

# 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	$to$	<b>to</b>	time zero	frame	$s$	4
7	$te$	<b>te</b>	time end	frame	$s$	5
8	$dt_{pulse}$	<b>dt_pulse</b>	pulse length	frame	$s$	6
9	$pulse$	<b>pulse</b>	pulse function	frame		7
1	$value$	<b>value</b>	numerical value	constant		
2	$one$	<b>one</b>	numerical value one	constant		1
3	$zero$	<b>zero</b>	numerical value zero	constant		2
4	$onehalf$	<b>onehalf</b>	numerical value one half	constant		3

### 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	$one := \text{Instantiate}(value, value)$	numerical value one	root
2	$zero := \text{Instantiate}(value, value)$	numerical value zero	root
3	$onehalf := \text{Instantiate}(value, value)$	numerical value one half	root
4	$to := \text{Instantiate}(t, value)$	time zero	root
5	$te := \text{Instantiate}(t, value)$	time end	root
6	$dt_{pulse} := \text{Instantiate}(t, value)$	pulse length	root
7	$pulse := \text{sign}(t - to) - \text{sign}(t - (to - dt_{pulse}))$	pulse function	root