

## chain-consistent-fails-before2<sup>13,45</sup>

$\forall es:ES, Cmd:Type, In:AbsInterface(Cmd), isupdate:(Cmd \rightarrow \mathbb{B}), Sys, Out:AbsInterface(Top).$   
 $(E(In) \subseteq_r E(Sys))$   
 $\Rightarrow (\forall f:sys\text{-antecedent}(es;Sys).$   
 $(\forall e:E(In). f(e) = e \in E)$   
 $\Rightarrow (\forall chain:(E(Sys) \rightarrow (Id\ List)).$   
 $chain\text{-consistent}(f;chain)$   
 $\Rightarrow (\forall e:E(Sys), i:Id.$   
 $loc(f(e)) \ll i \Rightarrow i \ll loc(e) \Rightarrow cr\text{-fails-before}(es; Sys; chain; i; loc(e))))))$