

APPROXIMATIONS OF THE DE RHAM COMPLEX AND THEIR COHOMOLOGY

Melis Tekin Akcin

Department of Mathematics, Hacettepe University

ABSTRACT. Consider the exact sequence

$$0 \rightarrow I \rightarrow R \otimes_k R \xrightarrow{\varphi} R \rightarrow 0$$

where φ is defined by $\varphi(\sum_{i=1}^n a_i \otimes b_i) = \sum_{i=1}^n a_i b_i$ for $a_i, b_i \in R$ and let I be the kernel of φ . The R -module I/I^{n+1} is called the universal module of n th order derivations and is denoted by $\Omega_n(R)$.

In this talk, an infinite chain of de Rham-like complexes is introduced where the first member of the chain is the de Rham complex. Their cohomologies are found for polynomial algebras.

References

- [1] W. C. Brown, The algebra of differentials of infinite rank, *Can. J. Math.*, **XXV** (1) (1973) 141–155.
- [2] A. Erdogan, Homological dimensions of the universal modules for hypersurfaces, *Comm. Algebra*, **24** (5) (1996) 1565–1573.
- [3] R. Hart, Higher derivations and universal differential operators, *J. Algebra*, **184** (1996) 175–181.
- [4] R. G. Heyneman and M. E. Sweedler, Affine Hopf algebras I, *J. Algebra*, **13** (1969) 192–241.
- [5] Y. Nakai, High order derivations 1, *Osaka Journal of Mathematics*, **7** (1970) 1–27.
- [6] H. Osborn, Modules of differentials 1, *Mathematische Annalen*, **170** (1967) 221–244.

2000 *Mathematics Subject Classification* 13N05, 13N10, 13N15.

Key words and phrases: **differentials, de Rham complex, universal module, polynomial algebra.**

E-mail addresses: hmtekin@hacettepe.edu.tr.