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**Jihyeon Jessie Yang\*** ([jyang@math.mcmaster.ca](mailto:jyang@math.mcmaster.ca)). *Tropical Severi Varieties and Applications*.

We study the tropicalizations of Severi varieties, which we call tropical Severi varieties. Severi varieties are classical objects in algebraic geometry. They are parameter spaces of plane nodal curves. On the other hand, tropicalization is an operation in tropical geometry, which turns subvarieties of an algebraic torus into polyhedral objects in a real vector space. By studying the tropicalizations, it may be possible to transform algebro-geometric problems into combinatorial ones.

We find a partial description of tropical Severi varieties in terms of subdivisions of polygons. Given a subdivision of a polygon, we construct another parameter space. This space is a much simpler object than the given Severi variety and it describes the tropical Severi variety.

We present two applications. First, we understand G.Mikhalkin's correspondence theorem in terms of tropical intersection theory. In particular, this provides a proof of the independence of point configurations in the enumeration of tropical nodal curves. The second application is about Secondary fans. Secondary fans are purely combinatorial objects which parameterize the regular subdivisions of marked polygons. We provide a relation between tropical Severi varieties and Secondary fans. (Received September 24, 2012)