

$$\begin{array}{ccccc}
\mathcal{Y}(A)(X) = h^A(X) & \xrightarrow{\mathcal{Y}(f)(X)=f \circ -} & & \xrightarrow{\quad} & \mathcal{Y}(B)(X) = h^B(X) \\
\uparrow \mathcal{Y}(A)(g)=- \circ g & & (X \xrightarrow{m \circ g} A) \mapsto (X \xrightarrow{f \circ m \circ g} B) & & \uparrow \mathcal{Y}(B)(g)=- \circ g \\
& & \uparrow & & \uparrow \\
& & (Y \xrightarrow{m} A) \mapsto (Y \xrightarrow{f \circ m} B) & & \\
\mathcal{Y}(A)(Y) = h^A(Y) & \xrightarrow{\mathcal{Y}(f)(Y)=f \circ -} & & \xrightarrow{\quad} & \mathcal{Y}(B)(Y) = h^B(Y)
\end{array}$$