

$$\begin{aligned}
 ((\lambda x. \lambda y. x \ y) \ x) &\xrightarrow{\alpha} (\lambda \overline{a}. \lambda \overline{b}. a \ \overline{x}) \\
 &\xrightarrow{\beta} (\lambda b. \gamma \ x) \\
 &\xrightarrow{\beta} \gamma
 \end{aligned}$$

$$\begin{aligned}
 &(\lambda \overline{y. y} \ x) \\
 &\quad \quad \quad x \\
 &\quad \quad \quad \downarrow \\
 &(\lambda e. ((\lambda x. \lambda y. x \ a) \ e) \ b)
 \end{aligned}$$

Normal  
Applicative

$$\xrightarrow{\beta} ((\lambda x. \lambda y. x \ a) \ b) \quad \xrightarrow{\beta} (\lambda e. (\lambda y. a \ e) \ b)$$

$$\xrightarrow{\beta} (\lambda y. a \ b) \quad \xrightarrow{\beta} (\lambda e. a \ b)$$

$$\xrightarrow{\beta} a \quad \xrightarrow{\beta} a$$

$$\lambda e. ((\lambda x. \lambda y. x \ a) \ e)$$

$$\xrightarrow{\eta} (\lambda x. \lambda y. x \ a)$$

$$(\lambda e. ((\lambda x. \lambda y. x \ a) \ e) \ b)$$

$$\xrightarrow{\eta} ((\lambda x. \lambda y. x \ a) \ b)$$

$$\xrightarrow{\beta} (\lambda y. a \ b)$$

$$\xrightarrow{\beta} a$$