

1 Variables

2 root

	var	symbol	documentation	type	units	eqs
8	$F_{N,A}$	F_N_A	fudamental incidence matrix	network		
5	t	t	time	frame	s	
6	t^o	to	starting time	frame	s	4
7	t^e	te	end time	frame	s	5
1	#	value	numerical value	constant		
2	1	one	numerical value one	constant		1
3	0	zero	numerical value zero	constant		2
4	0.5	onehalf	numerical value one half	constant		3

3 physical

	var	symbol	documentation	type	units	eqs
9	$P_{N,A}$	P_N_A	projection from node to arc for arc properties	projection		
10	r_{xN}	r_x	x-coordinate	frame	m	
11	r_{yN}	r_y	y-coordinate	frame	m	
12	r_{zN}	r_z	z coordinate	frame	m	
13	U_N	U	fundamental state – internal energy	state	$kg\,m^2\,s^{-2}$	
14	S_N	S	fundamental state – entropy	state	$kg\,m^2\,K^{-1}\,s^{-2}$	
15	V_N	V	fundamental state – volume	state	m^3	
16	n_{NS}	n	fundamental state – molar mass	state	mol	

4 control

	var	symbol	documentation	type	units	eqs
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5 reactions

	var	symbol	documentation	type	units	eqs
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6 material

	var	symbol	documentation	type	units	eqs
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7 macroscopic

	var	symbol	documentation	type	units	eqs
17	p_N	p	thermodynamic pressure	effort	$kg\,m^{-1}\,s^{-2}$	6
18	T_N	T	temperature	effort	K	7
19	μ_{NS}	chemPot	chemical potential	effort	$kg\,m^2\,mol^{-1}\,s^{-2}$	8

8 solid

	var	symbol	documentation	type	units	eqs
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9 fluid

	var	symbol	documentation	type	units	eqs
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10 liquid

	var	symbol	documentation	type	units	eqs
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11 gas

	var	symbol	documentation	type	units	eqs
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12 control-control

	var	symbol	documentation	type	units	eqs
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13 gas–liquid

	var	symbol	documentation	type	units	eqs
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14 gas–gas

	var	symbol	documentation	type	units	eqs
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15 liquid–liquid

	var	symbol	documentation	type	units	eqs
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16 gas–solid

	var	symbol	documentation	type	units	eqs
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17 solid-solid

	var	symbol	documentation	type	units	eqs
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18 liquid–solid

	var	symbol	documentation	type	units	eqs
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19 material–material

	var	symbol	documentation	type	units	eqs
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20 reactions–reactions

	var	symbol	documentation	type	units	eqs
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21 control-reactions

	var	symbol	documentation	type	units	eqs
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22 reactions-control

	var	symbol	documentation	type	units	eqs
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23 control-material

	var	symbol	documentation	type	units	eqs
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24 material-control

	var	symbol	documentation	type	units	eqs
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25 control-macroscopic

	var	symbol	documentation	type	units	eqs
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26 macroscopic-control

	var	symbol	documentation	type	units	eqs
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27 reactions-material

	var	symbol	documentation	type	units	eqs
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28 material-reactions

	var	symbol	documentation	type	units	eqs
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29 reactions–macroscopic

	var	symbol	documentation	type	units	eqs
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30 macroscopic-reactions

	var	symbol	documentation	type	units	eqs
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31 material–macroscopic

	var	symbol	documentation	type	units	eqs
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32 macroscopic-material

	var	symbol	documentation	type	units	eqs
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33 Equations

34 Generic

no	equation	documentation	layer
1	$1 := \text{Instantiate}(\#, \#)$	numerical value 1	root
2	$0 := \text{Instantiate}(\#, \#)$	numerical value zero	root
3	$0.5 := \text{Instantiate}(\#, \#)$	numerical value one half	root
4	$t^o := \text{Instantiate}(t, \#)$	starting time	root
5	$t^e := \text{Instantiate}(t, \#)$	end time	root
6	$p_N := \left(-\frac{\partial U_N}{\partial V_N}\right)$	thermodynamic pressure	macroscopic
7	$T_N := \frac{\partial U_N}{\partial S_N}$	temperature	macroscopic
8	$\mu_{NS} := \frac{\partial U_N}{\partial n_{NS}}$	chemical potential	macroscopic