The Euromath System – the WYSIWYG structured XML editor, browser, . . .

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Introduction

The research of electronic documents has several basic goals:

- the document can be used for multiple purposes with different applications, for example: various kinds of printed material, WWW, database applications, communication with external applications,
- a long life-time,
- easily interchangeable across different computer platforms and networks.

To fulfil the previous $\Longrightarrow$ *the markup of documents* was developed

Multipurpose documents $\Rightarrow$ the separation of the presentation and the logical structure of a document (plain TEX & LATEX classes)

Idea of a DTD (Document Type Definition) and SGML (Standard Generalized Markup Language – ISO Standard 8879:1986).

SGML is a complex standard – large companies and a few research institutes.

The most known DTD – HTML.DTD. Bad things – fixed grammar, unstructured approach – more the presentation as the logical structure

XML (Extensive Markup Language) – younger brother of SGML (1998) — the new language of WWW:

- international standard for information exchange and reusability of documents,
- metalanguage allowing to define a new markup languages – Document Type Definition (DTD),
- Unicode support.

XML is good idea — but how to create XML documents comfortable way?

Structured editors

– the most comfortable tool for editing XML documents,

– the author does not have to be familiar with the logical structure of the document,

– the user is guided according to the logical structure of the edited document:

- add a new element,
- move or copy complete logical parts of the document,
- change an element to an element of another type,
- create or delete some additional structure around an element,
- …

WYSIWYG structured editors

– the clearly separation of the logical and the presentation structure of a document

- the layout of a document is produced automatically,
- several different presentations can be defined for one logical structure,
- automatically update of the numbering of theorems, footnotes, cross-references, etc.

The author of the document only has to take care of the content of the document — the layout is produced automatically — the same philosophy as LaTeX classes.

Commercial: Adobe FrameMaker + SGML/XML

Am example of free available WYSIWYG structured editors: Thot, Amaya, Euromath System, . . .

Thot – an open experimental authoring system developed by the Opera project, no support for XML.

Amaya – W3C test-bed browser and authoring tool for HTML documents developed on top of the Thot technology, support for MathML and CSS.

Euromath System – an XML authoring tool and browser based on Thot.

Historical remarks about ES

- First version of the Euromath System (1992) – developed within the Euromath Project led by the European Mathematical Trust.
  The goal: *homogeneous computer working environments for mathematicians*.

- Euromath System – originally based on the commercial SGML structured editor Grif (Unix).

- At present, Euromath System is based on XML and Thot $\Rightarrow$ a public domain software, more platforms (Linux, Unix).

Due to the conceptual proximity of both editors, the re-implementation from Grif to Thot was possible.

The principal tasks of the re-implementation:

- *There is no direct support of XML in Thot* – the internal languages of Thot: S (the logical structure), P (the presentation) and T (the translation).

  First task: the translation DTD $\Rightarrow$ S, P and T, a new tool `DTD2SPT` – from DTD (and a feature file) are automatically generated :

  – S-file describes the logical structure and follows directly from DTD,

  – P-file is a standard non-WYSIWYG XML presentation,

  – T-file for saving documents in XML format according given DTD.

- *Thot uses the binary PIV format for saving documents*
  – directly through automatically generated T-file for every DTD.

- The support for Unicode.

- Euromath System is not only structured editor – *www browser* and *Euromath applications* (Personal File system, TEX support) were added

What offers the last version of the Euromath System?

Euromath System

Euromath System =
Euromath editor + Euromath applications

Euromath editor:

- the same basic editing functions as non-structural text editors, the possibility to change a layout of user's text, . . .
- simple WYSIWYG creating of tables,
- incorporation graphics of various formats,
- WYSIWYG structured editor based on standardized XML format:
  the default templates – for DTD correspond to LaTeX classes and for the basic moduls of a standard document type as paragraphs, tables, mathematics, . . .

Advantages of structural approach in Euromath System:

- *The structure and the layout of the document is given, the author of the document has only to take care of the content of the document.*
  – editing accordingly the relevant DTD (given or own)
  – adding a new element (or changing attributes) is checked by the system
  – given DTD similar as LaTeX document classes (‘article.dtd’, ‘letter.dtd’, ‘slide.dtd’, . . .)

- *For one document class (DTD) several different presentations can be defined.*
  – one document = (f.e.) private letter, memorandum, fax, . . .
  – default XML presentation
  – user’s private presentations (P-language)

- *The individual logical elements of the document can be displayed in several windows.*

- *Automatic housekeeping by the system.*
  – similarly as in LaTeX,
  – cross-references – hypertext-nodes,
  – cross-references available also between documents.

- *Export to other formats.*
  – important for communication with other systems,
  – standard format like LaTeX,
  – user's private export (T-language).

All menus are *case-sensitive* – the author is not supposed to be familiar with the document structure.

Euromath applications:

– extend the possibilities of the Euromath System as a structured editor — provide tools to help mathematicians in several ways.

Personal File System:

- PFS is a front-end for the Zentrall-Blatt Math database,
- PFS connects the Euromath System with an electronic version of the database created by Zentralblatt für Mathematik (either on-line or from the CD-ROMs),
- Founded information are translated into XML and displayed in the Euromath System as part of the standard ‘article’ document (in particular, mathematical formulae are displayed in WYSIWYG mode).

Euromath System – WWW-browser:

- the possibility to retrieve documents across networks,

- Euromath System – an ideal tool for viewing remote XML files with known template,

- formulae – impossible to describe in HTML, can be described in XML $\Longrightarrow$ displayed WYSIWYG in the Euromath System.

DTD2SPT – the translator from DTD to internal languages of Thot.

L2S – the translator from the LaTeX to XML:

- to open LaTeX files,
- the interactive translation between LaTeX and WYSIWYG XML format of the mathematical expressions.

TEX & Euromath System

Euromath System – tries to be related to TEX

- *import TEX (LATEX) files* – document classes into related DTD, translation from 'structural' TEX to XML,

- *insert a mathematical formulae as a LATEX string* and switching between LATEX and WYSIWYG XML mode,

- *export* – translation from XML to TEX – adding the translation rules for logical elements and attributes in available T-language,

- similarity in styles.

Concluding remarks

XML – the standard for publishing, for full-text databases and WWW

The Euromath system is at the fore-front in exploiting the benefits of XML for scientific documents and also the type-setting qualities of the TEX system.

The latest (free) version of the Euro-math System is available for UNIX (X-windows systems) based on SUN plat-form and Linux.