

ABSTRACT

HILBERT FUNCTIONS OF GORENSTEIN MONOMIAL CURVES

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The aim of this thesis is to study the Hilbert function of a one-dimensional Gorenstein local ring of embedding dimension four in the case of monomial curves. We show that the Hilbert function is non-decreasing for some families of Gorenstein monomial curves in affine 4-space. In order to prove this result, under some arithmetic assumptions on generators of the defining ideal, we determine the minimal generators of their tangent cones by using the standard basis and check the Cohen-Macaulayness of them. Later, we determine the behavior of the Hilbert function of these curves, and we extend these families to higher dimensions by using a method developed by Morales. In this way, we obtain large families of local rings with non-decreasing Hilbert function.

Keywords : Monomial curves, Standard basis, Hilbert Function, Gorenstein rings