

Typing for Graded Monads

Given: (E, \top, \otimes, \leq)

$$\frac{\Gamma \vdash t : B}{\Gamma \vdash \langle t \rangle : M_{\top} B} \eta$$

$$\frac{\Gamma_1 \leq \Gamma_2 \quad A \leq B \quad \Gamma_1 \vdash t : A}{\Gamma_2 \vdash t : B} \leq$$

$$\frac{\Gamma_2 \vdash t_1 : M_{e_1} A \quad \Gamma_1, x : A \vdash t_2 : M_{e_2} B}{\Gamma_1, \Gamma_2 \vdash \text{let } \langle x \rangle = t_1 \text{ in } t_2 : M_{e_1 \otimes e_2} B} \mu$$

Graded Comonads & Data Usage