Design of a Maple Package for Dixon Resultant Computation

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Introduction: The Dixon resultant is a polynomial in the coefficients of $n+1$ polynomials in n variables. It vanishes if the polynomials have a common root, and therefore provides a necessary condition for the consistency of an overdetermined system of polynomial equations. Applied works, such as [1, 2], commonly use the Dixon resultant to eliminate variables from systems of polynomial equations [3], either to check consistency or to find solutions. Kapur/Saxena/Yang [4] generalized Dixon's work [5] and developed an efficient method for computing Dixon resultants of polynomials in n variables. More recently, Lewis [6] provided some heuristics to accelerate Dixon resultant computations for adequately structured polynomial systems.

Software package: The Maple package DR [7] for computing Dixon resultants includes code contributed by A. Cherba, H. Hong and M. Minimair and is maintained by Minimair. It has been extensively used by Cherba, Kapur and Minimair during past works, for example [8, 9, 10]. It includes functions for constructing Dixon matrices, computing maximal minors of matrices and various auxiliary procedures useful for applications. The design and functions of the package will be introduced and its computational efficiency will be discussed.

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