TROPICAL GEOMETRY AND NEWTON-OKOUNKOV BODY FOR GRASSMANNIAN OF PLANES

JIHYEON JESSIE YANG

Toric geometry is a very well-established field in algebraic geometry. In toric geometry we are able to use a wonderful correspondence between combinatorics of polyhedral objects in Euclidean spaces and algebraic geometry over arbitrary fields. There have been two active developments that aim to generalize toric geometry: theory of Newton-Okounkov bodies and tropical geometry. One of the important questions in this approach is to understand the connection between these two theories. We provide an answer to this question in the case of (the affine cone of) the Grassmannian of planes $X$. The main idea is to construct compactifications $X_\sigma$ (indexed by trivalent trees $\sigma$ with labeled leaves) of $X$ which recover both of the tropicalization and Newton-Okounkov bodies of $X$. This is a joint work with Chris Manon.