



SIGNATURE OF GROTHENDIECK RESIDUE

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Abstract

For $f : \mathbb{R}^{n+1} \rightarrow \mathbb{R}$ an algebraically isolated hypersurface singularity germ, It can be assigned a non-degenerate bilinear form $\langle \bullet, \bullet \rangle_L : A_f \times A_f \rightarrow A_f \rightarrow \mathbb{R}$, 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 fibration, f . The result also applies to topological indices of singularities of vector fields.

Keywords and phrases: signature, Riemann-Hodge bilinear relations, Lefschetz property, Hodge index theorem, residue pairing.

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