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Exterior algebra meets idempotent algebra

Abstract

Classically, exterior algebra provides a framework for understanding the Plucker embedding of a Grassmannian into a projective space. A d -multivector w satisfies the Plucker relations if and only if the d -th exterior power of the kernel of wedging with w is a line. I'll present a tropical analogue of this picture. This leads to a new cryptomorphic description of (valuated) matroids as those d -multivectors for which the d -th tropical exterior power of a certain associated module is free of rank 1. This also leads to a conjectural description of the space of all linear relations among the circuit vectors of a valuated matroid. This is joint work with Noah Giansiracusa.