1 Variables

2 root

	var	symbol	documentation	type	units	eqs
10	$F_{N,A}$	`F`	basic directed graph incidence matrix	network		
96	I_{NN}	`I_N`	vector of ones of length nodes	projection		
48	$I_{NAN,A}$	`I_N_A`	project node on arc	projection		
97	I_{AA}	`I_A`	vector of ones of length arcs	projection		
9	Δ	`pulse`	pulse of length time interval	frame		7
4	t	`t`	time	frame	s	
6	t^e	`te`	time end	frame	s	4
7	Δt	`t_interval`	time interval	frame	s	5
5	t^o	`to`	time zero	frame	s	3
8	0.5	`onehalf`	numerical one half	constant		6
2	1	`one`	numerical one	constant		1
3	0	`zero`	numerical value zero	constant		2
1	#	`value`	numerical value	constant		

3 physical

	var	symbol	documentation	type	units	eqs
98	I_{SS}	`I_S`	vector of ones of length sepecies	projection		
14	r_{zN}	`r_z`	z-direction	frame	m	10
13	r_{yN}	`r_y`	y-direction	frame	m	9
11	ℓ_N	`l`	length	frame	m	
12	r_{xN}	`r_x`	x-direction	frame	m	8
23	A_N	`A`	Helmholts energy	state	$kg\,m^2\,s^{-2}$	17
18	$n_{N,S}$	`n`	fundamental state - molar mass	state	mol	
22	H_N	`H`	Enthalpy	state	$kg\,m^2\,s^{-2}$	15
16	U_N	`U`	fundamental state - internal energy	state	$kg\,m^2\,s^{-2}$	
24	G_N	`G`	Gibbs free energy	state	$kg\,m^2\,s^{-2}$	18
25	C_N	`C`	fundamental state - charge	state	$A\,s$	
15	V_N	`V`	fundamental state - volume	state	m^3	11
17	S_N	`S`	fundamental state - entropy	state	$kg\,m^2\,K^{-1}\,s^{-2}$	
34	R_N	`R`	Gas constant	constant	$kg\,m^2\,mol^{-1}\,K^{-1}\,s^{-2}$	25
33	B_N	`Boltz`	Boltzmann constant	constant	$kg\,m^2\,K^{-1}\,s^{-2}$	24
32	A^v	`Av`	Avogadro number	constant	mol^{-1}	
20	p_N	`p`	pressure	effort	$kg\,m^{-1}\,s^{-2}$	13
19	T_N	`T`	temperature	effort	K	16
35	${U^e}_N$	`Ue`	electrical potential – voltage	effort	$kg\,m^2\,A^{-1}s^{-3}$	26
21	$\mu_{N,S}$	`chemPot`	chemical potential	effort	$kg\,m^2\,mol^{-1}\,s^{-2}$	14 88
29	v_{zN}	`v_z`	velocity in z-direction	secondaryState	ms^{-1}	21
27	v_{xN}	`v_x`	velocity in x-direction	secondaryState	ms^{-1}	19
28	v_{yN}	`v_y`	velocity in y-direction	secondaryState	ms^{-1}	20

4 material

	var	symbol	documentation	type	units	eqs
47	$h_{N,S}$	`h`	partial molar enthalpies	property	$kg\,m^2\,mol^{-1}\,s^{-2}$	38
54	$k^d_{z\,A,S}$	`kd_z_A`	diffusional mass conductivity in z-direction in arc	property	$kg^{-1}\,m^{-4}\,mol^2\,s$	44
44	$k^c_{x\,N}$	`kc_x`	convective mass conductivity in x-direction	property	$m^{-1}\,s$	35
50	$k^c_{y\,A}$	`kc_y_A`	convective mass conductivity in y-direction in arc	property	$m^{-1}\,s$	40
45	$k^c_{y\,N}$	`kc_y`	convective mass conductivity in y-direction	property	$m^{-1}\,s$	36
39	$k^q_{y\,N}$	`kq_y`	thermal conductivity in y-direction	property	$kg\,K^{-1}\,s^{-3}$	30
59	ρ_N	`density`	density	property	$kg\,m^{-3}$	49
56	$k^q_{y\,A}$	`kq_y_A`	thermal conductivity in y-direction in arc	property	$kg\,K^{-1}\,s^{-3}$	46
107	$h_{AA,S}$	`h_A`	partial molar enthalpies of transport system	property	$kg\,m^2\,mol^{-1}\,s^{-2}$	93
26	λ_S	`Mm`	species' molecular mass	property	$kg\,mol^{-1}$	
40	$k^q_{z\,N}$	`kq_z`	thermal conductivity in z-direction	property	$kg\,K^{-1}\,s^{-3}$	31
41	$k^d_{x\,N,S}$	`kd_x`	diffusional mass conductivity in x-direction	property	$kg^{-1}\,m^{-4}\,mol^2\,s$	32
38	$k^q_{x\,N}$	`kq_x`	thermal conductivity in x-direction	property	$kg\,K^{-1}\,s^{-3}$	29
62	${k^{d,Fick}_{y}}_{A,S}$	`kd_y_Fick`	Fick's diffusivity in arc and y-direction	property	ms^{-1}	52
60	v_S	`v`	molar volume of species	property	$m^3\,mol^{-1}$	50
49	$k^c_{x\,A}$	`kc_x_A`	convective mass conductivity in x-direction in arc	property	$m^{-1}\,s$	39
46	$k^c_{z\,N}$	`kc_z`	convective mass conductivity in z-direction	property	$m^{-1}\,s$	37
37	$C_{v\,N}$	`Cv`	total heat capacity at constant volume	property	$kg\,m^2\,K^{-1}\,s^{-2}$	28
55	$k^q_{x\,A}$	`kq_x_A`	thermal conductivity in x-direction in arc	property	$kg\,K^{-1}\,s^{-3}$	45
52	$k^d_{x\,A,S}$	`kd_x_A`	diffusional mass conductivity in x-direction in arc	property	$kg^{-1}\,m^{-4}\,mol^2\,s$	42
51	$k^c_{z\,A}$	`kc_z_A`	convective mass conductivity in z-direction in arc	property	$m^{-1}\,s$	41
36	$C_{p\,N}$	`Cp`	total heat capacity at constant pressure	property	$kg\,m^2\,K^{-1}\,s^{-2}$	27
58	m_N	`m`	mass	property	kg	48

Continued on next page

	var	symbol	documentation	type	units	eqs
61	${k_x^{d,Fick}}_{A,S}$	`kd_x_Fick`	Fick's diffusivity in arc and x-direction	property	ms^{-1}	51
42	${k_y^d}_{N,S}$	`kd_y`	diffusional mass conductivity in z-direction	property	$kg^{-1}\,m^{-4}\,mol^2\,s$	33
53	${k_y^d}_{A,S}$	`kd_y_A`	diffusional mass conductivity in y-direction in arc	property	$kg^{-1}\,m^{-4}\,mol^2\,s$	43
63	${k_z^{d,Fick}}_{A,S}$	`kd_z_Fick`	Fick's diffusivity in arc and z-direction	property	ms^{-1}	53
89	ρ_A	`density_A`	density of arc material	property	$kg\,m^{-3}$	78
43	${k_z^d}_{N,S}$	`kd_z`	diffusional mass conductivity in z-direction	property	$kg^{-1}\,m^{-4}\,mol^2\,s$	34
57	${k_z^q}_A$	`kq_z_A`	thermal conductivity in z-direction in arc	property	$kg\,K^{-1}\,s^{-3}$	47
102	${\mu^o}_{N,S}$	`chemPot_o`	standard chemical potential	effort	$kg\,m^2\,mol^{-1}\,s^{-2}$	86

5 macroscopic

	var	symbol	documentation	type	units	eqs
92	$fnc_{A,S}$	fnc	convective mass flow in an arc	transport	$mol\,s^{-1}$	81
105	$\dot{H}^{w}{}_{N}$	aw	accumulation due to work flow – instantiate	transport	$kg\,m^{2}\,s^{-2}$	91
83	fq_{xA}	fq_x	heat flow in arc and x-direction	transport	$kg\,m^{2}\,s^{-3}$	72
109	$\hat{H}^{c}{}_{A}$	fHc	enthalpy flow due to convective mass flow	transport	$kg\,m^{2}\,s^{-3}$	95
86	d_{A}	d	fow direction of convective flow	transport		75
104	$\dot{n}^{d}{}_{N,S}$	and	accumulation due to diffusional mass transfer	transport	$mol\,s^{-1}$	90
110	$\hat{H}^{d}{}_{A}$	fHd	enthalpy flow due to diffusive mass flow	transport	$kg\,m^{2}\,s^{-3}$	96
112	$\dot{H}^{d}{}_{N}$	aHd	enthalpy accumulation due to diffusive mass flow	transport	$kg\,m^{2}\,s^{-3}$	98
101	$fnd_{A,S}$	fnd	diffusional mass flow in arc	transport	$mol\,s^{-1}$	85 89
93	$\dot{n}^{c}{}_{N,S}$	anc	accumulation due to convective mass flow	transport	$mol\,s^{-1}$	82
91	$\dot{V}_{A}$	fV	volumetric flow	transport	$m^{3}\,s^{-1}$	80
111	$\dot{H}^{c}{}_{N}$	aHc	enthalpy accumulation due to convective mass flow	transport	$kg\,m^{2}\,s^{-3}$	97
87	$c_{A,S}$	c_A	concentration in convective mass flow	transport	$m^{-3}\,mol$	76
84	$\dot{q}_{N}$	aq	accumulation due to conductive heat flow	transport	$kg\,m^{2}\,s^{-3}$	73
68	A_{xyA}	A_xy_A	cross sectional area yz of arc	geometry	m^{2}	57
70	A_{yzA}	A_yz_A	cross sectional area yz of arc	geometry	m^{2}	59
69	A_{xzA}	A_xz_A	cross sectional area xz of arc	geometry	m^{2}	58
67	A_{yzN}	A_yz	cross sectional area yz	geometry	m^{2}	56
66	A_{xzN}	A_xz	cross sectional area xz	geometry	m^{2}	55
65	A_{xyN}	A_xy	cross sectional area xy	geometry	m^{2}	54
64	$D_{N,A}$	D	difference operator	differenceOperator		
85	$c_{N,S}$	c	molar concentration	secondaryState	$m^{-3}\,mol$	74
100	$x_{N,S}$	x	concentration mole fraction	secondaryState		84

Continued on next page

	var	symbol	documentation	type	units	eqs
99	nt_N	`nt`	total amount	secondaryState	*mol*	83

6 material–macroscopic

	var	symbol	documentation	type	units	eqs
90	$\_\rho_A$	`_density_A`	link variable density A to interface material »> macroscopic	get	$kg\,m^{-3}$	79
88	$\_\rho_N$	`_density`	link variable density to interface material »> macroscopic	get	$kg\,m^{-3}$	77
72	$\_k^c{}_{yA}$	`_kc_y_A`	link variable kc y A to interface material »> macroscopic	get	$m^{-1}\,s$	61
108	$\_h_{A,S}$	`_h_A`	link variable h A to interface material »> macroscopic	get	$kg\,m^2\,mol^{-1}\,s^{-2}$	94
30	$\_\lambda_S$	`_Mm`	link variable Mm to interface material »> macroscopic	get	$kg\,mol^{-1}$	22
77	$\_k^d{}_{yA,S}$	`_kd_y_A`	link variable kd y A to interface material »> macroscopic	get	$kg^{-1}\,m^{-4}\,mol^2\,s$	66
106	$\_h_{N,S}$	`_h`	link variable h to interface material »> macroscopic	get	$kg\,m^2\,mol^{-1}\,s^{-2}$	92
81	$\_k^q{}_{yA}$	`_kq_y_A`	link variable kq y A to interface material »> macroscopic	get	$kg\,K^{-1}\,s^{-3}$	70
76	$\_k^{d,Fick}{}_{yA,S}$	`_kd_y_Fick`	link variable kd y Fick to interface material »> macroscopic	get	ms^{-1}	65
74	$\_k^d{}_{xA,S}$	`_kd_x_A`	link variable kd x A to interface material »> macroscopic	get	$kg^{-1}\,m^{-4}\,mol^2\,s$	63
78	$\_k^d{}_{zA,S}$	`_kd_z_A`	link variable kd z A to interface material »> macroscopic	get	$kg^{-1}\,m^{-4}\,mol^2\,s$	67
82	$\_k^q{}_{zA}$	`_kq_z_A`	link variable kq z A to interface material »> macroscopic	get	$kg\,K^{-1}\,s^{-3}$	71
71	$\_k^c{}_{xA}$	`_kc_x_A`	link variable kc x A to interface material »> macroscopic	get	$m^{-1}\,s$	60
73	$\_k^c{}_{zA}$	`_kc_z_A`	link variable kc z A to interface material »> macroscopic	get	$m^{-1}\,s$	62

Continued on next page

	var	symbol	documentation	type	units	eqs
80	$\_k^q{}_{xA}$	`_kq_x_A`	link variable kq x A to interface material »> macroscopic	get	$kg\,K^{-1}\,s^{-3}$	69
75	$\_k_x^{d,Fick}{}_{A,S}$	`_kd_x_Fick`	link variable kd x Fick to interface material »> macroscopic	get	ms^{-1}	64
79	$\_k_z^{d,Fick}{}_{A,S}$	`_kd_z_Fick`	link variable kd z Fick to interface material »> macroscopic	get	ms^{-1}	68

7 macroscopic–material

	var	symbol	documentation	type	units	eqs
103	$\_x_{N,S}$	`_x`	link variable x to interface macroscopic »> material	get		87

8 Equations

9 Generic

no	equation	documentation	layer
1	$1 := \text{Instantiate}(\#, \#)$	numerical one	root
2	$0 := \text{Instantiate}(\#, \#)$	numerical value zero	root
3	$t^o := \text{Instantiate}(t, 0)$	time zero	root
4	$t^e := \text{Instantiate}(t, \#)$	time end	root
5	$\Delta t := \text{Instantiate}(t, \#)$	time interval	root
6	$0.5 := \text{Instantiate}(\#, \#)$	numerical one half	root
7	$\Delta := \text{sign}\,(t - t^o) - \text{sign}\,(t - (t^o - \Delta t))$	pulse of length time interval	root
8	$r_{xN} := \text{Instantiate}(\ell_N, \#)$	x-direction	physical
9	$r_{yN} := \text{Instantiate}(\ell_N, \#)$	y-direction	physical
10	$r_{zN} := \text{Instantiate}(\ell_N, \#)$	z-direction	physical
11	$V_N := r_{xN} \,.\, r_{yN} \,.\, r_{zN}$	volume	physical
13	$p_N := \frac{\partial U_N}{\partial V_N}$	pressure	physical
14	$\mu_{N,S} := \frac{\partial U_N}{\partial n_{N,S}}$	chemical potential	physical
15	$H_N := U_N - p_N \,.\, V_N$	Enthalpy	physical
16	$T_N := \frac{\partial U_N}{\partial S_N}$	temperature	physical
17	$A_N := U_N - T_N \,.\, S_N$	Helmholts energy	physical

Continued on next page

no	equation	documentation	layer
18	$G_N := U_N + p_N \,.\, V_N - T_N \,.\, S_N$	Gibbs free energy	physical
19	$v_{xN} := (t)^{-1} \,.\, r_{xN}$	velocity in x-direction	physical
20	$v_{yN} := (t)^{-1} \,.\, r_{yN}$	velocity in y-direction	physical
21	$v_{zN} := (t)^{-1} \,.\, r_{zN}$	velocity in z-direction	physical
24	$B_N := \text{Instantiate}(S_N, \#)$	Boltzmann constant	physical
25	$R_N := A^v \,.\, B_N$	Gas constant	physical
26	$U^e{}_N := (C_N)^{-1} \,.\, U_N$	electrical potential – voltage	physical
27	$C_{pN} := \frac{\partial H_N}{\partial T_N}$	total heat capacity at constant pressure	material
28	$C_{vN} := \frac{\partial U_N}{\partial T_N}$	total heat capacity at constant volume	material
29	$k^q_{xN} := (V_N)^{-1} \,.\, C_{pN} \,.\, v_{xN}$	thermal conductivity in x-direction	material
30	$k^q_{yN} := (V_N)^{-1} \,.\, C_{pN} \,.\, v_{yN}$	thermal conductivity in y-direction	material
31	$k^q_{zN} := (V_N)^{-1} \,.\, C_{pN} \,.\, v_{zN}$	thermal conductivity in z-direction	material
32	$k^d_{xN,S} := (\mu_{N,S})^{-1} \,.\, \left(v_{xN} \,.\, \left((V_N)^{-1} \,.\, \frac{\partial U_N}{\partial \mu_{N,S}}\right)\right)$	diffusional mass conductivity in x-direction	material
33	$k^d_{yN,S} := (\mu_{N,S})^{-1} \,.\, \left(v_{yN} \,.\, \left((V_N)^{-1} \,.\, \frac{\partial U_N}{\partial \mu_{N,S}}\right)\right)$	diffusional mass conductivity in y-direction	material
34	$k^d_{zN,S} := (\mu_{N,S})^{-1} \,.\, \left(v_{zN} \,.\, \left((V_N)^{-1} \,.\, \frac{\partial U_N}{\partial \mu_{N,S}}\right)\right)$	diffusional mass conductivity in z-direction	material
35	$k^c_{xN} := \left(\lambda_S \star (\mu_{N,S})^{-1}\right) \,.\, (V_N)^{-1} \,.\, \frac{\partial U_N}{\partial p_N} \,.\, v_{xN}$	convective mass conductivity in x-direction	material

Continued on next page

no	equation	documentation	layer
36	$k^c_{yN} := \left(\lambda_S \star (\mu_{N,S})^{-1}\right) \,.\, (V_N)^{-1} \,.\, \frac{\partial U_N}{\partial p_N} \,.\, v_{yN}$	convective mass conductivity in y-direction	material
37	$k^c_{zN} := \left(\lambda_S \star (\mu_{N,S})^{-1}\right) \,.\, (V_N)^{-1} \,.\, \frac{\partial U_N}{\partial p_N} \,.\, v_{zN}$	convective mass conductivity in z-direction	material
38	$h_{N,S} := H_N \,.\, (n_{N,S})^{-1}$	partial molar enthalpies	material
39	$k^c_{xA} := I_{NAN,A} \star k^c_{xN}$	convective mass conductivity in x-direction in arc	material
40	$k^c_{yA} := I_{NAN,A} \star k^c_{yN}$	convective mass conductivity in y-direction in arc	material
41	$k^c_{zA} := I_{NAN,A} \star k^c_{zN}$	convective mass conductivity in z-direction in arc	material
42	$k^d_{xA,S} := I_{NAN,A} \star k^d_{xN,S}$	diffusional mass conductivity in x-direction in arc	material
43	$k^d_{yA,S} := I_{NAN,A} \star k^d_{yN,S}$	diffusional mass conductivity in z-direction in arc	material
44	$k^d_{zA,S} := I_{NAN,A} \star k^d_{zN,S}$	diffusional mass conductivity in z-direction in arc	material
45	$k^q_{xA} := I_{NAN,A} \star k^q_{xN}$	thermal conductivity in x-direction in arc	material
46	$k^q_{yA} := I_{NAN,A} \star k^q_{yN}$	thermal conductivity in y-direction in arc	material
47	$k^q_{zA} := I_{NAN,A} \star k^q_{zN}$	thermal conductivity in z-direction in arc	material
48	$m_N := \lambda_S \star n_{N,S}$	mass	material

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no	equation	documentation	layer
49	$\rho_N := (V_N)^{-1} \,.\, m_N$	density	material
50	$v_S := V_N \star (n_{N,S})^{-1}$	molar volume of species	material
51	${k_x^{d,Fick}}_{A,S} := I_{NAN,A} \star \left(v_{xN} \,.\, \frac{\partial U_N}{\partial \mu_{N,S}} \,.\, (n_{N,S})^{-1} \right)$	Fick's diffusivity in arc and x-direction	material
52	${k_y^{d,Fick}}_{A,S} := I_{NAN,A} \star \left(v_{yN} \,.\, \frac{\partial U_N}{\partial \mu_{N,S}} \,.\, (n_{N,S})^{-1} \right)$	Fick's diffusivity in arc and y-direction	material
53	${k_z^{d,Fick}}_{A,S} := I_{NAN,A} \star \left(v_{zN} \,.\, \frac{\partial U_N}{\partial \mu_{N,S}} \,.\, (n_{N,S})^{-1} \right)$	Fick's diffusivity in arc and z-direction	material
54	$A_{xyN} := r_{xN} \,.\, r_{yN}$	cross sectional area xy	macroscopic
55	$A_{xzN} := r_{xN} \,.\, r_{zN}$	cross sectional area xz	macroscopic
56	$A_{yzN} := r_{yN} \,.\, r_{zN}$	cross sectional area yz	macroscopic
57	$A_{xyA} := I_{NAN,A} \star A_{xyN}$	cross sectional area yz of arc	macroscopic
58	$A_{xzA} := I_{NAN,A} \star A_{xzN}$	cross sectional area xz of arc	macroscopic
59	$A_{yzA} := I_{NAN,A} \star A_{yzN}$	cross sectional area yz of arc	macroscopic
72	$fq_{xA} := A_{yzA} \,.\, \_k_{xA}^{q} \,.\, (D_{N,A} \star T_N)$	heat flow in arc and x-direction	macroscopic
73	$\dot{q}_N := F_{N,A} \star fq_{xA}$	accumulation due to conductive heat flow	macroscopic
74	$c_{N,S} := (V_N)^{-1} \,.\, n_{N,S}$	molar concentration	macroscopic
75	$d_A := \mathrm{sign}\,(D_{N,A} \star p_N)$	fow direction of convective flow	macroscopic
76	$c_{A,S} := (0.5 \,.\, (D_{N,A} - d_A \,.\, \lvert D_{N,A} \rvert)) \star c_{N,S}$	concentration in convective mass flow	macroscopic
78	$\rho_A := I_{NAN,A} \star \rho_N$	density of arc material	material
80	$\dot{V}_A := (\_\rho_A)^{-1} \,.\, \_k_{xA}^{c} \,.\, A_{yzA} \,.\, (D_{N,A} \star p_N)$	volumetric flow	macroscopic

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no	equation	documentation	layer
81	$fnc_{A,S} := \dot{V}_A \,.\, c_{A,S}$	convective mass flow in an arc	macroscopic
82	$\dot{n}^c{}_{N,S} := F_{N,A} \star fnc_{A,S}$	accumulation due to convective mass flow	macroscopic
83	$nt_N := I_{SS} \star n_{N,S}$	total amount	macroscopic
84	$x_{N,S} := (nt_N)^{-1} \,.\, n_{N,S}$	concentration mole fraction	macroscopic
85	$fnd_{A,S} := A_{yzA} \,.\, \left(-\_k_x^{d,Fick}{}_{A,S}\right) \,.\, (D_{N,A} \star c_{N,S})$	diffusional mass flow in arc	macroscopic
86	$\mu^o{}_{N,S} := \text{Instantiate}(\mu_{N,S}, \#)$	standard chemical potential	material
88	$\mu_{N,S} := \mu^o{}_{N,S} + R_N \,.\, T_N \,.\, ln(\_x_{N,S})$	chemical potential standard model with mole fraction	material
89	$fnd_{A,S} := A_{yzA} \,.\, \left(-\_k_x^d{}_{A,S}\right) \,.\, (D_{N,A} \star \mu_{N,S})$	diffusional mass flow in arc	macroscopic
90	$\dot{n}^d{}_{N,S} := F_{N,A} \star fnd_{A,S}$	accumulation due to diffusional mass transfer	macroscopic
91	$\dot{H}^w{}_N := \text{Instantiate}(H_N, \#)$	work flow – instantiate	macroscopic
93	$h_{AA,S} := I_{NAN,A} \star h_{N,S}$	partial molar enthalpies of transport system	material
95	$\hat{H}^c{}_A := I_{SS} \star (\_h_{A,S} \,.\, fnc_{A,S})$	enthalpy flow due to convective mass flow	macroscopic
96	$\hat{H}^d{}_A := I_{SS} \star (\_h_{A,S} \,.\, fnd_{A,S})$	enthalpy flow due to diffusive mass flow	macroscopic
97	$\dot{H}^c{}_N := F_{N,A} \star \hat{H}^c{}_A$	enthalpy accumulation due to convective mass flow	macroscopic

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no	equation	documentation	layer
98	$\dot{H}^d{}_N := F_{N,A} \star \hat{H}^d{}_A$	enthalpy accumulation due to diffusive mass flow	macroscopic

10 Interface Link Equation

no	equation	documentation	layer
22	$\_\lambda_S := \lambda_S$	interface equation	material –> macroscopic
60	$\_k^c_{xA} := k^c_{xA}$	interface equation	material –> macroscopic
61	$\_k^c_{yA} := k^c_{yA}$	interface equation	material –> macroscopic
62	$\_k^c_{zA} := k^c_{zA}$	interface equation	material –> macroscopic
63	$\_k^d_{xA,S} := k^d_{xA,S}$	interface equation	material –> macroscopic
64	$\_k^{d,Fick}_{x\,A,S} := k^{d,Fick}_{x\,A,S}$	interface equation	material –> macroscopic
65	$\_k^{d,Fick}_{y\,A,S} := k^{d,Fick}_{y\,A,S}$	interface equation	material –> macroscopic
66	$\_k^d_{yA,S} := k^d_{yA,S}$	interface equation	material –> macroscopic
67	$\_k^d_{zA,S} := k^d_{zA,S}$	interface equation	material –> macroscopic
68	$\_k^{d,Fick}_{z\,A,S} := k^{d,Fick}_{z\,A,S}$	interface equation	material –> macroscopic
69	$\_k^q_{xA} := k^q_{xA}$	interface equation	material –> macroscopic

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no	equation	documentation	layer
70	$\_k^q_{yA} := k^q_{yA}$	interface equation	material –> macroscopic
71	$\_k^q_{zA} := k^q_{zA}$	interface equation	material –> macroscopic
77	$\_\rho_N := \rho_N$	interface equation	material –> macroscopic
79	$\_\rho_A := \rho_A$	interface equation	material –> macroscopic
87	$\_x_{N,S} := x_{N,S}$	interface equation	macroscopic –> material
92	$\_h_{N,S} := h_{N,S}$	interface equation	material –> macroscopic
94	$\_h_{A,S} := h_{AA,S}$	interface equation	material –> macroscopic