

MACHINE

TimeTriggered_M

REFINES

EventTriggered_M

SEES

TimeTriggered_Ctx

Theorems

VARIABLES

t

plantV

ctrlV

exec

EVENTS**INITIALISATION** \triangleq

extended

STATUS

ordinary

BEGIN*act1* : $t := Rzero$ *act2* : $plantV := \{Rzero \mapsto plantV0\}$ *act3* : $ctrlV : \in RReal$ *act4* : $exec := ctrl$ **END****Progress_time** \triangleq

extended

STATUS

ordinary

REFINES

Progress

ANY*t1***WHERE***grd1* : $exec = prg$ *grd2* : $t1 \in TIME \wedge (t \mapsto t1 \in lt \wedge minus(t1 \mapsto t) \mapsto sigma \in geq)$ $\forall x. x \in PROP \Rightarrow$ *grd3* : $(ctrlV \neq prop_evade_values(x) \Rightarrow$
 $(prop_evt_trig(x))(plantV(t) \mapsto minus(t1 \mapsto t) \mapsto ctrlV) = TRUE)$ *grd4* : $t1 \in TIME \wedge (t \mapsto t1 \in lt) \wedge minus(t1 \mapsto t) \mapsto sigma \in geq \wedge minus(t1 \mapsto t) \mapsto epsilon \in leq$ **THEN***act1* : $t := t1$ *act2* : $exec := plant$ **END****Plant_time** \triangleq

extended

STATUS

ordinary

REFINES

Plant

ANY*plant1***WHERE***grd1* : $exec = plant$ *grd2* : $plant1 \in Closed2Closed(Rzero, t) \setminus dom(plantV) \rightarrow RReal$ *grd3* : $ode(f_evol_plantV(ctrlV), plant1(t), t) \in DE(RReal)$ *grd4* : $Solvable(Closed2Closed(Rzero, t) \setminus dom(plantV),$
 $ode(f_evol_plantV(ctrlV), plant1(t), t))$ *grd5* : $AppendSolutionBAP(ode(f_evol_plantV(ctrlV), plant1(t), t),$
 $Closed2Closed(Rzero, t) \setminus dom(plantV),$
 $Closed2Closed(Rzero, t) \setminus dom(plantV), plant1)$ **THEN***act1* : $plantV := plantV \uparrow plant1$ *act2* : $exec := ctrl$ **END****Ctrl** \triangleq

extended

STATUS

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ordinary
REFINES
  Ctrl
ANY
  value
WHERE
  grd1 :  $exec = ctrl$ 
  grd2 :  $value \in \mathbb{R}Real$ 
  grd3 :  $\forall x. x \in PROP \Rightarrow$ 
          $(value \notin prop\_evade\_values(x) \Rightarrow (prop\_safe(x))(plantV(t) \Vdash value) = TRUE)$ 
  grd4 :  $\forall x. x \in PROP \Rightarrow$ 
          $(value \notin prop\_evade\_values(x) \Rightarrow (prop\_safeEpsilon(x))(plantV(t) \Vdash value) = TRUE)$ 
THEN
  act1 :  $ctrlV \Vdash value$ 
  act2 :  $exec \Vdash prg$ 
END
END

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