

$$\begin{array}{ccc}
\mathrm{Hom}_{\mathcal{C}}(R, R) & \xrightarrow{\sim} & K(R) \\
\downarrow h \circ (-) & & \downarrow K(h) \circ (-) \\
\mathrm{Hom}_{\mathcal{C}}(R, C) & \xrightarrow{\sim} & K(C)
\end{array}$$

$$\begin{array}{ccc}
1_R & \longmapsto & \varphi(1_R) \\
\downarrow & & \downarrow \\
h : R \longrightarrow C & \longmapsto & \varphi(h) = K(h)(\varphi(1_R)).
\end{array}$$