SBML Model Report

Model name: "Vizan2013 - TGF pathway long term signaling"

February 24, 2014

1 General Overview

This is a document in SBML Level 2 Version 4 format. This model was created by the following two authors: Pedro Vizn[1] and Nick Juty[2] at December 16th 2013 at 11:13 a. m. and last time modified at February 24th 2014 at 9:47 a. m. Table 1 provides an overview of the quantities of all components of this model.

Table 1: Number of components in this model, which are described in the following sections.

Element	Quantity	Element	Quantity
compartment types	0	compartments	1
species types	0	species	26
events	0	constraints	0
reactions	0	function definitions	0
global parameters	29	unit definitions	3
rules	30	initial assignments	6

2 Unit Definitions

This is an overview of five unit definitions of which two are predefined by SBML and not mentioned in the model.

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2.1 Unit volume

Name volume

Definition dimensionless

2.2 Unit time

Name time

Definition 3600 s

2.3 Unit substance

Name substance

Definition dimensionless

2.4 Unit area

Notes Square metre is the predefined SBML unit for area since SBML Level 2 Version 1.

Definition m^2

2.5 Unit length

Notes Metre is the predefined SBML unit for length since SBML Level 2 Version 1.

Definition m

3 Compartment

This model contains one compartment.

Table 2: Properties of all compartments.

Id	Name	SBO	Spatial Dimensions	Size	Unit	Constant	Outside
compartment_1	Cell		3	1	dimensionless	☑	

3.1 Compartment compartment_1

This is a three dimensional compartment with a constant size of one dimensionless.

Name Cell

4 Species

This model contains 26 species. The boundary condition of 25 of these species is set to `true` so that these species' amount cannot be changed by any reaction. Section 8 provides further details and the derived rates of change of each species.

Table 3: Properties of each species.

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
`species_1`	S22	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_2`	S24	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_3`	pS2tot	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_4`	TGF	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_5`	R	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_6`	S2c	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_7`	Rcom	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_8`	pS2c	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_9`	Rcom_S	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑
`species_10`	S2n	`compartment_1`	dimensionless · dimensionless^{-1}	⊟	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
species_11	S22n	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_12	S4n	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_13	S22c	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_14	pS2n	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_15	pS2fn	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_16	S24n	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_17	S24c	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_18	S4fc	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_19	S4c	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_20	pS2fc	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_21	S4fn	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_22	SBI	compartment_1	dimensionless · dimensionless^{-1}	⊟	⊟
species_23	Rtot	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
species_24	RT	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_25	Rcom_I	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑
species_26	Ract	compartment_1	dimensionless · dimensionless^{-1}	⊟	☑

5 Parameters

This model contains 29 global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
parameter_1	kd	0000009	0.320		☑
parameter_2	kex	0000009	20.000		☑
parameter_3	kin	0000009	9.360		☑
parameter_4	alpha	0000009	0.080		☑
parameter_5	CHX	0000390	0.000		☑
parameter_6	kp	0000009	21.372		☑
parameter_7	kdp	0000009	24.000		☑
parameter_8	koff	0000282	60.000		☑
parameter_9	kon	0000337	350.877		☐
parameter_10	KDiss	0000282	0.171		☐
parameter_11	CIF	0000380	5.700		☑
parameter_12	D	0000360	4.000		☑
parameter_13	a	0000360	2.270		☑
parameter_14	S2tot	0000361	1.000		☑
parameter_15	S4tot	0000361	1.000		☑
parameter_16	rc0	0000540	0.050		☑
parameter_17	KSBI	0000282	0.197		☑
parameter_18	k'T	0000009	100.000		☑
parameter_19	kex4	0000009	9.360		☐
parameter_20	Total Nuc S2 for fit	0000360	1.000		☐
parameter_21	Ktr	0000281	0.711		☐
parameter_22	k'act	0000009	24.538		☑
parameter_23	Tmax in ng/ml	0000470	2.000		☑
parameter_24	TSca	0000470	2.000		☑
parameter_25	k'cc	0000009	0.350		☑
parameter_26	k'synT	0000009	0.000		☑
parameter_27	k'synTbas	0000009	0.000		☑
parameter_28	MG132	0000009	0.000		☑
Metabolite_9	Initial for S2n	0000360	0.559		☑

6 Initialassignments

This is an overview of six initialassignments.

6.1 Initialassignment species_4

Derived unit contains undeclared units

Math $\text{parameter\_23} \cdot \text{parameter\_24}$

6.2 Initialassignment species_5

Derived unit contains undeclared units

Math $\frac{1-\text{parameter\_16}}{\text{parameter\_4}+1}$

6.3 Initialassignment species_6

Derived unit contains undeclared units

Math $\frac{\text{parameter\_14} \cdot \text{parameter\_2} \cdot (1+\text{parameter\_13})}{\text{parameter\_3}+\text{parameter\_13} \cdot \text{parameter\_2}}$

6.4 Initialassignment species_7

Derived unit contains undeclared units

Math $\frac{\text{parameter\_16}+\text{parameter\_4}}{1+\text{parameter\_4}}$

6.5 Initialassignment species_19

Derived unit contains undeclared units

Math parameter_15

6.6 Initialassignment Metabolite_9

Derived unit $\text{dimensionless}^{-1}$

Math $[\text{species\_10}]$

7 Rules

This is an overview of 30 rules.

7.1 Rule species_16

Rule species_16 is an assignment rule for species species_16:

$$\text{species\_16} = (\text{parameter\_13} + 1) \cdot [\text{species\_2}] - \text{parameter\_13} \cdot [\text{species\_17}] \quad (1)$$

7.2 Rule species_18

Rule species_18 is an assignment rule for species species_18:

$$\text{species\_18} = [\text{species\_19}] - [\text{species\_17}] \tag{2}$$

Derived unit $\text{dimensionless}^{-1}$

7.3 Rule parameter_10

Rule parameter_10 is an assignment rule for parameter parameter_10:

$$\text{parameter\_10} = 0.171 \tag{3}$$

7.4 Rule parameter_9

Rule parameter_9 is an assignment rule for parameter parameter_9:

$$\text{parameter\_9} = \frac{\text{parameter\_8}}{\text{parameter\_10}} \tag{4}$$

7.5 Rule parameter_19

Rule parameter_19 is an assignment rule for parameter parameter_19:

$$\text{parameter\_19} = \text{parameter\_3} \tag{5}$$

7.6 Rule parameter_21

Rule parameter_21 is an assignment rule for parameter parameter_21:

$$\text{parameter\_21} = \frac{\text{parameter\_16}}{1 - \text{parameter\_16}} \cdot \frac{\text{parameter\_4} + 1}{\text{parameter\_4}} \tag{6}$$

7.7 Rule species_20

Rule species_20 is an assignment rule for species species_20:

$$\text{species\_20} = [\text{species\_8}] - 2 \cdot [\text{species\_13}] - [\text{species\_17}] \tag{7}$$

7.8 Rule species_23

Rule species_23 is an assignment rule for species species_23:

$$\text{species\_23} = [\text{species\_5}] + [\text{species\_7}] + [\text{species\_24}] + [\text{species\_26}] \tag{8}$$

Derived unit $\text{dimensionless}^{-1}$

7.9 Rule species_25

Rule species_25 is an assignment rule for species species_25:

$$\text{species\_25} = [\text{species\_7}] \cdot \frac{1}{1 + \text{parameter\_21}} \tag{9}$$

7.10 Rule species_9

Rule species_9 is an assignment rule for species species_9:

$$\text{species\_9} = [\text{species\_7}] \cdot \frac{\text{parameter\_21}}{1 + \text{parameter\_21}} \tag{10}$$

7.11 Rule species_10

Rule species_10 is an assignment rule for species species_10:

$$\text{species\_10} = (\text{parameter\_13} + 1) \cdot (\text{parameter\_14} - [\text{species\_3}]) - \text{parameter\_13} \cdot [\text{species\_6}] \tag{11}$$

7.12 Rule species_11

Rule species_11 is an assignment rule for species species_11:

$$\text{species\_11} = (\text{parameter\_13} + 1) \cdot [\text{species\_1}] - \text{parameter\_13} \cdot [\text{species\_13}] \tag{12}$$

7.13 Rule species_12

Rule species_12 is an assignment rule for species species_12:

$$\text{species\_12} = (\text{parameter\_13} + 1) \cdot \text{parameter\_15} - \text{parameter\_13} \cdot [\text{species\_19}] \tag{13}$$

7.14 Rule species_21

Rule species_21 is an assignment rule for species species_21:

$$\text{species\_21} = [\text{species\_12}] - [\text{species\_16}] \tag{14}$$

Derived unit $\text{dimensionless}^{-1}$

7.15 Rule species_14

Rule species_14 is an assignment rule for species species_14:

$$\text{species\_14} = (\text{parameter\_13} + 1) \cdot [\text{species\_3}] - \text{parameter\_13} \cdot [\text{species\_8}] \tag{15}$$

7.16 Rule species_15

Rule species_15 is an assignment rule for species species_15:

$$\text{species\_15} = [\text{species\_14}] - 2 \cdot [\text{species\_11}] - [\text{species\_16}] \tag{16}$$

7.17 Rule parameter_20

Rule parameter_20 is an assignment rule for parameter parameter_20:

$$\text{parameter\_20} = \frac{[\text{species\_10}] + [\text{species\_14}]}{\text{Metabolite\_9}} \tag{17}$$

7.18 Rule species_1

Rule species_1 is a rate rule for species species_1:

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_1} = \frac{1}{1 + \text{parameter\_13}} \cdot \big(&\text{parameter\_9} \cdot \big(\text{parameter\_13} \cdot [\text{species\_20}]^2 + [\text{species\_15}]^2\big) \\ &- \text{parameter\_8} \cdot (\text{parameter\_13} \cdot [\text{species\_13}] + [\text{species\_11}])\big)\end{aligned} \tag{18}$$

7.19 Rule species_2

Rule species_2 is a rate rule for species species_2:

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_2} = \frac{1}{\text{parameter\_13} + 1} \cdot (&\text{parameter\_9} \\ &\cdot (\text{parameter\_13} \cdot [\text{species\_18}] \cdot [\text{species\_20}] + [\text{species\_15}] \cdot [\text{species\_21}]) \\ &- \text{parameter\_8} \cdot (\text{parameter\_13} \cdot [\text{species\_17}] + [\text{species\_16}]))\end{aligned} \tag{19}$$

7.20 Rule species_3

Rule species_3 is a rate rule for species species_3:

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_3} = \frac{1}{1 + \text{parameter\_13}} \cdot \Bigg(&\text{parameter\_13} \cdot \text{parameter\_6} \cdot [\text{species\_26}] \\ &\cdot \frac{\text{parameter\_17}}{\text{parameter\_17} + [\text{species\_22}]} \cdot [\text{species\_6}] - \text{parameter\_7} \cdot [\text{species\_15}]\Bigg)\end{aligned} \tag{20}$$

7.21 Rule species_4

Rule species_4 is a rate rule for species species_4:

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_4} = \text{parameter\_1} \cdot (&\text{parameter\_27} + \text{parameter\_26} \cdot [\text{species\_16}] \\ &- (\text{parameter\_18} \cdot [\text{species\_9}] + \text{parameter\_25}) \cdot [\text{species\_4}])\end{aligned} \tag{21}$$

7.22 Rule species_5

Rule species_5 is a rate rule for species species_5:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{species\_5} = \mathrm{parameter\_1} \cdot ((1 - \mathrm{parameter\_5}) \cdot (1 - \mathrm{parameter\_16}) - (\mathrm{parameter\_4} + (1 - \mathrm{parameter\_28})) \cdot [\mathrm{species\_5}]) \tag{22}$$

7.23 Rule species_6

Rule species_6 is a rate rule for species species_6:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{species\_6} = \mathrm{parameter\_2} \cdot [\mathrm{species\_10}] - \left(\mathrm{parameter\_3} + \mathrm{parameter\_6} \cdot [\mathrm{species\_26}] \cdot \frac{\mathrm{parameter\_17}}{\mathrm{parameter\_17} + [\mathrm{species\_22}]}\right) \cdot [\mathrm{species\_6}] \tag{23}$$

7.24 Rule species_7

Rule species_7 is a rate rule for species species_7:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{species\_7} = \mathrm{parameter\_1} \cdot (\mathrm{parameter\_4} \cdot [\mathrm{species\_5}] - (1 - \mathrm{parameter\_28}) \cdot [\mathrm{species\_25}] - \mathrm{parameter\_18} \cdot [\mathrm{species\_4}] \cdot [\mathrm{species\_9}]) \tag{24}$$

7.25 Rule species_8

Rule species_8 is a rate rule for species species_8:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{species\_8} = \mathrm{parameter\_6} \cdot [\mathrm{species\_26}] \cdot \frac{\mathrm{parameter\_17}}{\mathrm{parameter\_17} + [\mathrm{species\_22}]} \cdot [\mathrm{species\_6}] + \mathrm{parameter\_2} \cdot [\mathrm{species\_15}] - \mathrm{parameter\_3} \cdot ([\mathrm{species\_20}] + \mathrm{parameter\_11} \cdot ([\mathrm{species\_17}] + 2 \cdot [\mathrm{species\_13}])) \tag{25}$$

7.26 Rule species_13

Rule species_13 is a rate rule for species species_13:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{species\_13} = \mathrm{parameter\_9} \cdot [\mathrm{species\_20}]^2 - (\mathrm{parameter\_8} + \mathrm{parameter\_3} \cdot \mathrm{parameter\_11}) \cdot [\mathrm{species\_13}] \tag{26}$$

7.27 Rule species_17

Rule species_17 is a rate rule for species species_17:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_17} = \text{parameter\_9} \cdot [\text{species\_18}] \cdot [\text{species\_20}] - (\text{parameter\_8} + \text{parameter\_3} \cdot \text{parameter\_11}) \cdot [\text{species\_17}] \tag{27}$$

7.28 Rule species_19

Rule species_19 is a rate rule for species species_19:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_19} = \text{parameter\_19} \cdot [\text{species\_21}] - \text{parameter\_3} \cdot ([\text{species\_18}] + \text{parameter\_11} \cdot [\text{species\_17}]) \tag{28}$$

7.29 Rule species_24

Rule species_24 is a rate rule for species species_24:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_24} = \text{parameter\_1} \cdot (\text{parameter\_18} \cdot [\text{species\_4}] \cdot [\text{species\_9}] - (\text{parameter\_22} + \text{parameter\_12} \cdot (1 - \text{parameter\_28})) \cdot [\text{species\_24}]) \tag{29}$$

7.30 Rule species_26

Rule species_26 is a rate rule for species species_26:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{species\_26} = \text{parameter\_1} \cdot (\text{parameter\_22} \cdot [\text{species\_24}] - \text{parameter\_12} \cdot (1 - \text{parameter\_28}) \cdot [\text{species\_26}]) \tag{30}$$

8 Derived Rate Equations

When interpreted as an ordinary differential equation framework, this model implies the following set of equations for the rates of change of each species.

8.1 Species species_1

Name S22

SBO:0000297 protein complex

Notes total cellular homomeric S22 complexes

Initial concentration $0\ \text{dimensionless} \cdot \text{dimensionless}^{-1}$

Involved in rule species_1

One rule determines the species' quantity.

8.2 Species species_2

Name S24

SBO:0000297 protein complex

Notes total cellular heteromeric S24 complexes

Initial concentration $0\ \text{dimensionless} \cdot \text{dimensionless}^{-1}$

Involved in rule species_2

One rule determines the species' quantity.

8.3 Species species_3

Name pS2tot

Notes total cellular pS2

Initial concentration $0\ \text{dimensionless} \cdot \text{dimensionless}^{-1}$

Involved in rule species_3

One rule determines the species' quantity.

8.4 Species species_4

Name TGF

Notes TGFbeta

Initial concentration $4\ \text{dimensionless} \cdot \text{dimensionless}^{-1}$

Initial assignment species_4

Involved in rule species_4

One rule determines the species' quantity.

8.5 Species species_5

Name R

Notes nascent receptors

Initial concentration 0.87962962962963 dimensionless · dimensionless^{-1}

Initial assignment species_5

Involved in rule species_5

One rule determines the species' quantity.

8.6 Species species_6

Name S2c

Notes cytoplasmic, unphosphorylated Smad2

Initial concentration 1.19430241051863 dimensionless · dimensionless^{-1}

Initial assignment species_6

Involved in rule species_6

One rule determines the species' quantity.

8.7 Species species_7

Name Rcom

Notes TGFb bound receptors

Initial concentration 0.12037037037037 dimensionless · dimensionless^{-1}

Initial assignment species_7

Involved in rule species_7

One rule determines the species' quantity.

8.8 Species species_8

Name pS2c

Notes Total cytoplasmic pS2

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_8

One rule determines the species' quantity.

8.9 Species species_9

Name Rcom_S

Notes mature, competent receptors

Initial concentration 0.05 dimensionless · dimensionless^{-1}

Involved in rule species_9

One rule determines the species' quantity.

8.10 Species species_10

Name S2n

Notes nuclear unphosphorylated Smad2

Initial concentration 0.558933528122717 dimensionless · dimensionless^{-1}

Involved in rule species_10

One rule determines the species' quantity.

8.11 Species species_11

Name S22n

SBO:0000297 protein complex

Notes nuclear homomeric S22 complexes

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_11

One rule determines the species' quantity.

8.12 Species species_12

Name S4n

Notes total nuclear Smad4

Initial concentration 1 dimensionless · dimensionless^{-1}

Involved in rule species_12

One rule determines the species' quantity.

8.13 Species species_13

Name S22c

SBO:0000297 protein complex

Notes cytoplasmic homomeric S22 complexes

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_13

One rule determines the species' quantity.

8.14 Species species_14

Name pS2n

Notes total nuclear pS2

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_14

One rule determines the species' quantity.

8.15 Species species_15

Name pS2fn

Notes monomeric nuclear pS2

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_15

One rule determines the species' quantity.

8.16 Species species_16

Name S24n

SBO:0000297 protein complex

Notes nuclear heteromeric S24 complexes

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_16

One rule determines the species' quantity.

8.17 Species species_17

Name S24c

SBO:0000297 protein complex

Notes cytoplasmic heteromeric S24 complexes

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_17

One rule determines the species' quantity.

8.18 Species species_18

Name S4fc

Notes monomeric cytoplasmic Smad4

Initial concentration 1 dimensionless · dimensionless^{-1}

Involved in rule species_18

One rule determines the species' quantity.

8.19 Species species_19

Name S4c

Notes total cytoplasmic Smad4

Initial concentration 1 dimensionless · dimensionless^{-1}

Initial assignment species_19

Involved in rule species_19

One rule determines the species' quantity.

8.20 Species species_20

Name pS2fc

Notes monomeric cytoplasmic pS2

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_20

One rule determines the species' quantity.

8.21 Species species_21

Name S4fn

Notes monomeric nuclear Smad4

Initial concentration 1 dimensionless · dimensionless^{-1}

Involved in rule species_21

One rule determines the species' quantity.

8.22 Species species_22

Name SBI

SBO:0000390 boolean switch

Notes Receptor inhibitor, either present or absent (1, 0)

Initial concentration 0 dimensionless · dimensionless^{-1}

This species does not take part in any reactions. Its quantity does hence not change over time:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{species\_22} = 0 \tag{31}$$

8.23 Species species_23

Name Rtot

Notes total receptors

Initial concentration 1 dimensionless · dimensionless^{-1}

Involved in rule species_23

One rule determines the species' quantity.

8.24 Species species_24

Name RT

Notes active receptors

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_24

One rule determines the species' quantity.

8.25 Species species_25

Name Rcom_I

Initial concentration 0.0703703703703704 dimensionless · dimensionless^{-1}

Involved in rule species_25

One rule determines the species' quantity.

8.26 Species species_26

Name Ract

Initial concentration 0 dimensionless · dimensionless^{-1}

Involved in rule species_26

One rule determines the species' quantity.

A Glossary of Systems Biology Ontology Terms

SBO:0000009 kinetic constant: Numerical parameter that quantifies the velocity of a chemical reaction

SBO:0000281 equilibrium constant: Quantity characterizing a chemical equilibrium in a chemical reaction, which is a useful tool to determine the concentration of various reactants or products in a system where chemical equilibrium occurs

SBO:0000282 dissociation constant: Equilibrium constant that measures the propensity of a larger object to separate (dissociate) reversibly into smaller components, as when a complex falls apart into its component molecules, or when a salt splits up into its component ions. The dissociation constant is usually denoted Kd and is the inverse of the affinity constant.

SBO:0000297 protein complex: Macromolecular complex containing one or more polypeptide chains possibly associated with simple chemicals. CHEBI:3608

SBO:0000337 association constant: Equilibrium constant that measures the propensity of two objects to assemble (associate) reversibly into a larger component. The association constant is usually denoted Ka and is the inverse of the dissociation constant.

SBO:0000360 quantity of an entity pool: The enumeration of co-localised, identical biochemical entities of a specific state, which constitute a pool. The form of enumeration may be purely numerical, or may be given in relation to another dimension such as length or volume

SBO:0000361 amount of an entity pool: A numerical measure of the quantity, or of some property, of the entities that constitute the entity pool.

SBO:0000380 biochemical coefficient: number used as a multiplicative or exponential factor for quantities, expressions or function

SBO:0000390 boolean switch: A parameter that has precisely two discrete values which may be switched between. Usually for the boolean parameter these are indicated as '0 or 1' or 'True or False'

SBO:0000470 mass fraction: For a given substance, A, its mass fraction (x A) is defined as the ratio of its mass (m A) to the total mass (m total) in which it is present, where the sum of all mass fractions is equal to 1. This provides a means to express concentration in a dimensionless size.

SBO:0000540 fraction of an entity pool: A ratio that represents the quantity of a defined constituent entity over the total number of all constituent entities present.

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