

f2f+-pred^{11,40}

f2f+-pred{i:l}

$$\begin{aligned}
& (es; ff; f2f+; sndr; rcvr; e'; e) \\
\equiv_{\text{def}} & (\text{snd-it}(ff; f2f+\text{Req}(f2f+); e; sndr; rcvr) \\
& \wedge (\exists a:\text{es-E}(es) \\
& \quad ((a \text{ c} \leq e \wedge \text{rcv-it}(ff; f2f+\text{Ack}(f2f+); a; sndr; rcvr)) \\
& \quad \wedge (\forall x:\text{es-E}(es). \\
& \quad \quad (\text{es-causl}(es; a; x) \wedge x \text{ c} \leq e) \Rightarrow (\neg \text{rcv-it}(ff; f2f+\text{Ack}(f2f+); x; sndr; rcvr))) \\
& \quad \wedge (e' = \text{fifoSender}(ff)(\text{sndr}, a)))))) \\
\vee & (\text{snd-it}(ff; f2f+\text{Ack}(f2f+); e; rcvr; sndr) \\
& \wedge (\exists a:\text{es-E}(es) \\
& \quad ((a \text{ c} \leq e \wedge \text{rcv-it}(ff; f2f+\text{Req}(f2f+); a; rcvr; sndr)) \\
& \quad \wedge (\forall x:\text{es-E}(es). \\
& \quad \quad (\text{es-causl}(es; a; x) \wedge x \text{ c} \leq e) \Rightarrow (\neg \text{rcv-it}(ff; f2f+\text{Req}(f2f+); x; rcvr; sndr))) \\
& \quad \wedge (e' = \text{fifoSender}(ff)(rcvr, a))))))
\end{aligned}$$

clarification:

f2f+-pred{i:l}

$$\begin{aligned}
& (es; ff; f2f+; sndr; rcvr; e'; e) \\
\equiv_{\text{def}} & (\text{snd-it}(ff; f2f+\text{Req}(f2f+); e; sndr; rcvr) \\
& \wedge (\exists a:\text{es-E}(es) \\
& \quad ((\text{es-causle}(es; a; e) \wedge \text{rcv-it}(ff; f2f+\text{Ack}(f2f+); a; sndr; rcvr)) \\
& \quad \wedge (\forall x:\text{es-E}(es). \\
& \quad \quad (\text{es-causl}(es; a; x) \wedge \text{es-causle}(es; x; e) \\
& \quad \quad \Rightarrow (\neg \text{rcv-it}(ff; f2f+\text{Ack}(f2f+); x; sndr; rcvr))) \\
& \quad \wedge (e' = \text{fifoSender}(ff)(\text{sndr}, a) \in \text{es-E}(es)))))) \\
\vee & (\text{snd-it}(ff; f2f+\text{Ack}(f2f+); e; rcvr; sndr) \\
& \wedge (\exists a:\text{es-E}(es) \\
& \quad ((\text{es-causle}(es; a; e) \wedge \text{rcv-it}(ff; f2f+\text{Req}(f2f+); a; rcvr; sndr)) \\
& \quad \wedge (\forall x:\text{es-E}(es). \\
& \quad \quad (\text{es-causl}(es; a; x) \wedge \text{es-causle}(es; x; e) \\
& \quad \quad \Rightarrow (\neg \text{rcv-it}(ff; f2f+\text{Req}(f2f+); x; rcvr; sndr))) \\
& \quad \wedge (e' = \text{fifoSender}(ff)(rcvr, a) \in \text{es-E}(es))))))
\end{aligned}$$