Date

is a meromorphic form with polar divisor

$$(\eta)_\infty = -\left(\sum_\lambda (p_\lambda + q_\lambda)\right) \qquad 1)$$

$$\mathrm{Res}_{p_\lambda}(\eta) = \frac{a_\lambda}{2\pi\sqrt{-1}}, \qquad \mathrm{Res}_{q_\lambda}(\eta) = \frac{b_\lambda}{2\pi\sqrt{-1}}. \qquad 2)$$

where we are now writing

$$D = \sum a_\lambda p_\lambda + \sum b_\lambda q_\lambda$$

with the p_λ q_λ distinct; and moreover

$$\int_\gamma \eta \in \mathbb{Z} \qquad 3)$$

for any closed loop γ on $S - \{p, q\}$. Conversely, if η is any meromorphic form with these three properties, we can set

$$f(p) = e^{2\pi i \int_{p_0}^{p} \eta}$$

to obtain a well-defined meromorphic function f with $(f) = D$.

Γ $\quad f(p) = e^{2\pi i \int_{p_0}^{p}\eta} \Rightarrow \dfrac{df}{f} = (2\pi\sqrt{-1} = 2\pi i)\,\eta$

$\Rightarrow$ f is a well-defined meromorphic function

$$\frac{1}{2\pi i}\int_{B_\epsilon(p_\lambda)} \frac{df}{f} = \int_{B_\epsilon(p_\lambda)} \eta = \mathrm{Res}_{p_\lambda}(\eta) = a_\lambda$$

$$\frac{1}{2\pi i}\int_{B_\epsilon(q_\lambda)} \frac{df}{f} = \int_{B_\epsilon(q_\lambda)} \eta = \mathrm{Res}_{q_\lambda}(\eta) = b_\lambda$$

$$\Rightarrow (f) = \sum a_i p_i + \sum b_i q_i$$

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