

Specification of the CBN Simply-Typed Lambda Calculus

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This document demonstrates the use of the Ott tool to generate L^AT_EXinput definitions. It uses the `ottalt` L^AT_EXpackage available from <http://users.eecs.northwestern.edu/~jesse/code/latex/>.

1 Syntax of STLC

typ, T	$::=$	types
	\circ	base type
	$T_1 \rightarrow T_2$	function types
exp, e, v	$::=$	expressions
	x	variables
	$\lambda x. e$	abstractions
	$e_1 e_2$	applications
ctx, Γ	$::=$	typing context
	\bullet	empty context
	$\Gamma, x : T$	assumption

2 Typing rules for STLC

$\boxed{\Gamma \vdash e : T}$	<i>(Typing rules)</i>	
$\frac{\text{TYPING-VAR} \quad \text{uniq}\Gamma \quad x : T \in \Gamma}{\Gamma \vdash x : T}$	$\frac{\text{TYPING-ABS} \quad \Gamma, x : T_1 \vdash e : T_2}{\Gamma \vdash \lambda x. e : T_1 \rightarrow T_2}$	$\frac{\text{TYPING-APP} \quad \Gamma \vdash e_1 : T_1 \rightarrow T_2 \quad \Gamma \vdash e_2 : T_1}{\Gamma \vdash e_1 e_2 : T_2}$

3 Small-step rules for STLC

$\boxed{e \longrightarrow e'}$	<i>(Small-step operational semantics)</i>
$\frac{\text{STEP-BETA}}{(\lambda x. e_1) e_2 \longrightarrow e_1[x \rightsquigarrow e_2]}$	$\frac{\text{STEP-APP} \quad e_1 \longrightarrow e'_1}{e_1 e_2 \longrightarrow e'_1 e_2}$