1 Variables

2 root

	var	symbol	documentation	type	units	eqs
3	${F^{source}}_{N,I}$	`F_NI_source`	incidence matrix NI source	network		
6	${F^{sink}}_{A,I}$	`F_AI_sink`	incidence matrix AI sink	network		
2	$F_{N,A}$	`F`	incidence matrix	network		
4	${F^{sink}}_{N,I}$	`F_NI_sink`	incidence matrix NI sink	network		
5	${F^{source}}_{A,I}$	`F_AI_source`	incidence matrix AI source	network		
8	$S_{I,q}$	`S_Iq`	selection matrix ouput	network		
7	$S_{I,p}$	`S_Ip`	selection matrix input	network		
1	t	`t`	time	frame	s	
101	$value$	`value`	numerical value	constant		
102	$zero$	`zero`	numerical value zero	constant		1
104	$oneHalf$	`oneHalf`	numerical value one half	constant		3
103	one	`one`	numerical value one	constant		2

3 physical

	var	symbol	documentation	type	units	eqs
9	r_{xN}	`r_x`	x-coordinate	frame	m	
10	r_{yN}	`r_y`	y-coordinate	frame	m	
11	r_{zN}	`r_z`	z-coordinate	frame	m	
113	A_N	`A`	Helmholtz energy	state	$kg\,m^2\,s^{-2}$	9
108	V_N	`V`	fundamental state - volume	state	m^3	4
105	U_N	`U`	fundamental state - internal energy	state	$kg\,m^2\,s^{-2}$	
112	H_N	`H`	enthalpy	state	$kg\,m^2\,s^{-2}$	8
107	n_N	`n`	fundamental state - molar mass	state	mol	
114	G_N	`G`	Gibbs free energy	state	$kg\,m^2\,s^{-2}$	10
106	S_N	`S`	fundamental state - entropy	state	$kg\,m^2\,K^{-1}\,s^{-2}$	
120	R_N	`R`	gas constant	constant	$kg\,m^2\,mol^{-1}\,K^{-1}\,s^{-2}$	15
118	B_N	`Boltz`	Boltzmann constant	constant	$kg\,m^2\,K^{-1}\,s^{-2}$	14
119	Av	`Avogadro`	Avogadro number	constant	mol^{-1}	
110	T_N	`T`	temperature	effort	K	6
109	p_N	`p`	thermodynamic pressure	effort	$kg\,m^{-1}\,s^{-2}$	5
111	μ_N	`chemPot`	chemical potential	effort	$kg\,m^2\,mol^{-1}\,s^{-2}$	7
115	v_{xN}	`v_x`	velocity in x-direction	secondaryState	ms^{-1}	11 16
116	v_{yN}	`v_y`	velocity in y-direction	secondaryState	ms^{-1}	12 17
117	v_{zN}	`v_z`	velocity in z-direction	secondaryState	ms^{-1}	13 18

4 Equations

5 Generic

no	equation	documentation	layer
1	$zero := \mathbf{Instantiate}(value, value)$	numerical value zero	root
2	$one := \mathbf{Instantiate}(value, value)$	numerical value one	root
3	$oneHalf := \mathbf{Instantiate}(value, value)$	numerical value one half	root
4	$V_N := r_{xN} \,.\, r_{yN} \,.\, r_{zN}$	fundamental state - volume	physical
5	$p_N := \frac{\partial U_N}{\partial V_N}$	thermodynamic pressure	physical
6	$T_N := \frac{\partial U_N}{\partial S_N}$	temperature	physical
7	$\mu_N := \frac{\partial U_N}{\partial n_N}$	chemical potential	physical
8	$H_N := U_N - p_N \,.\, V_N$	Helmholtz energy	physical
9	$A_N := U_N - T_N \,.\, S_N$	Helmholtz energy	physical
10	$G_N := U_N + p_N \,.\, V_N - T_N \,.\, S_N$	Gibbs free energy	physical
11	$v_{xN} := (t)^{-1} \,.\, r_{xN}$	velocity in x-direction	physical
12	$v_{yN} := (t)^{-1} \,.\, r_{yN}$	velocity in y-direction	physical
13	$v_{zN} := (t)^{-1} \,.\, r_{zN}$	velocity in z-direction	physical
14	$B_N := \mathbf{Instantiate}(S_N, value)$	Boltzmann constant	physical
15	$R_N := Av \,.\, B_N$	gas constant	physical
16	$v_{xN} := \frac{\partial r_{xN}}{\partial t}$	velocity in x-direction	physical

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no	equation	documentation	layer
17	$v_{yN} := \frac{\partial r_{yN}}{\partial t}$	velocity in y-direction	physical
18	$v_{zN} := \frac{\partial r_{zN}}{\partial t}$	velocity in z-direction	physical