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WEAK GLOBAL TORELLI THEOREM FOR CERTAIN WEIGHTED PROJECTIVE HYPERSURFACES

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0. Introduction. In this paper, we shall study the weak global Torelli problem for hypersurfaces in weighted projective spaces. Among these hypersurfaces, we shall consider the following two types;

(I) A k-sheeted branched covering of $\mathbf{P}^r$, (cf. §4).

(II) A Veronese double cone, (or a hyperelliptic fibre space over $\mathbf{P}^r$), (cf. §10).

Let X be a nonsingular projective manifold of dimension r with an ample line bundle. Then its rth primitive cohomology $H^r(X, \mathbf{Z})_0$ has a (pure) Hodge structure of weight r. Let us assume that the moduli space M of X exists and that we can define a period map (associated to its middle cohomology) $p: M \to G_{\mathbf{Z}} \backslash D$. Then the weak global Torelli problem for X can be stated as follows.

WEAK GLOBAL TORELLI PROBLEM. Does the period map have degree one onto its image?

In a notable paper [5], Donagi proved that the weak global Torelli theorem holds for almost all hypersurfaces in $\mathbf{P}^N$. Inspired by Donagi's work, we extend his result to quasismooth weighted projective hypersurfaces.

As in [5], the main tool in this paper is the "infinitesimal variation of Hodge structures (abbreviated by *IVHS*)," which was introduced by Carlson–Griffiths [1]. We refer the reader to the introduction of [5] for the *Principle of Prolongation*. (See also [8].) We begin by outlining the results needed to prove the weak global Torelli theorem. *First of all*, we prove the existence of the moduli space M in some sense and define a period map $p: M \to G_{\mathbf{Z}} \backslash D$. *Secondly* we prove that the degree of the period map p makes sense. *Thirdly* we prove the existence of regular value of the period map p, that is, the image of the period map contains smooth points of $G_{\mathbf{Z}} \backslash D$. *Fourthly* we prove the *Local Torelli theorem* to show that the period map has a finite degree. *Lastly* we prove the following hypothesis.

MAIN HYPOTHESIS. *At a generic point of the moduli M the IVHS determines the isomorphism class of the variety.*

The main results in this paper are as follows;

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