

send-minimal-lemma^{11,40}

$$\begin{aligned}
& \forall es:ES, T:\text{Type}, l_1, l_2:\text{IdLnk}, tg, a:\text{Id}, ds_1, ds_2:x:\text{Id} \text{ fp} \rightarrow \text{Type}, P:(\text{State}(ds_1) \rightarrow \mathbb{N} \rightarrow \mathbb{B}), \\
& \quad Q:(\text{State}(ds_2) \rightarrow \mathbb{N} \rightarrow \mathbb{B}), d_1:(\forall s:\text{State}(ds_1). \text{Dec}(\exists n:\mathbb{N}. (\uparrow(\neg_b(P(s,n)))))), \\
& \quad d_2:(\forall s:\text{State}(ds_2). \text{Dec}(\exists n:\mathbb{N}. (\uparrow(\neg_b(Q(s,n)))))), f:(\text{State}(ds_1) \rightarrow \mathbb{N} \rightarrow T). \\
& \text{weak-send-do-apply}(es;T;l_1;tg;a;ds_1;f \text{ o' mu' }(\lambda s,n. \neg_b(P(s,n)))) \\
& \Rightarrow \text{weak-send-do-apply}(es;\mathbb{N};l_2;tg;a;ds_2;\text{mu' }(\lambda s,n. \neg_b(Q(s,n)))) \\
& \Rightarrow (\text{destination}(l_1) = \text{source}(l_2) \in \text{Id}) \\
& \Rightarrow (\text{destination}(l_2) = \text{source}(l_1) \in \text{Id}) \\
& \Rightarrow @\text{source}(l_1) \text{ discrete } ds_1 \\
& \Rightarrow @\text{source}(l_2) \text{ discrete } ds_2 \\
& \Rightarrow (\forall k:\mathbb{N}. @\text{source}(l_1) \text{ stable } s.\uparrow(P(s,k))) \\
& \Rightarrow (\forall k:\mathbb{N}. @\text{source}(l_2) \text{ stable } s.\uparrow(Q(s,k))) \\
& \Rightarrow (\forall k:\mathbb{N}. \\
& \quad \forall e@\text{source}(l_1). \\
& \quad (\uparrow(P((\text{discrete state after } e),k))) \\
& \quad \Rightarrow \exists e'@\text{destination}(l_1).(\uparrow(Q((\text{discrete state when } e'),k))) \\
& \quad \quad \vee (\forall n:\mathbb{N}. \uparrow(Q((\text{discrete state after } e'),n)))) \\
& \Rightarrow (\forall e:E. \\
& \quad (\text{kind}(e) = \text{rcv}(l_2,tg) \in \text{Knd}) \\
& \quad \Rightarrow (\forall k:\mathbb{N}. (k < \text{val}(e)) \Rightarrow (\uparrow(P((\text{discrete state after } e),k)))) \\
& \Rightarrow (\forall k:\mathbb{N}, e:E. \\
& \quad (\text{kind}(e) = \text{rcv}(l_1,tg) \in \text{Knd}) \\
& \quad \Rightarrow (\text{val}(e) = f((\text{state when sender}(e),k)) \\
& \quad \Rightarrow (\uparrow(Q((\text{discrete state after } e),k)))) \\
& \Rightarrow \exists e@\text{destination}(l_1).\text{True} \\
& \Rightarrow (\forall k:\mathbb{N}. \\
& \quad \exists e@\text{destination}(l_1).(\forall n:\{0..k^-\}. \uparrow(Q((\text{discrete state when } e),n))) \\
& \quad \quad \vee (\forall n:\mathbb{N}. \uparrow(Q((\text{discrete state after } e),n))))
\end{aligned}$$