t	::=		terms	c	::=	configurations
		true	true value			v
		false	false value			$t[s]$
		n	numeric value			$c :: T$
		$\lambda x.\ t$	abstraction			mlet $x : T = c$ in c
		x	variable			$c\ c$
		$t\ t$	application			add1 c
		mlet $x : T = t$ in t	overloading let			not c
		$t :: T$	ascription			error
		add1 t	sum	s	::=	explicit substitutions
		not t	negation			$\bullet$ empty substitution
						$x \mapsto \{\overline{v}\}, s$ variable substitution
v	::=		configuration − values			
		true	true value			
		false	false value			
		n	numeric value			
		$(\lambda x.\ t)[s]$	abstraction			

Figure 1: Syntax of the simply typed lambda-calculus vith overloading.

$\boxed{c \longrightarrow c}$

$$\mathsf{true}[s] \longrightarrow \mathsf{true} \qquad \text{(True)}$$

$$\mathsf{false}[s] \longrightarrow \mathsf{false} \qquad \text{(False)}$$

$$n[s] \longrightarrow n \qquad \text{(Num)}$$

$$x[\,] \longrightarrow \mathsf{error} \qquad \text{(ErrVarFail)}$$

$$x[x \mapsto \{\overline{v}\}, s] \longrightarrow v_i \qquad \text{(VarOk)}$$

$$\frac{x \neq y}{x[y \mapsto \{\overline{v}\}, s] \longrightarrow x[s]} \qquad \text{(VarNext)}$$

$$(t :: T)[s] \longrightarrow t[s] :: T \qquad \text{(AscSub)}$$

$$(\mathsf{mlet}\ x : T_1 = t_1\ \mathsf{in}\ t_2)[s] \longrightarrow \mathsf{mlet}\ x : T_1 = t_1[s]\ \mathsf{in}\ t_2[s] \qquad \text{(LetSub)}$$

$$(t_1\ t_2)[s] \longrightarrow t_1[s]\ t_2[s] \qquad \text{(AppSub)}$$

$$(\mathsf{add1}\ t_1)[s] \longrightarrow \mathsf{add1}\ t_1[s] \qquad \text{(SumSub)}$$

$$(\mathsf{not}\ t)[s] \longrightarrow \mathsf{not}\ t[s] \qquad \text{(NegationSub)}$$

$$v :: T \longrightarrow v \qquad \text{(Asc)}$$

$$\mathsf{mlet}\ x : T_1 = v\ \mathsf{in}\ t_2[s] \longrightarrow t_2[x \mapsto v \oplus s] \qquad \text{(Let)}$$

$$(\lambda x.\ t_2)[s]\ v \longrightarrow ([x \mapsto v]t_2)[s] \qquad \text{(App)}$$

$$\mathsf{add1}\ v_1 \longrightarrow v_1 + 1 \qquad \text{(Sum)}$$

$$\mathsf{not}\ v \longrightarrow \neg\ v \qquad \text{(Negation)}$$

$$\frac{c \longrightarrow c'}{c :: T \longrightarrow c' :: T} \qquad \text{(Asc1)}$$

$$\frac{c_1 \longrightarrow c_1'}{\mathsf{mlet}\ x : T_1 = c_1\ \mathsf{in}\ t_2[s] \longrightarrow \mathsf{mlet}\ x : T_1 = c_1'\ \mathsf{in}\ t_2[s]} \qquad \text{(Let1)}$$

$$\frac{c_1 \longrightarrow c_1'}{c_1\ c_2 \longrightarrow c_1'\ c_2} \qquad \text{(App1)}$$

$$\frac{c \longrightarrow c'}{v\ c \longrightarrow v\ c'} \qquad \text{(App2)}$$

$$\frac{c_1 \longrightarrow c_1'}{\mathsf{add1}\ c_1 \longrightarrow \mathsf{add1}\ c_1'} \qquad \text{(Sum1)}$$

$$\frac{c \longrightarrow c'}{\mathsf{not}\ c \longrightarrow \mathsf{not}\ c'} \qquad \text{(Negation1)}$$

Figure 2: Configuration reduction rules.