

## es\_realizer-induction<sup>11,40</sup>

$$\begin{aligned}
& \forall P_1: (\text{es\_realizer}\{i:l\} \rightarrow \text{prop}\{i:l\}). \\
& P_1(\text{Rnone}) \\
& \Rightarrow (\forall \text{left}, \text{right}: \text{es\_realizer}\{i:l\}. P_1(\text{left}) \Rightarrow P_1(\text{right}) \Rightarrow P_1(\text{Rplus}(\text{left}; \text{right}))) \\
& \Rightarrow (\forall \text{loc}: \text{Id}, T: \text{Type}\{i\}, x: \text{Id}, v: (T + (\text{rationals} \rightarrow T)). P_1(\text{Rinit}(\text{loc}; T; x; v))) \\
& \Rightarrow (\forall \text{loc}: \text{Id}, T: \text{Type}\{i\}, x: \text{Id}, L: (\text{Knd List}). P_1(\text{Rframe}(\text{loc}; T; x; L))) \\
& \Rightarrow (\forall \text{lnk}: \text{IdLnk}, \text{tag}: \text{Id}, L: (\text{Knd List}). P_1(\text{Rsframe}(\text{lnk}; \text{tag}; L))) \\
& \Rightarrow (\forall \text{loc}: \text{Id}, ds: \text{fpf}(\text{Id}; x.\text{Type}\{i\}), \text{knd}: \text{Knd}, T: \text{Type}\{i\}, x: \text{Id}, \\
& \quad f: ((\text{decl-state}(ds) \rightarrow T \rightarrow \text{decl-type}\{i:l\} \\
& \quad \quad (ds; x)) + (\text{decl-state}(ds) \rightarrow T \rightarrow \text{rationals} \rightarrow \\
& \quad \quad \text{decl-type}\{i:l\} \\
& \quad \quad (ds; x))). P_1(\text{Reffect}(\text{loc}; ds; \text{knd}; T; x; f))) \\
& \Rightarrow (\forall ds: \text{fpf}(\text{Id}; x.\text{Type}\{i\}), \text{knd}: \text{Knd}, T: \text{Type}\{i\}, l: \text{IdLnk}, dt: \text{fpf}(\text{Id}; x.\text{Type}\{i\}), \\
& \quad g: ((\text{tg}: \text{Id} \times (\text{decl-state}(ds) \rightarrow T \rightarrow (\text{decl-type}\{i:l\}(\text{dt}; \text{tg}) \text{List}))) \text{List}). \\
& \quad P_1(\text{Rsend}(\text{ds}; \text{knd}; T; l; dt; g))) \\
& \Rightarrow (\forall \text{loc}: \text{Id}, ds: \text{fpf}(\text{Id}; x.\text{Type}\{i\}), a: \text{Id}, p: \text{finite-prob-space}, P: (\text{decl-state}(ds) \rightarrow \mathbb{B}). \\
& \quad P_1(\text{Rpre}(\text{loc}; ds; a; p; P))) \\
& \Rightarrow (\forall \text{loc}: \text{Id}, k: \text{Knd}, L: (\text{Id List}). P_1(\text{Raframe}(\text{loc}; k; L))) \\
& \Rightarrow (\forall \text{loc}: \text{Id}, k: \text{Knd}, L: (\text{IdLnk List}). P_1(\text{Rbframe}(\text{loc}; k; L))) \\
& \Rightarrow (\forall \text{loc}, x: \text{Id}, L: (\text{Knd List}). P_1(\text{Rrframe}(\text{loc}; x; L))) \\
& \Rightarrow \text{guard}((\forall x_1: \text{es\_realizer}\{i:l\}. P_1(x_1)))
\end{aligned}$$