

$vars, n, a, x, y, z, w, m, o$

$ivar, i, k, j, l$

$R, S, T ::=$
 $| 0$
 $| S + T$
 $| S - T$
 $| HA$

$A, B, C ::=$
 $| \perp$
 $| A \oplus B$
 $| A \bullet B$
 $| JS$

$s, t ::=$
 $| x$
 $| \text{connect}_w \text{ to } t$
 $| t_1 \cdot t_2$
 $| \text{false } t$
 $| x(t)$
 $| \text{mkc}(t, x)$
 $| \text{postp}(x \mapsto t_1, t_2)$
 $| \text{inl } t$
 $| \text{inr } t$
 $| \text{case } t_1 \text{ of } x.t_2, y.t_3$
 $| H e$
 $| \text{let } J x = e \text{ in } t_2$
 $| \text{let } H x = t_1 \text{ in } t_2$
 $| (t) \quad S$

$e, u ::=$
 $| x$
 $| \text{connect}_\perp \text{ to } e$
 $| \text{postp}_\perp e$
 $| \text{postp}(x \mapsto e_1, e_2)$
 $| \text{mkc}(e, x)$
 $| x(e)$
 $| e_1 \oplus e_2$
 $| \text{case l } e$
 $| \text{case r } e$
 $| J t$
 $| (e) \quad S$

$\Psi, \Pi ::=$
 $| \cdot$

$$\begin{array}{c}
| \quad T \\
| \quad t : T \\
| \quad \Psi, \Pi \\
| \quad (\Psi) \quad \text{S}
\end{array}$$

$$\begin{array}{c}
\Gamma, \Delta \quad ::= \\
| \quad \cdot \\
| \quad A \\
| \quad e : A \\
| \quad \Gamma, \Gamma' \\
| \quad (\Gamma) \quad \text{S}
\end{array}$$

$$\boxed{S \vdash_{\text{C}} \Psi}$$

$$\begin{array}{c}
\frac{}{S \vdash_{\text{C}} S} \text{C_ID} \\
\frac{S \vdash_{\text{C}} \Psi}{S \vdash_{\text{C}} T, \Psi} \text{C_WK} \\
\frac{S \vdash_{\text{C}} T, T, \Psi}{S \vdash_{\text{C}} T, \Psi} \text{C_CR} \\
\frac{R \vdash_{\text{C}} \Psi_1, S, T, \Psi_2}{R \vdash_{\text{C}} \Psi_1, T, S, \Psi_2} \text{C_EX} \\
\frac{}{0 \vdash_{\text{C}} \Psi} \text{C_fL} \\
\frac{T_1 \vdash_{\text{C}} \Psi_1 \quad T_2 \vdash_{\text{C}} \Psi_2}{T_1 + T_2 \vdash_{\text{C}} \Psi_1, \Psi_2} \text{C_dL} \\
\frac{R \vdash_{\text{C}} \Psi, T_1}{R \vdash_{\text{C}} \Psi, T_1 + T_2} \text{C_dR1} \\
\frac{R \vdash_{\text{C}} \Psi, T_2}{R \vdash_{\text{C}} \Psi, T_1 + T_2} \text{C_dR2} \\
\frac{T_1 \vdash_{\text{C}} T_2, \Psi}{T_1 - T_2 \vdash_{\text{C}} \Psi} \text{C_sL} \\
\frac{S \vdash_{\text{C}} \Psi_1, T_1 \quad T_2 \vdash_{\text{C}} \Psi_2}{S \vdash_{\text{C}} \Psi_1, \Psi_2, T_1 - T_2} \text{C_sR} \\
\frac{S \vdash_{\text{C}} \Psi_1, T \quad T \vdash_{\text{C}} \Psi_2}{S \vdash_{\text{C}} \Psi_1, \Psi_2} \text{C_CUT} \\
\frac{S \vdash_{\text{C}} \Psi, S'' \quad S \vdash_{\text{C}} \Psi'}{S \vdash_{\text{C}} \Psi, \Psi'} \text{C_MCUT} \\
\frac{A \vdash_{\text{L}} \cdot; \Psi}{HA \vdash_{\text{C}} \Psi} \text{C_hL}
\end{array}$$

$$\boxed{A \vdash_{\text{L}} \Delta; \Psi}$$

$$\frac{}{A \vdash_{\text{L}} A; \cdot} \text{L_ID}$$

$$\begin{array}{c}
\frac{A \vdash_L \Delta; \Psi}{A \vdash_L \Delta; T, \Psi} \quad \text{L_WK} \\
\frac{A \vdash_L \Delta; T, T, \Psi}{A \vdash_L \Delta; T, \Psi} \quad \text{L_CTR} \\
\frac{A \vdash_L \Delta_1, A, B, \Delta_2; \Psi}{A \vdash_L \Delta_1, B, A, \Delta_2; \Psi} \quad \text{L_EX} \\
\frac{A \vdash_L \Delta; \Psi_1, S, T, \Psi_2}{A \vdash_L \Delta; \Psi_1, T, S, \Psi_2} \quad \text{L_CEX} \\
\frac{A \vdash_L \Delta_1, B; \Psi_1 \quad B \vdash_L \Delta_2; \Psi_2}{A \vdash_L \Delta_1, \Delta_2; \Psi_1, \Psi_2} \quad \text{L_CUT} \\
\frac{A \vdash_L \Delta; \Psi_1, T \quad T \vdash_C \Psi_2}{A \vdash_L \Delta; \Psi_1, \Psi_2} \quad \text{L_CCUT} \\
\frac{}{\perp \vdash_L \cdot; \cdot} \quad \text{L_FLL} \\
\frac{A \vdash_L \Delta; \Psi}{A \vdash_L \perp, \Delta; \Psi} \quad \text{L_FLR} \\
\frac{A \vdash_L \Delta; \Psi, T_1}{A \vdash_L \Delta; \Psi, T_1 + T_2} \quad \text{L_DR1} \\
\frac{A \vdash_L \Delta; \Psi, T_2}{A \vdash_L \Delta; \Psi, T_1 + T_2} \quad \text{L_DR2} \\
\frac{B_1 \vdash_L \Delta_1; \Psi_1 \quad B_2 \vdash_L \Delta_2; \Psi_2}{B_1 \oplus B_2 \vdash_L \Delta_1, \Delta_2; \Psi_1, \Psi_2} \quad \text{L_PL} \\
\frac{A \vdash_L \Delta, B, C; \Psi}{A \vdash_L \Delta, B \oplus C; \Psi} \quad \text{L_PR} \\
\frac{B_1 \vdash_L B_2, \Delta; \Psi}{B_1 \bullet B_2 \vdash_L \Delta; \Psi} \quad \text{L_SL} \\
\frac{A \vdash_L B_1, \Delta_1; \Psi_1 \quad B_2 \vdash_L \Delta_2; \Psi_2}{A \vdash_L B \bullet C, \Delta_1, \Delta_2; \Psi_1, \Psi_2} \quad \text{L_SR} \\
\frac{A \vdash_L \Delta; \Psi_1, T_1 \quad T_2 \vdash_C \Psi_2}{A \vdash_L \Delta; \Psi_1, \Psi_2, T_1 - T_2} \quad \text{L_CSR} \\
\frac{T \vdash_C \Psi}{JT \vdash_L \cdot; \Psi} \quad \text{L_JL} \\
\frac{A \vdash_L \Delta; T, \Psi}{A \vdash_L \Delta, JT; \Psi} \quad \text{L_JR} \\
\frac{A \vdash_L \Delta, B; \Psi}{A \vdash_L \Delta; HB, \Psi} \quad \text{L_HR} \\
\frac{A \vdash_L \Delta; \Psi, S'' \quad S' \vdash_C \Psi'}{A \vdash_L \Delta; \Psi, \Psi'} \quad \text{L_CMCUT}
\end{array}$$