

The q -analogue of matroid

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In combinatorics, a q -analogue is a generalization from finite sets to finite dimensional vector spaces, usually over a finite field. Before zooming in on q -matroids, the q -analogue of a matroid, we give some history and background on q -analogues.

We aim to develop some intuition on when a q -analogue is straightforward and when it is not: in general, an object defined using sets can have many equivalent descriptions that are not (at all) equivalent if we take their q -analogue. This means that for defining the q -analogue of a combinatorial object, it is sometimes needed to take a very elaborated and non-straightforward way to write its definition.

In this talk we illustrate this problem with three notions associated to matroids: axioms for independent sets and bases, the direct sum, and the family of transversal matroids. If time permits, there will be some wild speculation about the q -analogue of polytopes.