

Equation assignment sequence for variable ϕ

no	var	equ	quations	token
85	26	-	$A^v :: \text{port variable}$	
84	64	-	$P_{NS,KS} :: \text{port variable}$	
83	9	-	$r_{xN} :: \text{port variable}$	
82	88	-	$K^o_K :: \text{port variable}$	
81	62	-	$P_{N,NK} :: \text{port variable}$	
80	23	-	$r_{zN} :: \text{port variable}$	
79	10	-	$r_{yN} :: \text{port variable}$	
78	86	-	$N_{S,K} :: \text{port variable}$	
77	61	-	$P_{S,NS} :: \text{port variable}$	
76	60	-	$P_{K,NK} :: \text{port variable}$	
75	63	-	$P_{NK,KS} :: \text{port variable}$	
74	59	-	$P_{NS,AS} :: \text{port variable}$	
73	128	-	$D_{NS,AS} :: \text{port variable}$	
72	127	-	$D_{N,A} :: \text{port variable}$	
71	5	-	$F_{N,A} :: \text{port variable}$	
70	12	-	$S_N :: \text{port variable}$	
69	1	-	$\# :: \text{port variable}$	
68	6	-	$t :: \text{port variable}$	
67	13	-	$V_N :: \text{port variable}$	

Continued on next page

no	var	equ	quations	token
66	11	-	$U_N :: \text{port variable}$	
65	27	16	$Bo_N := \text{Instantiate}(S_N, \#)$	
64	87	64	$E_{a_{NK}} := \text{Instantiate}(P_{N,NK} \overset{N}{\star} R_N . T_{NK}, \#)$	
63	28	17	$R_N := A^v . Bo_N$	
62	115	91	$c_{KS}^o := \text{Instantiate}(c_{KS}, \#)$	
61	114	90	$c_{KS} := c_{NS} \overset{NS}{\star} P_{NS,KS}$	
60	71	49	$\rho_N := m_N . (V_N)^{-1}$	
59	50	134	$k_{xN}^c := \text{Instantiate}(k_{xN}^c, \#)$	
58	50	37	$k_{xN}^c := \left(\lambda_S \overset{S \in NS}{\star} (\mu_{NS})^{-1} \right) . (V_N)^{-1} . \frac{\partial U_N}{\partial p_N} . v_{xN}$	
57	65	46	$d_A := \text{sign} \left(F_{N,A} \overset{N}{\star} p_N \right)$	
56	4	3	$0.5 := \text{Instantiate}(\#, \#)$	
55	108	127	$c_{NS} := \text{Instantiate}(c_{NS}, \#)$	
54	108	84	$c_{NS} := (V_N)^{-1} \odot n_{NS}$	
53	21	12	$v_{xN} := \frac{\partial r_{xN}}{\partial t}$	
52	77	55	$T_{NK} := P_{N,NK} \overset{N}{\star} T_N$	
51	89	65	$K_{NK} := K^o_K \odot \exp((-E_{a_{NK}}) . \left(R_N \overset{N}{\star} P_{N,NK} . T_{NK} \right)^{-1})$	
50	116	92	$\phi_{KS} := \prod (c_{KS} . (c_{KS}^o)^{-1})$	
49	98	74	$\hat{V}_A := (\rho_N)^{-1} . k_{xN}^c . A_{yzN} . D_{N,A} \overset{N}{\star} p_N$	
48	109	85	$c_{AS} := (0.5 . (F_{NS,AS} - d_A \odot F_{NS,AS})) \overset{NS}{\star} c_{NS}$	
47	54	137	$k_{xNS}^d := \text{Instantiate}(k_{xNS}^d, \#)$	

Continued on next page

no	var	equ	quations	token
46	54	41	$k_{xNS}^d := (\mu_{NS})^{-1} \cdot \left(v_{xN} \odot \left((V_N)^{-1} \odot \frac{\partial U_N}{\partial \mu_{NS}} \right) \right)$	
45	45	114	$\mu_{NS} := \text{Instantiate}(\mu_{NS}, \#)$	
44	45	32	$\mu_{NS} := \frac{\partial U_N}{\partial n_{NS}}$	
43	95	71	$A_{yzN} := r_{yN} \cdot r_{zN}$	
42	34	22	$k_{xN}^q := (V_N)^{-1} \cdot \frac{\partial U_N}{\partial T_N} \cdot v_{xN}$	
41	34	131	$k_{xN}^q := \text{Instantiate}(k_{xN}^q, \#)$	
40	58	45	$h_{NS} := H_N \odot (n_{NS})^{-1}$	
39	58	139	$h_{NS} := \text{Instantiate}(h_{NS}, \#)$	
38	93	69	$N_{NS,NK} := P_{S,NS} \overset{S}{\star} \left((P_{K,NK} \cdot T_{NK} \cdot (T_{NK})^{-1}) \overset{K}{\star} N_{S,K} \right)$	
37	117	93	$\xi_{NK} := K_{NK} \cdot P_{NK,KS} \overset{KS}{\star} \phi_{KS}$	
36	110	86	$\hat{n}_{AS}^c := \hat{V}_A \odot c_{AS}$	
35	73	51	$F_{NS,AS} := F_{N,A} \odot P_{NS,AS}$	
34	104	80	$\hat{n}_{AS}^d := A_{yzN} \odot (-k_{xNS}^d) \cdot D_{NS,AS} \overset{NS}{\star} \mu_{NS}$	
33	124	100	$\hat{q}_A := A_{yzN} \cdot k_{xN}^q \cdot D_{N,A} \overset{N}{\star} T_N$	
32	122	98	$\hat{w}_A := \text{Instantiate}(\hat{H}_A^c, \#)$	
31	120	96	$\hat{H}_A^c := \left(F_{NS,AS} \overset{NS}{\star} h_{NS} \right) \overset{S \in AS}{\star} \hat{n}_{AS}^c$	
30	106	82	$\hat{H}_A^d := \left(F_{NS,AS} \overset{NS}{\star} h_{NS} \right) \overset{S \in AS}{\star} \hat{n}_{AS}^d$	
29	118	94	$\tilde{n}_{NS} := V_N \odot \left(N_{NS,NK} \overset{NK}{\star} \xi_{NK} \right)$	
28	111	87	$\hat{n}_{NS}^c := F_{NS,AS} \overset{AS}{\star} \hat{n}_{AS}^c$	
27	105	81	$\hat{n}_{NS}^d := F_{NS,AS} \overset{AS}{\star} \hat{n}_{AS}^d$	

Continued on next page

no	var	equ	quations	token
26	125	101	$\hat{q}_N := F_{N,A} \overset{A}{\star} \hat{q}_A$	
25	123	99	$\hat{w}_N := F_{N,A} \overset{A}{\star} \hat{w}_A$	
24	121	97	$\hat{H}^c_N := F_{N,A} \overset{A}{\star} \hat{H}^c_A$	
23	107	83	$\hat{H}^d_N := F_{N,A} \overset{A}{\star} \hat{H}^d_A$	
22	2	1	$0 := \text{Instantiate}(\#, \#)$	
21	30	18	$C_{pN} := \frac{\partial H_N}{\partial T_N}$	
20	150	124	$n^o_{NS} := \text{Instantiate}(n_{NS}, \#)$	
19	119	95	$\dot{n}_{NS} := \hat{n}^c_{NS} + \hat{n}^d_{NS} + \tilde{n}_{NS}$	
18	119	129	$\dot{n}_{NS} := \text{Instantiate}(\dot{n}_{NS}, 0)$	
17	8	5	$t_e := \text{Instantiate}(t, \#)$	
16	7	4	$t_o := \text{Instantiate}(t, \#)$	
15	151	125	$H^o_N := \text{Instantiate}(H_N, \#)$	
14	126	102	$\dot{H}_N := \hat{H}^c_N + \hat{H}^d_N + \hat{q}_N + \hat{w}_N$	
13	126	128	$\dot{H}_N := \text{Instantiate}(\dot{H}_N, 0)$	
12	69	47	$m_N := \lambda_S \overset{S \in NS}{\star} n_{NS}$	
11	16	7	$T_N := \frac{\partial U_N}{\partial S_N}$	
10	16	113	$T_N := \text{Instantiate}(T_N, \#)$	
9	148	140	$cp_N := \text{Instantiate}(cp_N, \#)$	
8	148	120	$cp_N := C_{pN} \cdot (m_N)^{-1}$	
7	145	117	$T_{ref_N} := \text{Instantiate}(T_N, \#)$	

Continued on next page

no	var	equ	quations	token
6	15	6	$p_N := \left(-\frac{\partial U_N}{\partial V_N} \right)$	
5	15	115	$p_N := \text{Instantiate}(p_N, \#)$	
4	42	116	$n_{NS} := \int_{t_o}^{t_e} \dot{n}_{NS} \, dt + n_{NS}^o$	
3	18	123	$H_N := \int_{t_o}^{t_e} \dot{H}_N \, dt + H_N^o$	
2	18	122	$H_N := m_N \cdot \int_{T_{ref_N}}^{T_N} c_{p_N} \, dT_N$	
1	18	9	$H_N := U_N - p_N \cdot V_N$	
0	153	130	$\text{phi} := \text{MixedStack}(n_{NS}, H_N)$	