

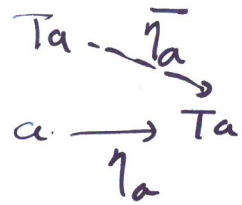
$(T, \eta, \bar{-})$  Kleisli Triple

-  $T: \text{obj } \mathcal{C} \rightarrow \text{obj } \mathcal{C}$

-  $\forall a \in \mathcal{C} \cdot \eta_a: a \rightarrow Ta \in \mathcal{C}$

-  $\forall f: a \rightarrow Tb \in \mathcal{C} \quad \bar{f}: Ta \rightarrow Tb \in \mathcal{C}$

①  $\bar{\eta}_a = 1_{Ta}$



②  $\bar{f} \cdot \eta_a = f$

③  $\overline{g \cdot f} = \bar{g} \cdot \bar{f}$

$(b \xrightarrow{g} Tc) \circ (a \xrightarrow{f} Tb) = \bar{g} \cdot f$

$T: \text{obj } \mathcal{C} \rightarrow \text{obj } \mathcal{C} \quad a \xrightarrow{f} Tb \xrightarrow{\bar{g}} Tc$

Monad

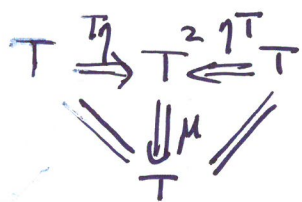
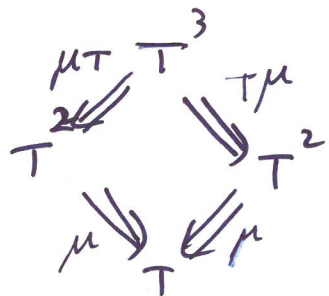
$(T, \eta, \mu)$

$$\eta_a : a \rightarrow Ta$$

$$\mu_a : T^2a \rightarrow Ta$$

$$\bullet \mu_a \circ \mu_{Ta} = \mu_a \cdot T\mu_a$$

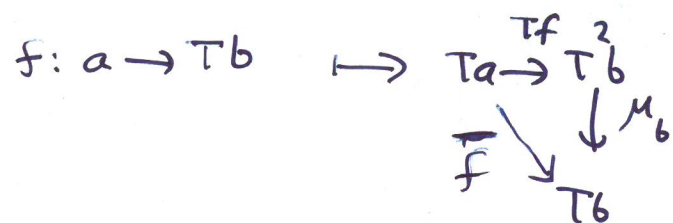
$$\bullet \mu_a \cdot \eta_{Ta} = \eta_{Ta} = \mu_a \cdot T\eta_a$$



T

From this data, construct a Kleisli Triple

$(T, \eta, (-))$



$(T, \eta, \mu) \rightsquigarrow (T, \eta, (-))$

Interpretation of equation  $\bar{f} \cdot \eta_a = f$

$$\eta_a: a \rightarrow Ta$$

$$f: a \rightarrow Tb$$

$$\bar{f}: Ta \rightarrow Tb$$

$$\eta_a; \bar{f} = f$$

takes a value of  
type "a", and gives  
the program of  
type "Ta" (which  
returns the <sup>value</sup>  
<sub>same</sub>)  
~~of~~

f transform a  
value of type "a"  
to a programme  
of type "b"