

## Tropical Severi varieties of univariate polynomials

Severi varieties were introduced a century ago by Enriques and Severi and parameterize plane curves with both degree and number of nodes fixed. The degree of these varieties can be computed tropically thanks to Mikhalkin's correspondence theorem [1]. The tropical curves appearing in Mikhalkin's theorem can be described by the associated regular subdivision of the support of the polynomials that parameterize those curves. However, the combinatorial description of the curves is not enough to decide if a tropical curve lies in the tropicalization of the Severi variety (see [2]).

We present combinatorial and arithmetic restrictions that allow us to offer a full characterization (as a set) of the tropical variety of univariate polynomials of fixed degree  $n$  having two distinct double roots (over a field of characteristic 0). This variety equals the union of three types of cones of dimension  $n - 1$ . Two of these types are cones corresponding to the secondary fan of the support of the polynomials. Our description is obtained by studying the possible valuations of the elementary symmetric functions of polynomials with two double roots. The proofs are constructive and provide a method for producing algebraic polynomials with double roots from tropical data. This is joint work with A. Dickenstein and L. F. Tabera.

### References

- [1] G. Mikhalkin. Enumerative tropical algebraic geometry in  $\mathbb{R}^2$ . *J. Amer. Math. Soc.* 18 (2005), no. 2, 313-377.
- [2] E. Katz. Tropical invariants from the secondary fan. *Adv. Geom.* 9 (2009), no. 2, 153-180.