for some choice of paths α_λ from q_λ to p_λ.

F By P230, Reciprocity Law I,

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

Apply this to $\omega = \omega_i$, η meromorphic form explained above.

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

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

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

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

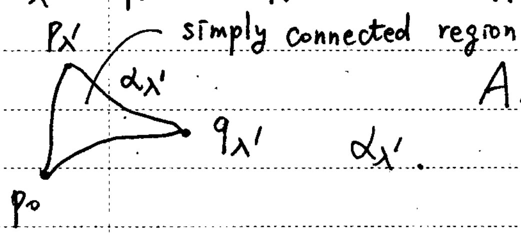
are integers.

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

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

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

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



As the figure left, we choose $\alpha_{\lambda'}$.