EuDML | The EUROPEAN DIGITAL MATHEMATICS LIBRARY

ICTPSP

DELIVERABLE

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D3.2: The EuDML metadata schema

Annex A: Best practice recommendations
Annex B: XML examples

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This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Contents

A Best practice recommendations

Contents

Metadata for describing items

Common bibliographic elements

Title

The article or book titles are to be placed in a **<title-group>**[1] (http://dtd.nlm.nih.gov/archiving/tag-library/n-ecq0.html) wrapper, which contains the original title (**<title>**), eventually the subtitle (**<subtitle>**), the translated and the transliterated versions (see Language and transliteration issues).

Item title is an obligatory element. However, in the very exceptional case where an item lacks a title, the **<title>** element should be omitted rather than left empty.

Contributors

Contributors is often expressed as an ordered list of authors. Author names may be provided in an unstructured way. In this case, it must be possible to add a structured version of the author name, provided by the metadata enhancer. See also #Transliteration for author names expressed in non latin characters.

Collective contributions should be tagged using **<collab>** instead of **<name>** (see: http://dtd.nlm.nih.gov/archiving/tag-library/n-4z50.html). This is not expected to happen often in EuDML items.

Example: **Author name, with structured and unstructured version**

```
<contrib-group content-type="authors">
    <contrib contrib-type="author">
      <string-name>Dušan Bednařík</string-name> <!-- provided by provider -->
      <name> <!--  added by enhancer -->
        <surname>Bednařík</surname>
        <given-names>Dušan</given-names>
      </name>
    </contrib>
    <contrib contrib-type="author">
      <string-name>Karel Pastor</string-name>
      <name>
        <surname>Pastor</surname>
        <given-names>Karel</given-names>
      </name>
        <email>pastor@inf.upol.cz</email>
    </contrib>
</contrib-group>
```

Editors

To set information about *editors* (e.g for a proceedings, when *editors* replace *authors*), **<contrib>** element is used together with ***@contrib-type*** attribute set to **"editor"**.

In the case of an article published in a special issue, its *authors* (or *editors*) should be distinguished from the *issue editors*: **<contrib>** element is used together with ***@contrib-type*** attribute set to **"issue-editor"**.

Data associated with contributors

Some of them may be useful to identify an author using a third-party author-identification service. These are handled as **<ext-link>** elements with ***@content-type*** attribute set to a service identifier.

Identifiers for contributors

Contributors may be identified by:

- an email address
- EuDML author ID (similar to Zbl author identification?)
- Zentrallblatt author ID e.g. **wiles.andrew-j** [2] (http://www.zentralblatt-math.org/zmath/en/search/?q=ai:wiles.andrew-j)
- Maybe, in the future, by an ORCID (http://www.orcid.org/) identifier

Example: **Author description with identifiers link**

```
<contrib-goup>
 <contrib contrib-type="author">
   <ext-link content-type="zbl-author"
      xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=ai:wiles.andrew-j">wiles.andrew-j</ext-link>
   <email>andrew.wiles@fermat.net</email>
   <name>
     <surname>Wiles</surname>
     <given-names>Andrew</given-names>
   </name>
 </contrib>
</contrib-group>
```

Page information

Obligatory metadata requires that each item be endowed with enough metadata to identify it uniquely among the whole literature. This implies that the full bibliographic references of its container be present, as well as the distinctive location of

that item within its container: this is typically a page range for items originated in paper or in a electronic format modelled on paper, but it can as well be something else when the model deviates from the continuous page model.

Anyway, an item should always have **<fpage>** and **<lpage>** elements (the value being the string which is printed on the first and last pages: it can be a Roman numeral such as V, an arabic numeral as well as anything else). When content of **<fpage>** does not allow to sort properly articles within an single journal issue, it is advised to use the ***@seq*** attribute to provide the default ordering. The default value is considered to be equal to 0 and is not required if not considered useful for an item.

Example: **Pages ordered by seq**

```
<fpage seq="0">i</fpage>
 <lpage>iii</lpage>
    ..............
<fpage seq="1">v</fpage>
<lpage>v</lpage>
    ..............
<fpage seq="2">1</fpage>
<lpage>13</lpage>
```

Sometimes, all articles from a given journal start in page 1. This may happen for two different reasons: either the journal style assigns article numbers to distinguish between them, or the journal is electronic only and affects unique identifiers to each published article. In the first case, JATS DTD provides a ***@seq*** attribute to the **<issue>** element which allows to locate the article in the sequence of all the issue's articles

Example: **Articles distinguished by their order within a single issue**

```
<issue seq="24"/>
 <fpage>1</fpage>
 <lpage>153</lpage>
```

In the second case, the **<elocation-id>** element is meant to store the electronic unique identifier of the given item.

Example: **Articles identified by unique ID**

```
<elocation-id>015204</elocation-id>
```

Document types and how to deal with them

- **General tree structure** is already described in the JATS DTD documentation (http://dtd.nlm.nih.gov/archiving /tag-library/) and therefore ***is not detailed here***
- **General description of the tags and attributes** are already described in the JATS DTD documentation (http://dtd.nlm.nih.gov/archiving/tag-library/) and therefore ***is not discussed here***

Journal articles

Journal articles do not differ in EuDML schema specification from plain JATS DTD v. 3.0 as long as obligatory metadata is involved. It is mandatory to insert the journal description in **<journal-meta>**, a provider identifier for the journal, its title, and an issn. It is mandatory to insert volume and issue numbers if relevant, as well as date of publication.

As a rule of thumb, do not try to overload the **<journal-meta>** element by information or identifiers that might not be consistant (or just constant) over the whole journal run, such as external identifiers to services that might have a different view on the same journal run. It is considered safer to insert such references as **<ext-link>** at the **<article-meta>** level.

Conference proceedings articles

Conference proceedings articles are dealt with as journal articles if the proceedings volume is published in a journal special (or regular) issue. The bibliographic metadata is thus standard journal article metadata. The conference details are provided by the **<conference>** element in **<article-meta>**.

If they are published in a separate volume, the volume is encoded with the book DTD, and each conference is encoded as a **<book-part>** inside the **<body>** of that book.

Proceedings volume, edited books, monographs

These are all encoded with the EuDML book DTD which is JATS book DTD extended so that each **<book-part-meta>**

element can contain a **<book-part-id>** element serving the same purpose as the **<article-id>** element, with same rules for its ***@book-part-id-type*** attribute.

The **<conference>** element has also been allowed in **<book-meta>**. Monographs are normally straightforward, and do not deviate from the JATS DTD.

An isbn, publisher, and year of publication is obligatory for all flavours of books.

Multivolume works

Multivolume works are encoded with the EuDML mbook DTD which is the major novelty of the EuDML specification. However, it only relies on the familiar JATS DTDs book and collection. These are meant for single, self-contained works that should be dealt with as items in EuDML even though they were long enough to be published across a number of different volumes.

They can be proceedings (such as those of ICM), edited books (such as collected works on a dedicated subject), single authors' œuvre spanning multiple volumes.

Their metadata is that of a book (in the **<mbook-meta>** element) but instead of **<body>** element, they have a **<mbook-list>** element, which is a list of **<mbook-volume>** elements holding titles and identifiers pointing to each individual volume which will have metadata encoded with the EuDML book DTD.

Describing the intellectual content

Abstract

Abstact and translated abstract are respectively tagged with **<abstract>** and **<trans-abstract>** element. See also #Language and transliteration issues

Example: **Article in French, with an abstract translated in english**

```
<abstract>
  <p>Dans cet article nous proposons différents algorithmes pour résoudre une nouvelle
classe de problèmes variationels non convexes. Cette classe  généralise plusieurs types d'inégalités
variationnelles (Cho et al. (2000), Noor (1992), Zeng (1998), Stampacchia (1964)) du cas convexe
au cas non convexe. La sensibilité de cette classe de problèmes variationnels non convexes a été aussi
étudiée.</p>
</abstract>
<trans-abstract xml:lang="en">
        <p>In this paper we propose several algorithms of the projection
type to solve a new class of nonconvex variational problems. This class generalizes many types
of variational inequalities (Cho et al. (2000), Noor (1992), Zeng (1998), Stampacchia (1964))
from the convex case to the nonconvex case. The sensitivity of this class of nonconvex variational
problems is also studied.</p>
</trans-abstract>
```

MSC (Mathematics Subject Classification)

Mathematics Subject Classification (http://www.zentralblatt-math.org/msc/) codes must be inserted using element **<kwd-group>** with attribute ***@kwd-group-type*** set to the actual scheme: "msc" following by the year (e.g. "**msc2000**").

More information about MSC :

- http://202.38.126.65/mirror/www.ams.org/msc/msc-changes.html
- http://www.ams.org/mathweb/mi-classifications.html

Example: **MSC codes**

```
<kwd-group kwd-group-type="msc2000">
   <kwd>53C05</kwd>
   <kwd>53C30</kwd>
   <kwd>22E60</kwd>
</kwd-group>
```

Identified revisions of the MSC :

2010: **msc2010**

2000: **msc2000**

1991: **msc1991**
1985: **msc1985**
1980: **msc1980**
1970: **msc1970**

Keywords

Keywords must be inserted in a **<kwd-group>** container. If the keywords' language is not the article's language, it must be set in ***@xml:lang*** attribute. If keywords in different languages are available, they must be grouped by language in different keyword groups.

Example: **Keywords (article in english, keywords in french and english)**

```
<kwd-group xml:lang="fr">
        <kwd>dépendences entre critères</kwd>
        <kwd>modélisation des préférences</kwd>
        <kwd>procédures internactives</kwd>
        <kwd>intégrale de Choquet</kwd>
        <kwd>méthodes ELECTRE</kwd>
</kwd-group>
<kwd-group>
        <kwd>dependencies between criteria</kwd>
        <kwd>preference modelling</kwd>
        <kwd>interactive procedures</kwd>
        <kwd>Choquet integral</kwd>
        <kwd>ELECTRE methods</kwd>
</kwd-group>
```

How and where to add Identifiers

EuDML identifiers

EuDML will assign identifiers to items, containers and authors. XML documents dispatched by EuDML will hold these identifiers.

EuDML identifiers in metadata

Except for author and affiliations, **<*-id>** elements must be used:

EuDML ID	In metadata	
	Element	Parent Element
Multi-book ID	**<book-id pub-id-type="eudml-id">**	**<mbook-meta>**
Book ID	**<book-id pub-id-type="eudml-id">**	**<book-meta>**
Journal ID	**<journal-id journal-id-type="eudml-id">**	**<journal-meta>**
Journal issue ID	**<issue-id pub-id-type="eudml-id">**	**<article-meta>**
Article ID	**<article-id pub-id-type="eudml-id">**	**<article-meta>**
Book part ID	**<book-part-id pub-id-type="eudml-id">**	**<book-part-meta>**
Author ID	**<ext-link ext-link-type="eudml-id">**	**<contrib>**
Affiliation ID	**<ext-link ext-link-type="eudml-id">**	**<aff>**

EuDML identifiers in bibliographic references

In bibliographic references, EuDML identifiers must be added using **<ext-link>** elements with an ***@ext-link-type*** set to **"eudml-id"**, the same way than external identifiers. See below.

"Primary" identifier

They identify an item (a journal article, a chapter, a contribution) or a container (a volume, a journal, a book, a multi-book). They are assigned by the the editor (DOI, PII and editor specific identifier) or by the local DML.

There is no need to associate this type of ID with URL for one of the following reason:

- they have a widely recognized resolution mechanism (e.g the DOI),
- they are used only inside the EuDML community (e.g the local DML identifiers),
- there is no resolution mechanism available (ISSN, ISBN).

If an item record is generated by consolidating metadata from many sources, it should hold each corresponding identifier.

"Primary" identifiers in metadata

Outside of bibliographic references, "primary" IDs must be set in the following elements (depending of the context, see below):

<issn>[3] (http://dtd.nlm.nih.gov/archiving/tag-library/n-66s0.html)	ISSN must be set or added. It's a common practice to assign a different ISSN for the print version and the online version of the journal. In this case, the ***@pub-type***[4] (http://dtd.nlm.nih.gov/archiving/tag-library/n-v522.html) attribute must be used, with a value of either **"ppub"** or **"epub"**.
<isbn>[5] (http://dtd.nlm.nih.gov/archiving/tag-library/n-vns0.html)	For some journals, in particular those publishing conference proceedings, an ISBN can be assigned to an issue. Books and multi-books should have ISBNs.
<book-id>[6] (http://dtd.nlm.nih.gov/book/tag-library/n-qf30.html)	Used to store the book ID as defined by the local DML and by the publisher. The attribute ***@pub-id-type*** must be set according to the defined values
<book-part-id>(*EuDML book DTD extension*)	Used to store the book part (chapter, contribution) ID as defined by the local DML and by the publisher. The attribute ***@pub-id-type*** (*part of EuDML book DTD extension*) must be set according to the defined values
<journal-id>[7] (http://dtd.nlm.nih.gov/archiving/tag-library/n-d7t0.html)	Used to store the journal ID as defined by the local DML and by the publisher. The attribute ***@journal-id-type*** must be set according to the defined values
<issue-id>[8] (http://dtd.nlm.nih.gov/archiving/tag-library/n-2ps0.html)	Used to store the issue ID as defined by the local DML and by the publisher. The attribute ***@pub-id-type*** must be set according to the defined values
<article-id>[9] (http://dtd.nlm.nih.gov/archiving/tag-library/n-hyc0.html)	Used to store the article ID as defined by the local DML and by the publisher. The attribute ***@pub-id-type*** must be set according to the defined values

The **<*-id>** elements must always be characterized by an attribute ***@*-id-type*** whose value must be chosen according to the table below

"Primary" identifiers in bibliographic references

In the list of bibliographic references, the following element must be used, to the extent possible:

- **<issn>**
- **<isbn>**
- **<ext-link>**

<ext-link> element must always be characterized by an attribute ***@ext-link-type*** whose value must be chosen according to the table below

Labels for the authorities assigning primary IDs

These labels must be used in attributes such as ***@journal-id-type*** or ***@pub-id-type*** (see below).

Autority	***@*-id-type* value**
EuDML ID	**"eudml-id"**
Local DML ID	**"*partner*-id"** (Example : **"numdam-id"**). For ***partner*** labels, see table in Partner's_collections
ID of the publisher	**"publisher-id"**
URL of the primary resource	**"url"**
Digital Object Identifier	**"doi"**
Publisher Item Identifier	**"pii"**
Directory of Open Access Journals	**"doaj"**

Example: **Identifiers for a journal**

```
<journal-meta>
        <journal-id journal-id-type="eudml-id">M2AN</journal-id>
        <journal-id journal-id-type="numdam-id">M2AN</journal-id>
        <journal-id journal-id-type="url">http://www.esaim-m2an.org/</journal-id>
        <journal-title-group>
          <journal-title>ESAIM: Mathematical Modelling and Numerical Analysis - Modélisation Mathématique et Analyse Numérique</journal-title>
          <abbrev-journal-title abbrev-type="short-title">ESAIM, Math. Model. Numer. Anal.</abbrev-journal-title></journal-title-group>
        <issn pub-type="ppub">0764-583X</issn>
        <issn pub-type="ppub">1290-3841</issn>
        <publisher>
          <publisher-name>EDP Sciences</publisher-name>
          <publisher-loc>Paris</publisher-loc>
        </publisher>
</journal-meta>
```

"Document" identifiers

"Document" identifiers are links to the different versions pertaining to an item or a container on the provider's web site (the PDF version, the full HTML version, etc.).

To set the value of this link, the **<self-uri>**[10] (http://dtd.nlm.nih.gov/book/tag-library/n-mqfo.html) [11] (http://dtd.nlm.nih.gov/archiving/tag-library/n-f5ro.html) elements must be used in **<mbook-meta>**, **<book-meta>**, **<book-part-meta>** or **<article-meta>**.

In EuDML, **<self-uri>** elements are typically used to build a list of accessible documents related to the item.

How to use <self-uri>

- The "main access" to the item must be the first one
- When available, the MIME type should be provided in the ***@content-type*** attribute (except for the "main access")
- In order to ease the translation process, element value should be one of the labels listed below.

Value of <self-uri> element

Value of <self-uri>		mime-type
Access to full text	Main access to the full text (typically a persistent URL associated with a resolver service)	
Full (PDF)	Direct link to the full text in PDF format	application/pdf
Full (PS)	Direct link to the full text in PostScript format	application/ps
Full (DjVu)	Direct link to the full text in DjVu (http://www.djvu.org/)	image/x.djvu
Full (HTML)	Direct link to the full text in HTML	text/html
Full (XML)	Direct link to the full text in XML (wathever the XML format is...)	text/xml
Abstract	Direct access to the abstract, probably in HTML...	text/html
Abstract/References	Direct access to the abstract AND the references, probably in HTML...	text/html
References (BibTeX)	Direct access to the references in BibTeX format	application/x-bibtex

[TODO] complete as needed...

Example: **<self-uri> elements for an article**

```
<self-uri xlink:href="http://aif.cedram.org/item?id=AIF_2007__57_4_1359_0">Access to full text</self-uri>
<self-uri content-type="text/html" xlink:href="http://aif.cedram.org/item?id=AIF_2007__57_4_1359_0">Abstract/References</self-uri>
<self-uri content-type="application/pdf" xlink:href="http://aif.cedram.org/cedram-bin/article/AIF_2007__57_4_1359_0.pdf">Full (PDF)</self-uri>
```

"External" identifiers

"External" identifiers are identifiers of other authorities, such as Zentralblatt MATH, Math. Reviews, Crossref, which assign IDs to articles, authors, journals or books. External identifiers must be set using **<ext-link>**[12] (http://dtd.nlm.nih.gov /archiving/tag-library/n-rrx0.html) elements. We describe below how and where to use theses elements.

How to use <ext-link> for external identifiers

<ext-link> must be characterized with a ***@ext-link-type*** attribute identifying the authority, according to the following table:

Database	***@ext-link-type* value**		
	For authors	**For items (article/book /book-part)**	**For journals**
Zentralblatt MATH (http://www.zentralblatt-math.org/zmath/en/) Value example:	**"zbl-author-id"**	**"zbl-item-id"**	**"zbl-journal-id"**
	kolmogorov.andrey-n (http://www.zentralblatt-math.org/zmath/en/search /?q=ai:kolmogorov.andrey-n)	05770630 (http://www.zentralblatt-math.org/zmath /en/search /?q=an:pre05770630& format=complete)	00000134 (http://www.zentralblatt-math.org/zmath/en/journals/search /?an=00000134)
Jahrbuch JFM (http://www.emis.de /MATH/JFM/JFM.html) Value example:	**"jfm-author-id"**	**"jfm-item-id"**	**"jfm-journal-id"**
	N/A	29.0522.01 (http://www.emis.de /cgi-bin /JFM-item?29.0522.01)	N/A
MathSciNet (http://www.ams.org /mathscinet/) Value example:	**"mr-author-id"**	**"mr-item-id"**	**"mr-journal-id"**
	104340 (http://www.ams.org /mathscinet/search /author.html?mrauthid=104340)	2605837 (http://www.ams.org /mathscinet-getitem?mr=2605837)	J_Math_Phys (http://www.ams.org /mathscinet/search /journaldoc.html?cn=J_Math_Phys)

Where to use <ext-link> for external identifiers

To identify.. ↓	**... in the context of ...** ↓	**... add a <ext-link> in** ↓
a journal	metadata	**<article-meta>** [13] (http://dtd.nlm.nih.gov/archiving/tag-library/n-pjc0.html) (forbidden by the DTD in **<journal-meta>**)
a journal	reference	**<source>** [14] (http://dtd.nlm.nih.gov/archiving/tag-library/n-yuh0.html)
a book	metadata	**<book-meta>** [15] (http://dtd.nlm.nih.gov/book/tag-library/n-ig30.html)
a book	reference	**<source>** [16] (http://dtd.nlm.nih.gov/archiving/tag-library/n-yuh0.html)
an article	metadata	**<article-meta>** [17] (http://dtd.nlm.nih.gov/archiving/tag-library/n-pjc0.html)
an article	reference	**<mixed-citation>** or **<element-citation>** *at the beginning of the citation* (before all other elements or text)
a book part	metadata	**<book-part-meta>** [18] (http://dtd.nlm.nih.gov/book/tag-library/n-xy30.html)
a book part	reference	**<chapter-title>** [19] (http://dtd.nlm.nih.gov/archiving/tag-library/n-yuh0.html)
an author	metadata	**<contrib>**[20] (http://dtd.nlm.nih.gov/archiving/tag-library/n-d4i0.html)
an author	reference	**<string-name>**

Bibliography (citations)

See the JATS DTD documentation [21] (http://dtd.nlm.nih.gov/archiving/tag-library/n-fat2.html#tag-citation) .

Citations are listed as **<ref>** elements in a **<ref-list>** container (see example). Citations as gathered from providers data and are more or less structured. This structure may be enhanced by EuDML system.

Because the DTD documentation is quite comprehensive, this documentation only focuses on some points:

- The choice of the citation style
- The possible values of the ***@publication-type*** attribute.
- The linking inside bibliographic items
- The authors structuring

Citation styles

Two citation styles are offered by the DTD [22] (http://dtd.nlm.nih.gov/archiving/tag-library/n-vwt2.html) : *mixed style* (element **<mixed-citation>** and *element style* (element **<element-citation>**). The *mixed style* can be used for unstructured citations, while the *element style* can't. For structured citations, we could use both style. In order to preserve as much information as possible, we suggest the following rules:

When to use *mixed style*

Mixed style must be used when the original citation string must or can be preserved:

- the citation is not structured
- The citation is only partially structured (examples: authors are not structured; in a book, only the book title and the authors are structured)
- The citation is structured in a mixed way.

When to use *element style*

Element style must be used when the original citation is stored as in a database without presentation information, more generally when the original citation string is not known or cannot be reconstructed from the information available.

Value of @publication-type

When the type of the cited work is known, the attribute ***@publication-type*** of either **<mixed-citation>** or **<element-citation>** must be set to one of the following values:

***@publication-type* value**	**Meaning**
article	Journal article
book	Book or book series
conf-proc	Conference proceedings
thesis	Work written as part of the completion of an advanced degree
web	Website
other	None of the listed types.

Identifiers and External links added by EuDML or local DML

Identifiers for the cited resource must be added using **<ext-link>** elements at the begining of the reference. See How and where to add Identifiers

Authors structuring

It is recommended to always use the **<string-name>** element to store authors in citations, as this allows to add an **<ext-link>** to possible author identifier systems (including foreseen EuDML's).

Language and transliteration issues

Language

Language information are provided by the standard ***@xml:lang*** [23] (http://dtd.nlm.nih.gov/archiving/tag-library/n-u9c2.html) attribute.

See also http://www.w3.org/International/questions/qa-choosing-language-tags for background information about the value of this attribute.

We suggest to follow the rule defined in the NLM JATS documentation:

- Default value is 'EN' for some elements
- Language value is inherited for other elements (this is the behaviour specified for ***@xml:lang*** in the XML specification (http://www.w3.org/TR/xml/))

Where xml:lang attribute should appear

- In the root element **<article>**, **<book>**, or **<mbook>** (this determines the item's main language)
- In **<trans-title-group>** elements
- In **<trans-abstract>** elements

If the attribute is not set, then it is implicitly set to 'en'.

Where xml:lang attribute may appear

@xml:lang may appear in the following element, when translations are available:

- In **<kwd-group>**
- In **<issue-title>**

If not present, the language for these elements is assumed to be the article language, as set in the root element.

Where xml:lang attribute should *not* appear

- In **<trans-title>** and **<trans-sub-title>**: the attribute must be present in the parent element **<trans-title-group>** instead.
- In **<abstract>**: for translated abstracts, use **<trans-abstract>** instead.

Transliteration

For items written in non-latin language, transliterated versions of titles, author names, etc., may be available, or added by EuDML. This section describes how to add transliteration information depending on the context.

Specifying transliteration scheme

When known, the transliteration scheme must be specified using ***@content-type*** or another available attribute (see below). There are potentially many transliteration systems that can be used or may have been used in the past by local DMLs (see e.g. [24] (http://en.wikipedia.org/wiki/Romanization_of_Russian)). Some transliteration schema and the corresponding value for the attribute are gathered in this table:

Transliteration scheme	Attribute value
unknown scheme	translit:unknown
ALAC-LC 97 [25] (http://www.loc.gov/catdir/cpso/roman.html)	translit:alcl97
ISO/R 9:1968 (1968) (cyrillic)	translit:iso9:1968
ISO 9:1995/GOST 7.79 (2002) (cyrillic)	translit:iso9:1995
ISO 843 (Greek)	translit:iso843

Transliterate author names

Example: **Notation of a transliterate article title**

```
<contrib-group content-type="authors">
  <contrib contrib-type="author">
   <name>
    <surname>Егиазарян</surname>
    <given-names>K.M. </given-names>
   </name>
   <name content-type="translit:iso9:1968">
    <surname>Egiazarjan</surname>
    <given-names>K.M. </given-names>
   </name>
   <name content-type="translit:iso9:1995">
    <surname>Egiazarân</surname>
    <given-names>K.M. </given-names>
   </name>
  </contrib>
</contrib-group>
```

Transliterate title

Transliterate titles must be provided using **<alt-title>**.

Example: **Notation of a transliterate article title**

```
<title-group>
 <article-title>Об инвариантных аффинных связностях на алгебре Ли группы Ли</article-title>
 <trans-title-group>
  <trans-title xml:lang='en'>Invariant affine connections in the Lie algebra of a Lie group</trans-title>
 </trans-title-group>
 <alt-title alt-title-type="translit:iso9:1968">Ob invariantnych affinnych svjaznostjach na algebre Li gruppy Li</alt-title>
 <alt-title alt-title-type="translit:iso9:1995">Ob invariantnyh affinnyh svâznostâh na algebre Li gruppy Li</alt-title>
</title-group>
```

Other elements

Other elements may contains transliterate information: **<book-title>**, **<journal-title>**, **<issue-title>**. In these cases, an additional element must be add with a ***@content-type*** attribute value set to relevant transliteration scheme.

Mathematical expressions

Inline and display mathematical formulae are expressed respectively with **<inline-formula>** [26] (http://dtd.nlm.nih.gov/archiving/tag-library/t-2000.html) and **<disp-formula>**[27] (http://dtd.nlm.nih.gov/archiving/tag-library/t-2000.html) elements. Both MathML and (La)TeX version of the same formula can be wrapped up using **<alternative>** element. This mechanism will be extended so that other versions (accessible, aural) can be stored in a similar fashion.

It is recommended to attach a unique ID to each formula to ease further processing.

Example: **Parallel versions of a mathematical formula**

```
<abstract>
 <p>We examine a class of modular functions for
  <inline-formula id="eqid0">
   <alternatives>
    <mml:math xmlns:mml="http://www.w3.org/1998/Math/MathML">
     <mml:mrow>
      <mml:msup>
       <mml:mi>Γ</mml:mi>
       <mml:mn>0</mml:mn>
      </mml:msup>
      <mml:mrow>
       <mml:mo>(</mml:mo>
       <mml:mi>N</mml:mi>
       <mml:mo>)</mml:mo>
      </mml:mrow>
     </mml:mrow>
    </mml:math>
    <tex-math>\Gamma ^0 (N)</tex-math>
   </alternatives>
  </inline-formula>
  whose values generate ring class fields of imaginary quadratic orders. This fact leads to a new algorithm for constructing elliptic curves with complex multiplication. The difficulties arising wh
  <inline-formula id="eqid1">
   <alternatives>
   <mml:math xmlns:mml="http://www.w3.org/1998/Math/MathML">
    <mml:mrow>
     <mml:msub>
      <mml:mi>X</mml:mi>
      <mml:mn>0</mml:mn>
     </mml:msub>
     <mml:mrow>
      <mml:mo>(</mml:mo>
      <mml:mi>N</mml:mi>
      <mml:mo>)</mml:mo>
     </mml:mrow>
    </mml:mrow>
   </mml:math>
   <tex-math>X_0 (N)</tex-math>
  </alternatives>
 </inline-formula>
  is not zero are overcome by computing certain modular polynomials.</p>
 <p>Being a product of four
 <inline-formula  id="eqid2">
  <alternatives>
   <mml:math xmlns:mml="http://www.w3.org/1998/Math/MathML">
    <mml:mi>η</mml:mi>
   </mml:math>
   <tex-math>\eta </tex-math>
  </alternatives></inline-formula>-functions, the proposed modular functions can be viewed as a natural generalisation of the functions examined by Weber and usually employed to construc
</abstract>
```

B Examples

B.1 A journal article with element bibliography

```
<?xml version="1.0"?>
<article xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:schemaLocation="http://dtd.nlm.nih.gov/3.0/xsd/archivearticle
           http://dtd.nlm.nih.gov/archiving/3.0/xsd/archivearticle3.xsd"
      xml:lang="fr" dtd-version="3.0">
  <front>
      <journal-meta>
          <journal-id journal-id-type="cedram-id">AIF</journal-id>
          <journal-title-group>
              <journal-title>Annales de l'institut Fourier</journal-title>
              <abbrev-journal-title abbrev-type="short-title">Ann. inst. Fourier</abbrev-journal-title>
          </journal-title-group>
          <issn pub-type="ppub">0373-0956</issn>
          <issn pub-type="epub">1777-5310</issn>
          <publisher>
              <publisher-name>Association des Annales de l'institut Fourier</publisher-name>
          </publisher>
      </journal-meta>
      <article-meta>
          <article-id article-id-type="cedram-id">AIF_2007__57_4_1359_0</article-id>
          <self-uri xlink:href="http://aif.cedram.org/item?id=AIF_2007__57_4_1359_0">Access to full
              text</self-uri>
          <self-uri content-type="application/pdf"
              xlink:href="http://aif.cedram.org/cedram-bin/article/AIF_2007__57_4_1359_0.pdf">Full
              (PDF)</self-uri>
          <ext-link ext-link-type="mr-item-id"
              xlink:href="http://www.ams.org/mathscinet-getitem?mr=2339335">2339335</ext-link>
          <ext-link ext-link-type="zbl-item-id"
              xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=an:1123.53022">1123.53022</ext-link>
          <title-group>
              <article-title>Les géométries de Hilbert sont à géométrie locale bornée</article-title>
              <trans-title-group xml:lang="en">
                  <trans-title>Hilbert geometries have bounded local geometry</trans-title>
              </trans-title-group>
          </title-group>
          <contrib-group content-type="authors">
              <contrib contrib-type="author">
                  <name>
                      <surname>Colbois</surname>
                      <given-names>Bruno</given-names>
                  </name>
                  <address>
                      <addr-line>Institut de mathématique Université de Neuchâtel Rue Émile Argand 11 Case postale
                          158 2009 Neuchâtel (Switzerland)</addr-line>
                  </address>
                  <email>Bruno.Colbois@unine.ch</email>
              </contrib>
              <contrib contrib-type="author">
                  <name>
                      <surname>Vernicos</surname>
                      <given-names>Constantin</given-names>
                  </name>
                  <address>
```

```
            <addr-line>Institut de mathématique Université de Neuchâtel Rue Émile Argand 11 Case postale
                158 2009 Neuchâtel (Switzerland)</addr-line>
        </address>
        <email>Constantin.Vernicos@unine.ch</email>
    </contrib>
</contrib-group>
<pub-date>
    <year>2007</year>
</pub-date>
<volume>57</volume>
<issue>4</issue>
<issue-id pub-id-type="cedram-id">AIF_2007__57_4</issue-id>
<fpage>1359</fpage>
<lpage>1375</lpage>
<abstract>
    <p>On montre que la géométrie de Hilbert d'un domaine convexe de
      <inline-formula id="eqid0">
        <alternatives>
          <mml:math xmlns="http://www.w3.org/1998/Math/MathML">
            <mml:msup>
              <mml:mrow>
                <mml:mi>ℝ</mml:mi>
              </mml:mrow>
              <mml:mi>n</mml:mi>
            </mml:msup>
          </mml:math>
          <tex-math>{\mathbb{R}} ^ n</tex-math>
        </alternatives>
      </inline-formula>
est à géométrie locale bornée c-à-d que pour un rayon fixé, toutes les boules sont bilipschitz à un domaine de
      <inline-formula id="eqid1">
        <alternatives>
          <mml:math xmlns="http://www.w3.org/1998/Math/MathML">
            <mml:msup>
              <mml:mrow>
                <mml:mi>ℝ</mml:mi>
              </mml:mrow>
              <mml:mi>n</mml:mi>
            </mml:msup>
          </mml:math>
          <tex-math>{\mathbb{R}} ^ n</tex-math>
        </alternatives>
      </inline-formula> euclidien. On en déduit que si la géométrie de Hilbert est hyperbolique au sens de
          Gromov, alors le bas de son spectre est strictement positif. On donne un contre-exemple en
          dimension trois qui montre que la réciproque n'est pas vraie pour les géométries de Hilbert non
          planes.</p>
</abstract>
<trans-abstract xml:lang="en">
    <p>We prove that the Hilbert geometry of a convex domain in
      <inline-formula id="eqid2">
        <alternatives>
          <mml:math xmlns="http://www.w3.org/1998/Math/MathML">
            <mml:msup>
              <mml:mi>ℝ</mml:mi>
              <mml:mi>n</mml:mi>
            </mml:msup>
```

```
                    </mml:math>
                    <tex-math>\mathbb{R} ^ n</tex-math>
                  </alternatives>
                 </inline-formula> has bounded local geometry, i.e., for a given radius, all balls are bilipschitz to a
                    euclidean domain of
                  <inline-formula id="eqid3">
                    <alternatives>
                      <mml:math xmlns="http://www.w3.org/1998/Math/MathML">
                        <mml:msup>
                          <mml:mi>ℝ</mml:mi>
                          <mml:mi>n</mml:mi>
                        </mml:msup>
                      </mml:math>
                      <tex-math>\mathbb{R} ^ n</tex-math>
                    </alternatives>
                  </inline-formula>. As a consequence, if the Hilbert geometry is also Gromov hyperbolic, then the
                    bottom of its spectrum is strictly positive. We also give a counter exemple in dimension three wich
                    shows that the reciprocal is not true for non plane Hilbert geometries.</p>
            </trans-abstract>
            <kwd-group kwd-group-type="msc2000">
              <kwd>53C60</kwd>
              <kwd>53C24</kwd>
              <kwd>51F99</kwd>
              <kwd>53A40</kwd>
            </kwd-group>
            <kwd-group>
              <unstructured-kwd-group>géométrie de Hilbert, hyperbolicité, bas du
                spectre</unstructured-kwd-group>
            </kwd-group>
            <kwd-group xml:lang="en">
              <unstructured-kwd-group>Hilbert Geometries, hyperbolicity, bottom of the spectrum, local
                geometry</unstructured-kwd-group>
            </kwd-group>
          <custom-meta-group>
           <custom-meta>
            <meta-name>provider</meta-name>
            <meta-value>cedram</meta-value>
           </custom-meta>
          </custom-meta-group>
        </article-meta>
      </front>
      <back>
        <ref-list>
          <ref id="bid0">
            <label>1</label>
            <element-citation publication-type="article">
              <ext-link ext-link-type="mr-item-id"
                  xlink:href="http://www.ams.org/mathscinet-getitem?mr=1771428">1771428</ext-link>
              <ext-link ext-link-type="zbl-item-id"
                  xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=an:0972.53021">0972.53021</ext-link>
              <name>
                <surname>Bonk</surname>
                <given-names>M.</given-names>
              </name>
              <name>
                <surname>Schramm</surname>
```

```
            <given-names>O.</given-names>
        </name>
        <article-title>Embeddings of Gromov hyperbolic spaces</article-title>
        <source>Geom. Funct. Anal.</source>
        <year>2000</year>
        <volume>10</volume>
        <issue>2</issue>
        <fpage>266</fpage>
        <lpage>306</lpage>
        <page-range>266-306</page-range>
    </element-citation>
</ref>
<ref id="bid4">
    <label>2</label>
    <element-citation publication-type="book">
        <ext-link ext-link-type="mr-item-id"
            xlink:href="http://www.ams.org/mathscinet-getitem?mr=1835418">1835418</ext-link>
        <ext-link ext-link-type="zbl-item-id"
            xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=an:0981.51016">0981.51016</ext-link>
        <name>
            <surname>Burago</surname>
            <given-names>D.</given-names>
        </name>
        <name>
            <surname>Burago</surname>
            <given-names>Y.</given-names>
        </name>
        <name>
            <surname>Ivanov</surname>
            <given-names>S.</given-names>
        </name>
        <article-title>A course in metric geometry</article-title>
        <publisher-name>American Mathematical Society</publisher-name>
        <publisher-loc>Providence, RI</publisher-loc>
        <year>2001</year>
        <series>Graduate Studies in Mathematics</series>
        <volume>33</volume>
    </element-citation>
</ref>
<ref id="bid5">
    <label>3</label>
    <element-citation publication-type="article">
        <ext-link ext-link-type="mr-item-id"
            xlink:href="http://www.ams.org/mathscinet-getitem?mr=1806945">1806945</ext-link>
        <ext-link ext-link-type="zbl-item-id"
            xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=an:0981.53021">0981.53021</ext-link>
        <name>
            <surname>Cao</surname>
            <given-names>J.</given-names>
        </name>
        <article-title>Cheeger isoperimetric constants of Gromov-hyperbolic spaces with
            quasi-poles</article-title>
        <source>Commun. Contemp. Math.</source>
        <year>2000</year>
        <volume>2</volume>
        <issue>4</issue>
```

```
            <fpage>511</fpage>
            <lpage>533</lpage>
            <page-range>511-533</page-range>
        </element-citation>
    </ref>
    <ref id="bid2">
        <label>4</label>
        <element-citation publication-type="article">
            <ext-link ext-link-type="mr-item-id"
                xlink:href="http://www.ams.org/mathscinet-getitem?mr=2245997">2245997</ext-link>
            <ext-link ext-link-type="zbl-item-id"
                xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=an:05144589">05144589</ext-link>
            <name>
                <surname>Colbois</surname>
                <given-names>B.</given-names>
            </name>
            <name>
                <surname>Vernicos</surname>
                <given-names>C.</given-names>
            </name>
            <article-title>Bas du spectre et delta-hyperbolicité en géométrie de Hilbert plane</article-title>
            <source>Bulletin de la Société Mathématique de France</source>
            <year>2006</year>
            <volume>1</volume>
            <page-range>357-381</page-range>
        </element-citation>
    </ref>
    <ref id="bid1">
        <label>5</label>
        <element-citation publication-type="article">
            <name>
                <surname>Lang</surname>
                <given-names>U.</given-names>
            </name>
            <ext-link ext-link-type="mr-item-id"
                xlink:href="http://www.ams.org/mathscinet-getitem?mr=1866853">1866853</ext-link>
            <ext-link ext-link-type="zbl-item-id"
                xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=an:1024.54013">1024.54013</ext-link>
            <name>
                <surname>Plaut</surname>
                <given-names>C.</given-names>
            </name>
            <article-title>Bilipschitz embeddings of metric spaces into space forms</article-title>
            <source>Geom. Dedicata</source>
            <year>2001</year>
            <volume>87</volume>
            <issue>1-3</issue>
            <fpage>285</fpage>
            <lpage>307</lpage>
            <page-range>285-307</page-range>
        </element-citation>
    </ref>
    <ref id="bid3">
        <label>6</label>
        <element-citation publication-type="phdthesis">
            <name>
```

```
                <surname>Socié-Méthou</surname>
                <given-names>E.</given-names>
            </name>
            <article-title>Comportements asymptotiques et rigidités en géométries de Hilbert</article-title>
            <year>2000</year>
            <institution>Université de Strasbourg</institution>
        </element-citation>
    </ref>
  </ref-list>
 </back>
</article>
```

B.2 A journal article from an edited special volume with mixed bibliography

```
<?xml version="1.0" ?>
<article xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://dtd.nlm.nih.gov/3.0/xsd/archivearticle
        http://dtd.nlm.nih.gov/archiving/3.0/xsd/archivearticle3.xsd"
    xml:lang="fr" dtd-version="3.0">
 <front>
    <journal-meta>
        <journal-id journal-id-type="cedram-id">ACIRM</journal-id>
        <journal-title-group>
            <journal-title>Actes des rencontres du CIRM</journal-title>
            <abbrev-journal-title abbrev-type="short-title">Actes du CIRM</abbrev-journal-title>
        </journal-title-group>
        <issn pub-type="epub">2105-0597</issn>
        <publisher>
            <publisher-name>CIRM</publisher-name>
        </publisher>
    </journal-meta>
    <article-meta>
        <article-id pub-id-type="cedram-id">ACIRM_2009__1_1_61_0</article-id>
        <self-uri xlink:href="http://acirm.cedram.org/item?id=ACIRM_2009__1_1_61_0">Access to full
            text</self-uri>
        <title-group>
            <article-title>Rosen fractions and Veech groups, an overly brief introduction</article-title>
        </title-group>
        <contrib-group content-type="authors">
            <contrib contrib-type="author">
                <name>
                    <surname>Schmidt</surname>
                    <given-names>Thomas A.</given-names>
                </name>
                <address>
                    <addr-line>Oregon State University Corvallis, OR 97331</addr-line>
                </address>
                <email>toms@math.orst.edu</email>
            </contrib>
        </contrib-group>
        <contrib-group content-type="organizer">
            <contrib contrib-type="organizer">
                <name>
                    <surname>Adamczewski</surname>
                    <given-names>Boris</given-names>
                </name>
                <address>
```

```
            <addr-line>Université Claude-Bernard, Institut Camille-Jordan, 43 Bd du 11 novembre 1918,
                69622 Villeurbanne cedex, France</addr-line>
        </address>
        <email>boris.adamczewski@math.univ-lyon1.fr</email>
    </contrib>
    <contrib contrib-type="organizer">
        <name>
            <surname>Siegel</surname>
            <given-names>Anne</given-names>
        </name>
        <address>
            <addr-line>IRISA, Campus de Beaulieu, 35042 Rennes cedex, France</addr-line>
        </address>
        <email>anne.siegel@irisa.fr</email>
    </contrib>
    <contrib contrib-type="organizer">
        <name>
            <surname>Steiner</surname>
            <given-names>Wolfgang</given-names>
        </name>
        <address>
            <addr-line>Université Denis-Diderot, LIAFA, case 7014, 75205 Paris cedex 13,
                France</addr-line>
        </address>
        <email>steiner@liafa.jussieu.fr</email>
    </contrib>
</contrib-group>
<pub-date>
    <month>23-27 mars</month>
    <year>2009</year>
</pub-date>
<volume>1</volume>
<issue>1</issue>
<issue-id pub-id-type="cedram-id">ACIRM_2009__1_1</issue-id>
<issue-title xml:lang="fr">Numération : mathématiques et informatique</issue-title>
<issue-title>Numeration: mathematics and computer science</issue-title>
<fpage>61</fpage>
<lpage>67</lpage>
<abstract>
    <p>We give a very brief, but gentle, sketch of an introduction both to the Rosen continued fractions and
        to a geometric setting to which they are related, given in terms of Veech groups. We have kept the
        informal approach of the talk at the Numerations conference, aimed at an audience assumed to have
        heard of neither of the topics of the title.</p>
    <p>The Rosen continued fractions are a family of continued fraction algorithms, each gives expansions
        of real numbers in terms of elements of a corresponding algebraic number field. A Veech group is
        comprised of the Jacobians of locally affine self-maps on a 'flat' surface to itself. The Rosen fractions
        are directly related to a certain family of (projective) matrix groups; these groups are directly related
        to W. Veech's original examples of surfaces with 'optimal' dynamics.</p>
</abstract>
<kwd-group kwd-group-type="msc2000">
    <kwd>37-01</kwd>
    <kwd>37-02</kwd>
    <kwd>11-01</kwd>
    <kwd>11-02</kwd>
    <kwd>11J70</kwd>
    <kwd>37E35</kwd>
```

```
            <kwd>37F30</kwd>
          </kwd-group>
        <custom-meta-group>
          <custom-meta>
            <meta-name>provider</meta-name>
            <meta-value>cedram</meta-value>
          </custom-meta>
        </custom-meta-group>
      </article-meta>
  </front>
  <back>
    <ref-list>
      <ref id="bid0">
        <label>AH</label>
        <mixed-citation publication-type="none"><ext-link ext-link-type="mr-item-id"
          xlink:href="http://www.ams.org/mathscinet-getitem?mr=1785277">1785277</ext-link>
          <ext-link ext-link-type="zbl-item-id"
          xlink:href="http://www.zentralblatt-math.org/zmath/en/search/?q=an:1029.11035">1029.11035</ext-link>
          P. Arnoux, P. Hubert, <italic>Fractions continues sur les surfaces de Veech</italic>, J. Anal.
          Math. 81 (2000), 35-64.
        </mixed-citation>
      </ref>
      <ref id="bid1">
        <label>A</label>
        <mixed-citation publication-type="none">E. Artin, <italic>Ein mechanisches System mit
          quasi-ergodischen Bahnen</italic>, <italic>Abh. Math. Sem. Hamburg</italic> 3 (1924)
          170-175 (and <italic>Collected Papers</italic>, Springer-Verlag, New York, 1982, 499-505).
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B.3 A simple journal article

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          formulae in the papers. We can say that, for the future development of DML, it is desirable to include,
          in the digitised journals, more structured information of the content of mathematical papers, e.g. tag
          information to indicate logical structure of papers such as headings of sections, definitions, theorems,
          lemmas, etc., together with mathematical formulae structures included. In the talk, I will present the
          current stage of our technology to extract such information from the scanned images in the
          retro-digitised mathematical papers. Mechanically-prepared new journals in the form of PDF are also
          the target of our research since it is not an easy task to get uniform structure description of
          mathematical formulae for example from the original LaTeX source with various styles and macro
          commands depending on authors. Although there are many methods presented in literature to
          recognize mathematical formulae, very few applications appeared to do this task in practical sense.
          One of the major problem in the development of math OCR is to avoid fatal effects caused by
          mis-recognition and mis-segmentation of characters and symbols. In the talk, I will explain first the
          method we took to overcome this difficulty. Some demonstration of our software InftyReader to
          recognize mathematical documents will also be given in the lecture. Secondly, as a better approach to
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        literature would be valuable, as both a guide and constraint in the creation of metadata records
        suitable for harvesting via OAI or sharing through other means. Adhering to the DCAP model would
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          http://www.ifla.org/VII/s13/frbr/frbr.htm</source>
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        original bitonal PDFs to be, on average, downsized by one third. Some modifications to the jbig2enc
        encoder that increase the compression ratio even further are also described here. Together with
        another program, the pdfsizeopt.py by Péter Szabó, we have managed to decrease PDF storage size to
        such an extent that the transmission needs of a digital library were significantly reduced. We report
        the storage saving results that we have achieved on The Czech Digital Mathematics Library DML-CZ—
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      data and at the same time reveal sometimes unexpected relationships among units; it at least speeds
      up browsing. This work follows the metadata processing undertaken on DML-CZ and visualizes all
      reasonable and useful relationships among journals, issues, articles, authors, classification, keywords,
      references and similar articles. We converted metadata to RDF and use a Visual Browser Java Applet
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            basic metadata that describes the article in an XML/MathML format. We also show a proof of concept
            of a method that enables us to include LaTeX source code of mathematical expressions into
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        (Unione Matematica Italiana) with initial support from the Biblioteca Digitale Italiana and the Italian
        Ministry of Beni and Attività Culturali and with the help of Numdam. At the moment bdim consists of
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      Based on the Invenio software, INSPIRE already provides seamless access to almost 1 million records,
      which will be expanded to cover multimedia, data, software, wikis. Services offered include citation
      analysis, fulltext search, extraction of figures from fulltext and search in figure captions, automatic
      keyword assignment, metadata harvesting, retrodigitization, ingestion and automatic display of LaTeX,
      and storage of supplementary materials like Mathematica notebooks. New services are in different
      phases of design or implementation, in strategic partnerships with all other information providers in
      the field and neighbouring disciplines, including; automatic author disambiguation, user tagging,
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          communication, things implicitly communicated when using a blackboard, such as the canonical
          verbalization or handwriting of formulae, are lost and become a big obstacle. Also, the editorial
          process for the creation of learning/teaching resources is suited for a generalist approach and,
          consequently, needs such as those presented by formula typesetting, especially for web-based
          materials, are not deemed a priority. In the last two years a series of innovation projects and initiatives
          have been set off in the UOC in order to improve the situation: the use of LaTeX and MathML
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