

MATROIDAL SUBDIVISIONS, DRESSIANS AND TROPICAL GRASSMANNIANS

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JOINT WORK WITH MICHAEL JOSWIG

ABSTRACT. The Grassmannian is the vanishing locus of the Plücker ideal $I_{d,n}$ and the moduli space of all d -dimensional linear subspaces in n -space over some field. The points on the Grassmannian are called *Plücker vectors*. The *tropical variety of an ideal I* is the subfan of the Gröbnerfan of I , consisting of all term orderings $w \in \mathbb{R}^{\binom{n}{d}}$ such that the corresponding initial ideal I_w does not contain a monomial. The tropical Grassmannian can be seen as a subfan of the secondary fan of the hypersimplex. A tropical Plücker vector subdivides the hypersimplex into matroid polytopes. The fan of all vectors that induce matroid subdivisions on the hypersimplex is called the *Dressian*. It is the intersection of the tropicalization of all 3-term Plücker relations.

In my talk I will give a brief introduction into the topic of matroid polytopes and their subdivisions. I will characterize parts of the Dressian in terms of matroid properties which lead to an estimate for the dimension of the Dressian. Furthermore, I will present results for the tropical Grassmannian with parameters $d = 3$ and $n = 8$.

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