

Take projective resolution of A :

$$\rightarrow P_n \rightarrow \cdots \rightarrow P_2 \rightarrow P_1 \rightarrow P_0 \rightarrow A \rightarrow 0$$

Take injective resolution of B :

$$0 \rightarrow B \rightarrow E_0 \rightarrow E_1 \rightarrow E_2 \rightarrow \cdots \rightarrow E_n \rightarrow$$

Let K_i be kernels in projective resolution. Get

$$0 \rightarrow K_i \rightarrow P_i \rightarrow K_{i-1} \rightarrow 0$$

Let V_j be kernels in injective resolution. Get

$$0 \rightarrow V_j \rightarrow E_j \rightarrow V_{j+1} \rightarrow 0$$

$$\begin{array}{ccccccc}
 & & X & & 0 & & Y \\
 & & \uparrow & & \uparrow & & \uparrow \\
 0 & \rightarrow & \text{Hom}(K_i, V_j) & \rightarrow & \text{Hom}(K_i, E_j) & \rightarrow & \text{Hom}(K_i, V_{j+1}) & \rightarrow & W \\
 & & \uparrow & & \uparrow & & \uparrow & & \\
 0 & \rightarrow & \text{Hom}(P_i, V_j) & \rightarrow & \text{Hom}(P_i, E_j) & \rightarrow & \text{Hom}(P_i, V_{j+1}) & \rightarrow & 0 \\
 & & \uparrow & & \uparrow & & \uparrow & & \\
 0 & \rightarrow & \text{Hom}(K_{i-1}, V_j) & \rightarrow & \text{Hom}(K_{i-1}, E_j) & \rightarrow & \text{Hom}(K_{i-1}, V_{j+1}) & \rightarrow & Z \\
 & & \uparrow & & \uparrow & & \uparrow & & \\
 & & 0 & & 0 & & 0 & &
 \end{array}$$