ON THE MIXED HODGE STRUCTURE ASSOCIATED TO HYPERSURFACE SINGULARITIES

Mohammad Reza Rahmati

Received September 1, 2014; Revised September 8, 2014

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, $\omega_f$. 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 polarization on the mixed Hodge structures $\Omega_f$. The Hodge filtration on $\Omega_f$ 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 $\text{Res}_k$.

Keywords and phrases: variation of mixed Hodge structure, primitive elements, Brieskorn lattice.