

`omdoc.sty/cls`: Semantic Markup for Open Mathematical Documents in \LaTeX

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Abstract

The `omdoc` package is part of the \gTeX collection, a version of $\text{\TeX}/\text{\LaTeX}$ that allows to markup $\text{\TeX}/\text{\LaTeX}$ documents semantically without leaving the document format, essentially turning $\text{\TeX}/\text{\LaTeX}$ into a document format for mathematical knowledge management (MKM).

This package supplies an infrastructure for writing OMDoc documents in \LaTeX . This includes a simple structure sharing mechanism for \gTeX that allows to move from a copy-and-paste document development model to a copy-and-reference model, which conserves space and simplifies document management. The augmented structure can be used by MKM systems for added-value services, either directly from the \gTeX sources, or after translation.

Contents

1	Introduction	3
2	The User Interface	3
2.1	Package and Class Options	3
2.2	Document Structure	3
2.3	Ignoring Inputs	5
2.4	Structure Sharing	5
2.5	Colors	6
3	Miscellaneous	6
4	Limitations	6
5	Implementation: The OMDoc Class	7
5.1	Class Options	7
5.2	Setting up Namespaces and Schemata for LaTeXML	8
5.3	Beefing up the <code>document</code> environment	8
6	Implementation: OMDoc Package	9
6.1	Package Options	9
6.2	Document Structure	11
6.3	Front and Backmatter	14
6.4	Ignoring Inputs	16
6.5	Structure Sharing	16
6.6	Colors	17
6.7	L ^A T _E X Commands we interpret differently	18
6.8	Miscellaneous	18
6.9	Leftovers	19

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1 Introduction

The `omdoc` package supplies macros and environment that allow to label document fragments and to reference them later in the same document or in other documents. In essence, this enhances the document-as-trees model to documents-as-directed-acyclic-graphs (DAG) model. This structure can be used by MKM systems for added-value services, either directly from the \LaTeX sources, or after translation. Currently, trans-document referencing provided by this package can only be used in the \LaTeX collection.

\LaTeX is a version of \TeX / \LaTeX that allows to markup \TeX / \LaTeX documents semantically without leaving the document format, essentially turning \TeX / \LaTeX into a document format for mathematical knowledge management (MKM). The package supports direct translation to the OMDoc format [Koh06]

DAG models of documents allow to replace the “Copy and Paste” in the source document with a label-and-reference model where document are shared in the document source and the formatter does the copying during document formatting/presentation.¹²³

2 The User Interface

The `omdoc` package generates four files: `omdoc.cls`, `omdoc.sty` and their \LaTeX ML bindings `omdoc.cls.ltxml` and `omdoc.sty.ltxml`. We keep the corresponding code fragments together, since the documentation applies to both of them and to prevent them from getting out of sync. The OMDoc class is a minimally changed variant of the standard `article` class that includes the functionality provided by `omdoc.sty`. Most importantly, `omdoc.cls` sets up the \LaTeX ML infrastructure and thus should be used if OMDoc is to be generated from the \LaTeX sources. The rest of the documentation pertains to the functionality introduced by `omdoc.sty`.

2.1 Package and Class Options

`noindex` `omdoc.sty` has the `noindex` package option, which allows to suppress the creation of index entries. The option can be set to activate multi-file support, see [Koh15c] for details.

`extrefs` `omdoc.cls` accepts all options of the `omdoc.sty` (see Subsection 2.0) and `article.cls` and just passes them on to these.⁴

2.2 Document Structure

`document` The top-level `document` environment is augmented with an optional key/value

¹EDNOTE: talk about the advantages and give an example.

²EDNOTE: is there a way to load documents at URIs in \LaTeX ?

³EDNOTE: integrate with \LaTeX ML’s XMRref in the Math mode.

⁴EDNOTE: describe them

argument that can be used to give metadata about the document. For the moment only the `id` key is used to give an identifier to the `omdoc` element resulting from the \LaTeX transformation.

`omgroup` The structure of the document is given by the `omgroup` environment just like in OMDoc. In the \LaTeX route, the `omgroup` environment is flexibly mapped to sectioning commands, inducing the proper sectioning level from the nesting of `omgroup` environments. Correspondingly, the `omgroup` environment takes an optional key/value argument for metadata followed by a regular argument for the (section) title of the `omgroup`. The optional metadata argument has the keys `id` for an identifier, `creators` and `contributors` for the Dublin Core metadata [DCM03]; see [Koh15a] for details of the format. The `short` allows to give a short title for the generated section. If the title contains semantic macros, they need to be protected by `\protect`, and we need to give the `loadmodules` key it needs no value. For instance we would have

```

\begin{module}{foo}
\symdef{bar}{B^a_r}
...
\begin{omgroup}[id=bardriv,loadmodules]{Introducing $\protect\bar$ Derivations}

```

\TeX automatically computes the sectioning level, from the nesting of `omgroup` environments. But sometimes, we want to skip levels (e.g. to use a subsection* as an introduction for a chapter). Therefore the `omdoc` package provides a variant `blindomgroup` that does not produce markup, but increments the sectioning level and logically groups document parts that belong together, but where traditional document markup relies on convention rather than explicit markup. The `blindomgroup` environment is useful e.g. for creating frontmatter at the correct level. Example 1 shows a typical setup for the outer document structure of a book with parts and chapters. We use two levels of `blindomgroup`:

- The outer one groups the introductory parts of the book (which we assume to have a sectioning hierarchy topping at the part level). This `blindomgroup` makes sure that the introductory remarks become a “chapter” instead of a “part”.
- The inner one groups the frontmatter¹ and makes the preface of the book a section-level construct. Note that here the `display=flow` on the `omgroup` environment prevents numbering as is traditional for prefaces.

`\currentsectionlevel` The `\currentsectionlevel` macro supplies the name of the current sectioning level, e.g. “chapter”, or “subsection”. `\CurrentSectionLevel` is the capitalized variant. They are useful to write something like “In this `\currentsectionlevel`, we will...” in an `omgroup` environment, where we do not know which sectioning level we will end up.

¹We shied away from redefining the `frontmatter` to induce a `blindomgroup`, but this may be the “right” way to go in the future.

```

\begin{document}
\begin{blindomgroup}
\begin{blindomgroup}
\begin{frontmatter}
\maketitle\newpage
\begin{omgroup}[display=flow]{Preface}
... <<preface>> ...
\end{omgroup}
\clearpage\setcounter{tocdepth}{4}\tableofcontents\clearpage
\end{frontmatter}
\end{blindomgroup}
... <<introductory remarks>> ...
\end{blindomgroup}
\begin{omgroup}{Introduction}
... <<intro>> ...
\end{omgroup}
... <<more chapters>> ...
\bibliographystyle{alpha}\bibliography{kwarc}
\end{document}

```

Example 1: A typical Document Structure of a Book

2.3 Ignoring Inputs

ignore The `ignore` environment can be used for hiding text parts from the document structure. The body of the environment is not PDF or DVI output unless the `showignores` option is given to the `omdoc` class or `package`. But in the generated OMDoc result, the body is marked up with a `ignore` element. This is useful in two situations. For

editing One may want to hide unfinished or obsolete parts of a document

narrative/content markup In \LaTeX we mark up narrative-structured documents. In the generated OMDoc documents we want to be able to cache content objects that are not directly visible. For instance in the `statements` package [Koh15d] we use the `\inlinedef` macro to mark up phrase-level definitions, which verbalize more formal definitions. The latter can be hidden by an `ignore` and referenced by the `verbalizes` key in `\inlinedef`.

2.4 Structure Sharing

`\STRlabel` The `\STRlabel` macro takes two arguments: a label and the content and stores the the content for later use by `\STRcopy[⟨URL⟩]{⟨label⟩}`, which expands to the previously stored content. If the `\STRlabel` macro was in a different file, then we can give a URL `⟨URL⟩` that lets \LaTeX ML generate the correct reference.

`\STRcopy`

`\STRsemantics` The `\STRlabel` macro has a variant `\STRsemantics`, where the label argument is optional, and which takes a third argument, which is ignored in \LaTeX . This allows to specify the meaning of the content (whatever that may mean) in cases,

where the source document is not formatted for presentation, but is transformed into some content markup format.⁵

2.5 Colors

For convenience, the `omdoc` package defines a couple of color macros for the `color` package: For instance `\blue` abbreviates `\textcolor{blue}`, so that `\blue{\textit{something}}` writes *something* in blue. The macros `\red` `\green`, `\cyan`, `\magenta`, `\brown`, `\yellow`, `\orange`, `\gray`, and finally `\black` are analogous.

3 Miscellaneous

4 Limitations

In this section we document known limitations. If you want to help alleviate them, please feel free to contact the package author. Some of them are currently discussed in the `sTeX` TRAC [sTeX].

1. none reported yet

⁵EdNOTE: make an example

5 Implementation: The OMDoc Class

The functionality is spread over the `omdoc` class and package. The class provides the `document` environment and the `omdoc` element corresponds to it, whereas the package provides the concrete functionality.

`omdoc.dtx` generates four files: `omdoc.cls` (all the code between `<*cls>` and `</cls>`), `omdoc.sty` (between `<*package>` and `</package>`) and their L^AT_EXML bindings (between `<*ltxml.cls>` and `</ltxml.cls>` and `<*ltxml.sty>` and `</ltxml.sty>` respectively). We keep the corresponding code fragments together, since the documentation applies to both of them and to prevent them from getting out of sync.

5.1 Class Options

To initialize the `omdoc` class, we declare and process the necessary options.

```
1 <*cls>
2 \DeclareOption{showmeta}{\PassOptionsToPackage{\CurrentOption}{metakeys}}
3 \def\omdoc@class{article}
4 \DeclareOption{report}{\def\omdoc@class{report}\PassOptionsToPackage{\CurrentOption}{omdoc}}
5 \DeclareOption{book}{\def\omdoc@class{book}\PassOptionsToPackage{\CurrentOption}{omdoc}}
6 \DeclareOption{showignores}{\PassOptionsToPackage{\CurrentOption}{omdoc}}
7 \DeclareOption{showmods}{\PassOptionsToPackage{\CurrentOption}{modules}}
8 \DeclareOption{extrefs}{\PassOptionsToPackage{\CurrentOption}{sref}}
9 \DeclareOption{noauxreq}{\PassOptionsToPackage{\CurrentOption}{modules}}
10 \DeclareOption{defindex}{\PassOptionsToPackage{\CurrentOption}{statements}}
11 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
12 \DeclareOption*{\PassOptionsToPackage{\CurrentOption}{omdoc}}
13 \ProcessOptions
14 </cls>
15 <*ltxml.cls>
16 # -*- CPERL -*-
17 package LaTeXML::Package::Pool;
18 use strict;
19 use LaTeXML::Package;
20 use LaTeXML::Util::Pathname;
21 use Cwd qw(abs_path);
22 DeclareOption('showmeta',sub {PassOptions('metakeys','sty',ToString(Digest(T_CS('\CurrentOption'))))})
23 DeclareOption('report',sub {PassOptions('omdoc','sty',ToString(Digest(T_CS('\CurrentOption'))))})
24 DeclareOption('book',sub {PassOptions('omdoc','sty',ToString(Digest(T_CS('\CurrentOption'))))})
25 DeclareOption('showignores',sub {PassOptions('omdoc','sty',ToString(Digest(T_CS('\CurrentOption'))))})
26 DeclareOption('extrefs',sub {PassOptions('sref','sty',ToString(Digest(T_CS('\CurrentOption'))))})
27 DeclareOption('noauxreq',sub {PassOptions('modules','sty',ToString(Digest(T_CS('\CurrentOption'))))})
28 DeclareOption('defindex',sub {PassOptions('statements','sty',ToString(Digest(T_CS('\CurrentOption'))))})
29 DeclareOption(undef,sub {PassOptions('article','cls',ToString(Digest(T_CS('\CurrentOption'))))})
30 ProcessOptions();
31 </ltxml.cls>
```

We load `article.cls`, and the desired packages. For the L^AT_EXML bindings, we make sure the right packages are loaded.

```

32 <*cls>
33 \LoadClass{\omdoc@class}
34 \RequirePackage{etoolbox}
35 \RequirePackage{omdoc}
36 </cls>
37 <*ltxml.cls>
38 LoadClass('article');
39 RequirePackage('sref');
40 </ltxml.cls>

```

5.2 Setting up Namespaces and Schemata for LaTeXML

Now, we also need to register the namespace prefixes for LaTeXML to use.

```

41 <*ltxml.cls>
42 RegisterNamespace('omdoc'=>"http://omdoc.org/ns");
43 RegisterNamespace('om'=>"http://www.openmath.org/OpenMath");
44 RegisterNamespace('m'=>"http://www.w3.org/1998/Math/MathML");
45 RegisterNamespace('dc'=>"http://purl.org/dc/elements/1.1/");
46 RegisterNamespace('cc'=>"http://creativecommons.org/ns");
47 RegisterNamespace('stex'=>"http://kwarc.info/ns/sTeX");
48 RegisterNamespace('ltx'=>"http://dlmf.nist.gov/LaTeXML");
49 </ltxml.cls>

```

Since we are dealing with a class, we need to set up the document type in the LaTeXML bindings.

```

50 <*ltxml.cls>
51 RelaxNGSchema('omdoc+ltxml',
52     '#default'=>"http://omdoc.org/ns",
53     'om'=>"http://www.openmath.org/OpenMath",
54     'm'=>"http://www.w3.org/1998/Math/MathML",
55     'dc'=>"http://purl.org/dc/elements/1.1/",
56     'cc'=>"http://creativecommons.org/ns",
57     'stex'=>"http://kwarc.info/ns/sTeX",
58     'ltx'=>"http://dlmf.nist.gov/LaTeXML");
59 </ltxml.cls>

```

Then we load the omdoc package, which we define separately in the next section so that it can be loaded separately⁶

```

60 <*ltxml.cls>
61 RequirePackage('omdoc');
62 </ltxml.cls>

```

5.3 Beefing up the document environment

Now, we will define the environments we need. The top-level one is the `document` environment, which we redefined so that we can provide keyval arguments.

⁶EdNOTE: reword

`document` For the moment we do not use them on the L^AT_EX level, but the document identifier is picked up by L^AT_EXML.

```

63 <*cls>
64 \let\orig@document=\document
65 \srefaddidkey{document}
66 \renewrobustcmd{\document}[1][\metasetkeys{document}{#1}\orig@document}
67 </cls>
68 <*ltxml.cls>
69 sub xmlBase {
70   my $baseuri = LookupValue('URLBASE');
71   $baseuri =~ s/\$//g; # No trailing slashes
72   Tokenize($baseuri); }
73 DefEnvironment('{document} OptionalKeyVals:omdoc',
74   "<omdoc:omdoc "
75   .   "&GetKeyVal(#1,'id')(xml:id='&GetKeyVal(#1,'id')')"
76   .   "(?&Tokenize(&LookupValue('SOURCEBASE'))"
77   .   "(xml:id='&Tokenize(&LookupValue('SOURCEBASE')).omdoc')()) "
78   .   "&Tokenize(&LookupValue('URLBASE'))"
79   .   "(xml:base='&xmlBase()')(>"
80   .   "#body"
81   . "</omdoc:omdoc>",
82   beforeDigest=> sub { AssignValue(inPreamble=>0); },
83   afterDigest=> sub { $_[0]->getGullet->flush; return; },
84   afterDigestBegin => sub {
85     $_[1]->setProperty(id => Expand(T_CS('\thedocument@ID')));
86     if (my $ops = LookupValue('@at@begin@document')) {
87       Digest(Tokens(@$ops)); }
88     else {
89       return; } },
90   beforeDigestEnd => sub {
91     $_[0]->getGullet->flush;
92     if (my $ops = LookupValue('@at@end@document')) {
93       Digest(Tokens(@$ops)); }
94     else {
95       return; } },
96   mode => 'text');
97 Tag('omdoc:omdoc', 'afterOpen:late'=>\&insertFrontMatter,
98   afterOpen=>\&numberIt,afterClose=>\&locateIt);
99 </ltxml.cls>%$

```

6 Implementation: OMDoc Package

6.1 Package Options

The initial setup for L^AT_EXML:

```

100 <*ltxml.sty>
101 package LaTeXML::Package::Pool;

```

```

102 use strict;
103 use LaTeXML::Package;
104 use Cwd qw(abs_path);
105 </ltxml.sty>

```

We declare some switches which will modify the behavior according to the package options. Generally, an option `xxx` will just set the appropriate switches to true (otherwise they stay false).⁷

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```

106 <*package>
107 \DeclareOption{showmeta}{\PassOptionsToPackage{\CurrentOption}{metakeys}}
108 \DeclareOption{showmods}{\PassOptionsToPackage{\CurrentOption}{modules}}
109 \newcount\section@level
110 \newif\ifshow@ignores\show@ignorefalse
111 \def\omdoc@class{article}\section@level=2
112 \DeclareOption{report}{\def\omdoc@class{report}\section@level=1}
113 \newif\ifclass@book\class@bookfalse
114 \DeclareOption{book}{\def\omdoc@class{book}\section@level=0\class@booktrue}
115 \DeclareOption{showignores}{\show@ignoretrue}
116 \DeclareOption{extrefs}{\PassOptionsToPackage{\CurrentOption}{sref}}
117 \DeclareOption*{}% accept all other options
118 \ProcessOptions
119 </package>
120 <*ltxml.sty>
121 DeclareOption('showmeta',sub {PassOptions('metakeys','sty',ToString(Digest(T_CS('\CurrentOption'))))})
122 DeclareOption('showmods',sub {PassOptions('modules','sty',ToString(Digest(T_CS('\CurrentOption'))))})
123 DeclareOption('report','');
124 DeclareOption('book','');
125 DeclareOption('showignores','');
126 DeclareOption('extrefs',sub {PassOptions('sref','sty',ToString(Digest(T_CS('\CurrentOption'))))})
127 DeclareOption(undef, '');
128 ProcessOptions();
129 </ltxml.sty>

```

Then we need to set up the packages by requiring the `sref` package to be loaded.

```

130 <*package>
131 \RequirePackage{sref}
132 \RequirePackage{xspace}
133 \RequirePackage{comment}
134 \RequirePackage{etoolbox}
135 </package>
136 <*ltxml.sty>
137 RequirePackage('sref');
138 RequirePackage('xspace');
139 RequirePackage('omtext');
140 </ltxml.sty>

```

⁷EDNOTE: need an implementation for \LaTeX ML

6.2 Document Structure

The structure of the document is given by the `omgroup` environment just like in OMDoc. The hierarchy is adjusted automatically according to the L^AT_EX class in effect.

`\currentsectionlevel`

```

141 <*package>
142 \def\currentsectionlevel{document\xspace}%
143 \def\Currentsectionlevel{Document\xspace}%
144 </package>
145 <*ltxml.sty>
146 DefMacro('\'currentsectionlevel',\'@currentsectionlevel\xspace');
147 DefMacro('\'Currentsectionlevel',\'@Currentsectionlevel\xspace');
148 DefConstructor('\'@currentsectionlevel',
149               "<ltx:text class='omdoc-currentsectionlevel'>section</ltx:text>");
150 DefConstructor('\'@CurrentSectionLevel',
151               "<ltx:text class='omdoc-Currentsectionlevel'>Section</ltx:text>");
152 </ltxml.sty>

```

`blindomgroup`

```

153 <*package>
154 \newrobustcmd\at@begin@blindomgroup[1]{%
155 \newenvironment{blindomgroup}{%
156   \advance\section@level by 1%
157   \at@begin@blindomgroup%
158   \setion@level%
159 }{%
160   \advance\section@level by -1%
161 }%
162 </package>
163 <*ltxml.sty>
164 DefEnvironment('\'{blindomgroup} OptionalKeyVals:omgroup',
165               "<omdoc:omgroup layout='invisible'"
166               . "    "?&GetKeyVal{#1,'id'}(xml:id='&GetKeyVal{#1,'id'}')()>"
167               . "    "?&GetKeyVal{#1,'type'}(type='&GetKeyVal{#1,'type'}')()>\n"
168               . "#body\n"
169               . "</omdoc:omgroup>");
170 </ltxml.sty>

```

`\omgroup@c1` Convenience macro: defines the `\currentsectionlevel` macro from the keywords in the arguments

```

171 <*package>
172 \newrobustcmd\omgroup@c1[2]{%
173   \def\currentsectionlevel{#1\xspace}%
174   \def\Currentsectionlevel{#2\xspace}%
175 }%

```

`\omgroup@nonum` convenience macro: `\omgroup@nonum{<level>}{<title>}` makes an unnumbered sectioning with title `<title>` at level `<level>`.

```

176 \newrobustcmd\omgroup@nonum[2]{%
177   \ifcsundef{hyper@anchor}{\phantomsection}%
178   \addcontentsline{toc}{#1}{#2}%
179   \@nameuse{#1}*{#2}%
180 }%

```

`\omgroup@num` convenience macro: `\omgroup@nonum{<level>}{<title>}` makes numbered sectioning with title *<title>* at level *<level>*. We have to check the `short` key was given in the `omgroup` environment and – if it is use it. But how to do that depends on whether the `rdfmata` package has been loaded.

```

181 \newrobustcmd\omgroup@num[2]{%
182   \sref@label@id{\omdoc@sect@Name~\@nameuse{the#1}}%
183   \ifx\omgroup@short\empty%
184     \@nameuse{#1}{#2}%
185   \else%
186     \ifundefined{rdfmata@sectioning}{\@nameuse{#1}[\omgroup@short]{#2}}%
187     {\@nameuse{rdfmata@#2@old}[\omgroup@short]{#2}}%
188   \fi%
189 }%
190 </package>

```

`omgroup`

```

191 <*package>
192 \def\@true{true}
193 \def\@false{false}
194 \srefaddidkey{omgroup}
195 \addmetakey{omgroup}{date}
196 \addmetakey{omgroup}{creators}
197 \addmetakey{omgroup}{contributors}
198 \addmetakey{omgroup}{srccite}
199 \addmetakey{omgroup}{type}
200 \addmetakey*{omgroup}{short}
201 \addmetakey*{omgroup}{display}
202 \addmetakey[false]{omgroup}{loadmodules}[true]

```

`\at@begin@omgroup` we define a switch for numbering lines and a hook for the beginning of groups: The `\at@begin@omgroup` macro allows customization. It is run at the beginning of the `omgroup`, i.e. after the section heading.

```

203 \newif\if@num\@numtrue
204 \newif\if@frontmatter\@frontmatterfalse
205 \newif\if@backmatter\@backmatterfalse
206 \newrobustcmd\at@begin@omgroup[3][]{%

```

Then we define a helper macro that takes care of the sectioning magic. It comes with its own key/value interface for customization.

```

207 \addmetakey{omdoc@sect}{name}
208 \addmetakey{omdoc@sect}{Name}
209 \addmetakey[false]{omdoc@sect}{clear}[true]
210 \addmetakey{omdoc@sect}{ref}
211 \addmetakey[false]{omdoc@sect}{num}[true]

```

```

212 \newrobustcmd\omdoc@sectioning[3] [] {%
213   \metasetkeys{omdoc@sect}{#1}%
214   \ifx\omdoc@sect@clear\@true%
215     \cleardoublepage%
216   \fi%
217   \if@num% numbering not overridden by frontmatter, etc.
218     \ifx\omdoc@sect@num\@true%
219       \omgroup@num{#2}{#3}%
220     \else%
221       \omgroup@nonum{#2}{#3}%
222     \fi%
223     \omgroup@c1\omdoc@sect@name\omdoc@sect@Name
224   \else%
225     \omgroup@nonum{#2}{#3}%
226   \fi%
227 }%

```

and another one, if redefines the `\addtocontentsline` macro of L^AT_EX to import the respective macros. It takes as an argument a list of module names.⁸

```

228 \newrobustcmd\omgroup@redefine@addtocontents[1] {%
229   \edef\@import{#1}%
230   \@for\@I:=\@import\do{%
231     \edef\@path{\csname module@\@I   @path\endcsname}%
232     \ifundefined{tf@toc}\relax{%
233       \protected@write{tf@toc}{\string\@requiremodules{\@path}{sms}}%
234     }%
235   }%
236   \ifcsundef{hyper@anchor}{% hyperref.sty loaded?
237     \def\addcontentsline##1##2##3{%
238       \addtocontents{##1}{\protect\contentsline{##2}{\string\importmodules{##1}##3}{\thepage}}}%
239   }{%
240     \def\addcontentsline##1##2##3{%
241       \addtocontents{##1}{\protect\contentsline{##2}{\string\importmodules{##1}##3}{\thepage}{\@
242     }%
243 }% hypreref.sty loaded?

```

now the `omgroup` environment itself. This takes care of the table of contents via the helper macro above and then selects the appropriate sectioning command from `article.cls`.

```

244 \newenvironment{omgroup}[2] [] {% keys, title
245   \metasetkeys{omgroup}{#1}\sref@target%
246   \ifx\omgroup@display\st@flow\@numfalse\fi%
247   \if@frontmatter\@numfalse\fi%

```

If the `loadmodules` key is set on `\begin{omgroup}`, we redefine the `\addcontetsline` macro that determines how the sectioning commands below construct the entries for the table of contents.

```

248   \ifx\omgroup@loadmodules\@true%

```

⁸EDNOTE: MK: the extension `sms` is hard-coded here, but should not be. This will not work in multilingual settings.

```

249 \omgroup@redefine@addtocontents{\@ifundefined{mod@id}\imported@modules%
250 {\@ifundefined{module@mod@id @path}\imported@modules}\mod@id}}%
251 \fi%

now we only need to construct the right sectioning depending on the value of
\section@level.

252 \advance\section@level by 1
253 \ifcase\section@level%
254 \or\omdoc@sectioning[name=part,Name=Part,clear,num]{part}{#2}%
255 \or\omdoc@sectioning[name=chapter,Name=Chapter,clear,num]{chapter}{#2}%
256 \or\omdoc@sectioning[name=section,Name=Section,num]{section}{#2}%
257 \or\omdoc@sectioning[name=subsection,Name=Subsection,num]{subsection}{#2}%
258 \or\omdoc@sectioning[name=subsubsection,Name=Subsubsection,num]{subsubsection}{#2}%
259 \or\omdoc@sectioning[name=paragraph,Name=Paragraph,ref=this paragraph]{paragraph}{#2}%
260 \or\omdoc@sectioning[name=subparagraph,Name=Subparagraph,ref=this subparagraph]{subparagraph}{#2}%
261 \fi% \ifcase
262 \at@begin@omgroup[#1]%
263 \section@level{#2}%
264 }{% for customization
265 \advance\section@level by -1
266 }%
267 \end{package}
268 \end{*ltxml.sty}
269 DefEnvironment('{omgroup} OptionalKeyVals:omgroup {}',
270               "<omdoc:omgroup layout='sectioning'",
271               . "&GetKeyVal(#1,'id')(xml:id='&GetKeyVal(#1,'id')')()"
272               . "&GetKeyVal(#1,'type')(type='&GetKeyVal(#1,'type')')()>\n"
273               . "<dc:title>#2</dc:title>\n"
274               . "#body\n"
275               . "</omdoc:omgroup>");
276 \end{*ltxml.sty}

```

6.3 Front and Backmatter

Index markup is provided by the `omtext` package [Koh15b], so in the `omdoc` package we only need to supply the corresponding `\printindex` command, if it is not already defined

```

\printindex
277 \begin{package}
278 \providecommand\printindex{\IfFileExists{\jobname.ind}\input{\jobname.ind}}{}
279 \end{package}
280 \end{*ltxml.sty}
281 DefConstructor('\printindex','<omdoc:index/>');
282 Tag('omdoc:index',afterOpen=>\&numberIt,afterClose=>\&locateIt);
283 \end{*ltxml.sty}

```

`\tableofcontents` The table of contents already exists in \LaTeX , so we only need to provide a \LaTeX ML binding for it.

```

284 <*lxml.sty>
285 DefConstructor('\tableofcontents',
286               "<omdoc:tableofcontents level='&ToString(&CounterValue('tocdepth'))' />");
287 Tag('omdoc:tableofcontents',afterOpen=>\&numberIt,afterClose=>\&locateIt);
288 </lxml.sty>

```

The case of the \bibliography command is similar

\bibliography

```

289 <*lxml.sty>
290 DefConstructor('\bibliography{ }', "<omdoc:bibliography files='#1' />");
291 Tag('omdoc:bibliography',afterOpen=>\&numberIt,afterClose=>\&locateIt);
292 </lxml.sty>

```

frontmatter book.cls already has a \frontmatter macro, so we have to redefine the front matter environment in this case.

```

293 <*cls>
294 \ifclass@book%
295   \renewenvironment{frontmatter}{%
296     \@frontmattertrue\cleardoublepage\@mainmatterfalse\pagenumbering{roman}%
297   }{%
298     \@frontmatterfalse\setcounter{page}{1}\pagenumbering{arabic}%
299   }%
300 \else%
301   \newenvironment{frontmatter}{%
302     \@frontmattertrue\pagenumbering{roman}%
303   }{%
304     \@frontmatterfalse\setcounter{page}{1}\pagenumbering{arabic}%
305   }%
306 \fi%
307 </cls>
308 <*lxml.cls>
309 DefEnvironment('{frontmatter}', '#body');
310 </lxml.cls>
311 % \End{macrocode}
312 % \end{environment}
313 %
314 % \begin{environment}{backmatter}
315 % |book.cls| already has a |\backmatter| macro, so we have to redefine the back
316 % matter environment in this case.
317 % \begin{macrocode}
318 <*cls>
319 \ifclass@book%
320   \renewenvironment{backmatter}{%
321     \cleardoublepage\@mainmatterfalse\@backmattertrue%
322   }{%
323     \@backmatterfalse%
324   }%
325 \else%
326   \newenvironment{backmatter}{\@backmattertrue}{\@backmatterfalse}%

```

```

327 \fi%
328 \</cls>
329 \<?xml.cls>
330 DefEnvironment('{backmatter}','body');
331 \</xml.cls>

```

6.4 Ignoring Inputs

`ignore`

```

332 \<?package>
333 \ifshow@ignores%
334 \addmetakey{ignore}{type}%
335 \addmetakey{ignore}{comment}%
336 \newenvironment{ignore}[1][{}]{%
337 \metasetkeys{ignore}{#1}%
338 \textless\ignore@type\textgreater\bgroup\itshape%
339 }{%
340 \egroup\textless/\ignore@type\textgreater%
341 }%
342 \renewenvironment{ignore}{}{}%
343 \else%
344 \excludacomment{ignore}%
345 \fi%
346 \</package>
347 \<?xml.sty>
348 DefKeyVal('ignore','type','Semiverbatim');
349 DefKeyVal('ignore','comment','Semiverbatim');
350 DefEnvironment('{ignore} OptionalKeyVals:ignore',
351 " <omdoc:ignore %&GetKeyVals(#1)>#body</omdoc:ignore>");
352 Tag('omdoc:ignore',afterOpen=>\&numberIt,afterClose=>\&locateIt);
353 \</xml.sty>

```

6.5 Structure Sharing

`\STRlabel` The main macro, it is used to attach a label to some text expansion. Later on, using the `\STRcopy` macro, the author can use this label to get the expansion originally assigned.

```

354 \<?package>
355 \long\def\STRlabel#1#2{\STRlabeldef{#1}{#2}{#2}}
356 \</package>
357 \<?xml.sty>
358 DefConstructor('\STRlabel{}{}', sub {
359 my($document,$label,$object)=@_;
360 $document->absorb($object);
361 $document->addAttribute('xml:id'=>ToString($label)) if $label; });
362 \</xml.sty>

```


EdN:9

\STRcopy The **\STRcopy** macro is used to call the expansion of a given label. In case the label is not defined it will issue a warning.⁹

```
363 <*package>
364 \newrobustcmd\STRcopy[2][]{%
365   \expandafter\ifx\csname STR@#2\endcsname\relax%
366   \message{STR warning: reference #2 undefined!}%
367   \else%
368     \csname STR@#2\endcsname%
369   \fi%
370 }%
371 </package>
372 <*ltxml.sty>
373 DefConstructor('\STRcopy[]{}', "<omdoc:ref xref='#1##2'/>");
374 Tag('omdoc:ref', afterOpen=>\&numberIt, afterClose=>\&locateIt);
375 </ltxml.sty>
```

\STRsemantics if we have a presentation form and a semantic form, then we can use

```
376 <*package>
377 \newrobustcmd\STRsemantics[3][]{#2\def@test{#1}\ifx@test\@empty\STRlabeldef{#1}{#2}\fi}
378 </package>
379 <*ltxml.sty>
380 DefConstructor('\STRsemantics[]{}{}', sub {
381   my($document, $label, $ignore, $object)=@_;
382   $document->absorb($object);
383   $document->addAttribute('xml:id'=>ToString($label)) if $label; });
384 </ltxml.sty>#<
```

\STRlabeldef This is the macro that does the actual labeling. Is it called inside **\STRlabel**

```
385 <*package>
386 \def\STRlabeldef#1{\expandafter\gdef\csname STR@#1\endcsname}
387 </package>
388 <*ltxml.sty>
389 DefMacro('\STRlabeldef{}{}', "");
390 </ltxml.sty>
```

6.6 Colors

blue, red, green, magenta We will use the following abbreviations for colors from **color.sty**

```
391 <*package>
392 \def\black#1{\textcolor{black}{#1}}
393 \def\gray#1{\textcolor{gray}{#1}}
394 \def\blue#1{\textcolor{blue}{#1}}
395 \def\red#1{\textcolor{red}{#1}}
396 \def\green#1{\textcolor{green}{#1}}
397 \def\cyan#1{\textcolor{cyan}{#1}}
398 \def\magenta#1{\textcolor{magenta}{#1}}
```

⁹EdNOTE: MK: we need to do something about the ref!

```

399 \def\brown#1{\textcolor{brown}{#1}}
400 \def\yellow#1{\textcolor{yellow}{#1}}
401 \def\orange#1{\textcolor{orange}{#1}}
402 \end{package}

```

For the \LaTeX ML bindings, we go a generic route, we replace $\text{\textcolor{blue}{#1}}$ by $\text{\@omdoc@color{blue}\@omdoc@color@content{#1}}$.

```

403 \*ltxml.sty
404 sub omdocColorMacro {
405   my ($color, @args) = @_;
406   my $tok_color = TokenizeInternal($color);
407   (T_BEGIN, T_CS('\@omdoc@color'), T_BEGIN, $tok_color->unlist,
408    T_END, T_CS('\@omdoc@color@content'), T_OTHER(''), $tok_color->unlist, T_OTHER('')),
409   T_BEGIN, $args[1]->unlist, T_END, T_END); }
410 DefMacro('\@omdoc@color{', sub { MergeFont(color=>$_[1]->toString); return; });#$
411 \end{ltxml.sty}

```

Ideally, here we will remove the optional argument and have a conversion module add the attribute at the end (or maybe add it just for math?) or, we can take the attributes for style from the current font ?

```

412 \*ltxml.sty
413 DefConstructor('\@omdoc@color@content[]{}',
414   "?#isMath(#2)(<ltx:text ?#1(style='color:#1')(>#2</ltx:text>))");
415 foreach my $color(qw(black gray blue red green cyan magenta brown yellow orange)) {
416   DefMacro("\\".$color.'{}', sub { omdocColorMacro($color, @_); }); }#$
417 \end{ltxml.sty}

```

6.7 \LaTeX Commands we interpret differently

The reinterpretations are quite simple, we either disregard presentational markup or we re-interpret it in terms of OMDoc.

```

418 \*ltxml.sty
419 DefConstructor('\newpage', '');
420 \end{ltxml.sty}

```

6.8 Miscellaneous

Some shortcuts that use math symbols but are not mathematical at all; in particular, they should not be translated by \LaTeX ML.

```

421 \*package
422 \newrobustcmd\hateq{\ensuremath{\hat{=}}\xspace}
423 \newrobustcmd\hatequiv{\ensuremath{\hat{=}}\equiv\xspace}
424 \ifdef\textleadsto{%
425   \renewrobustcmd\textleadsto{\ensuremath{\leadsto}\xspace}%
426 }{%
427   \newrobustcmd\textleadsto{\ensuremath{\leadsto}\xspace}%
428 }%
429 \end{package}

```

```

430 <*ltxml.sty>
431 DefMacro('\'hateq', '\@hateq\xspace');
432 DefConstructor('\'@hateq', "\x{2259}");
433 DefMacro('\'hatequiv', '\@hatequiv\xspace');
434 DefConstructor('\'@hatequiv', "\x{2A6F}");
435 DefMacro('\'textleadsto', '\@textleadsto\xspace');
436 DefConstructor('\'@textleadsto', "\x{219D}");
437 </ltxml.sty>

```

6.9 Leftovers

```

438 <*package>
439 \newrobustcmd\baseURI[2][]{ }
440 </package>
441 <*ltxml.sty>
442 DefMacro('\'baseURI []Semiverbatim', sub {
443   my $baselocal = ToString(Digest($_[1]));
444   $baselocal = abs_path($baselocal) unless $baselocal =~ /\w+:\//;
445   AssignValue('BASELOCAL'=>$baselocal, 'global');
446   AssignValue('URLBASE'=>ToString(Digest($_[2])), 'global');
447 });
448 </ltxml.sty>%$

```

EdN:10

¹⁰ and finally, we need to terminate the file with a success mark for perl.

```

449 <ltxml.sty | ltxml.cls>1;

```

¹⁰EDNOTE: this should be handled differently, omdoc.sty should include url and give a new macro for it, which we then use in omdoc

References

- [DCM03] The DCMI Usage Board. *DCMI Metadata Terms*. DCMI Recommendation. Dublin Core Metadata Initiative, 2003. URL: <http://dublincore.org/documents/dcmi-terms/>.
- [Koh06] Michael Kohlhase. *OMDOC – An open markup format for mathematical documents [Version 1.2]*. LNAI 4180. Springer Verlag, Aug. 2006. URL: <http://omdoc.org/pubs/omdoc1.2.pdf>.
- [Koh15a] Michael Kohlhase. *dcm.sty: An Infrastructure for marking up Dublin Core Metadata in L^AT_EX documents*. Tech. rep. Comprehensive T_EX Archive Network (CTAN), 2015. URL: <http://www.ctan.org/tex-archive/macros/latex/contrib/stex/dcm/dcm.pdf>.
- [Koh15b] Michael Kohlhase. *omtext: Semantic Markup for Mathematical Text Fragments in L^AT_EX*. Tech. rep. Comprehensive T_EX Archive Network (CTAN), 2015. URL: <http://www.ctan.org/tex-archive/macros/latex/contrib/stex/omtext/omtext.pdf>.
- [Koh15c] Michael Kohlhase. *sref.sty: Semantic Crossreferencing in L^AT_EX*. Tech. rep. Comprehensive T_EX Archive Network (CTAN), 2015. URL: <http://www.ctan.org/tex-archive/macros/latex/contrib/stex/sref/sref.pdf>.
- [Koh15d] Michael Kohlhase. *statements.sty: Structural Markup for Mathematical Statements*. Tech. rep. Comprehensive T_EX Archive Network (CTAN), 2015. URL: <http://www.ctan.org/tex-archive/macros/latex/contrib/stex/statements/statements.pdf>.
- [sTeX] *Semantic Markup for L^AT_EX*. Project Homepage. URL: <http://trac.kwarc.info/sTeX/> (visited on 02/22/2011).