

Meeting: 1003, Atlanta, Georgia, SS 35A, AMS-MAA Special Session on Tropical Geometry, I

1003-05-776

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The Positive Bergman Complex of an Oriented Matroid.

We study the positive Bergman complex $B^+(M)$ of an oriented matroid M , which is a certain subcomplex of the Bergman complex $B(\underline{M})$ of the underlying unoriented matroid \underline{M} . The positive Bergman complex is defined so that given a linear ideal I with associated oriented matroid M_I , the positive part of the tropical variety associated to I is equal to the fan over $B^+(M_I)$. Our main result is that a certain “fine” subdivision of $B^+(M)$ is the order complex of the proper part of the Las Vergnas face lattice of M . It follows that $B^+(M)$ is homeomorphic to a sphere. For the oriented matroid M of the hyperplane arrangement of type A_{n-1} , we show that the face poset of the “coarse” subdivision of $B^+(M)$ is dual to the face poset of the associahedron A_{n-2} . Finally, there are connections to generalized associahedra in the sense of Carr and Devadoss. (Received September 29, 2004)