$x,\ y,\ z$

$type,\ t,\ A,\ B$	::=		
	|	**int**	
	|	**forall** $x.t$	bind x in t
	|	$t_1 -> t_2$	
	|	x	
	|	$\uparrow x$	
	|	(t)	S
	|	$[t_1/x]t_2$	M
$var,\ v$	::=		
	|	x	
	|	$\uparrow x$	
$bounds,\ bs$	::=		
	|	**bnil**	
	|	bs, t	
$work,\ w$	::=		
	|	x	
	|	$bs <= \uparrow x <= bs'$	
	|	$t_1 <: t_2$	
$worklist,\ wl$	::=		
	|	**wnil**	
	|	wl, w	
$formula$	::=		
	|	$judgement$	
$Monotype$	::=		
	|	**mono** t	
$InWorklist$	::=		
	|	v **in** wl	
$InScope$	::=		
	|	$wl[v_1][v_2]$	
$AlgorithmeticSubtyping$	::=		
	|	$\|- wl$	
	|	$wl\|- w$	
	|	$wl\|- wl'$	
$judgement$	::=		
	|	$Monotype$	
	|	$InWorklist$	
	|	$InScope$	
	|	$AlgorithmeticSubtyping$	

$$
\begin{array}{lll}
\mathit{user\_syntax} & ::= & \\
 & | & x \\
 & | & \mathit{type} \\
 & | & \mathit{var} \\
 & | & \mathit{bounds} \\
 & | & \mathit{work} \\
 & | & \mathit{worklist}
\end{array}
$$

$\boxed{\textbf{mono}\ t}$

$$\frac{}{\textbf{mono}\ x}\ \text{LA\_\_MONO\_\_TVAR}$$

$$\frac{}{\textbf{mono}\ (\uparrow x)}\ \text{LA\_\_MONO\_\_TEXVAR}$$

$$\frac{}{\textbf{mono}\ \textbf{int}}\ \text{LA\_\_MONO\_\_INT}$$

$$\frac{\begin{array}{c}\textbf{mono}\ t_1 \\ \textbf{mono}\ t_2\end{array}}{\textbf{mono}\ (t_1 -> t_2)}\ \text{LA\_\_MONO\_\_ARROW}$$

$\boxed{v\ \textbf{in}\ wl}$

$$\frac{}{x\ \textbf{in}\ wl, x}\ \text{IWL\_\_HERE\_\_VAR}$$

$$\frac{}{\uparrow x\ \textbf{in}\ wl, bs <= \uparrow x <= bs'}\ \text{IWL\_\_HERE\_\_EXTVAR}$$

$$\frac{x\ \textbf{in}\ wl}{x\ \textbf{in}\ wl, bs <= \uparrow y <= bs'}\ \text{IWL\_\_THERE\_\_VAR\_\_VAR}$$

$$\frac{x\ \textbf{in}\ wl}{x\ \textbf{in}\ wl, y}\ \text{IWL\_\_THERE\_\_VAR\_\_EXTVAR}$$

$$\frac{\uparrow x\ \textbf{in}\ wl}{\uparrow x\ \textbf{in}\ wl, y}\ \text{IWL\_\_THERE\_\_EXTVAR\_\_VAR}$$

$$\frac{\uparrow x\ \textbf{in}\ wl}{\uparrow x\ \textbf{in}\ wl, bs <= \uparrow y <= bs'}\ \text{IWL\_\_THERE\_\_EXTVAR\_\_EXTVAR}$$

$$\frac{x\ \textbf{in}\ wl}{x\ \textbf{in}\ wl, t_1 <: t_2}\ \text{IWL\_\_THERE\_\_VAR\_\_JUDGE}$$

$$\frac{\uparrow x\ \textbf{in}\ wl}{\uparrow x\ \textbf{in}\ wl, t_1 <: t_2}\ \text{IWL\_\_THERE\_\_EXTVAR\_\_JUDGE}$$

$\boxed{wl[v_1][v_2]}$

$$\frac{v_1\ \textbf{in}\ wl}{wl, x[v_1][x]}\ \text{INS\_\_HERE\_\_VAR}$$

$$\frac{v_1\ \textbf{in}\ wl}{wl, bs <= \uparrow x <= bs'[v_1][\uparrow x]}\ \text{INS\_\_HERE\_\_EXTVAR}$$

$$\frac{wl[v_1][v_2]}{wl, w[v_1][v_2]}\ \text{INS\_\_THERE\_\_W}$$

$\boxed{|- wl}$

$$\frac{}{| - \mathbf{wnil}} \quad \text{LA\_\_WF\_\_WL\_\_NIL}$$

$$\frac{\begin{array}{l}| - wl \\ wl| - w\end{array}}{| - wl, w} \quad \text{LA\_\_WF\_\_WL\_\_CONS}$$

$\boxed{wl| - w}$

$$\frac{}{wl| - x} \quad \text{LA\_\_W\_\_WL\_\_VAR}$$

$$\frac{\texttt{coq wl\_worklist wl single\_side\_constraints } (bs')}{wl| - \mathbf{bnil} <= \uparrow x <= bs'} \quad \text{LA\_\_W\_\_WL\_\_EXTVAR\_\_UNFOLD\_\_LNIL}$$

$$\frac{\texttt{coq wl\_worklist wl single\_side\_constraints } (bs)}{wl| - bs <= \uparrow x <= \mathbf{bnil}} \quad \text{LA\_\_W\_\_WL\_\_EXTVAR\_\_UNFOLD\_\_UNIL}$$

$$\frac{\texttt{coq wl\_worklist wl double\_side\_constraint } (bs)}{wl| - bs <= \uparrow x <= bs'} \quad \text{LA\_\_W\_\_WL\_\_EXTVAR\_\_UNFOLD}$$

$$\frac{}{wl| - \mathbf{int} <: \mathbf{int}} \quad \text{LA\_\_W\_\_WL\_\_SUB\_\_INT}$$

$$\frac{}{wl| - x <: x} \quad \text{LA\_\_W\_\_WL\_\_SUB\_\_TVAR}$$

$$\frac{}{wl| - \uparrow x <: \uparrow x} \quad \text{LA\_\_W\_\_WL\_\_SUB\_\_EXTVAR}$$

$$\frac{wl, \mathbf{bnil} <= \uparrow y <= \mathbf{bnil}| - [\uparrow y/x]A <: B}{wl| - \mathbf{forall}\, x.A <: B} \quad \text{LA\_\_W\_\_WL\_\_SUB\_\_FORALLL}$$

$$\frac{wl, y| - [y/x]A <: B}{wl| - A <: \mathbf{forall}\, x.B} \quad \text{LA\_\_W\_\_WL\_\_SUB\_\_FORALLR}$$

$$\frac{\begin{array}{l}wl| - A_2 <: B_2 \\ wl, A_2 <: B_2| - B_1 <: A_1\end{array}}{wl| - A_1 -> A_2 <: B_1 -> B_2} \quad \text{LA\_\_W\_\_WL\_\_SUB\_\_ARROW}$$

$\boxed{wl| - wl'}$

$$\frac{| - wl}{wl| - \mathbf{wnil}} \quad \text{LA\_\_WL\_\_WL\_\_NIL}$$

$$\frac{\texttt{coq } wl \texttt{ ++ } wl'}{wl| - wl', w'} \quad \text{LA\_\_WL\_\_WL\_\_CONS}$$

```
Definition rules:         29 good    0 bad
Definition rule clauses: 51 good    0 bad
```