η -Conversion

FLOLAC
2008

- η -Conversion is useful to eliminate redundant lambda abstractions
- If the sole purpose of a lambda abstraction is to pass its argument to another function, then the lambda abstraction is redundant

$$\lambda x. \ (E \ x) \equiv E, \ \ if \ x \notin FV(E)$$

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Examples of η **-Conversion**

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- Valid conversion

  $\lambda x. \ add \ x \rightarrow_{\eta} add$

  $\lambda y. \ add \ x \ y \rightarrow_{\eta} add \ x$

  $\boxed{\lambda x. \ (E \ x) \equiv E, \ \ if \ x \notin FV(E)}$

- Invalid conversion

  $\lambda x. \ add \ x \ x \rightarrow_{\eta} add \ x$

- Valid conversion

  $\lambda x. \ (\lambda y. \ y) \ x \rightarrow_{\eta} \ \lambda y. \ y$

- What about $\lambda x. \lambda y. \ y \ x$

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