

Differential Chow Form and Differential resultant

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In this talk, an intersection theory for generic differential polynomials is presented. Based on the intersection theory, the Chow form for an irreducible differential variety is defined and most of the properties of the Chow form in the algebraic case are established for its differential counterpart. Furthermore, the generalized differential Chow form is defined and its properties are proved. As an application of the generalized differential Chow form, the differential resultant of $n + 1$ generic differential polynomials in n variables is defined and properties similar to that of the Macaulay resultant for multivariate polynomials are proved.

The concept of sparse differential resultant for a system of quasi-generic differential polynomials is introduced and its properties are proved. In particular, a degree bound for the sparse differential resultant is given. Based on the degree bound, an algorithm to compute the sparse differential resultant is proposed, which is single exponential in terms of the order, the number of variables, and the size of the quasi-generic polynomials.