

Mixed Discriminants

The mixed discriminant of n Laurent polynomials in n variables with fixed support is the irreducible polynomial in the coefficients which vanishes whenever two of the roots coincide. It represents the variety of ill-posed systems. By means of the Cayley trick, we can express the mixed discriminant as an A -discriminant in the sense of Gelfand, Kapranov and Zelevinski. Our goal is to characterize its degree. Inspired by the tropical approach to computing A -discriminants, we show that the degree of the mixed discriminant is a piecewise linear function in the Plücker coordinates of a mixed Grassmannian. Finally, I will discuss in detail the case of two plane curves where an explicit degree formula can be provided. In the case of two dense polynomials, this formula recovers the classical tact invariant of Salmon. This is joint work with E. Cattani, A. Dickenstein, S. Di Rocco and B. Sturmfels ([arXiv:1112.1012v1](https://arxiv.org/abs/1112.1012v1))