

$$0 \rightarrow \text{Ext}^0(S; f(L, \Omega^2)) \xrightarrow{H^0(\mathcal{O}(k-L))} \text{Ext}^0(S; \mathcal{O} \oplus \mathcal{O}, \Omega^2) \xrightarrow{H^0(\mathcal{O}(k)) \oplus H^0(\mathcal{O}(k))} \text{Ext}^0(S; \mathcal{O}(L^*))$$

$$\Omega^2) \rightarrow \text{Ext}^1(S; f(L, \Omega^2)) \xrightarrow{H^0(\mathcal{O}(k-L))} \text{Ext}^1(S; \mathcal{O} \oplus \mathcal{O}, \Omega^2) \xrightarrow{H^0(\mathcal{O}(k)) \oplus H^0(\mathcal{O}(k))} \text{Ext}^1(S; \mathcal{O}(L^*))$$

This gives the interpretation

$$(**) \quad \text{Ext}^1(S; f(L, \Omega^2)) \cong \left\{ \begin{array}{l} H^0(\mathcal{O}(k+L)) / \{ s\omega + s'\omega' \}, \text{ where} \\ \omega, \omega' \in H^0(\mathcal{O}(k)) \end{array} \right\}$$

$$\begin{array}{c} \text{If} \\ 0 \rightarrow H^0(\mathcal{O}(k-L)) \rightarrow H^0(\mathcal{O}(k)) \oplus H^0(\mathcal{O}(k)) \rightarrow H^0(\mathcal{O}(k+L)) \\ \rightarrow \text{Ext}^1(S; f(L, \Omega^2)) \rightarrow 0 \end{array}$$

$$\Rightarrow \text{Since} \quad \begin{array}{c} H^0(\mathcal{O}(k-L)) \rightarrow H^0(\mathcal{O}(k)) \oplus H^0(\mathcal{O}(k)) \\ \downarrow \sigma \mapsto (-\sigma \otimes \beta', \sigma \otimes s) \end{array}$$

and

$$\begin{array}{c} H^0(\mathcal{O}(k)) \oplus H^0(\mathcal{O}(k)) \xrightarrow{\phi} H^0(\mathcal{O}(k+L)) \\ (\omega, \omega') \mapsto s\omega + s'\omega' \end{array}$$

$$\frac{H^0(\mathcal{O}(k+L))}{\text{Im } \phi} = \text{Ext}^1(S; f(L, \Omega^2))$$

$$= \frac{H^0(\mathcal{O}(k+L))}{\{ s\omega + s'\omega' \}, \omega, \omega' \in H^0(\mathcal{O}(k))}$$

Spectral sequences & sheaf exact sequences are natural.

\Rightarrow Everything is functorial, i.e. natural.

$$\text{Now since } \underline{\text{Ext}}_0^0(\mathcal{O}_P(L), \Omega^2) = \underline{\text{Ext}}_0^1(\mathcal{O}_P(L), \Omega^2) = 0$$