

Characteristic Decomposition = Gröbner Bases + Triangular Sets

Dongming Wang

Beihang University, China and CNRS, France

Abstract. The characteristic pair of a polynomial ideal is a pair (G, C) of polynomial sets in which G is the reduced lexicographical Gröbner basis of the ideal and C is the minimal triangular set contained in G . The characteristic pair (G, C) is said to be regular or normal if C is regular or normal respectively; it is said to be strong if the saturated ideal of C is equal to the ideal generated by G . In this talk, I present some properties about characteristic pairs, discuss inherent connections between lexicographical Gröbner bases and Ritt characteristic sets, and explain how to regularize characteristic pairs, how to strengthen regular and normal characteristic pairs, and how to decompose an arbitrary set of multivariate polynomials into finitely many strong regular or normal characteristic pairs with associated ideal and zero relations.

The content of this talk is based on joint work with Chenqi Mou and Rina Dong.