

$$\begin{array}{ccc}
 c_1 = \langle X^*, Y \rangle & \xrightarrow{\text{Hom}_{\mathbf{C}}} & \text{Hom}_{\mathbf{C}}(X; Y) \\
 \downarrow f & \downarrow f_1^* & \downarrow f_2 \\
 c_2 = \langle Z^*, U \rangle & \xrightarrow{\text{Hom}_{\mathbf{C}}} & \text{Hom}_{\mathbf{C}}(Z; U)
 \end{array}$$

A commutative diagram illustrating a mapping between two Hom-sets in a category \mathbf{C} . The top row shows the object $c_1 = \langle X^*, Y \rangle$ mapping to the Hom-set $\text{Hom}_{\mathbf{C}}(X; Y)$ via the natural isomorphism $\text{Hom}_{\mathbf{C}}$. The bottom row shows the object $c_2 = \langle Z^*, U \rangle$ mapping to the Hom-set $\text{Hom}_{\mathbf{C}}(Z; U)$ via the natural isomorphism $\text{Hom}_{\mathbf{C}}$. Four vertical arrows connect the two rows: f maps c_1 to c_2 , f_1^* maps X^* to Z^* , f_2 maps Y to U , and $\text{Hom}_{\mathbf{C}}(g)$ maps the Hom-set $\text{Hom}_{\mathbf{C}}(X; Y)$ to $\text{Hom}_{\mathbf{C}}(Z; U)$.