

## 1 Variables

### 2 root

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

### 3 physical

	var	symbol	documentation	type	units	eqs
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## 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	$1 := \text{Instantiate}(\#, \#)$	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