**Faithful Tropicalization of the Grassmannian of planes**

## ABSTRACT

Fix a complete non-Archimedean valued field $K$. Any subscheme $X$ of $(K^*)^n$ can be "tropicalized" by taking the (closure) of the coordinate-wise valuation. This process is highly sensitive to coordinate changes. When restricted to group homomorphisms between the ambient tori, the image changes by the corresponding linear map. This was the foundational setup of tropical geometry.

In recent years the picture has been completed to a commutative diagram including the analytification of $X$ in the sense of Berkovich. The corresponding tropicalization map is continuous and surjective and is also coordinate-dependent. Work of Payne shows that the Berkovich space $X$ is homeomorphic to the projective limit of all tropicalizations. A natural question arises: given a concrete $X$, can we find a split torus containing it and a continuous section to the tropicalization map? If the answer is yes, we say that the tropicalization is faithful. The curve case was worked out by Baker, Payne and Rabinoff.

In this talk, we show that the tropical projective Grassmannian of planes is homeomorphic to a closed subset of the analytic Grassmannian in Berkovich sense. Our proof is constructive and it relies on the combinatorial description of the tropical Grassmannian as a space of (generalized) phylogenetic trees by Speyer-Sturmfels. We also show that both sets have piecewiselinear structures that are compatible with our homeomorphism.

This is joint work with M. Haebich and A. Werner (`arXiv:1309.0450`).