

x variables

$e ::=$

- $| x$
- $| \lambda x.e \quad \text{bind } x \text{ in } e$
- $| e_1 e_2$
- $| \mathbf{halt} e$
- $| (e) \quad \mathbf{S}$

expressions

$\Gamma ::=$

- $|$
- $| \Gamma, x \text{ ok}$

contexts

$\boxed{\Gamma \vdash_{\Lambda} e \text{ ok}}$ well-formedness

$$\frac{x \in \Gamma}{\Gamma \vdash_{\Lambda} x \text{ ok}} \quad \text{L_EXP_VAR}$$

$$\frac{\Gamma \vdash_{\Lambda} e_1 \text{ ok} \quad \Gamma \vdash_{\Lambda} e_2 \text{ ok}}{\Gamma \vdash_{\Lambda} e_1 e_2 \text{ ok}} \quad \text{L_EXP_APP}$$

$$\frac{\Gamma, x \text{ ok} \vdash_{\Lambda} e \text{ ok}}{\Gamma \vdash_{\Lambda} \lambda x.e \text{ ok}} \quad \text{L_EXP_LAM}$$

$\boxed{\Gamma \vdash_{\Lambda} e_1 \equiv e_2}$ equivalence

$$\frac{\Gamma \vdash_{\Lambda} e \text{ ok}}{\Gamma \vdash_{\Lambda} e \equiv e} \quad \text{L_EQ_ID}$$

$$\frac{\Gamma \vdash_{\Lambda} e \equiv e'}{\Gamma \vdash_{\Lambda} e' \equiv e} \quad \text{L_EQ_COMM}$$

$$\frac{\Gamma \vdash_{\Lambda} e \equiv e' \quad \Gamma \vdash_{\Lambda} e' \equiv e''}{\Gamma \vdash_{\Lambda} e \equiv e''} \quad \text{L_EQ_TRANS}$$

$$\frac{\Gamma \vdash_{\Lambda} e_1 \equiv e'_1 \quad \Gamma \vdash_{\Lambda} e_2 \equiv e'_2}{\Gamma \vdash_{\Lambda} e_1 e_2 \equiv e'_1 e'_2} \quad \text{L_EQ_APP}$$

$$\frac{\Gamma, x \text{ ok} \vdash_{\Lambda} e \equiv e'}{\Gamma \vdash_{\Lambda} \lambda x.e \equiv \lambda x.e'} \quad \text{L_EQ_LAM}$$

$$\frac{\Gamma, x \text{ ok} \vdash_{\Lambda} e_2 \text{ ok} \quad \Gamma \vdash_{\Lambda} e_1 \text{ ok}}{\Gamma \vdash_{\Lambda} (\lambda x.e_2) e_1 \equiv [e_1/x]e_2} \quad \text{L_EQ_ABS}$$

$\boxed{\Gamma \vdash_K e \text{ ok}}$ well-formedness

$$\frac{x \in \Gamma}{\Gamma \vdash_K x \text{ ok}} \quad \text{K_EXP_VAR}$$

$$\frac{\Gamma \vdash_K e_1 \text{ ok} \quad \Gamma \vdash_K e_2 \text{ ok}}{\Gamma \vdash_K e_1 e_2 \text{ ok}} \quad \text{K_EXP_APP}$$

$$\frac{\Gamma, x \text{ ok} \vdash_K e \text{ ok}}{\Gamma \vdash_K \lambda x. e \text{ ok}} \quad \text{K_EXP_LAM}$$

$$\frac{\Gamma \vdash_K e \text{ ok}}{\Gamma \vdash_K \mathbf{halt} \ e \text{ ok}} \quad \text{K_EXP_HALT}$$

$\boxed{\Gamma \vdash_K e_1 \mapsto e_2}$ reduction

$$\frac{\begin{array}{c} \Gamma, x \text{ ok} \vdash_K e_2 \text{ ok} \\ \Gamma \vdash_K e_1 \text{ ok} \end{array}}{\Gamma \vdash_K (\lambda x. e_2) \ e_1 \mapsto [e_1/x]e_2} \quad \text{K_STEP_ABS}$$

Definition rules: 14 good 0 bad
Definition rule clauses: 34 good 0 bad