

$$\begin{array}{ccccccc}
 & & 0 & & 0 & & \\
 & & \uparrow & & \uparrow & & \\
 \Rightarrow & 0 & \rightarrow & \text{Hom}(I, \mathcal{O}) & \rightarrow & \text{Hom}(I, \mathcal{O} \oplus \mathcal{O}) & \rightarrow & \text{Hom}(I, I) \\
 & & \uparrow & & \uparrow & & \uparrow & \\
 & 0 & \rightarrow & \text{Hom}(I, \mathcal{O}) & \rightarrow & \text{Hom}(I, \mathcal{O} \oplus \mathcal{O} \oplus \mathcal{O}) & \rightarrow & \text{Hom}(I, \mathcal{O} \oplus \mathcal{O}) \\
 & 0 & \rightarrow & \dots & & & & 
 \end{array}$$

We can not produce a long exact sequence.

$$\begin{array}{ccccccc}
 & & 0 & & 0 & & \\
 & & \downarrow & & \downarrow & & \\
 0 & \rightarrow & \text{Hom}(I, \mathcal{O}) & \rightarrow & \text{Hom}(I, \mathcal{O} \oplus \mathcal{O}) & \rightarrow & \text{Hom}(I, I) \\
 & & \delta \downarrow & & \delta \downarrow & & \delta \downarrow \begin{smallmatrix} \psi \\ \text{id}_I \end{smallmatrix} \\
 0\text{-stage } 0 & \rightarrow & \text{Hom}(\mathcal{O} \oplus \mathcal{O}, \mathcal{O}) & \rightarrow & \text{Hom}(\mathcal{O} \oplus \mathcal{O}, \mathcal{O} \oplus \mathcal{O}) & \rightarrow & \text{Hom}(\mathcal{O} \oplus \mathcal{O}, I) \rightarrow 0 \\
 & & \delta \downarrow & & \delta \downarrow \begin{smallmatrix} \psi \\ \text{id} \end{smallmatrix} & & \delta \downarrow \begin{smallmatrix} \psi \\ \text{id}_I \end{smallmatrix} \\
 1\text{-stage } 0 & \rightarrow & \text{Hom}(\mathcal{O}, \mathcal{O}) & \rightarrow & \text{Hom}(\mathcal{O}, \mathcal{O} \oplus \mathcal{O}) & \rightarrow & \text{Hom}(\mathcal{O}, I) \rightarrow 0 \\
 & & \delta \downarrow \begin{smallmatrix} \psi \\ \text{id} : g \mapsto g \end{smallmatrix} & & \delta \downarrow \begin{smallmatrix} \psi \\ g \mapsto (-gf_2, gf_1) \end{smallmatrix} & & \delta \downarrow \begin{smallmatrix} \psi \\ \text{id}_I \end{smallmatrix} \\
 0 & \rightarrow & 0 & \rightarrow & 0 & \rightarrow & 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 & & 0 & & 0 & & 0
 \end{array}$$

$$\Rightarrow \text{Hom}(I, I) \rightarrow \text{Ext}^1(I, \mathcal{O})$$

$$\begin{smallmatrix} \psi \\ \text{id}_I \end{smallmatrix} \longmapsto \partial(\text{id}_I) = \text{id}_{\mathcal{O}}$$

$$\Rightarrow \alpha = 1, \text{ since } \text{Hom}(\mathcal{O}, \mathcal{O}) \cong \mathcal{O}$$

$$\begin{smallmatrix} \psi \\ \text{id}_{\mathcal{O}} \end{smallmatrix} \longleftrightarrow \begin{smallmatrix} \psi \\ 1 \end{smallmatrix}$$

$$\Rightarrow \langle \psi_p, e_p \rangle = \text{Res}_p \left( \frac{\psi}{s} \right) = \left\{ \frac{1 \cdot h(z) dz_1 \wedge \dots \wedge dz_n}{s_1(z) \dots s_n(z)} \right\} \text{ see p6p3}$$