

$$\begin{array}{ccc}
 c_1 = \langle X^*, Y \rangle & \xrightarrow{\text{Hom}_{\mathbf{C}}} & \text{Hom}_{\mathbf{C}}(X; Y) \\
 \downarrow f & & \downarrow \text{Hom}_{\mathbf{C}}(g) \\
 c_2 = \langle Z^*, U \rangle & \xrightarrow{\text{Hom}_{\mathbf{C}}} & \text{Hom}_{\mathbf{C}}(Z; U)
 \end{array}$$

The diagram illustrates a commutative square in the context of category theory. The top row shows the object  $c_1 = \langle X^*, Y \rangle$  mapping to  $\text{Hom}_{\mathbf{C}}(X; Y)$  via the  $\text{Hom}_{\mathbf{C}}$  functor. The bottom row shows the object  $c_2 = \langle Z^*, U \rangle$  mapping to  $\text{Hom}_{\mathbf{C}}(Z; U)$  via the same functor. The left vertical arrow is labeled  $f$ , the middle vertical arrow is labeled  $f_1^*$ , the right vertical arrow is labeled  $f_2$ , and the right vertical arrow is labeled  $\text{Hom}_{\mathbf{C}}(g)$ .