an affine group  $G$ , we will demonstrate how the structure of the conjugacy classes of the general linear group  $GL(n, q)$  can be used to obtain the parameters of the  $G$ -invariant designs constructed by this method, and we will explicitly compute the parameters for small values of  $n$ . We will also demonstrate how fixed-points of primitive groups can be used to find designs and obtain what we call "reduced designs" which enable us to determine the automorphism groups of the designs in many cases.