

*termvar*,  $x, y, z$   
*tyvar*,  $X, Y, Z$   
*index*,  $i, j, n, m$

$t, u$  ::= term:  
 |  $x$  variable  
 |  $\lambda x : S. t$  abstraction  
 |  $t t'$  application  
 |  $\lambda X :: K. t$  type abstraction  
 |  $t [ T ]$  type application

$v$  ::= value:  
 |  $\lambda x : T. t$  abstraction value

$T, S$  ::= types:  
 |  $X$  type variable  
 |  $T T'$  operator application  
 |  $S \rightarrow S'$  type of function  
 |  $\forall X :: K. S$  universal type

$\Gamma$  ::= contexts:  
 |  $\emptyset$  empty context  
 |  $\Gamma, x : S$  term variable binding  
 |  $\Gamma, X :: K$  type variable binding

$K$  ::= kinds:  
 |  $*$  kind of proper types  
 |  $K \Rightarrow K'$  kind of operators

$t \rightarrow t'$  Evaluation

$$\frac{t_1 \rightarrow t'_1}{t_1 t_2 \rightarrow t'_1 t_2} \text{ E\_APP1}$$

$$\frac{t_2 \rightarrow t'_2}{t_1 t_2 \rightarrow t_1 t'_2} \text{ E\_APP2}$$

$$\frac{}{(\lambda x : T_{11}. t_{12}) v_2 \rightarrow t_{12} \{ v_2 / x \}} \text{ E\_APPAbs}$$

$$\frac{t_1 \rightarrow t'_1}{t_1 [ T_2 ] \rightarrow t'_1 [ T_2 ]} \text{ E\_TAPP}$$

$$\frac{}{(\lambda X :: K_{11}. t_{12}) [ T_2 ] \rightarrow t_{12} \{ T_2 / X \}} \text{ E\_TAPPtAbs}$$

$\Gamma \vdash T :: K$  Kinding

$$\frac{X :: K \in \Gamma}{\Gamma \vdash X :: K} \text{ K\_TVAR}$$

$$\frac{\Gamma \vdash T_1 :: K_{11} \Rightarrow K_2 \quad \Gamma \vdash T_2 :: K_{11}}{\Gamma \vdash T_1 T_2 :: K_2} \text{ K\_APP}$$

$$\frac{\Gamma \vdash T_1 :: * \quad \Gamma \vdash T_2 :: *}{\Gamma \vdash T_1 \rightarrow T_2 :: *} \text{ K\_ARROW}$$

$$\frac{\Gamma, X :: K_1 \vdash T_2 :: *}{\Gamma \vdash \forall X :: K_1. T_2 :: *} \quad \text{K\_ALL}$$

$\boxed{\Gamma \vdash t : S}$  Typing

$$\frac{x : S \in \Gamma}{\Gamma \vdash x : S} \quad \text{T\_VAR}$$

$$\frac{\Gamma \vdash S_1 :: * \quad \Gamma, x : S_1 \vdash t_2 : T_2}{\Gamma \vdash \lambda x : S_1. t_2 : S_1 \rightarrow S_2} \quad \text{T\_ABS}$$

$$\frac{\Gamma \vdash t_1 : S_{11} \rightarrow S_{12} \quad \Gamma \vdash t_2 : S_{11}}{\Gamma \vdash t_1 t_2 : S_{12}} \quad \text{T\_APP}$$

$$\frac{\Gamma, X :: K \vdash t : S}{\Gamma \vdash \lambda X :: K. t : \forall X :: K. S} \quad \text{T\_TABS}$$

$$\frac{\Gamma \vdash t : \forall X :: K. S \quad \Gamma \vdash T :: K}{\Gamma \vdash t[T] : S\{T/X\}} \quad \text{T\_TAPP}$$

Definition rules: 14 good 0 bad

Definition rule clauses: 26 good 0 bad