Algebra
Seminar

Lifting Tropical Curves and Linear Systems on Graphs

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Abstract: Tropicalization is a procedure for associating a polyhedral complex to a subvariety of an algebraic torus. We explain the method of tropicalization and study the question of which graphs arise from tropicalizing algebraic curves. By applying Matthew Baker's technique of specialization of linear systems from curves to graphs, we are able to give a necessary condition for a balanced weighted graph to be the tropicalization of a curve. Our condition is phrased in terms of the harmonic theory of graphs, reproduces the known necessary conditions, and also gives new conditions. Moreover, our method gives a combinatorial way of thinking about the deformation theory of algebraic varieties.

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Mathematics and Computer Science
Emory University