

# 1 Variables

## 2 root

	var	symbol	documentation	type	units	eqs
10	$F_{N,A}$	<b>F</b>	fundamental incidence matrix	network		
5	$t$	<b>t</b>	time	frame	$s$	
6	$t^o$	<b>to</b>	time zero	frame	$s$	4
7	$t^e$	<b>te</b>	time end	frame	$s$	5
8	$\Delta t$	<b>dt_pulse</b>	pulse length	frame	$s$	6
9	$pulse$	<b>pulse</b>	pulse function	frame		7
1	$\#$	<b>value</b>	numerical value	constant		
2	1	<b>one</b>	numerical value one	constant		1
3	0	<b>zero</b>	numerical value zero	constant		2
4	0.5	<b>onehalf</b>	numerical value one half	constant		3

### 3 physical

	var	symbol	documentation	type	units	eqs
11	$r_{xN}$	<b>r_x</b>	x-coordinate	frame	$m$	
12	$r_{yN}$	<b>r_y</b>	y-coordinate	frame	$m$	
13	$r_{zN}$	<b>r_z</b>	z-coordinate	frame	$m$	

## 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
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## 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 energy

	var	symbol	documentation	type	units	eqs
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## 11 liquid

	var	symbol	documentation	type	units	eqs
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## 12 gas

	var	symbol	documentation	type	units	eqs
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## 13 control-control

	var	symbol	documentation	type	units	eqs
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## 14 energy–gas

	var	symbol	documentation	type	units	eqs
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## 15 energy–energy

	var	symbol	documentation	type	units	eqs
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## 16 gas–gas

	var	symbol	documentation	type	units	eqs
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## 17 energy-liquid

	var	symbol	documentation	type	units	eqs
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## 18 liquid–liquid

	var	symbol	documentation	type	units	eqs
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## 19 energy–solid

	var	symbol	documentation	type	units	eqs
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## 20 solid-solid

	var	symbol	documentation	type	units	eqs
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## 21 gas–liquid

	var	symbol	documentation	type	units	eqs
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## 22 gas–solid

	var	symbol	documentation	type	units	eqs
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## 23 liquid–solid

	var	symbol	documentation	type	units	eqs
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## 24 material–material

	var	symbol	documentation	type	units	eqs
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## 25 reactions-reactions

	var	symbol	documentation	type	units	eqs
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## 26 control-reactions

	var	symbol	documentation	type	units	eqs
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## 27 reactions-control

	var	symbol	documentation	type	units	eqs
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## 28 control-material

	var	symbol	documentation	type	units	eqs
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## 29 material-control

	var	symbol	documentation	type	units	eqs
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## 30 control-macroscopic

	var	symbol	documentation	type	units	eqs
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## 31    macroscopic-control

	var	symbol	documentation	type	units	eqs
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## 32 reactions-material

	var	symbol	documentation	type	units	eqs
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### 33 material-reactions

	var	symbol	documentation	type	units	eqs
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## 34 reactions-macroscopic

	var	symbol	documentation	type	units	eqs
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## 35    macroscopic-reactions

	var	symbol	documentation	type	units	eqs
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## 36 material–macroscopic

	var	symbol	documentation	type	units	eqs
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## 37    macroscopic-material

	var	symbol	documentation	type	units	eqs
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## 38 Equations

## 39 Generic

no	equation	documentation	layer
1	$1 := \text{Instantiate}(\text{value}, \text{value})$	numerical value one	root
2	$0 := \text{Instantiate}(\text{value}, \text{value})$	numerical value zero	root
3	$0.5 := \text{Instantiate}(\text{value}, \text{value})$	numerical value one half	root
4	$t^o := \text{Instantiate}(t, \text{value})$	time zero	root
5	$t^e := \text{Instantiate}(t, \text{value})$	time end	root
6	$\Delta t := \text{Instantiate}(t, \text{value})$	pulse length	root
7	$\text{pulse} := \text{sign}(t - to) - \text{sign}(t - (to - dt_p \text{pulse}))$	pulse function	root