

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

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 the hom-object $\text{Hom}_{\mathbf{C}}(X; Y)$ via the $\text{Hom}_{\mathbf{C}}$ functor. The bottom row shows the object $c_2 = \langle Z^*, U \rangle$ mapping to the hom-object $\text{Hom}_{\mathbf{C}}(Z; U)$ via the same functor. The left vertical arrow is labeled f , the middle vertical arrow is labeled f_1^* , and the right vertical arrow is labeled $\text{Hom}_{\mathbf{C}}(g)$. The right vertical arrow is also labeled f_2 .