

1 Variables

2 root

	var	symbol	documentation	type	units	eqs
3	$F^{source}_{N,I}$	F_NI_source	incidence matrix NI source	network	s	
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		
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	$V_N := r_{xN} \cdot r_{yN} \cdot r_{zN}$	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	$H_N := U_N - p_N \cdot V_N$	Helmholtz energy	physical
9	$A_N := U_N - T_N \cdot S_N$	Helmholtz energy	physical
10	$G_N := U_N + p_N \cdot V_N - T_N \cdot S_N$	Gibbs free energy	physical
11	$v_{xN} := (t)^{-1} \cdot r_{xN}$	velocity in x-direction	physical
12	$v_{yN} := (t)^{-1} \cdot r_{yN}$	velocity in y-direction	physical
13	$v_{zN} := (t)^{-1} \cdot r_{zN}$	velocity in z-direction	physical
14	$B_N := \mathbf{Instantiate}(S_N, value)$	Boltzmann constant	physical
15	$R_N := Av \cdot B_N$	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