

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

The diagram illustrates a commutative square in the context of category theory. The top row shows the mapping from the object $c_1 = \langle X^*, Y \rangle$ to the hom-object $\text{Hom}_{\mathbf{C}}(X; Y)$ via the $\text{Hom}_{\mathbf{C}}$ functor. The bottom row shows the mapping from the object $c_2 = \langle Z^*, U \rangle$ to the hom-object $\text{Hom}_{\mathbf{C}}(Z; U)$ via the $\text{Hom}_{\mathbf{C}}$ functor. The vertical arrows represent the functors f , f_1^* , f_2 , and $\text{Hom}_{\mathbf{C}}(g)$, which map the objects of the top row to the objects of the bottom row.