

Abstract
Constructions of new matroids and designs
over \mathbb{F}_q

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A *perfect matroid design* (PMD) is a matroid whose flats of the same rank all have the same size. As the name suggest, these matroids give rise to certain designs, and in the literature this construction is used to find new designs. The aim of this work is to establish a q -analogue of this construction.

We will introduce the q -analogue of a PMD and its properties. In order to do that, we first define a q -matroid in terms of its flats. We show that q -Steiner systems are examples of q -PMD's, just like Steiner systems are examples of PMD's. We use the q -matroid structure to construct subspace designs from q -Steiner systems. We apply this construction to known q -Steiner systems and discuss the designs coming from it.

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