# Gröbner Bases with respect to Several Orderings and Multivariable Hilbert Polynomials

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## Abstract

Let $R = k[X]$ be a ring of generalized polynomials in a set of indeterminates $X$ over a field $k$, and let a partition of $X$ into $p$ disjoint subsets be fixed. Furthermore, let $E$ be a finitely generated free $R$-module. We consider $p$ orderings of the set of terms of $E$ that naturally correspond to the partition of $X$ and develop a Gröbner basis technique that involves these orderings. As an application we give a method of computation of Hilbert polynomials in several variables.