

CurExt

Typesetting variable-sized curved symbols

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1 Introduction

The program **CurExt** allows the composition of variable-sized curved symbols such as those occurring in mathematics. This application extends the capabilities of the well-known system \TeX designed by D. E. Knuth for typesetting. Big delimiters, such as brackets, or special curved symbols, such as the Arabic mathematical symbol of sum, can be built automatically according to the size and the shape of the concerned mathematical expression. **CurExt** will make it possible to stretch Arabic letters according to calligraphic rules in order to draw the kashida. The kashida is a small curve used to stretch some characters in order to cover the concerned mathematical expression or to break the line when the left margin is reached. It follows a useful tool for justifying texts written with Arabic alphabet. Unlike in Latin alphabet based writing, where the justification is done through inserting small blanks among characters, cursive writing fills in the space between characters with the kashida.

The **CurExt** system is an extension of the system of treatment of document \TeX . It must be integrated in a \TeX system. The **CurExt** extension can be used independently of the **RyDArab** extension to compose some expandable curvilinear symbols such as parentheses. It's used by the package **RyDArab** to compose some Arabic mathematical expressions with the expandable curvilinear symbols and the **NasX** font for the stationary

parts of Arabic mathematical expandable symbols. It uses the font **NasX** in **METAFONT**.

The main qualities of the **CurExt** system are:

- compatibility:
 - the Arabic and Romance expression cohabit at the same time in a document;
 - the different versions of **CurExt** are compatible between them;
 - the **CurExt** system is compatible with the other extensions of \TeX ;
 - the syntax of commands of **CurExt** is structurally analogous to the one of commands of \TeX .
- the universality:
 - it can be used with any distribution of \TeX system;
 - it can be used under the Windows or Linux platform;
 - it can be adapted easily to the other expandable curvilinear symbols;
- the simplicity: it is easily usable.

The main hiatuses of the **CurExt** application are:

- the no total transparency of the dynamic font generation;
- the limitation to 16 different expandable curvilinear symbols in a document;
- the limitation to 256 different sizes of every expandable curvilinear symbol in a document;
- it can be used under the \LaTeX format only. The extension for \LaTeX requires the standard $\text{\LaTeX}2\epsilon$;
- the font development in **METAFONT** and not in **PostScript**.

The **CurExt** system is not:

- an autonomous system, it requires to be scratched in a \TeX system;

- again a system of justification of the Arabic text, it permits to compose the expandable curvilinear mathematical symbols;
- a system 16 bits, it is 8 bits;
- a system owner.

\TeX is a system of document treatment developed initially by D. E. Knuth of the Stanford university. It is conceived for the exchange and the transmission of text, a real, language of communication, and the formatting, an excellent capacity of composition, of document. It contains families of fonts **Computer Modern** developed in **METAFONT**. \TeX is a set down mark of American Mathematical Society. **METAFONT** is a set down mark of Addison-Wesley Inc. The format **plain \TeX** has been developed by D. E. Knuth.

Arab \TeX is an extension of \TeX conceived by K. Lagally of the Stuttgart university. It permits to generate the Arabic writing, from an ASCII transliteration, of text of different, languages using the Arabic alphabet. It permits to encrust a text in Arabic in a Romance text, and vice versa. It also permits to introduce a Romance mathematical expression in an Arabic text. **Arab \TeX** contains the **xnsh** font developed in **METAFONT**. **Arab \TeX** is protected by copyright and set down under the LPPL (*\LaTeX Project Public License*) of \LaTeX 3 Project.

Ω is an extension of \TeX developed by J. Plaice and Y. Haralambous. It allows generating multilingual texts using the Unicode coding system.

The \LaTeX format has been developed initially by L. Lamport. \LaTeX is protected by a free license that is LPPL (*\LaTeX Project Public License*) of \LaTeX 3 Project.

2 Package

2.1 Files

The package **CurExt** is distributed as:

curext.zip: file compressed in ZIP format for Windows or Linux platform.

The decompression package gives the following directory tree:

readmece.tex: this file in **TEX** format for a preliminary description.

readmece.pdf: this file in **PDF** format for a preliminary description.

lppl.txt: license information of the \LaTeX Project Public License.

`clear.bat`: the file batch under DOS/Windows of destruction of font files generated.

`clear.exe`: the file script under Unix/Linux of destruction of font files generated.

`example`: subdirectory of some examples

`fonts`: subdirectory of subdirectories fonts:

`mf`: subdirectory of source files font in **Metafont**.

`tex`: subdirectory of **T_EX** macros:

`latex`: subdirectory for **L^AT_EX**.

These subdirectories contain:

`example` subdirectory:

`examla.tex`: a whole of expandable curvilinear symbol examples in **L^AT_EX**.

`examla.pdf`: the file result of the file `examla.tex`.

`fonts` subdirectory:

`mf`: the subdirectory of files in **METAFONT** composed of:

`font.mf`: the file of font generalized.

`param.mf`: the file of parameters.

`base.mf`: the file of basis.

`buffer.txt`: a generated intermediate file.

`parent.txt`: the file generated of the different sizes of the bracket, opening or closing, in the document in composition.

`kashida.txt`: the file generated of the different sizes of the kashida in the document in composition.

`parent.mf`: the file generated of the picture of the different sizes of the bracket, opening or closing, in the document in composition.

`kashida.mf`: the file generated of the picture of the different sizes of the kashida in the document in composition.

`opp10.mf`: the file of the dynamic font of the opening parentheses.
`clp10.mf`: the file of the dynamic font of the closing parentheses.
`ksd10.mf`: the file of the dynamic font of kashida.
`caropp10.mf`: the file of the shape of glyphs of the opening parentheses of the different sizes.
`carclp10.mf`: the file of the shape of glyphs of the closing parentheses of different size.
`carksd10.mf`: the file of the shape of glyphs of the kashida of different size.

`tex` subdirectory:

`latex`: the subdirectory of files for \LaTeX composed of:
`curext.sty`: the **CurExt** extension.
`varsize.tex`: the file of declarations of variables and calls of procedures.
`prtprc.tex`: the file of commands of utilization of the bracket.
`opp10fnt.tex`: the file of declarations of the font of the opening bracket.
`clp10fnt.tex`: the file of declarations of the font of closing bracket.
`arabprt.tex`: the file of commands of utilization of the bracket in Arabic mathematics.
`ksdprc.tex`: the file of commands of utilization of the kashida.
`ksdfnt.tex`: the file of declarations of the font of the kashida.
`omxopp10.fd`: the file of definition of the font of the opening bracket.
`omxclp10.fd`: the file of definition of the font closing bracket.
`omxksd10.fd`: the file of definition of the font of the kashida.

2.2 Installation

To install this package, one can put it into a folder intended to be the usual one.

3 Versions

3.1 Historic

- 2002/03/01 v1.1: the version used to compose the manuscript of the thesis [1].
- 2003/03/03 v1.2: includes:
 - the optimization of variables interns;
 - the possibility to use the same names of commands that for the Romance mathematics with the command `\arabmath`.
- the future version will include:
 - the adaptation of this system to the format `plain TeX`;
 - the extension of this system to the other expandable curvilinear symbols such as the horizontal or vertical accolades and the symbol integral;
 - the adaptation of this system to the different features of writing (the greasiness, the italic, ...) for the different expandable symbols;
 - the confection of the expandable symbol fonts in `PostScript`;
 - the adaptation of this system to the Unicode norm on the system Ω ;
 - the improvement of glyphs;
 - etc.

3.2 Compatibility

There is a compatibility between the first versions.

The **CurExt** extension is compatible with all extensions that we had the opportunity to use jointly. It can happen that incompatibilities are generated at the time of the utilization of **CurExt** together with other extensions.

4 Preamble

To generate some variable-sized curved symbols, the user must insert, in the preamble document, the following command:

`\usepackage[options]{curext}`

when \LaTeX that is in utilization. The list of the options *options*, separated by gamma , are described in the following section.

5 Options

The following options are offered:

parenthesis to generate some expandable curvilinear parentheses for the mathematical expressions;

kashidasymbol to generate the expandable curvilinear kashida for the mathematical conventional symbols in Arabic.

6 Commands

The command `\arabmath` permits to use the same names of commands in Arabic mathematics that for the Romance mathematics.

Hereafter, some commands offer by **CurExt** package.

The syntax for parentheses command is:

`$\parentheses`

```
{\matrix{1 & 2 & 3\cr
          4 & 5 & 6\cr
          7 & 8 & 9\cr
```

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

```
}}$
```

The syntax for open (or left) parenthesis command is:

`$\openparentheses`

```
{\matrix{1 & 2 & 3\cr
          4 & 5 & 6\cr
          7 & 8 & 9\cr
```

$$\left(\begin{array}{ccc} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{array} \right.$$

```
}}$
```

The syntax for close (or right) parenthesis command is:

`$\closeparentheses`

```
{\matrix{1 & 2 & 3\cr
          4 & 5 & 6\cr
          7 & 8 & 9\cr
```

$$\begin{array}{ccc} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{array} \right)$$

```
}}$
```

The syntax for parentheses, in an Arabic mathematical presentation, command is:

```
\arabmath$ {\parentheses
  {\matrix{1 & 2 & 3\cr
            4 & 5 & 6\cr
            7 & 8 & 9\cr
          }}}$
```

$$\begin{pmatrix} 3 & 2 & 1 \\ 6 & 5 & 4 \\ 9 & 8 & 7 \end{pmatrix}$$

The syntax for open (or right) parenthesis, in an Arabic mathematical presentation, command is:

```
\arabmath$ {\openparentheses
  {\matrix{1 & 2 & 3\cr
            4 & 5 & 6\cr
            7 & 8 & 9\cr
          }}}$
```

$$\begin{pmatrix} 3 & 2 & 1 \\ 6 & 5 & 4 \\ 9 & 8 & 7 \end{pmatrix}$$

The syntax for close (or left) parenthesis, in an Arabic mathematical presentation, command is:

```
\arabmath$ {\closeparentheses
  {\matrix{1 & 2 & 3\cr
            4 & 5 & 6\cr
            7 & 8 & 9\cr
          }}}$
```

$$\begin{pmatrix} 3 & 2 & 1 \\ 6 & 5 & 4 \\ 9 & 8 & 7 \end{pmatrix}$$

The syntax for Arabic sum command is:

```
\arabmath$ {\csum_{b=T-1}^{s}} c{\}^{b}$
```

$$\sum_{b=T-1}^s c{\}^{b}$$

The syntax for Arabic product command is:

```
\arabmath$ {\cprod_{b=T-1}^{s}} c{\}^{b}$
```

$$\prod_{b=T-1}^s c{\}^{b}$$

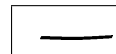
The syntax for Arabic limit command is:

```
\arabmath$ {\clim_{c \to 0}
  c{\}^2}$
```

$$\lim_{c \to 0} c{\}^2$$

The syntax for Arabic kashida command is:

```
\arabmath$ {\kashida{9mm}}$
```



or

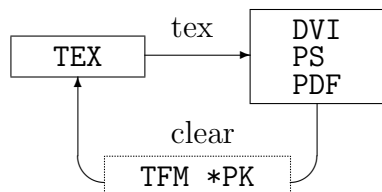
```
\arabmath$ {\kashida_{\quad}^{\quad}}$
```



7 Execution

The size of an extensible symbol of an expression can be given if the expression itself does not comprise another extensible symbol. A problem arises when several extensible symbols are overlapping in the same expression. \TeX and \METAFONT should be called as many as variable-sized symbols overlap.

The TFM's and *PK's files must be cleared in order to compute them every time with the new sizes as font's parameters, as might look like at following:



8 Documentation

In [1], we have given a large presentation for this system and a manual of utilization. In [2], we have presented the application **CurExt**. In [3], we'll give a short presentation for this system.

9 Copyright

CurExt is copyrighted. The system and its source programs are in the public domain. That will encourage its use in one hand, and in the other hand, it allows its extension and improvement. The system is copyrighted only in order to forbid unauthorized copies.

However, you may use it freely for any scientific, experimental and strictly personal, non-commercial purposes if you give proper credit to the author. All other uses require a separate written license from the author.

This program may be distributed and/or modified under the conditions of the L^AT_EX Project Public License, either version 1.2 of this license or any later version.

The latest version of this license is in:

<http://www.latex-project.org/lppl.txt>

and version 1.2 or later is part of all distributions of L^AT_EX version 1999/12/01 or later.

This program consists of all files listed in this file `readmece.tex`.

The **CurExt** project is far from finished. It is supposed to change without prior notice.

Do not, however, mistake **CurExt** itself for a T_EX system! This document is only a brief introduction to the new possibilities and is intended for package writers who are familiar with T_EX fonts and T_EX or L^AT_EX packages. It is neither a user-guide nor a reference manual for T_EX or L^AT_EX.

10 Acknowledgements

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The possibilities are almost unlimited, take your time and explore them! If you encounter any problem or inquiries please contact me. Please send error reports and suggestions for improvement to the author.

11 Author

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