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$\Rightarrow \psi = \varphi_v \circ \varphi_u^{-1}$. This proves that $\{(\alpha|_u(\sigma_1^*), \alpha|_u(\sigma_2^*))\}$ defines a section of $\mathcal{E}$ over S.

$P_g(S) = h^{2,0}(S) = h^{0,2}(S) = \dim H^{0,2}(S)$
$= \dim H^2(S, \mathcal{O}) = 0 \Rightarrow H^2(S, \mathcal{O}) = E_2^{2,0} = 0$ if we take $\mathcal{L} = \mathcal{O}$.

I don't understand what "sufficiently ample" means. Maybe ??

$S \overset{i}{\subset} \mathbb{P}^N \to (i^*[H])^k = \mathcal{L}$ for $k \geq k_0$. k_0 some positive integer $\Rightarrow H^q(S, \mathcal{L}) = 0$ for $q > 0$.

$\lrcorner$

Example

Take $S = \mathbb{P}^2$, so that the $P_g = 0$ condition is satisfied. Then there exists a rank-two holomorphic vector bundle $E \to \mathbb{P}^2$ and section $s \in H^0(\mathbb{P}^2, \mathcal{O}(E))$ that defines any given Z.

$\ulcorner$ $P_g(S) = \dim H^{2,0}(\mathbb{P}^2) = 0$ by P49. $\lrcorner$

If Z is nonempty, then we claim that s is unique up to a constant, and the vector bundle E is not a global extension

$$0 \longrightarrow L \longrightarrow E \longrightarrow L' \longrightarrow 0$$

of line bundles on $\mathbb{P}^2$. Thus, in this manner

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