

# From Simply Typed $\lambda$ -Calculus to a Bidirectional Variant

$$\frac{(x : A) \in \Gamma}{\Gamma \vdash x : A} \text{VAR}$$

$$\frac{\Gamma \vdash t : A}{\Gamma \vdash (t \circ A) : A} \text{ANNO}$$

$$\frac{\Gamma, x : A \vdash t : B}{\Gamma \vdash \lambda x. t : A \supset B} \text{ABS}$$

$$\frac{\Gamma \vdash t : A \supset B \quad \Gamma \vdash u : A}{\Gamma \vdash t \, u : B} \text{APP}$$

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The type of a variable can be looked up in the context  $\Gamma$

$$\frac{(x : A) \in \Gamma}{\Gamma \vdash x : \Rightarrow A} \text{VAR} \Rightarrow$$

$$\frac{\Gamma \vdash t : A}{\Gamma \vdash (t \circ A) : A} \text{ANNO}$$

$$\frac{\Gamma, x : A \vdash t : B}{\Gamma \vdash \lambda x. t : A \supset B} \text{ABS}$$

$$\frac{\Gamma \vdash t : A \supset B \quad \Gamma \vdash u : A}{\Gamma \vdash t u : B} \text{APP}$$