$\sum \int_{p_0}^{p_i(\lambda)} \frac{dx}{y} = h(p_1(\lambda)) + h(p_2(\lambda)) + h(p_3(\lambda))$ where h is holomorphic. For example, $h(z) = a_0 + a_1 z + a_2 z^2 + \cdots$ locally. $\Rightarrow$ Obviously, $h(p_1(\lambda)) + h(p_2(\lambda)) + h(p_3(\lambda))$ is expressed as a polynomial of $\sigma_1, \sigma_2 \& \sigma_3$. $\Rightarrow$ $\psi(\lambda)$ is holomorphic.

$\Rightarrow$ $z = f(x_1, x_2, \cdots x_5)$ around $(a_1, \cdots a_5)$.

Let z be a Euclidean coordinate on $\mathbb{C}/\Lambda$ and dz the corresponding global 1-form; then, since $H^{1,0}(\mathbb{P}^2) = H^0(\mathbb{P}^2, \Omega^1) = 0$,

$$\psi^* dz \equiv 0,$$

and hence ψ is constant. Q.E.D.

「 $\psi : \mathbb{P}^{2*} \longrightarrow \mathbb{C}/\Lambda \Rightarrow \psi^* : T^{*\prime}(\mathbb{C}/\Lambda) \longrightarrow T^{*\prime}(\mathbb{P}^{2*})$

$\Rightarrow \psi^* : H^0(\mathbb{C}/\Lambda, \Omega^1) \longrightarrow H^0(\mathbb{P}^{2*}, \Omega^1) = H^{1,0}(\mathbb{P}^{2*})_{\text{m}} = 0$

since $H^1(\mathbb{P}^{2*}) = H^1(\mathbb{P}^2) = 0$. $\Rightarrow \psi^* dz \equiv 0$.

$\Rightarrow \psi^* dz(v) = 0$ for all $v \in T^{*\prime}\mathbb{P}^{2*}$

$\Rightarrow dz(\psi_* v) = 0 \Rightarrow \psi_* v = 0 \therefore \psi_* = 0 \Rightarrow \psi$ is constant since all partial derivatives of ψ are zero. 」

In a similar way, we prove a slight generalization: again let C be a curve of genus 1, $\omega \in H^0(C, \Omega^1)$ a holomorphic differential, $\Lambda \subset \mathbb{C}$ the period lattice of ω. Then, if $D = (g) = \sum p_i - \sum q_i$ is the divisor of a meromorphic function f on C, we have

$$\sum_i \int_{q_i}^{p_i} \omega \equiv 0 \ (\text{modulo } \Lambda),$$

i.e., there exists a collection of paths α_i from q_i to p_i s.t.

$$\sum \int_{\alpha_i} \omega = 0.$$

「 g must be corrected to f. 」

Proof. Write $D_\lambda = (\lambda_0 f - \lambda_1) = \sum p_i(\lambda) - \sum q_i(\lambda)$ for $\lambda = [\lambda_0, \lambda_1] \in \mathbb{P}^1$. set .