

1 Labelled Transition System for repeated Head Linear Reduction

1.1 Notes

State is a tuple $\langle \lambda\text{-term with underlined node, context, list of arguments} \rangle$, where

- λ -term (a tree; by considering λ -term as a tree it becomes possible to cross arguments out of tree (*... without term*)) with underlined node is a usual lambda term with one underlined position;
- context Γ is an unordered list of pair (*variable : term*);
- list of arguments Δ is an ordered list of λ -terms. (one can also think about Δ as unordered list of pointers to the corresponding subtree)

1.2 Rules

$$\langle A[e_1 @ e_2]; \Gamma; \Delta \rangle \longrightarrow \langle A[\underline{e_1} @ e_2]; \Gamma; e_2 \bullet \Delta \rangle \quad [\text{APP}]$$

$$\langle A[\underline{\lambda x}.e]; \Gamma; B \bullet \Delta \rangle \longrightarrow \langle A[\cancel{\lambda x}.\underline{e}]; x : B, \Gamma; \Delta \rangle \quad [\text{LAM-ELIM}]$$

$$\langle A[\underline{\lambda x}.e]; \Gamma; \$ \bullet \Delta \rangle \longrightarrow \langle A[\lambda x.\underline{e}]; \Gamma; \Delta \rangle \quad [\text{LAM-NON-ELIM}]$$

$$\langle A[\underline{x}]; x : B, \Gamma; \Delta \rangle \longrightarrow \langle A[\underline{B}]; x : B, \Gamma; \Delta \rangle \quad [\text{BVAR}]$$

$$\langle A[M[\underline{x}] @ B]; \Gamma; B \bullet \Delta \rangle \longrightarrow \langle A[M @ \underline{B}]; \Gamma; \$ \bullet \Delta \rangle, x \notin \text{dom } \Gamma \quad [\text{FVAR-PAUSE-0}]$$

$$\langle A[M[\underline{x}] @ B]; \Gamma; \$ \bullet B \bullet \Delta \rangle \longrightarrow \langle A[M @ \underline{B}]; \Gamma; \$ \bullet \Delta \rangle, x \notin \text{dom } \Gamma \quad [\text{FVAR-PAUSE-1}]$$

$$\langle A[\underline{x}]; \Gamma; \$ \bullet \$ \bullet \Delta \rangle \longrightarrow \langle A[\underline{x}]; \Gamma; \$ \bullet \Delta \rangle, x \notin \text{dom } \Gamma \quad [\text{FVAR-PAUSE-2}]$$