

## filter-updates-lemma<sup>13,45</sup>

$$\begin{aligned} & \forall es:\mathbb{E}S, Cmd:\text{Type}, isupdate:(Cmd \rightarrow \mathbb{B}), Sys:\text{AbsInterface}(Cmd \text{ List}), e, e':\mathbb{E}. \\ & (\uparrow(e \in_b Sys)) \\ & \Rightarrow (e' <_{\text{loc}} e) \\ & \Rightarrow (\uparrow(e' \in_b Sys)) \\ & \Rightarrow (\forall a:\mathbb{E}(Sys). (e' <_{\text{loc}} a) \Rightarrow (a <_{\text{loc}} e) \Rightarrow (\text{filter}(isupdate; Sys(a)) = [] \in (Cmd \text{ List}))) \\ & \Rightarrow (\text{filter}(isupdate; \text{es-interface-history}(es; Sys; e)) \\ & \quad = \\ & \quad \text{filter}(isupdate; \text{es-interface-history}(es; Sys; e') @ Sys(e)) \\ & \quad \in (Cmd \text{ List})) \end{aligned}$$