

LAMBDA

MODULE LAMBDA

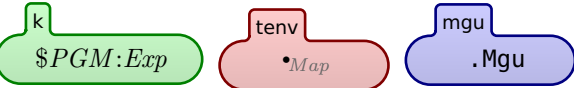
SYNTAX $Exp ::= Int$
| $Bool$
| Id
| (Exp) [bracket]
| $Exp\ Exp$ [strict]
| $Exp * Exp$ [strict]
| Exp / Exp [strict]
| $Exp + Exp$ [strict]
| $Exp <= Exp$ [strict]
| $\text{lambda } Id . Exp$
| $\text{if } Exp \text{ then } Exp \text{ else } Exp$ [strict]
| $\text{let } Id = Exp \text{ in } Exp$ [strict(2)]
| $\text{letrec } Id\ Id = Exp \text{ in } Exp$
| $\text{mu } Id . Exp$

SYNTAX $Type ::= \text{int}$
| bool
| $Type \rightarrow Type$
| $(Type)$ [bracket]

SYNTAX $Exp ::= Type$

SYNTAX $KResult ::= Type$

CONFIGURATION:



RULE $\frac{I: Int}{\text{int}}$

RULE $\frac{B: Bool}{\text{bool}}$

RULE $\frac{\frac{X: Id}{T}}{X \mapsto T: Type}$

RULE $\frac{T1: Type * T2: Type}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{int}}$

RULE $\frac{T1: Type / T2: Type}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{int}}$

RULE $\frac{T1: Type + T2: Type}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{int}}$

RULE $\frac{T1: Type <= T2: Type}{T1 = \text{int} \curvearrowright T2 = \text{int} \curvearrowright \text{bool}}$

SYNTAX $Exp ::= Exp \rightarrow Exp$ [strict]

RULE $\frac{\frac{\text{lambda } X: Id . E: Exp}{T \rightarrow E \curvearrowright \text{tenv } (TEnv)}}{\frac{TEnv}{TEnv[T / X]}}$ requires fresh $(T: Type)$

RULE $\frac{T1: Type\ T2: Type}{T1 = (T2 \rightarrow T) \curvearrowright T}$ requires fresh $(T: Type)$

RULE $\frac{\text{if } T: Type \text{ then } T1: Type \text{ else } T2: Type}{T = \text{bool} \curvearrowright T1 = T2 \curvearrowright T1}$

SYNTAX $TypeSchema ::= (\text{forall } Set) Type$ [binder]

RULE $\frac{\frac{\text{let } X = T: Type \text{ in } E}{E \curvearrowright \text{tenv } (TEnv)}}{\frac{TEnv}{TEnv[(\text{forall } FV(\theta(T)) \rightarrow_{Set} FV(\theta(\text{values } TEnv)))\theta(T) / X]}}$

RULE $\frac{\frac{X: Id}{\text{freshVariables } (Tvs, T)}}{X \mapsto (\text{forall } Tvs) T}$

RULE $\frac{\text{letrec } F\ X = E \text{ in } E'}{\text{let } F = \text{mu } F . \text{lambda } X . E \text{ in } E'}$

RULE $\frac{\frac{\text{mu } X: Id . E: Exp}{(T \rightarrow T)\ E \curvearrowright \text{tenv } (TEnv)}}{\frac{TEnv}{TEnv[T / X]}}$ requires fresh $(T: Type)$

SYNTAX $K ::= Type = Type$

RULE $\frac{\frac{T = T'}{\bullet_K}}{\frac{\theta: Mgu}{\text{updateMgu } (\theta, T, T')}}}$

RULE $\frac{\frac{T: Type}{\theta(T)}}{\frac{\theta: Mgu}{\bullet_K}}$

SYNTAX $K ::= \text{tenv } (Map)$

RULE $\frac{\frac{T: Type \curvearrowright \text{tenv } (TEnv)}{\bullet_K}}{\frac{}{TEnv}}$

END MODULE

[macro]