HIGHER DIFFERENTIALS OVER GRADED COMMUTATIVE RINGS

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ABSTRACT. The goal of this project is to describe modules of higher differentials for graded algebras over a field. We have developed several methods of describing a computable free resolution of its dual, the module of principal parts.

This project is ongoing work beginning March 2019. We currently have some preliminary results in special cases and some computations on Macaulay2 (an algebra computing system) . We would like to describe the free resolution of the module of principal parts $P^n_{R/k}$ over a graded commutative ring R. So far, we have only been successful if the defining elements of R have low degree. This is joint work with Rachel Diethorn (Yale University), Jack Jeffries (University of Nebraska-Lincoln), Claudia Miller (Syracuse University), Josh Pollitz (University of Utah), Hamid Rahmati (University of Nebraska-Lincoln) and Sophia Vassiliadou (Georgetown University). We hope to have publishable results in the next year.