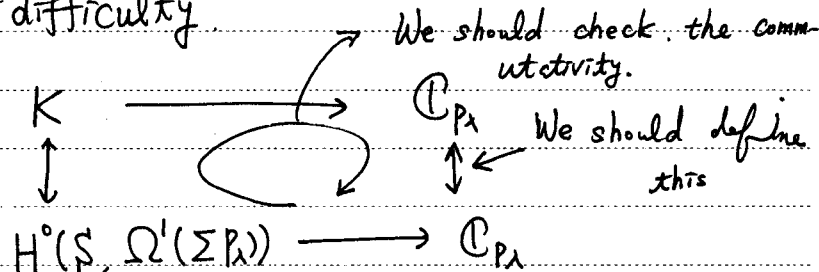


\Rightarrow Set of all meromorphic 1-forms on S with a simple pole at each point P_λ . $= K \xrightarrow{\sigma/s_0} \bigoplus \mathbb{C}_{P_\lambda}$
 $\downarrow \sigma/s_0 \quad \downarrow \text{Res}_{P_\lambda} \sigma/s_0$

Still there is ^{some} difficulty.



Consider the exact sheaf sequence. on p. 147

$$0 \rightarrow \Omega^1 \rightarrow \Omega^1(\Sigma P_\lambda) \xrightarrow{\text{P.R.}} \mathcal{O}_{\Sigma P_\lambda} \rightarrow 0$$

\uparrow
 $\bigoplus \mathbb{C}_{P_\lambda}$

$$\Rightarrow H^0(S, \Omega^1(\Sigma P_\lambda)) \xrightarrow{\text{residue map}} \bigoplus \mathbb{C}_{P_\lambda}$$

\uparrow
 K

$$K \xrightarrow{\phi} \bigoplus \mathbb{C}_{P_\lambda}$$

$\downarrow \sigma/s_0 \quad \downarrow \text{Res}_{P_\lambda} \sigma/s_0$

$$\Rightarrow \phi(K) \subset \{ (a_\lambda) \in \bigoplus \mathbb{C}_{P_\lambda} \mid \sum a_\lambda = 0 \} = H$$

But since $\text{cod } \phi(K) \leq 1$, and $\text{cod } H = 1$,

$H = \phi(K)$. \Rightarrow Given any $(a_\lambda) \in \bigoplus \mathbb{C}_{P_\lambda}$ s.t. $\sum a_\lambda = 0$, \exists a meromorphic 1-form on S whose residue is a_λ at each point P_λ . \Rightarrow

Now choose cycles $\delta_1, \dots, \delta_{2g}$ representing a canonical basis.

