1 Variables

2 root

	var	symbol	documentation	type	units	tokens	eqs
13	$F_{N,A}$	`F`	directed graph incidence matrix	network		[]	
1	t_N	`t`	time	frame	s	[]	
3	${t^o}_N$	`to`	starting time	frame	s	[]	1
4	${t^e}_N$	`te`	end time	frame	s	[]	2
2	$\#$	`value`	numerical value	constant		[]	
18	$null$	`null`	numerical value 0	constant		[]	16
19	one	`one`	numerical value 1	constant		[]	17

3 System

	var	symbol	documentation	type	units	tokens	eqs
5	x_N	`x`	state - length	state	m	[]	13
11	${\pi^a}_N$	`pi_a`	effort a	state	m	[]	7 14
12	${\pi^b}_N$	`pi_b`	effort b	state	m	[]	8 15
14	${\hat{x}^a}_N$	`fx_a`	flow of x mechanism a	state	ms^{-1}	[]	9
15	${\hat{x}^b}_N$	`fx_b`	flow of x mechanism b	state	ms^{-1}	[]	10
16	$\dot{x}_N$	`dx`	differential state	state	ms^{-1}	[]	11 18
17	${x^o}_N$	`xo`	initial condition	state	m	[]	12
20	$\underline{\mathbf{pi}}_N$	`pi_stack`	the stack of intensive variables	state	m	[]	19
7	K_N	`K`	frequency a	constant	s^{-1}	[]	3
8	L_N	`L`	frequency b	constant	s^{-1}	[]	4

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	var	symbol	documentation	type	units	tokens	eqs
9	M	`M`	gain a	constant		[]	5
10	N	`N`	gain b	constant		[]	6

4 Properties

	var	symbol	documentation	type	units	tokens	eqs

5 Control

	var	symbol	documentation	type	units	tokens	eqs

6 System–Properties

	var	symbol	documentation	type	units	tokens	eqs

7 Properties–System

	var	symbol	documentation	type	units	tokens	eqs

8 System–Control

	var	symbol	documentation	type	units	tokens	eqs

9 Control–System

	var	symbol	documentation	type	units	tokens	eqs

10 Properties–Control

	var	symbol	documentation	type	units	tokens	eqs

11 Control–Properties

	var	symbol	documentation	type	units	tokens	eqs

12 Equations

12.1 Model equations

no	equation	documentation	layer
1	$t^o{}_N := Set(t_N, \#)$	starting time	root
2	$t^e{}_N := Set(t_N, \#)$	end time	root
3	$K_N := Set((t_N)^{-1}, \#)$	frequency a	System
4	$L_N := Set((t_N)^{-1}, \#)$	frequency b	System
5	$M := Set(\#, \#)$	gain a	System
6	$N := Set(\#, \#)$	gain b	System
7	$\pi^a{}_N := M \,.\, x_N$	effort a	System
8	$\pi^b{}_N := N \,.\, x_N$	effort b	System
9	$\hat{x}^a{}_N := F_{N,A} \overset{A}{\star} \left(K_N \,.\, F_{N,A} \overset{N}{\star} \pi^a{}_N \right)$	flow of x mechanism a	System
10	$\hat{x}^b{}_N := F_{N,A} \overset{A}{\star} \left(L_N \,.\, F_{N,A} \overset{N}{\star} \pi^b{}_N \right)$	flow of x mechanism b	System
11	$\dot{x}_N := \hat{x}^a{}_N + \hat{x}^b{}_N$	differential state	System
12	$x^o{}_N := Set(x_N, \#)$	initial condition	System
13	$x_N := \int_{t^o{}_N}^{t^e{}_N} \dot{x}_N \;\; d\, t_N + x^o{}_N$	state - length	System
14	$\pi^a{}_N := Set(\pi^a{}_N, \#)$	effort a	System
15	$\pi^b{}_N := Set(\pi^b{}_N, \#)$	effort b	System
16	$null := Set(\#, \#)$	numerical value 0	root

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no	equation	documentation	layer
17	$one := Set(\#, \#)$	numerical value 1	root
18	$\dot{x}_N := Set(\dot{x}_N, null)$	differential state	System
19	$\underline{\mathbf{pi}}_N := Stack\left({\pi^a}_N, {\pi^b}_N\right)$	the stack of intensive variables	System