

at p_λ, q_λ lies
normalized

By the
kind with
two such

hence the
the A-periods

in $\frac{\sigma_i}{s_0} - \frac{\sigma_i}{s_0}$
form and

gives \Rightarrow

make all

its without
ality of

linear com-

s possible,

reciprocity law:

which \bar{u} ,

\bar{u} ω_i

for some choice of paths α_λ from q_λ to p_λ .

By P. 230, Reciprocity Law I,

$$\sum_{i=1}^g (\pi^i N^{g+i} - \pi^{g+i} N^i) = 2\pi\sqrt{-1} \sum_{\lambda} \text{Res}_{s_\lambda}(\eta) \cdot \int_{s_0}^{s_\lambda} \omega.$$

Apply $\sqrt{\omega} = \omega_i$, η meromorphic form explained above.

$$\Rightarrow \pi^{\frac{1}{i}} N^{g+i} = N^{g+i} = 2\pi\sqrt{-1} \sum_{\lambda} \text{Res}_{p_\lambda}(\eta) \cdot \int_{p_0}^{p_\lambda} \omega_i$$

$$+ 2\pi\sqrt{-1} \sum_{\lambda} \text{Res}_{q_\lambda}(\eta) \int_{p_0}^{q_\lambda} \omega_i = 2\pi\sqrt{-1} \sum_{\lambda} \frac{a_\lambda}{2\pi\sqrt{-1}} \int_{p_0}^{p_\lambda} \omega_i$$

$$+ 2\pi\sqrt{-1} \sum_{\lambda} \frac{b_\lambda}{2\pi\sqrt{-1}} \int_{p_0}^{q_\lambda} \omega_i = \sum a_\lambda \int_{p_0}^{p_\lambda} \omega_i + \sum b_\lambda \int_{p_0}^{q_\lambda} \omega_i$$

$$= \sum_{\lambda'} \int_{q_{\lambda'}}^{p_{\lambda'}} \omega_i \quad \text{since } \sum a_\lambda + \sum b_\lambda = 0 \text{ and } a_\lambda \text{'s \& } b_\lambda \text{'s are integers.}$$

"Here we have to be careful on the indices λ .

Sometimes $\forall \lambda$ repetition is prohibited, sometimes not.

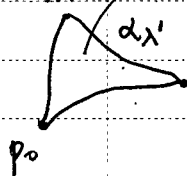
So we have to see every line carefully. I am going to use λ' or ℓ for repetition allowed indices."

$$\Rightarrow \sum (p_{\lambda'} - q_{\lambda'}) = \sum a_\lambda p_\lambda + \sum b_\lambda q_\lambda$$

$$\Rightarrow \sum a_\lambda \int_{p_0}^{p_\lambda} \omega_i + \sum b_\lambda \int_{p_0}^{q_\lambda} \omega_i = \sum \int_{p_0}^{p_{\lambda'}} \omega_i - \sum \int_{p_0}^{q_{\lambda'}} \omega_i$$

$$= \sum_{\lambda'} \int_{p_0}^{p_{\lambda'}} \omega_i - \int_{p_0}^{q_{\lambda'}} \omega_i = \sum_{\lambda'} \int_{q_{\lambda'}}^{p_{\lambda'}} \omega_i$$

$p_{\lambda'}$ simply connected region



$q_{\lambda'}$ $\alpha_{\lambda'}$

As the figure left, we choose