⊓ If p is in the base locus of $|K|$, for all $\sigma \in H^0(S, \Omega^1)$, $\sigma(p) = 0$.

$$H^0(S, \Omega^1(-p)) = H^0(S, \mathcal{O}(K-p)) \xleftrightarrow{\text{1-1, onto}} H^0(S, \Omega^1)$$

$$\frac{\sigma}{s_0} \longleftrightarrow \sigma \in H^0(S,\Omega^1)$$

where $(s_0 = 0) = p$.

$$\begin{array}{ccccccccc} 0 & \longrightarrow & \Omega^1(-p) & \longrightarrow & \Omega^1 & \longrightarrow & \mathbb{C}_p & \longrightarrow & 0 \\ & & \parallel & & \parallel & & & & \\ & & \mathcal{O}(K-p) & & \mathcal{O}(K) & & & & \end{array}$$

$$\Rightarrow 0 \to H^0(S, \Omega^1(-p)) \longrightarrow H^0(S, \Omega^1) \xrightarrow[\text{zero map}]{\text{rest}} H^0(S, \mathbb{C}_p) \to \cdots$$

$$\Rightarrow \quad H^0(S, \Omega^1(-p)) \cong H^0(S, \Omega^1) \Rightarrow h^0(K-p) = h^0(K) = g.$$

$$\Rightarrow h^0(p) = 1 - g + 1 + h^0(K-p) = 1 - g + 1 + g = 2. \quad \text{by R-R.}$$

$$h^0(p) = \dim H^0(S, \mathcal{O}(p)) \qquad \sigma \in H^0(S, \mathcal{O}(p))$$

$\Rightarrow$ Consider σ/s_0,
where $(s_0 = 0) = p$. $\Rightarrow$ σ/s_0 is a meromorphic function on S holomorphic on $S - \{p\}$ and having only a single pole at p. $\Rightarrow$ By P.222, $S \cong \mathbb{P}^1$. $\Rightarrow$ Contradiction to the fact that $g(S) \geq 2$. ⅃

It follows that the line bundle K gives a map

$$\iota_K : S \longrightarrow \mathbb{P}^{g-1}$$
$$p \longmapsto [\omega_1(p), \cdots \omega_g(p)],$$

where $\omega_1, \omega_2, \cdots, \omega_g$ are basis for $H^0(S, \Omega^1)$. ι_K is called the