1 Labelled Transition System for repeated Head Linear Reduction

1.1 Notes

State is a tuple $\langle$ λ-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 ordere list of λ-terms. (one can also think about Δ as unordered list of pointers to the corresponding subtree)

1.2 Rules

$$\langle A\left[e_1\underline{@}e_2\right];\ \Gamma;\ \Delta\rangle \longrightarrow \langle A\left[\underline{e_1}@e_2\right];\ \Gamma;\ e_2\bullet\Delta\rangle \qquad\qquad [\text{App}]$$

$$\langle A\left[\underline{\lambda x}.e\right];\ \Gamma;\ B\bullet\Delta\rangle \longrightarrow \langle A_{\cancel{B}}\left[\cancel{\lambda x}.\underline{e}\right];\ x:B,\Gamma;\ \Delta\rangle \qquad\qquad [\text{Lam-Elim}]$$

$$\langle A\left[\underline{\lambda x}.e\right];\ \Gamma;\ \epsilon\rangle \longrightarrow \langle A\left[\lambda x.\underline{e}\right];\ \Gamma;\ \epsilon\rangle \qquad\qquad [\text{Lam-Non-Elim}]$$

$$\langle A\left[\underline{x}\right];\ x:B,\Gamma;\ \Delta\rangle \longrightarrow \langle A\left[\underline{B}\right];\ x:B,\Gamma;\ \Delta\rangle \qquad\qquad [\text{BVar}]$$

$$\langle A\left[M\left[\underline{x}\right]@B\right];\ \Gamma;\ B\bullet\Delta\rangle \longrightarrow \langle A\left[M[x]@\underline{B}\right];\ \Gamma;\ \Delta\rangle,\ x\notin dom\,\Gamma \qquad\qquad [\text{FVar}]$$