

evalquote is defined by using two main functions, called eval and apply. apply handles a function and its arguments, while eval handles forms. Each of these functions also has another argument that is used as an association list for storing the values of bound variables and function names.

$\text{evalquote}[fn;x] = \text{apply}[fn;x;NIL]$

where

$\text{apply}[fn;x;a] =$
 $\quad [\text{atom}[fn] \rightarrow [\text{eq}[fn;CAR] \rightarrow \text{caar}[x];$
 $\quad \quad \text{eq}[fn;CDR] \rightarrow \text{cdar}[x];$
 $\quad \quad \text{eq}[fn;CONS] \rightarrow \text{cons}[\text{car}[x];\text{cadr}[x]];$
 $\quad \quad \text{eq}[fn;ATOM] \rightarrow \text{atom}[\text{car}[x]];$
 $\quad \quad \text{eq}[fn;EQ] \rightarrow \text{eq}[\text{car}[x];\text{cadr}[x]];$
 $\quad \quad T \rightarrow \text{apply}[\text{eval}[fn;a];x;a];$
 $\quad \text{eq}[\text{car}[fn];LAMBDA] \rightarrow \text{eval}[\text{caddr}[fn];\text{pairlis}[\text{cadr}[fn];x;a]];$
 $\quad \text{eq}[\text{car}[fn];LABEL] \rightarrow \text{apply}[\text{caddr}[fn];x;\text{cons}[\text{cons}[\text{cadr}[fn];$
 $\quad \quad \quad \text{caddr}[fn]];a]]]$

$\text{eval}[e;a] = [\text{atom}[e] \rightarrow \text{cdr}[\text{assoc}[e;a];$
 $\quad \text{atom}[\text{car}[e]] \rightarrow$
 $\quad \quad [\text{eq}[\text{car}[e];QUOTE] \rightarrow \text{cadr}[e];$
 $\quad \quad \text{eq}[\text{car}[e];COND] \rightarrow \text{evcon}[\text{cdr}[e];a];$
 $\quad \quad T \rightarrow \text{apply}[\text{car}[e];\text{evlis}[\text{cdr}[e];a];a];$
 $\quad T \rightarrow \text{apply}[\text{car}[e];\text{evlis}[\text{cdr}[e];a];a]]]$

pairlis and assoc have been previously defined.

$\text{evcon}[c;a] = [\text{eval}[\text{caar}[c];a] \rightarrow \text{eval}[\text{cadar}[c];a];$
 $\quad T \rightarrow \text{evcon}[\text{cdr}[c];a]]]$

and

$\text{evlis}[m;a] = [\text{null}[m] \rightarrow \text{NIL};$
 $\quad T \rightarrow \text{cons}[\text{eval}[\text{car}[m];a];\text{evlis}[\text{cdr}[m];a]]]$