

## es\_realizer\_ind\_wf<sup>11,40</sup>

$\forall X:\text{Type}\{j\}, x_1:\text{es\_realizer}\{i:l\}, \text{none}:X, \text{plus}:(\text{es\_realizer}\{i:l\} \rightarrow \text{es\_realizer}\{i:l\} \rightarrow X \rightarrow X \rightarrow X),$   
 $\text{init}:(\text{Id} \rightarrow (T:\text{Type}\{i\} \rightarrow \text{Id} \rightarrow (T + (\text{rationals} \rightarrow T)) \rightarrow X)),$   
 $\text{frame}:(\text{Id} \rightarrow \text{Type}\{i\} \rightarrow \text{Id} \rightarrow (\text{Knd List}) \rightarrow X), \text{sframe}:(\text{IdLnk} \rightarrow \text{Id} \rightarrow (\text{Knd List}) \rightarrow X),$   
 $\text{effect}:(\text{Id} \rightarrow (ds:\text{fpf}(\text{Id}; x.\text{Type}\{i\}) \rightarrow \text{Knd} \rightarrow (T:\text{Type}\{i\} \rightarrow x:\text{Id} \rightarrow ((\text{decl\_state}(ds) \rightarrow T \rightarrow \text{decl\_type}\{i:l\} (ds; x)) + (\text{decl\_state}(ds) \rightarrow T \rightarrow \text{rationals} \rightarrow \text{decl\_type}\{i:l\} (ds; x))) \rightarrow X))),$   
 $\text{sends}:(ds:\text{fpf}(\text{Id}; x.\text{Type}\{i\}) \rightarrow \text{Knd} \rightarrow (T:\text{Type}\{i\} \rightarrow \text{IdLnk} \rightarrow (dt:\text{fpf}(\text{Id}; x.\text{Type}\{i\}) \rightarrow ((tg:\text{Id} \times (\text{decl\_state}(ds) \rightarrow T \rightarrow (\text{decl\_type}\{i:l\} (dt; tg) \text{List}))) \text{List}) \rightarrow X))),$   
 $\text{pre}:(\text{Id} \rightarrow (ds:\text{fpf}(\text{Id}; x.\text{Type}\{i\}) \rightarrow \text{Id} \rightarrow \text{finite\_prob\_space} \rightarrow (\text{decl\_state}(ds) \rightarrow \mathbb{B}) \rightarrow X)),$   
 $\text{aframe}:(\text{Id} \rightarrow \text{Knd} \rightarrow (\text{Id List}) \rightarrow X), \text{bframe}:(\text{Id} \rightarrow \text{Knd} \rightarrow (\text{IdLnk List}) \rightarrow X),$   
 $\text{rframe}:(\text{Id} \rightarrow \text{Id} \rightarrow (\text{Knd List}) \rightarrow X).$   
 $\text{es\_realizer\_ind}(x_1;$   
 $\quad \text{none};$   
 $\quad \text{left, right, rec}_1, \text{rec}_2.\text{plus}(\text{left, right, rec}_1, \text{rec}_2);$   
 $\quad \text{loc, } T, x, v.\text{init}(\text{loc, } T, x, v);$   
 $\quad \text{loc, } T, x, L.\text{frame}(\text{loc, } T, x, L);$   
 $\quad \text{lnk, tag, } L.\text{sframe}(\text{lnk, tag, } L);$   
 $\quad \text{loc, } ds, \text{knd, } T, x, f.\text{effect}(\text{loc, } ds, \text{knd, } T, x, f);$   
 $\quad ds, \text{knd, } T, l, dt, g.\text{sends}(ds, \text{knd, } T, l, dt, g);$   
 $\quad \text{loc, } ds, a, p, P.\text{pre}(\text{loc, } ds, a, p, P);$   
 $\quad \text{loc, } k, L.\text{aframe}(\text{loc, } k, L);$   
 $\quad \text{loc, } k, L.\text{bframe}(\text{loc, } k, L);$   
 $\quad \text{loc, } x, L.\text{rframe}(\text{loc, } x, L))$   
 $\in X$