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New subspace designs from q -matroids

A perfect matroid design (PMD) is a matroid whose flats of the same rank all have the same size. In this talk we introduce the q -analogue of a PMD. A subspace design is a collection B of k -dimensional spaces such that every t -dimensional subspace is contained in the same number λ of members of B . For $\lambda = 1$, the design is called a q -Steiner system. Currently, the only known q -Steiner system parameters that have been realised is $S(2, 3, 13; 2)$. We show that q -Steiner systems are examples of q -PMD's and we use this q -matroid structure to construct subspace designs from q -Steiner systems.