ON THE MIXED HODGE STRUCTURE ASSOCIATED TO HYPERSURFACE SINGULARITIES

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Abstract

Let $f : \mathbb{C}^{n+1} \to \mathbb{C}$ be a germ of hyper-surface with isolated singularity. We identify the extended fiber with the module of relative differentials, ω_f. A MHS structure can also be defined on this fiber due to A. Varchenko using a set of graded isomorphisms with the J. Steenbrink limit mixed Hodge structure. We show, the polarization on extended fiber is a modification of residue product. In this way a sign modification of Grothendieck residue defines a polarizations on the mixed Hodge structures Ω_f. The Hodge filtration on Ω_f would be opposite to (Steenbrink) limit Hodge filtration and they pair together to define $\mathbb{C}$-VHS, according to a theorem of G. Pearlstein and J. Fernandez generalizing a result of P. Deligne in the pure case. The above form polarizes the complex VHS of G. Pearlstein et al. We present a set of graded polarizations denoted Res_k.