## Generalized Gröbner Bases and Dimension Polynomials of D-modules

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## Abstract

We consider several term orderings in a finitely generated free module E over a Weyl algebra  $A_n(K)$  that are associated with a partition of the basic set of variables of  $A_n(K)$ . Using these term orderings, we introduce a new type of reductions in the module E and Gröbner-type bases associated with these reductions. Properties of the introduced bases allow us to obtain a multivariate dimension polynomial of a finitely generated D-module, that is, a left  $A_n(K)$ -module. We present invariants of such dimension polynomials and prove an intersection property for multivariate filtrations in a certain class of D-modules. The obtained results generalize theorems on bivariate Bernstein-type dimension polynomials proved in [1] and reveal new characteristics of finitely generated D-modules.

## References

 C. Dönch; A. Levin. Bivariate Dimension Polynomials and New Invariants of Finitely Generated D-Modules. Int. J. Algebra Comput., 23: 1625–1651, 2013.