SBMLToolbox

Version 3.0

MATLAB_SBML Structure

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This document describes the MATLAB_SBML structure in detail. It lists the fields within each structure, the data types for each field and indicates the Levels and Versions of SBML for which each given field is appropriate.

For example:

Component

Fieldname	Type	
	C	MATLAB
var	int	mxArray of int32
var2**	double	mxArray of double
var3***	List Of structures	array of structures of type Component2

** L2V1 *** L2V1 – L2V2

Indicates that the Component has a field var which is of type int in C and an mxArray of type int32 in MATLAB. The field, which corresponds to an attribute on Component in SBML is present in all current levels and versions of SBML.

Component also has a field var2, of type double in C and an mxArray of type double in MATLAB. However, the attribute var2 is only present in SBML L2V1 and beyond.

The third field on Component, var3, represents a ListOf element from SBML. In this case var3 is a ListOf some other component Component2 which is a specialised ListOf structure in C and an array of structures in MATLAB. It should be noted that var3 only exists in L2V1 and L2V2 and has been removed from SBML in L2V3.

Details of each of the structures within the Model structure are given below.

Model

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
SBML_level	unsigned int	mxArray of int32
SBML_version	unsigned int	mxArray of int32
name	char *	mxArray of char
id**	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
functionDefinition**	List of structures	array of structures of type FunctionDefinition
unitDefinition	List of structures	array of structures of type UnitDefinition
compartmentType***	List of structures	array of structures of type CompartmentType
speciesType***	List of structures	array of structures of type SpeciesType
compartment	List of structures	array of structures of type Compartment
species	List of structures	array of structures of type Species
parameter	List of structures	array of structures of type Parameter
initialAssignment***	List of structures	array of structures of type InitialAssignment
rule	List of structures	array of structures of type Rule
constraint***	List of structures	array of structures of type Constraint
reaction	List of structures	array of structures of type Reaction
event**	List of structures	array of structures of type Event
[1]time_symbol**	N/A	mxArray of char
namespaces	N/A	array of structures with prefix & url
** L2V1	*** L2V2	

[1] if the MathML csymbol time has been used the symbol used is recorded in this field
Multiple occurrences will be replaced with the symbol recorded here

UnitDefinition

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm****	unsigned int	mxArray of int32
name	char *	mxArray of char
id**	char *	mxArray of char
unit	List of structures	array of structures of type Unit

** L2V1 **** L2V3

Compartment

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm****	unsigned int	mxArray of int32
name	char *	mxArray of char
id**	char *	mxArray of char
compartmentType***	char *	mxArray of char
spatialDimensions**	unsigned int	mxArray of int32
size**	double	mxArray of double
volume*	double	mxArray of double
units	char *	mxArray of char
outside	char *	mxArray of char
constant**	int	mxArray of int32
isSetSize**	unsigned int	mxArray of int32
isSetVolume	unsigned int	mxArray of int32

*L1V1–L1V2 **L2V1 ***L2V2 ****L2V3

Species

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid[**]	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm[****]	unsigned int	mxArray of int32
name	char *	mxArray of char
id[**]	char *	mxArray of char
speciesType[***]	char *	mxArray of char
compartment	char *	mxArray of char
initialAmount	double	mxArray of double
initialConcentration[**]	double	mxArray of double
substanceUnits[**]	char *	mxArray of char
spatialSizeUnits[1*]	char *	mxArray of char
hasOnlySubstanceUnits[**]	int	mxArray of int32
units[*]	char *	mxArray of char
boundaryCondition	int	mxArray of int32
charge	int	mxArray of int32
constant[**]	int	mxArray of int32
isSetInitialAmount	unsigned int	mxArray of int32
isSetConcentration[**]	unsigned int	mxArray of int32
isSetCharge	unsigned int	mxArray of int32

[*]L1V1–L1V2 [**]L2V1 [***]L2V2 [1*]L2V1–L2V2 [****]L2V3

Parameter

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
name	char *	mxArray of char
id**	char *	mxArray of char
value	double	mxArray of double
units	char *	mxArray of char
constant**	int	mxArray of int32
isSetValue	unsigned int	mxArray of int32
** L2V1	*** L2V2	

Rule

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
type***	char *	mxArray of char
formula	char *	mxArray of char
variable	char *	mxArray of char
species	char *	mxArray of char
compartment	char *	mxArray of char
name	char *	mxArray of char
units	char *	mxArray of char
* L1V1 – L1V2	*** L2V2	

Reaction

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
name	char *	mxArray of char
id**	char *	mxArray of char
reactant	List of structures	array of structures of type SpeciesReference
product	List of structures	array of structures of type SpeciesReference
modifier**	List of structures	array of structures of type ModifierSpeciesReference
kineticLaw	structure	structure of type KineticLaw
reversible	int	mxArray of int32
fast	int	mxArray of int32
isSetFast**	unsigned int	mxArray of int32
** L2V1	*** L2V2	

KineticLaw

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
name	char *	mxArray of char
formula	char *	mxArray of char
math**	char *	mxArray of char
parameter	List of structures	array of structures of type Parameter
timeUnits2*	char *	mxArray of char
substanceUnits2*	char *	mxArray of char
** L2V1	2* L2V1 – L2V1	*** L2V2

SpeciesReference

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
species	char *	mxArray of char
id***	char *	mxArray of char
name***	char *	mxArray of char
stoichiometry	int* double**	mxArray of int32 mxArray of double
demoninator 2*	int	mxArray of int32
stoichiometryMath**	char * structure $	mxArray of char structure of type StoichiometryMath $

*L1V1–L1V2 **L2V1 ***L2V2 2*L2V1–L2V1
$ L2V3

Unit

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid**	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm****	unsigned int	mxArray of int32
kind	char *	mxArray of char
exponent	int	mxArray of int32
scale	int	mxArray of int32
multiplier**	double	mxArray of double
offset 2*	double	mxArray of double

** L2V1 **** L2V3 2* L2V1 – L2V1

FunctionDefinition (Level 2 ONLY)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
name	char *	mxArray of char
id	char *	mxArray of char
math	char *	mxArray of char

*** L2V2

Event (Level 2 ONLY)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
name	char *	mxArray of char
id	char *	mxArray of char
trigger	char * structure $	mxArray of char structure of type Trigger $
delay	char * structure $	mxArray of char structure of type Delay $
timeUnits1*	char *	mxArray of char
eventAssignment	List of structures	array of structures of type EventAssignment

*** L2V2 1* L2V1 – L2V2 $ L2V3

ModifierSpeciesReference (Level 2 ONLY)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
species	char *	mxArray of char
id***	char *	mxArray of char
name***	char *	mxArray of char
*** L2V2		

EventAssignment (Level 2 ONLY)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm***	unsigned int	mxArray of int32
variable	char *	mxArray of char
math	char *	mxArray of char
*** L2V2		

CompartmentType (L2V2 onwards)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm****	unsigned int	mxArray of int32
name	char *	mxArray of char
id	char *	mxArray of char
**** L2V3		

SpeciesType (L2V2 onwards)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm****	unsigned int	mxArray of int32
name	char *	mxArray of char
id	char *	mxArray of char
**** L2V3		

InitialAssignment (L2V2 onwards)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm	unsigned int	mxArray of int32
symbol	char *	mxArray of char
math	char *	mxArray of char

Constraint (L2V2 onwards)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm	unsigned int	mxArray of int32
math	char *	mxArray of char
message	char *	mxArray of char

StoichiometryMath (L2V3 onwards)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm	unsigned int	mxArray of int32
math	char *	mxArray of char

Trigger (L2V3 onwards)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm	unsigned int	mxArray of int32
math	char *	mxArray of char

Delay (L2V3 onwards)

Fieldname	Type	
	C	MATLAB
typecode	char *	mxArray of char
metaid	char *	mxArray of char
notes	char *	mxArray of char
annotation	char *	mxArray of char
sboTerm	unsigned int	mxArray of int32
math	char *	mxArray of char