SIGNATURE OF GROTHENDIECK RESIDUE

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Abstract

For $f : \mathbb{R}^{n+1} \to \mathbb{R}$ an algebraically isolated hypersurface singularity germ, It can be assigned a non-degenerate bilinear form $\langle \bullet, \bullet \rangle_L : A_f \times A_f \to A_f \to \mathbb{R}$, where A_f is the Jacobi ring of f, the first map is the usual product in A_f and the second map is an arbitrary linear map such that it maps the class of Hessian of f to a positive number. It is a theorem by Grothendieck that this form is non-degenerate, and also another theorem by Eisenbud-Levine that its signature is independent of the choice of the second linear map with the appropriate property. We provide a method to calculate the signature of this form in terms of Hodge numbers of vanishing cohomology associated to fiberation, f. The result also applies to topological indices of singularities of vector fields.