

Some naturally occurring matroids and matroid-like structures in commutative algebra

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Abstract

We show that given a finitely generated standard-graded algebra of dimension d over an infinite field, its graded Noether normalizations obey a certain kind of “generic exchange”, allowing one to pass between any two of them in at most d steps. We prove analogous generic exchange theorems for minimal reductions of an ideal, minimal reductions with respect to tight closure and Frobenius closure (where we get a true matroid), and other contexts if time permits. We unify all these results into the common axiomatic framework of the *generic matroid*, a common generalization of the concepts of topological space and matroid. – This work is joint with Joseph P. Brennan.

Keywords: graded algebra, Frobenius closure.