Arithmetic Language

Help Going from Felleisen to Pierce Notation

CS 6520, Spring 2000

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\begin{array}{rcl}
t & = & \texttt{true} \mid \texttt{false} \mid 0 \mid (\texttt{succ}\ t) \mid (\texttt{pred}\ t) \mid (\texttt{if}\ t\ \texttt{then}\ t\ \texttt{else}\ t) \\
v & = & \texttt{true} \mid \texttt{false} \mid n \\
n & = & 0 \mid (\texttt{succ}\ n)
\end{array}
$$

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\begin{array}{lcl}
(\texttt{pred}\ 0) & \xrightarrow{a} & 0 \\
(\texttt{pred}\ (\texttt{succ}\ t)) & \xrightarrow{a} & t \\
(\texttt{iszero}\ 0) & \xrightarrow{a} & \texttt{true} \\
(\texttt{iszero}\ n) & \xrightarrow{a} & \texttt{false} \\
\quad \text{where } n \not\equiv 0 & & \\
(\texttt{if true then}\ t_1\ \texttt{else}\ t_2) & \xrightarrow{a} & t_1 \\
(\texttt{if false then}\ t_1\ \texttt{else}\ t_2) & \xrightarrow{a} & t_2
\end{array}
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E \quad = \quad [\,] \mid (\texttt{if}\ E\ \texttt{then}\ t\ \texttt{else}\ t) \mid (\texttt{pred}\ E) \mid (\texttt{succ}\ E) \mid (\texttt{izsero}\ E)
$$

$\longmapsto$ (written as just $\longrightarrow$ in Pierce) is the closure of $\xrightarrow{a}$ over E.
$\longmapsto^*$ (written as just $\longrightarrow^*$ in Pierce) is the transitive, reflexive closure of $\longmapsto$.