

es-p-equiv^{11,40}

$$\begin{aligned} es &\equiv es' \text{ mod } es, e.P(es;e) \\ \equiv_{\text{def}} &\{e:\mathbb{E} \mid P(es;e)\} \equiv \{e:\mathbb{E} \mid P(es';e)\} \\ &\& (\forall e:\{e:\mathbb{E} \mid P(es;e)\} . \text{kind}(e) = \text{kind}(e) \& \text{loc}(e) = \text{loc}(e)) \\ &\& (\forall e_1, e_2:\{e:\mathbb{E} \mid P(es;e)\} . \\ &\quad ((e_1 < e_2) \iff (e_1 < e_2)) \& (\text{val}(e_1) \equiv \text{val}(e_2) \iff \text{val}(e_1) \equiv \text{val}(e_2))) \end{aligned}$$

clarification:

$$\begin{aligned} es &\equiv es' \text{ mod } es, e.P(es;e) \\ \equiv_{\text{def}} &\{e:\text{es-E}(es) \mid P(es;e)\} \equiv \{e:\text{es-E}(es') \mid P(es';e)\} \\ &\& (\forall e:\{e:\text{es-E}(es) \mid P(es;e)\} . \\ &\quad \text{es-kind}(es; e) = \text{es-kind}(es'; e) \in \text{Knd} \& \text{es-loc}(es; e) = \text{es-loc}(es'; e) \in \text{Id}) \\ &\& (\forall e_1:\{e:\text{es-E}(es) \mid P(es;e)\} , e_2:\{e:\text{es-E}(es) \mid P(es;e)\} . \\ &\quad (\text{es-causl}(es; e_1; e_2) \iff \text{es-causl}(es'; e_1; e_2)) \\ &\quad \& (\text{es-same-val}(es; e_1; e_2) \iff \text{es-same-val}(es'; e_1; e_2))) \end{aligned}$$