My humble additions to (La)TEX mathematics*

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Abstract
This package provides a set of big delimiters, intermediate to those of
the original \TeX, and also much bigger. It also provides very wide accents
(including two new ones: parenthesis and triangle). These symbols are in-
cluded in a font provided both in Metafont and PostScript which has Don’s
cmex10 as lower ASCII part.

1 Installation
This package consists of (a) a font, written in PostScript, (b) the same font written
in Metafont, (c) a \LaTEX style file, (d) a FD file for the OMX encoding using the
new font, (e) a virtual font that uses cmex font for the lower 128 positions.

In case you obtained the package via one of the distributions, no further steps
should be necessary. If you downloaded the files from CTAN, all the files have to
be installed into their respective places within the TDS hierarchy.

2 About Changes in v1.1
Yannis first released the Metafont version of the font in 1996, and later added
the PostScript version in 2002. These two packages ended up in two different
directories on CTAN, creating confusion. In 2013, after a discussion on the TeX
Live mailing list, we decided to merge the two packages into one.

We change the direction and generation in this release. The original dtx file cre-
at the Metafont source as \texttt{yhcrix10.mf}, which was then copied to \texttt{yrcmex10.mf}.
We changed this to directly generate \texttt{yrcmex10.mf}.

Furthermore, the virtual font provided originally by Yannis had a small bug
with respect to big delimiters (small empty space in the middle), which was fixed
by Akira Kakuto.

Another bug concerning the DeclareFontFamily declaration was reported and
fixed by Kazuhiro Okuma.

Norbert Preining merged the various sources, adapted the documentation, and
uploaded the new package to CTAN.

*This file is 1.1, last revised 2013/07/04.
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3 Availability

Don Knuth’s code is included in Metafont files, so this code is under the usual \TeXware \copyright conditions. My code is postcard-ware (if you like it and find it is worth a postcard + a stamp + the mental effort of writing a word [optional!] and the physical effort of going to the nearest mailbox, then do it!).

Everything is on CTAN, and if there are upgrades you will be informed in the usual way.

4 Very big delimiters

I never liked those parentheses of matrices which become almost immediately straight. In traditional math typography, parentheses stay curved, even if they are very big. So I decided to play around with \TeX’s \texttt{charlist} font property, and make some more of those big delimiters. I also did intermediate sizes (for all “big” delimiters). Here are some examples:

\[
\begin{pmatrix}
  a & b \\
  c & d
\end{pmatrix}
\quad
\begin{pmatrix}
  a & b & c & d \\
  e & f & g & h \\
  i & j & k & l \\
  m & n & o & p
\end{pmatrix}
\]

(1)

\[
\begin{pmatrix}
  a & b & c & d & e \\
  f & g & h & i & j \\
  k & l & m & n & o \\
  p & q & r & s & t \\
  u & v & w & x & y
\end{pmatrix}
\quad
\begin{pmatrix}
  a & b & c & d & e & f \\
  g & h & i & j & k & l \\
  m & n & o & p & q & r \\
  s & t & u & v & w & x \\
  y & z & \alpha & \beta & \gamma & \delta
\end{pmatrix}
\]

(2)

5 A new $\texttt{AMS-L\LaTeX}$-like matrice-like environment

Since I did also “very big” versions of the “left angle” and “right angle” symbols, why not making “matrices” with them as delimiters? I have never seen such a mathematical object, but perhaps was it just because this constructions wasn’t available yet? (this is a chicken and egg story).

I called this new $\texttt{AMS-L\LaTeX}$-like environment \texttt{amatrix} ("a" for “angle”). I hope AMS people will just love it and include it into $\texttt{AMS-L\LaTeX}$\textsuperscript{1}

Here are the same matrices as above, with angles instead of parentheses:

\begin{verbatim}
\begin{amatrix}
  a & b & c & d & e \\
  f & g & h & i & j \\
  k & l & m & n & o \\
  p & q & r & s & t \\
  u & v & w & x & y
\end{amatrix}
\end{verbatim}

\begin{verbatim}
\begin{amatrix}
  a & b & c & d & e & f \\
  g & h & i & j & k & l \\
  m & n & o & p & q & r \\
  s & t & u & v & w & x \\
  y & z & \alpha & \beta & \gamma & \delta
\end{amatrix}
\end{verbatim}

\textsuperscript{1}Talking of $\texttt{AMS-L\LaTeX}$ there are a few more macros I would like to see included, see next section.
6 New roots

Roots got bigger as well, so that now the “vertical root” comes much later. Example:

\[
\sqrt{x^3}
\]

7 A few things missing from \texttt{AMS-\LaTeX} v1.2

\texttt{\textbackslash ddots} In \texttt{AMS-\LaTeX} there is a \texttt{\textbackslash ddots} command for diagonal dots. How about antidiagonal ones? There are matrices called anti-symmetric, and for them we need the notation “dots going up”. I define a \texttt{\textbackslash adots} macro, with a code symmetric to \texttt{\textbackslash ddots}, here is the result: \ldots.

\texttt{\textbackslash ring} Another thing missing in all \TeX{} & Co. packages: the ring accent, used in topology for the interior of a space. I define a macro \texttt{\textbackslash ring} to be used in math mode. Here is the result: if \(X = [0, 1]\) then \(\mathring{X} = ]0, 1[^{\text{.}}\).

8 Very wide accents

\texttt{\textbackslash widetriangle} I added some more hats and tildes, so that you can get really wide accents now; see the examples below:

\[
\hat{A}, \hat{AB}, \hat{ABC}, \hat{ABCD}, \hat{ABCDE}, \hat{ABCDEF}, \hat{ABCDEFG}
\]

\[
\hat{A}, \hat{AB}, \hat{ABC}, \hat{ABCD}, \hat{ABCDE}, \hat{ABCDEF}, \hat{ABCDEFG}
\]

I also designed two new accents: the triangle accent \texttt{\textbackslash widetriangle} and the parenthesis accent \texttt{\textbackslash wideparen}:

\[
\hat{A}, \hat{AB}, \hat{ABC}, \hat{ABCD}, \hat{ABCDE}, \hat{ABCDEF}, \hat{ABCDEFG}
\]
The former is used (in France only??) to show that the notation $ABC$, where $A, B, C$ are three points, means a triangle and not an angle. See what I mean?

The latter is used when we want a non-expansible accent to be applied to more than one letters at once. Of course $\overline{ABC}$ is a triangle, $\overline{AB}$ is an angle.

And of course this notation is not my invention, I saw it in many French math books (ever heard of Nick Bourbaki?).

I call this macro \widetilde, because it plays the rôle of a wide symbol (and since the ring can’t be widened, a parenthesis is used). Here are some more examples (the first one coded as \ring{A}):

\[ [0, 1] \]

\[ ([0, 1])' \]

don’t you?

And now the \adots macro for anti-diagonal dots. This is just the \ddots command, mirrored

Following the way $\LaTeX$ defines math accents, here is the definition of \ring family.
And finally here is a (clumsy) definition of \texttt{\widering}, that is a ring over an horizontal parenthesis.

\newcommand{\widering}[1]{{\overset{\smash{\lower1.333ex\hbox{\scriptsize{$\displaystyle\ring{}$}}}}{\wideparen{#1}}}}

Follows the FD file. Here we define the \texttt{yhex} family, at least for the OMX (Old Math Extensible symbols) encoding. We use the virtual font \texttt{yhcmex10} to make sure that the lower 128 code points are filled, too.