

FORMULATOR

v3.8

MathML Weaver

MathML 2.0 Conformance

Published By

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Formulator conforms to the Mathematical Markup Language (MathML) version 2.0 (W3C recommendation, second edition, 21 October 2003). The following tables show the implemented MathML elements and attributes:

- [+] in the cell means that the element or attribute is implemented;
- [±] means that the element or attribute is partially implemented;
- [-] means that the element is not implemented or attribute is kept, but not used.

IMPLEMENTED ELEMENTS AND ATTRIBUTES

General

Element	Support	Comments / Attributes
<math>	+	The 'display' attribute is effective when rendering MathML in the Internet Explorer browser.

Presentation: Token Elements

Element	Support	Comments / Attributes
Mathematics style attributes (mathvariant, mathsize, mathcolor, mathbackground) are used both for rendering (when importing MathML) and for exporting formulas to MathML 2.0. Deprecated style attributes (fontsize, fontweight, fontstyle, fontfamily, color) are recognized and used for rendering by converting them to the four above mentioned style attributes. For the 'mathvariant' attributes there is no check whether needed for rendering font is present in a system.		
<mi>	+	MathML 2.0 specification advices to render identifiers depending on their content: as 'italic' when the content is a single character and as 'normal' otherwise. Since the default editing model of Formulator is to keep user choice of a specific font and character style for an identifier regardless of its content, it is usual for multicharacter 'mi' elements to have 'mathvariant' attribute set to 'italic'.
<mn>	+	
<mo>	+	'maxsize' and 'minsize' attributes do not effect on rendering formulas.
<mtext>	+	
<mSPACE>	±	
<ms>	+	
<mglyph>	+	The 'alt' attribute is used for substitution of the element body in the case when needed font can't be applied. There are no checks whether a position given by the 'index' attributes is valid for the specified font, so it may be that user see blank rectangle instead of the expected symbol.

Presentation: General Layout

Element	Support	Comments / Attributes
<mrow>	+	
<mfrac>	+	
<msqrt>	+	
<mroot>	+	
<mstyle>	±	For further editing purposes in the internal document model 'mstyle' element is implemented as insertion of an additional frame (slot) which contents are set according to children of the 'mstyle' element. Among own special attributes of 'mstyle' element only 'background' takes effect. In order to preserve formatting even if a child of the 'mstyle' element is removed from this extra frame node, attributes of every child element in the 'mstyle' are set as a combination of explicitly set parameters and inherited parameters (own parameters have higher priority).
<merror>	+	
<mpadded>	±	If 'height' and 'depth' attributes lead to lessening of the vertical formula size, they are ignored.
<mphantom>	+	
<mfenced>	+	
<menclase>	+	Supports all notations which are stated in the current MathML 2.0 specification (longdiv, actuarial, radical, box, roundedbox, circle, left, right, top, bottom, updiagonalstrike, downdiagonalstrike, verticalstrike, horizontalstrike). Additionally several new values are implemented according to the content of Formulator's mathematical toolbars (joint-status, strike-through, top-left, top-right, bottom-left, bottom-right). Their effect on 'menclase' element contents is the same as of Formulator's buttons with corresponding names (toolbars 'Underbar and overbar templates' and 'Box templates').

Presentation: Scripts and Limits

Element	Support	Comments / Attributes
<msub>	+	Except for the 'subscriptshift' attribute.
<msup>	+	Except for the 'superscriptshift' attribute.
<msubsup>	+	Except for the 'subscriptshift' attribute and the 'superscriptshift' attribute.
<munder>	+	Except for the 'accentunder' attribute.
<mover>	+	Except for the 'accent' attribute.
<munderover>	+	Except for the 'accentunder' attribute and the 'accent' attribute.
<mmultiscripts>	+	

Presentation: Tables and Matrices

Element	Support	Comments / Attributes
<mtable>	±	Attributes which relates to cell size and spacing are not processed.
<mtr>	±	The 'groupalign' attribute is not processed.
<mlabeldtr>	–	This element is treated simply as 'mtr' element.
<mtd>	±	The 'groupalign' attribute, the 'rowspan' attribute and the 'colspan' attribute are not processed.
<maligngrop>	–	
<maligngmark>	–	

Presentation: Enlivening Expressions

Element	Support	Comments / Attributes
<maction>	–	

Content: Token Elements

Element	Support	Comments / Attributes
<cn>	+	
<ci>	+	
<csymbol>	+	

Content: Relations

Element	Support	Comments / Attributes
<eq>	+	
<neq>	+	
<gt>	+	
<lt>	+	
<geq>	+	
<leq>	+	
<equivalent>	+	
<approx>	+	
<factorof>	+	

Content: Sequences and Series

Element	Support	Comments / Attributes
<sum>	+	
<product>	+	
<limit>	+	
<tendsto>	+	

Content: Basic Content Elements

Element	Support	Comments / Attributes
<apply>	+	
<reln>	+	
<fn>	+	
<interval>	+	
<inverse>	+	
<sep>	+	
<condition>	+	
<declare>	+	This element usually is not rendered (by W3C MathML 2.0 recommendation), but there are two cases when a user can access it. The first is connected with a moment of insertion of the 'declare' element using Formulator's mathematical toolbars. The second case is when a user explicitly commands Formulator to show invisible elements ('declare', 'momentabout', 'annotation-xml' and in some expressions 'bvar').
<lambda>	+	
<compose>	+	
<ident>	+	
<domain>	+	
<codomain>	+	
<image>	+	
<domainofapplication>	+	
<piecewise>	+	
<piece>	+	
<otherwise>	+	

Content: Theory of Sets

Element	Support	Comments / Attributes
<set>	+	
<list>	+	
<union>	+	
<intersect>	+	
<in>	+	
<notin>	+	
<subset>	+	
<prsubset>	+	
<notsubset>	+	
<notprsubset>	+	
<setdiff>	+	
<card>	+	
<cartesianproduct>	+	

Content: Arithmetic, Algebra and Logic

Element	Support	Comments / Attributes
<quotient>	+	
<factorial>	+	
<divide>	+	
<max>	+	
<min>	+	
<minus>	+	
<plus>	+	
<power>	+	
<rem>	+	
<times>	+	
<root>	+	
<gcd>	+	
<and>	+	
<or>	+	
<xor>	+	
<not>	+	
<implies>	+	
<forall>	+	
<exists>	+	
<abs>	+	
<conjugate>	+	
<arg>	+	
<real>	+	
<imaginary>	+	
<lcm>	+	
<floor>	+	
<ceiling>	+	

Content: Linear Algebra

Element	Support	Comments / Attributes
<vector>	+	
<matrix>	+	
<matrixrow>	+	
<determinant>	+	
<transpose>	+	
<selector>	+	
<vectorproduct>	+	
<scalarproduct>	+	
<outerproduct>	+	

Content: Calculus and Vector Calculus

Element	Support	Comments / Attributes
<int>	+	
<diff>	+	
<partialdiff>	+	
<lowlimit>	+	
<uplimit>	+	
<bvar>	+	<p>Rendering of this element is strongly depends on its context. There are several MathML constructions with 'bvar' element which don't presuppose its visual representation. Then a user can access and edit 'bvar' elements either at the moment of insertion of a MathML element using Formulator's mathematical toolbars, or by explicitly selecting an option to show invisible MathML elements.</p> <p>Note that after insertion of a MathML element containing invisible 'bvar' its rendering can differ from normative one in order to enable further editing a 'bvar' element. This will become normal after exporting expressions to MathML and importing them back to Formulator (by using 'Refresh All Through MathML' menu command or by switching to "MathML text" page, editing and return back).</p>
<degree>	+	
<divergence>	+	
<grad>	+	
<curl>	+	
<laplacian>	+	

Content: Constants and Symbol Elements

Element	Support	Comments / Attributes
<integers>	+	
<reals>	+	
<rationals>	+	
<naturalnumbers>	+	
<complexes>	+	
<primes>	+	
<exponentiale>	+	
<imaginaryi>	+	
<notanumber>	+	
<>true>	+	
<>false>	+	
<emptyset>	+	
<pi>	+	
<eulergamma>	+	

$\langle \infty \rangle$	+	
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Content: Elementary Functions

Element	Support	Comments / Attributes
$\langle \exp \rangle$	+	
$\langle \ln \rangle$	+	
$\langle \log \rangle$	+	
$\langle \sin \rangle$	+	
$\langle \cos \rangle$	+	
$\langle \tan \rangle$	+	
$\langle \sec \rangle$	+	
$\langle \csc \rangle$	+	
$\langle \cot \rangle$	+	
$\langle \sinh \rangle$	+	
$\langle \cosh \rangle$	+	
$\langle \tanh \rangle$	+	
$\langle \operatorname{sech} \rangle$	+	
$\langle \operatorname{csch} \rangle$	+	
$\langle \operatorname{coth} \rangle$	+	
$\langle \arcsin \rangle$	+	
$\langle \arccos \rangle$	+	
$\langle \arctan \rangle$	+	
$\langle \operatorname{arccosh} \rangle$	+	
$\langle \operatorname{arccot} \rangle$	+	
$\langle \operatorname{arccoth} \rangle$	+	
$\langle \operatorname{arccsc} \rangle$	+	
$\langle \operatorname{arccsch} \rangle$	+	
$\langle \operatorname{arcsec} \rangle$	+	
$\langle \operatorname{arcsech} \rangle$	+	
$\langle \operatorname{arcsinh} \rangle$	+	
$\langle \operatorname{arctanh} \rangle$	+	

Content: Statistics

Element	Support	Comments / Attributes
$\langle \text{mean} \rangle$	+	
$\langle \text{sdev} \rangle$	+	
$\langle \text{variance} \rangle$	+	
$\langle \text{median} \rangle$	+	
$\langle \text{mode} \rangle$	+	
$\langle \text{moment} \rangle$	+	
$\langle \text{momentabout} \rangle$	+	

Content: Semantic Mapping Elements

Element	Support	Comments / Attributes
<semantics>	+	<p>The default rendering of a 'semantics' element is the default rendering of its first child. Other children elements are kept, but usually are not rendered.</p> <p>There are two cases when a user can access and edit 'annotation-xml' child element. The first is connected with a moment of insertion of the 'semantics' element using Formulator's mathematical toolbars. The second case is when a user explicitly commands Formulator to show invisible elements ('declare', 'momentabout', 'annotation-xml' and in some expressions 'bvar').</p> <p>Note that after insertion of a 'semantics' element its rendering is nonnormative in order to enable editing of 'annotation-xml' child elements for 'Presentation' and 'Content' encoding. This situation becomes normal after exporting the expression to MathML and importing its back to Formulator (by using 'Refresh All Through MathML' menu command or by switching to "MathML text" page, editing and return back).</p>
<annotation>	+	
<annotation-xml>	+	

NOTES

- Author can accompany MathML tags with arbitrary attributes. In the case of unknown or currently unsupported attributes Formulator keeps them, but ignores their values during rendering. Among well-known examples of such attributes are 'id', 'xref', 'class', etc.
- There is a set of mathematical operators which should be rendered as horizontally stretchy, but currently are not always conform to this rule. E.g., arrows in some uncommon cases might not be able to be extended in their bounding box.