An Algorithm to Calculate the Kernel of Certain Polynomial Ring Homomorphisms

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Abstract

We propose an improvement upon the standard algorithm for computing the kernel of a polynomial map, assuming that the map sends monomials into monomials. Rather than computing a Gröbner basis in the joint polynomial ring, and then selecting only the elements of interest, we show that a moderate number of iterations of the Buchberger algorithm in the variables of the domain suffices.