$$\begin{array}{ccc}
\mathbb{D}(X, FGX) & \xrightarrow{G_{X,FGX}} & \mathbb{C}(GX, GFGX) \\
& \searrow{\varepsilon_X}^* & \Big\downarrow{\cong} \\
& & \mathbb{D}(FGX, FGX)
\end{array}$$