

Definition (Kleisli composition)

Let $\langle M, \text{mu}, \text{un} \rangle$ be a monad on a category \mathbf{C} , let $X, Y, Z \in \text{Ob}_{\mathbf{C}}$, and let $f : X \rightarrow MY$ and $g : Y \rightarrow MZ$ be morphisms in \mathbf{C} (so, they are Kleisli morphisms). Their *Kleisli composition* is the morphism in \mathbf{C} given by the composition

$$X \xrightarrow{f} M(Y) \xrightarrow{Mg} (M \circ M)(Z) \xrightarrow{\text{mu}_Z} M(Z).$$