The mathastext package

Jean-François Burnol
jfbu at free dot fr

Abstract

The mathastext package[1] automatically (or only locally) changes the document fonts used in math mode for letters and digits (and a few other punctuation and symbol signs) to replace them by the font used for the text. Thus, the package makes it possible to use a quite arbitrary font without worrying too much that it does not have specially designed accompanying math fonts. Also, mathastext provides a simple mechanism in order to use more than one math-as-text font in the same document.

1 What mathastext does

1.1 Examples

mathastext's basic aim to is to have the same font for text and mathematics. Here is an example with Latin Modern typewriter proportional:

Let (X, Y) be two functions of a variable a. If they obey the differential system ($\mathrm{VI}_{\nu,\mathrm{n}}$):

$$\mathrm{a}\frac{\mathrm{d}}{\mathrm{da}}\mathrm{X} = \nu\mathrm{X} - (1-\mathrm{X}^2)\frac{2\mathrm{na}}{1-\mathrm{a}^2}\frac{\mathrm{aX}+\mathrm{Y}}{1+\mathrm{aXY}}$$
$$\mathrm{a}\frac{\mathrm{d}}{\mathrm{da}}\mathrm{Y} = -(\nu+1)\mathrm{Y} + (1-\mathrm{Y}^2)\frac{2\mathrm{na}}{1-\mathrm{a}^2}\frac{\mathrm{X}+\mathrm{aY}}{1+\mathrm{aXY}}$$

then the quantity $\mathrm{q} = \mathrm{a}\frac{\mathrm{aX}+\mathrm{Y}}{\mathrm{X}+\mathrm{aY}}$ satisfies as function of $\mathrm{b} = \mathrm{a}^2$ the P_{VI} differential equation:

$$\frac{\mathrm{d}^2\mathrm{q}}{\mathrm{db}^2} = \frac{1}{2}\left\{\frac{1}{\mathrm{q}}+\frac{1}{\mathrm{q}-1}+\frac{1}{\mathrm{q}-\mathrm{b}}\right\}\left(\frac{\mathrm{dq}}{\mathrm{db}}\right)^2 - \left\{\frac{1}{\mathrm{b}}+\frac{1}{\mathrm{b}-1}+\frac{1}{\mathrm{q}-\mathrm{b}}\right\}\frac{\mathrm{dq}}{\mathrm{db}} + \frac{\mathrm{q}(\mathrm{q}-1)(\mathrm{q}-\mathrm{b})}{\mathrm{b}^2(\mathrm{b}-1)^2}\left\{\alpha + \frac{\beta\mathrm{b}}{\mathrm{q}^2} + \frac{\gamma(\mathrm{b}-1)}{(\mathrm{q}-1)^2} + \frac{\delta\mathrm{b}(\mathrm{b}-1)}{(\mathrm{q}-\mathrm{b})^2}\right\}$$

with parameters $(\alpha,\beta,\gamma,\delta) = (\frac{(\nu+\mathrm{n})^2}{2}, \frac{-(\nu+\mathrm{n}+1)^2}{2}, \frac{\mathrm{n}^2}{2}, \frac{1-\mathrm{n}^2}{2})$.

Note that the mathematical letters are not italicized. But perhaps we do insist on obeying the standardized habits:

Let (X, Y) be two functions of a variable a. If they obey the differential system ($VI_{\nu,n}$):

$$a\frac{d}{da}X = \nu X - (1-X^2)\frac{2na}{1-a^2}\frac{aX+Y}{1+aXY}$$
$$a\frac{d}{da}Y = -(\nu+1)Y + (1-Y^2)\frac{2na}{1-a^2}\frac{X+aY}{1+aXY}$$

then the quantity $q = a\frac{aX+Y}{X+aY}$ satisfies as function of $b = a^2$ the P_{VI} differential equation:

$$\frac{d^2q}{db^2} = \frac{1}{2}\left\{\frac{1}{q}+\frac{1}{q-1}+\frac{1}{q-b}\right\}\left(\frac{dq}{db}\right)^2 - \left\{\frac{1}{b}+\frac{1}{b-1}+\frac{1}{q-b}\right\}\frac{dq}{db} + \frac{q(q-1)(q-b)}{b^2(b-1)^2}\left\{\alpha + \frac{\beta b}{q^2} + \frac{\gamma(b-1)}{(q-1)^2} + \frac{\delta b(b-1)}{(q-b)^2}\right\}$$

[1] This document describes mathastext v1.15b (2012/09/27).

with parameters $(\alpha,\beta,\gamma,\delta) = (\frac{(\nu+n)^2}{2}, \frac{-(\nu+n+1)^2}{2}, \frac{n^2}{2}, \frac{1-n^2}{2})$.

This used the Times font (available in any TEX distribution). Let us now be a bit more original and have our mathematics with italic letters from the sans serif font Helvetica, while the letters in text use New Century Schoolbook.

Let (X, Y) be two functions of a variable a. If they obey the differential system $(VI_{\nu,n})$:

$$a\frac{d}{da}X = \nu X - (1-X^2)\frac{2na}{1-a^2}\frac{aX+Y}{1+aXY}$$
$$a\frac{d}{da}Y = -(\nu+1)Y + (1-Y^2)\frac{2na}{1-a^2}\frac{X+aY}{1+aXY}$$

then the quantity $q = a\frac{aX+Y}{X+aY}$ satisfies as function of $b = a^2$ the P_{VI} differential equation:

$$\frac{d^2q}{db^2} = \frac{1}{2}\left\{\frac{1}{q} + \frac{1}{q-1} + \frac{1}{q-b}\right\}\left(\frac{dq}{db}\right)^2 - \left\{\frac{1}{b} + \frac{1}{b-1} + \frac{1}{q-b}\right\}\frac{dq}{db} + \frac{q(q-1)(q-b)}{b^2(b-1)^2}\left\{\alpha + \frac{\beta b}{q^2} + \frac{\gamma(b-1)}{(q-1)^2} + \frac{\delta b(b-1)}{(q-b)^2}\right\}$$

with parameters $(\alpha,\beta,\gamma,\delta) = (\frac{(\nu+n)^2}{2}, \frac{-(\nu+n+1)^2}{2}, \frac{n^2}{2}, \frac{1-n^2}{2})$.

And after all that, we may wish to return to the default math typesetting:

Let (X, Y) be two functions of a variable a. If they obey the differential system $(VI_{\nu,n})$:

$$a\frac{d}{da}X = \nu X - (1-X^2)\frac{2na}{1-a^2}\frac{aX+Y}{1+aXY}$$
$$a\frac{d}{da}Y = -(\nu+1)Y + (1-Y^2)\frac{2na}{1-a^2}\frac{X+aY}{1+aXY}$$

then the quantity $q = a\frac{aX+Y}{X+aY}$ satisfies as function of $b = a^2$ the P_{VI} differential equation.

1.2 Basic use

The initial ideology of `mathastext` was to produce mathematical texts with a very uniform look, not separating math from text as strongly as is usually done. As soon as one switches text fonts one realizes how extremely thin are the default TEX fonts for mathematics. They definitely do not fit well visually with the majority of text fonts. With `mathastext` and minimal effort one can get one's (simple... or not) mathematics typeset in a manner more compatible with the text, without having to look for an especially designed font. Here is a minimal example of what to put in the preamble:

```
\usepackage[T1]{fontenc}
\usepackage{times}
\usepackage[italic]{mathastext}
```

The entire document, including in math mode letters, digits, and some signs, will then be typeset in Times. However, the Greek letters in math mode still come from the default fonts (or as specified by the user in the preamble with some other packages). And all the "large" math symbols are the default ones. In fact `mathastext`'s basic scope is strictly limited to the following

characters from `ASCII`:

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789
!?*,.:;+−=()[]/# $%&<>|{} and \

Even for typesetting simple mathematics, the standard text fonts lack some important glyphs: in particular the prime ′ indicating derivatives will be left by `mathastext` to the default (or current) math font, as the text font glyph ' is not, as a rule, a satisfying alternative. Also the minus sign is picked up from the endash character, if available, not the hyphen character. And nothing is changed to the "large" math symbols, except for $\prod$ and $\sum$ in inline math which, like here: $\prod\sum$, will be taken from the Symbol Font if option `symbolmisc` was used.

We specified in our minimal working example a `T1` encoding (`LY1` would have been ok, too) because the default `OT1` does not have the <>|{} and \ glyphs. If `mathastext` detects `OT1` as the default encoding it will leave these characters to their defaults from the math fonts (the *subdued* option, described next, acts a bit otherwise.)

The present document illustrated the use of various fonts, so the set-up in the preamble is accordingly a bit more complicated:

```
\usepackage[T1]{fontenc}
\usepackage{lmodern}
\usepackage[subdued,italic,defaultmathsizes]{mathastext}
\MTDeclareVersion[n]{lmvtt}{T1}{lmvtt}{m}{n}
\usepackage{newcent}
\Mathastext[newcent]
\usepackage{times}
\Mathastext[times]
\usepackage[scaled]{helvet}
\renewcommand\familydefault\sfdefault
\Mathastext[helvet]
\begin{document}\MTversion{normal}
```

Here we see that the document declared four `math versions`: `lmvtt`, `newcent`, `times`, and `helvet`. the names are arbitrary and only need to be suitable arguments to the LaTeX `\DeclareMathVersion` command. The `normal` and `bold` original math versions LaTeX remain, thanks to the `subdued` option, untouched by `mathastext`.

Once these options are defined, the command `\MTversion{name_of_version}` in the *body* of the document enacts the font switches. As is usual with LaTeX one can limit the scope to the inside of a group, or also switch back to the main set-up through issuing a `\MTversion{normal}`.

Important: the normal and bold versions are the only ones for which the command `\MTversion` will set up (possibly) different fonts used in text vs math. All other versions, and also normal and bold if the `subdued` option is absent, when invoked with a `\MTversion` command, will set up the same fonts for text and math (letters, digits, and the few other signs listed before).

So, `\MTversion` admits an optional argument in order to allow specifying different fonts for text and math: for example we used here `\MTversion[newcent]{helvet}` in order to get New Century Schoolbook for the text and Helvetica for the math.

1.3 The `subdued` option

This is new with `v1.15` (which almost immediately became `v1.15b`) of `mathastext`. It provides a manner to switch on the *mathastextification* only for limited portions of the document, with the mechanism of math versions. Without the `subdued` option, the *mathastextification* applies by default to the whole of the document (and one may define additional math versions in the preamble); with the `subdued` option the *mathastextification* has to be activated by an explicit use of a `\MTversion` (also written `\Mathastextversion`) command in the document body, and the document preamble must contain at least one `\Mathastext` command (with the version name in square brackets) to define a math version, to be later used in the body.

Note for the interested people: it is not exactly true that with the `subdued` option the font set-up in math is completely left untouched, but these are internal details of inner workings and should not be perceptible in most cases. The initial version of the package made some design choices based on a radical aim to *mathastextify* everything, and completely cancelling this now would require defining even more internal structures and would lead in documents with many fonts to hit more easily against some limitations of LaTeX regarding the number of fonts one can possibly declare in math mode.

1.4 The `italic` option

In the initial version `1.0`, the Latin letters in mathematical mode assumed the exact same shape as in text mode, and this meant, generally speaking, that they would turn up upright. Doing this gives a very uniform look to the document, so that one has to make an effort and read it with attention, I explained above why I did this on purpose.

Nevertheless, soon after I posted the initial version of the package to CTAN, I was overwhelmed by numerous[2] questions[3] on how to have the letters be in italic shape.

Starting with version `1.1` the default is still, as in version `1.0`, for everything to be in upright shape, but it suffices to pass to the package the option `italic` to have italic Latin letters in math mode.[4] There is also an option `frenchmath`[5] to make the uppercase letters nevertheless upright, because this is the way of traditional French mathematical typography.[6]

1.5 Basic example with math versions

```
\usepackage[T1]{fontenc}
\usepackage{newcent}
\usepackage[subdued]{mathastext}
\Mathastext[newcent]
\renewcommand\familydefault\ttdefault
\Mathastext[courier]
\renewcommand\familydefault\sfdefault
\Mathastext[avantgarde]
\renewcommand\familydefault\rmdefault
\begin{document} stuff and $stuff$ etc\dots
```

[2] this means "more then one."

[3] I thank in particular Tariq Perwez and Kevin Klement for their kind remarks (chronological order).

[4] more precisely stated, the value of `\itdefault` is used.

[5] in versions of the package prior to `1.13`, it was necessary to also pass the option `italic` to enable `frenchmath`. This is now superfluous.

[6] more precisely stated, the shape will be the one used for digits and operator names, thus by default `\shapedefault`.

The `newcent` package from the `psnfss` standard bundle of LaTeX font packages sets up New Century Schoolbook (NCE) for the serif font, Avant Garde for the sans font, and Courier for the typewriter font. The command `\usepackage[subdued]{mathastext}` does not change the `normal` math version, but when later invoked through `\MTversion{normal}` it will remember and reset the text font to be New Century Schoolbook. On the other hand `\MTversion{newcent}` is more radical as it sets up the math to also use Schoolbook. Each call to the `\Mathastext` command in the preamble registers the current font family, as given by the current `\familydefault` value. At first `\familydefault` is given as `\rmdefault`, so changing `\rmdefault` is another, indirect, manner to change which font will be associated by `mathastext` to the given version name. Remember though that if `\familydefault` points to some other value, changing `\rmdefault` will not be effective for the `\Mathastext` command. Just before `\begin{document}` we issue a last `\renewcommand` on `\familydefault` if we want the initial font to be used in the text to be roman one, here NCS.

In the body of a document `\MTversion` with a version name does three things: it changes the font for letters, digits, operator names in math mode; it changes the font for text; and it resets the `\(family,rm,sf,tt)default`s to their values as registered at the time of definition of the version. You may wish to limit its scope to the inside of some group.

One may also just use the LaTeX command `\mathversion` to only change the fonts in math.

1.6 Greek letters

The Computer Modern fonts are very light and thin in comparison to many text fonts, and as a result rarely mix well with them (particularly if the Latin letters in math mode are upright). The following options are provided by `mathastext`:

no option: nothing is done by the package, Greek letters are the default Computer Modern ones or have been set-up by other packages; for example by the `fourier` package with option 'upright', which gives upright Greek letters.

LGRgreek: this is for fonts which additionally to Latin letters also provide Greek letters in LGR encoding.[7]

eulergreek: the Greek letters will be taken from the Euler font which is included in all LaTeX distributions (although no package loading is necessary for the user, nor done by `mathastext`, the file `uzeur.fd` from the `eulervm` package must be accessible to LaTeX as it provides a mechanism to scale by an arbitrary factor the Euler font.) The letters are upright.

symbolgreek: the Greek letters will be taken from the (Adobe) Symbol font. A command is provided so that the user can scale the Symbol font to let it better mix with the text font. The letters are upright.

selfGreek: this option is in case the text font is available in OT1-encoding and does contain the glyphs for the eleven capital Greek letters of default TeX. It does nothing for the lowercase Greek letters. The encoding used in the document does not have to be OT1.[8]

[7] among examples known to the author are the Comfortaa and the Droid (serif and sans) fonts, and of course the Greek Font Society fonts such as GFS Didot.

[8] contrarily to the previous versions of the package, `v1.14c` will not assume that the encoding is OT1-compatible, it will directly load the OT1-encoded version of the font.

1.7 Shape of Greek letters

Classic TEX uses in math mode italic lowercase and upright uppercase Greek letters. French typography uses upright shape for both lowercase and uppercase. And the ISO standard is to use italic shape for both lowercase and uppercase.

The Euler and Symbol font not being available in other than their default upright shape, this question of shapes for Greek letters raises issues only in the case of the options `LGRgreek` and `selfGreek`.

The options `frenchmath`, `itgreek`, `upgreek`, `itGreek` and `upGreek` modify the Greek letter shapes according to the following rules, listed from the lowest to the highest priority:

no option: the lowercase Greek letters are in the same shape as Latin letters, and the uppercase in the same shape as applied to digits and operator names,

frenchmath: both lowercase and uppercase are in the same shape as the digits and operator names (most of the time this means "upright shape", but it can be otherwise),

itgreek,upgreek: both lowercase and uppercase are in the `\itdefault`, respectively the `\updefault` shape (at the time of loading the package or at the time of a subsequent call to `\Mathastext` or `\MathastextWillUse`),

itGreek,upGreek: same as above, but only for the uppercase letters.

So, the default gives the classic TEX behavior when option `italic` was passed. Each call to `\Mathastext` (or `\MathastextWillUse`) macros (described in a later section) reinitializes the computation of the shapes.

As described in the next section the package allows to define various "math versions". The fonts used for the Greek letters, and their shapes, are the same accross all math versions, except when options `LGRgreeks` or `selfGreeks` are passed to the package (Note the additional "s"). It is then expected that all math versions will use fonts available in LGR encoding (or, OT1 encoding for the capital Greek letters), and the shapes will then also be local to the math version.

1.8 Unicode engines

It is recommended to the user to look at the `mathspec` package, as a more powerful and natively unicode-aware alternative. However, `mathastext` has been made minimally unicode-aware and can be used with XeTEX or LuaTEX.

Of course `mathastext` is extremely far from being able to define a math font, as it applies basically only to a subset of the 32-127 ascii range, and in particular it does not know how to use a given Unicode font simultaneously for Latin and Greek letters. For this the user is strongly advised to look at `mathspec` and `unicode-math`.

To specify math versions using unicode fonts, only use the `fontspec` `\setmainfont` command (with arbitrary optional features) prior to loading `mathastext`, or after and then followed by a `\Mathastext` command with the name of the version in square brackets. It is possible to mix unicode fonts and classical TEX fonts, but due to the handling of the minus sign in math mode (in particular), it is best to have either only unicode fonts, or only old-fashioned TEX fonts in a fixed encoding (T1, or LY1 for example).

Important: `fontspec` must be loaded with its *no-math* option, and *prior* to `mathastext`.

The package was not extensively tested with unicode engines, but I include here two examples which compiled successfully with XeTEX, the first one on a Linux machine, the second one on a Mac OS X machine. The inclusion of `amsmath` and `mathtools` was just made in order to detect

possible conflicts with the current version of `mathastext`. I commented out `mathtools` because with it one has to define one math version less to not generate errors.

```
\documentclass{article}
\usepackage[hscale=0.8]{geometry}
\usepackage{multicol}
\usepackage{amsmath}
%\usepackage{mathtools}
\usepackage[no-math]{fontspec}
\usepackage{lmodern}
\usepackage[subdued,italic]{mathastext}
\setmainfont{Andale Mono}
\Mathastext[Andale]
\setmainfont[Color=0000FF]{Arial}
\Mathastext[Arial]
\setmainfont{DejaVu Serif}
\Mathastext[DejaVu]
\MathastextDeclareVersion{times}{T1}{ptm}{m}{n}
\MTlettershape{n}\MTshape{it}
\setmainfont{Verdana}\Mathastext[Verdana]
\begin{document}
\begin{multicols}2
   \centerline{\textbf{math mode}}
\columnbreak
   \centerline{ text }
\end{multicols}
\MTversion{DejaVu} % or any other, as defined in the preamble
\begin{multicols}2
   \centerline{ $abcdefghijklmnopqrstuvwxyz$}
   \centerline{ $ABCDEFGHIJKLMNOPQRSTUVWXYZ$}
   \centerline{ $0123456789$}
   \centerline{ $!\,?\,*\,,\,.\,:\,;\,+\,-\,=\,(\,)\,[\,]\,/\,\#\,%
   \$\,\%\,\&\,<\,>\,|\,\{\,\}\,\backslash$ }
\columnbreak
   \centerline{ abcdefghijklmnopqrstuvwxyz}
   \centerline{ ABCDEFGHIJKLMNOPQRSTUVWXYZ}
   \centerline{ 0123456789}
   \centerline{ !\,?\,*\,,\,.\,:\,;\,+\,-\,=\,(\,)\,[\,]\,/\,\#\,%
   \$\,\%\,\&\,<\,>\,|\,\{\,\}\,\char92 }
\end{multicols}
(repeat with the other fonts)
\end{document}
```

And now an example with fonts available on Mac OS X:

```
\documentclass{article}
\usepackage[hscale=0.8]{geometry}
\usepackage{multicol}
\usepackage{amsmath}
\usepackage[no-math]{fontspec}
\usepackage[subdued,italic]{mathastext}
\setmainfont{Hoefler Text}\Mathastext[Hoefler]
\setmainfont{Osaka}\Mathastext[Osaka]
\setmainfont{Herculanum}\Mathastext[Herculanum]
```

```
\setmainfont{Didot}\Mathastext[Didot]
\setmainfont{Comic Sans MS}\Mathastext[Comic]
\begin{document}
\begin{multicols}2
   \centerline{\textbf{math mode}}
\columnbreak
   \centerline{ text }
\end{multicols}
\MTversion{Hoefler}
\begin{multicols}2
   \centerline{ $abcdefghijklmnopqrstuvwxyz$}
   \centerline{ $ABCDEFGHIJKLMNOPQRSTUVWXYZ$}
   \centerline{ $0123456789$}
   \centerline{ $!\,?\,*\,,\,.\,:\,;\,+\,-\,=\,(\,)\,[\,]\,/\,\#\,%
   \$\,\%\,\&\,<\,>\,|\,\{\,\}\,\backslash$ }
\columnbreak
   \centerline{ abcdefghijklmnopqrstuvwxyz}
   \centerline{ ABCDEFGHIJKLMNOPQRSTUVWXYZ}
   \centerline{ 0123456789}
   \centerline{ !\,?\,*\,,\,.\,:\,;\,+\,-\,=\,(\,)\,[\,]\,/\,\#\,%
   \$\,\%\,\&\,<\,>\,|\,\{\,\}\,\char92 }
\end{multicols}
(repeat with the other fonts)
\end{document}
```

2 The package options and commands

2.1 Summary of main options

`italic, frenchmath`: italic letters in math, upright uppercase if `frenchmath`.

`subdued` : acts in a subdued way. The `normal` and `bold` math versions are left (quasi) unchanged.

`LGRgreek, eulergreek, symbolgreek`: the Greek letters will be taken, respectively from the text font itself (in LGR encoding), or from the Euler font, or from the Postscript Symbol font.

`symbolmax`: all characters listed supra, other than letters and digits, are taken from the Symbol font. This option also makes a number of further glyphs available, including some basic mathematical arrows, as well as the sum and product signs. For documents with very simple needs in mathematical symbols, `mathastext` with option `symbolmax` may give in the end a PDF file quite smaller than the one one would get without the package.

`defaultmathsizes`: `mathastext` opts for bigger subscripts (and, copied from the `moresize` package, redefines `\Huge` and defines `\HUGE`). Use this option to prevent it from doing so.

`defaultalphabets`: by default, `mathastext` redeclares the math alphabets `\mathrm`, `\mathit`, etc... (but not `\mathcal`) to refer to the current document text fonts (at the time of loading the package). Use this option to prevent it from doing so (each alphabet also has its own disabling option).

2.2 Miscellaneous

the en-dash as minus sign: Very often the - character from the text font does not give a good minus sign. So by default, the package uses the en-dash sign –. Use `noendash` to deactivate it. Starting with version `1.12` of the package this 'en-dash as minus' should work in all encodings, including Unicode (if `fontspec` has been loaded).

hbar: The definition of `\hbar` inherited from default LaTeX will in our context make use of the `h` of the current math font (so for us, it is also the text font, perhaps in italic shape), but the bar accross the `h` will come from the original default math font for letters (usually `cmmi`), and furthermore its placement on the `h` can be odd-looking. So we redefine `\hbar` to use only the text font (and this will be aware of the `italic` option). Our construction does not always give an optimal result (and its scope is limited to the OT1, LY1 and T1 encodings), so an option `nohbar` deactivates it. There is no `\hslash` provided by the package, though. The version `1.12` of the package when dealing with a Unicode font tries to get the `\hbar` directly as a glyph from the font.

dotless i and j: By default the package redefines `\i` and `\j` to give the dotless i and j (if it exists at all), *also in math mode,* in the text font. Will overwrite the default commands `\imath` and `\jmath`. In version `1.12` of the package this should work in all encodings, including Unicode (it is then assumed that `fontspec` has been loaded, and of course that the glyphs are indeed in the font).

XeTeX and LuaLaTeX: for the en-dash and the dotless i and j, the package expects to detect either the EU1 encoding for XeTeX or the EU2 encoding for LuaLaTeX (this will be true if `fontspec` was loaded), or one of OT1, LY1 or T1, else it will renounce and not attempt to access the en-dash or the dotless i and j glyphs. With LaTeX and PdfLaTeX, there is no such limitation and all 8bit-encodings (containing these glyphs) should be ok.

fontspec: one more note to users of XeTeX/LuaLaTeX with `fontspec`: it has to be loaded *with the option* `no-math`, *and before* `mathastext`.

vec accent: The default `\vec` accent is not appropriate for upright letters, so `mathastext` provides a `\fouriervec` which takes its glyph in a Fourier font, and an Ersatz `\pmvec` which is reasonably good looking on upright letters and works with the `\rightarrow` glyph. Contrarily to version `1.0`, the default `\vec` is not overwritten with `\fouriervec`. And contrarily to version `1.1`, one now needs to pass the option `fouriervec` to have the math accent `\fouriervec` defined by the package.

math alphabets:

- We define a new math alphabet command `\mathnormalbold` which gives direct access to the bold version of the `\mathnormal` alphabet (rather than using either the `\bm` command from the `bm` package or the `\boldsymbol` command from the `amsbsy` package).
- The other math alphabet changing commands defined by the package are `\MathEulerBold`, `\MathEuler` and `\MathPSymbol`.
- `\mathnormal`, `\mathrm`, `\mathbf`, `\mathit`, `\mathsf` and `\mathtt` are modified to make reference to the document text fonts (this can be disabled by suitable package options).

Note though that it is not possible to use too many of such commands in the same document, due to some limitations of LaTeX. Declaring them does not seem to be a problem, and I will welcome any information by knowledgeable people.

math accents: an option `mathaccents` is provided to pick up the accents in math mode from the text font, but the package knows only T1, LY1 or OT1-compatible encodings.

Regarding the encoding-dependent glyphs: the en-dash, the dotless i and j, the math accents, the hbar, are encoding dependent and the relevant decisions are made by `mathastext` at the time it is loaded. So you can use math versions with different encodings but, regarding these characters only those with the same encoding as the normal math version will display them correctly.

2.3 Commands

2.3.1 Preamble-only commands

Nothing is necessary besides loading `mathastext`, possibly with some customizing options. The following commands provide enhancements to the basic use of the package.

- `\Mathastext`: reinitializes `mathastext` according to the current defaults of encoding, family, series and shape.
  - It can also be preceded optionally by one or more of[9] `\MTencoding{`⟨*enc*⟩`}`, `\MTfamily{`⟨*fam*⟩`}`, `\MTseries{`⟨*ser*⟩`}`, `\MTshape{`⟨*sh*⟩`}`, and, new with version `1.1`, `\MTlettershape{`⟨*sh*⟩`}`. For example valid values are, respectively, ⟨*T1*⟩, ⟨*phv*⟩, ⟨*m*⟩, ⟨*n*⟩, and ⟨*it*⟩: this is the Helvetica font in T1-encoding, regular (medium) series, upright shape, and the letters will be in italic shape. Once used their effect applies to all succeeding calls to `\Mathastext`, and can only be undone by using them again.
  - **math versions:** starting with version `1.12` `\Mathastext` accepts an optional argument, which will serve as a name to designate the corresponding math version (without optional argument `\Mathastext` redefines the default normal and bold versions.) This argument, being optional, must be enclosed within square brackets.[10]
- `\MTWillUse[`⟨*ltsh*⟩`]{`⟨*enc*⟩`}{`⟨*fam*⟩`}{`⟨*ser*⟩`}{`⟨*sh*⟩`}`: tells `mathastext` to use the font with the specified encoding, family, series, and shape for the letters and digits (and all other afflicted characters) in math mode. The optional argument ⟨*ltsh*⟩ specifies a shape for the letters, for example `\itdefault`, or directly ⟨*it*⟩ or ⟨*sc*⟩.
- `\MTDeclareVersion[`⟨*ltsh*⟩`]{`⟨*name*⟩`}{`⟨*enc*⟩`}{`⟨*fam*⟩`}{`⟨*ser*⟩`}{`⟨*sh*⟩`}`: declares that the document will have access to the font with the specified characteristics, under the version name ⟨*name*⟩. For example:

  ```
  \MTDeclareVersion[sc]{palatino}{T1}{ppl}{b}{sl}
  ```

  declares under the name `palatino` a version where mathematics will be typset using the Palatino font in T1-encoding, bold, slanted, and the letters will in fact be in caps and small caps (and bold).[11] When the optional argument is absent, and `mathastext` was loaded with the `italic` option, then the default letter shape will be `it`,[12] else letters will have the same shape as used for digits and operator-names.

[9] these commands exist also with long names: `\Mathastextencoding`, etc... The same applies to the other commands mentioned in this section.

[10] The allowed version names are as for the LaTeX `\DeclareMathVersion` macro. Do not use "normal" or "bold"; this is already taken care of by a call to `\Mathastext` without optional argument.

[11] I do not especially recommend to use this in real life!

[12] more precisely, the shape is the latest value passed in one of the previously used package commands to specify the shape of letters, or the `\itdefault` of the time of loading the package.

- `\MTboldvariant{`⟨*var*⟩`}`: when used before `\Mathastext`, specifies which bold (`b`,`sb`,`bx`,...) to be used by `\mathbf` (and `\boldmath`). Default is the `\bfdefault` at the time of loading `mathastext`. When used before the declaration of a version, decides the way `\mathbf` will act in this version.
- `\MTEulerScale{`⟨*factor*⟩`}`: scales the Euler font by ⟨*factor*⟩.
- `\MTSymbolScale{`⟨*factor*⟩`}`: scales the Symbol font by ⟨*factor*⟩.

2.3.2 Commands to be used in the body

- `\MTVersion[`⟨*nametext*⟩`]{`⟨*namemath*⟩`}`:[13] in the absence of the optional argument changes simultaneously the text and the math fonts to be the fonts corresponding to the version ⟨*namemath*⟩. If there is an optional argument then the text fonts will use ⟨*nametext*⟩ and the math mode will use ⟨*namemath*⟩. To change only the math fonts, use the LaTeX command `\mathversion`.

All further commands are for math mode only.

- `\hbar`: this is constructed (in a way compatible with the `italic` option) from the `h` letter and the ¯ accent from the `mathastext` font. Note that `\mathrm{\hbar}` and `\mathbf{\hbar}` should work and that `\hbar` does scale in subscripts and exponents. Only for T1 and OT1 (or LY1) encodings.
- `\fouriervec`: this is a `\vec` accent taken from the Fourier font; the `fourier` package need not be loaded. Active only if option `fouriervec`.
- `\pmvec`: this provides a poor man `\vec` accent command, for upright letters. It uses the right arrow. Does not change size in subscripts and exponents.
- `\Mathnormal`, `\Mathrm`, `\Mathbf`, `\Mathit`, `\Mathsf`, `\Mathtt`: modifications of the original `\mathnormal`, `\mathrm`, `\mathbf`, `\mathit`, `\mathsf`, `\mathtt`. By default, the originals are overwritten with the new commands.
- `\mathnormalbold`: a bold version of `\mathnormal`.
- `\inodot`, `\jnodot`: the corresponding glyphs in the chosen font for math mode. By default, will overwrite `\imath` and `\jmath`. With version `1.12` by default `\i` and `\j` work also in math mode and give then `\inodot`, resp. `\jnodot`. This should work for all 8bit-encodings having these glyphs, and also in Unicode.
- `\MathEuler`, `\MathEulerBold`: math alphabets to access all the glyphs of the Euler font, if option `eulergreek` (or `eulerdigits`) was passed to the package.
- `\MathPSymbol`: math alphabet to access the Symbol font.
- when one of the options `symbolgreek`, `eulergreek`, or `selfGreek` is passed to the package the capital Greek letters which look like their Latin counterparts acquire names: `\Digamma`, `\Alpha`, `\Beta`, `\Epsilon`, `\Zeta`, `\Eta`, `\Iota`, `\Kappa`, `\Mu`, `\Nu`, `\Omicron`, `\Rho`, `\Tau`, `\Chi` (no `\Digamma` for Symbol). Also an `\omicron` control sequence is provided.

[13] `\MTVersion` is also available as `\MTversion`.

- LGR Greek and 'var'-letters: only the `\varsigma` is available in this encoding, so using for example `\varphi` will load the previous default math font. It might thus be suitable when recompiling already written LaTeX sources to add to the preamble `\let\varphi=\phi`, `\let\varepsilon=\epsilon`, etc. . . , in case only the 'variant' form of the letter was used in the documents.

- Miscelleneous mathematical symbols from the postscript Symbol font are made available (or replaced) when option `symbolmisc` is passed. They are `\prod` $\prod$ `\sum` $\sum$ `\implies` $\Rightarrow$ `\impliedby` $\Leftarrow$ `\iff` $\Longleftrightarrow$, `\shortiff` $\Leftrightarrow$ `\to` $\to$ `\longto` $\longrightarrow$ `\mapsto` $\mapsto$ `\longmapsto` $\longmapsto$, `\aleph` $\aleph$ `\inftypsy` ∞ `\emptyset` $\emptyset$ `\surd` $\surd$ `\nabla` ∇, `\angle` $\angle$ `\forall` $\forall$ `\exists` $\exists$ `\neg` $\neg$ `\clubsuit` $\clubsuit$, `\diamondsuit` $\diamondsuit$ `\heartsuit` $\heartsuit$ `\spadesuit` $\spadesuit$ `\smallint` $\smallint$, `\wedge` $\wedge$ `\vee` $\vee$ `\cap` $\cap$ `\cup` $\cup$ `\bullet` $\bullet$ `\div` $\div$, `\otimes` $\otimes$ `\oplus` $\oplus$ `\pm` $\pm$ `\ast` $\ast$ `\times` $\times$ `\proptopsy` $\propto$, `\mid` $\mid$ `\leq` $\leq$ `\geq` $\geq$ `\approx` $\approx$ `\supset` $\supset$ `\subset` $\subset$, `\supseteq` $\supseteq$ `\subseteq` $\subseteq$ `\in` $\in$ `\sim` $\sim$ `\cong` $\cong$ `\perp` $\perp$, `\equiv` $\equiv$ `\notin` $\notin$ `\langle` $\langle$ `\rangle` $\rangle$. And a `\DotTriangle` $\therefore$ is made available by option `symbolre` (which overwrites `\Re` and `\Im`: $\Re, \Im$). The `\inftypsy` and `\proptopsy` have these names to leave up to the user the choice to replace (or no) the original (larger) `\infty` ∞ and `\propto` $\propto$.

  Regarding the `\prod` and `\sum` commands: they will use the Symbol glyphs $\prod\sum$ in inline math, and in display math the Computer Modern ones (or whatever is set up by other packages) :

  $$\prod\sum$$

  The package provides `\prodpsy` and `\sumpsy`: if one really wants in all situations the Symbol glyphs, one can do `\let\prod\prodpsy` and `\let\sum\sumpsy`. Also `\defaultprod` and `\defaultsum` will refer to the `\prod` and `\sum` before redefinition by the package: this is to allow constructs such as `$\displaystyle\defaultprod$` or `\[\textstyle\defaultprod\]`, because they would not work with the `\prod` and `\sum` as re-defined by the package.

2.4 Complete list of options

- `basic`: only mathastextify letters and digits.

- `subdued`: does not change the default fonts, activates only after an explicit `\MTversion` command.

- `italic`: the letters will default to italic shape in math mode.

- `frenchmath`: `italic`, but uppercase Latin letters in the same font as for digits and operator names. In general this means that they will be upright. In case of the `LGRgreek` option, `frenchmath` influences also the shape of the Greek letters.

- `endash`, `emdash`: use the text font en-dash (–) or even the em-dash (—, but this seems crazy) for the minus sign rather than -. `endash` option is default for the package.

- `noendash`: the minus sign will be the - from the text font, not the en-dash –.

- `nohbar`: prevents `mathastext` from defining its own `\hbar`.

- `nolessnomore`: besides ! ? * , . : ; + - = ( ) [ ] / # $ % & `mathastext` treats also < > | { } and \. Use this option to not do it. The option `nolessnomore` is activated by default in case of OT1-encoding.

- further excluding options: `noexclam` !? `noasterisk` * `nopunctuation` ,.:; `noplus`, `nominus`, `noplusnominus` +− `noequal` = `noparenthesis` ()[]/ `nospecials` #$%& and `nodigits`.
- `alldelims`: true by default, means that the characters excluded by `nolessnomore` are treated. Use this option in case of a mono-width OT1-encoded font.
- `symbolgreek`, `symboldigits`: to let Greek letters (digits) use the Symbol font.
- `symbolre`: replaces `\Re` and `\Im` by the Symbol glyphs $\Re, \Im$ and defines a `\DotTriangle` command ($\therefore$).
- `symbolmisc`: takes quite a few glyphs, including logical arrows, product and sum signs from Symbol. They are listed *supra*. You may also consider `\renewcommand{\int}{\smallint}` to maximize still more the use of the Symbol font.
- `symboldelimiters`: the characters apart from letters and digits will be taken from the Symbol font.
- `symbol`: combines `symbolgreek`, `symbolre`, and `symbolmisc`.
- `symbolmax`: combines `symbol` and `symboldelimiters`.
- `eulergreek`, `eulerdigits`: to let Greek letters (digits) use the Euler font.
- `LGRgreek`: this is for a font which is also available in LGR-encoding.
- `LGRgreeks`: each declared math version will be supposed to be with a font which is also available in LGR-encoding.
- `selfGreek`: this is for a font which is also available in OT1-encoding and contains the glyphs for the default eleven capital Greek letters.
- `selfGreeks`: each declared math version will be supposed to be with a font with the eleven capital Greek letters in its OT1-encoded version.
- `upgreek`, `itgreek`, `upGreek`, `itGreek`: options to tell to use `\itdefault` or `\updefault` for the lowercase and uppercase (or only the uppercase) Greek letters. Only operant in the case of the `LGRgreek(s)` and `selfGreek(s)` options.
- `mathaccents`: use the text font also for the math accents. As in vanilla LaTeX, they are taken from the font for the digits and `\log`-like names. Obey the alphabet changing commands. Will work only for T1, LY1, or OT1-compatible encodings.
- `defaultrm`, `defaultbf`, `defaulnormal`, `defaultit`, `defaultsf`, `defaultt`, `defaultalphabets`: do not overwrite (respectively) `\mathrm`, `\mathbf`, `\mathnormal`, `\mathit`, `\mathsf`, and `\mathtt`, or all.
- `defaultimath`: do not overwrite `\imath` and `\jmath`, do not extend `\i` and `\j` to math mode use.
- `defaultmathsizes`: do not change the LaTeX defaults.
- `fouriervec`: provides a `\fouriervec` command. The user can then add in the preamble `\let\vec=\fouriervec`. There is also always available a "poor man" vec accent `\pmvec` for upright letters.

Thanks to Kevin Klement, Tariq Perwez and Ricard Torres for sending bug reports and feature requests when the first version of the package was issued.

Numerous examples are available here:
http://jf.burnol.free.fr/mathastext.html