

$$E_1'' \rightarrow E_0'' \rightarrow M'' \rightarrow 0$$

$$\downarrow P_1 \quad \circlearrowleft \quad \downarrow P_0 \quad \circlearrowleft \quad \downarrow \gamma$$

$$E_1' \rightarrow E_0' \rightarrow M' \rightarrow 0$$

$$\downarrow \Phi_1 \quad \circlearrowleft \quad \downarrow \Phi_0 \quad \circlearrowleft \quad \downarrow \varphi$$

$$E_1 \rightarrow E_0 \rightarrow M \rightarrow 0$$

$$\varphi \circ \gamma = \lambda, \quad \Phi_0 \circ P_0 = \Lambda_0, \quad \Phi_1 \circ P_1 = \Lambda_1$$

Take $\text{Hom}(\quad, N)$, then we get

$$0 \rightarrow \text{Hom}(M'', N) \rightarrow \text{Hom}(E_0'', N) \rightarrow \text{Hom}(E_1'', N) \rightarrow$$

$$\uparrow \gamma^*$$

$$\uparrow P_0^*$$

$$\uparrow P_1^*$$

$$0 \rightarrow \text{Hom}(M', N) \rightarrow \text{Hom}(E_0', N) \rightarrow \text{Hom}(E_1', N) \rightarrow$$

$$\uparrow \varphi^*$$

$$\uparrow \Phi_0^*$$

$$\uparrow \Phi_1^*$$

$$0 \rightarrow \text{Hom}(M, N) \rightarrow \text{Hom}(E_0, N) \rightarrow \text{Hom}(E_1, N) \rightarrow$$

$$\lambda^* = \gamma^* \circ \varphi^*, \quad \Lambda^* = P_0^* \circ \Phi_0^*$$

\Rightarrow

$$H^n(\text{Hom}(E, (M), N)) \xrightarrow{\Phi^*} H^n(\text{Hom}(E, (M'), N)) \xrightarrow{P^*} H^n(\text{Hom}(E, (M''), N))$$

$\underbrace{\hspace{15em}}_{\Lambda^*}$

$M''), N)$

i.e.

$$\text{Ext}_0^n(M, N) \xrightarrow{\Phi^*} \text{Ext}_0^n(M', N) \xrightarrow{P^*} \text{Ext}_0^n(M'', N)$$

$\underbrace{\hspace{15em}}_{\Lambda^*}$

Thus if we take $M' = M'' = M$, and different projective resolutions, i.e. consider the following diagram.