

causal-pred-from-relation^{11,40}

$$\begin{aligned} & \forall es:ES, R:\{R:E\rightarrow E\rightarrow \mathbb{P} \mid \forall e, e':E. R(e, e') \Rightarrow (e' < e)\} . \\ & (\forall e, e':E. \text{Dec}(R(e, e'))) \\ \Rightarrow & (\exists p:E\rightarrow(E + \text{Top}) \\ & (\text{causal-predecessor}(es;p) \\ & \& (\forall e:E. \\ & ((\uparrow \text{can-apply}(p;e)) \iff (\exists e':E. R(e, e'))) \\ & \& ((\uparrow \text{can-apply}(p;e)) \Rightarrow R(e, \text{do-apply}(p;e)))))) \end{aligned}$$