

## Fifth annual conference of the SFB-TRR 195

Wednesday, Sept 15, 9:15 am

**Marta Panizzut & Alheydis Geiger**

**A tropical proof of Plücker's Theorem**

In 1839 Plücker proved that a smooth complex quartic has exactly 28 bitangent lines, while a smooth real quartic has either 4, 8, 16 or 28 real bitangent lines.

We provide a computational proof of a tropical Pluecker theorem. For this we build upon the results about tropical bitangents by Cueto and Markwig and their classification of the bitangent shapes. Our results allow to break the existence of tropical bitangents of quartics down to an analysis of the dual triangulation. Together with the results from Cueto and Markwig, this enabled us to compute the possible numbers of real bitangents of quartics using polymake.

After a brief introduction of the tropical tools needed, we dive into the world of tropical bitangents finishing with a short demonstration of the polymake code that was developed during the project.