¡-latexrelease¿ [2018/09/24 v3.0b LaTeX Kernel (¡-latexrelease¿ font setup)]

The `fontdef.dtx` file*

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1 Introduction

This file is used to generate the files `fonttext.ltx` (text font declarations) and `fontmath.ltx` (math font declarations), which are used during the format generation. It contains the declaration of the standard text encodings used at the site as well as a minimal subset of font shape groups that NFSS will look at to ensure that the specified encodings are valid.

The math part contains the setup for math encodings as well as the default math symbol declarations that belong to the encoding.

It is possible to change this setup (by using other fonts, or defaults) without losing the ability to process documents written at other sites. Portability in this sense means that a document will compile without errors. It does not mean, however, that identical output will be produced. For this it is necessary that the distributed setup is used at both installations.

2 Customization

You are not allowed to change this source file! If you want to change the default encodings and/or the font shape groups preloaded you should should create a copy of `fonttext.ltx` under the name `fonttext.cfg` and change this copy. If LaTeX 2_ε finds a file of this name it will use it, otherwise it uses the standard file which is `fontdef.ltx`.

If you don't plan to use Computer Modern much or at all, it might (!) be a good idea to make your own `fonttext.cfg`. Look at the comments below (docstrip module 'text') to see what should should go into such a file.

To change the math font setup use a copy of `fontmath.ltx` under the name `fontmath.cfg` and change this copy. However, dealing with this interface is even

*This file has version number ?, dated ?

more a job for an expert than changing the text font setup — in short, we don't encourage either.

> **Warning:** please note that we don't support customised LaTeX versions. Thus, before sending in a bug report please try your test file with a LaTeX format which is not customised and send in the log from that version (unless the problem goes away).

Please note: the following standard encodings have to be defined in all local variants of `font....cfg` to guarantee that all LaTeX installations behave in the same way.

`T1`	Cork TeX text encoding
`OT1`	old TeX text encoding
`U`	unknown encoding
`OML`	old TeX math letters encoding
`OMS`	old TeX math symbols encoding
`OMX`	old TeX math extension symbols encoding
`TU`	Unicode

Notice that some of these encodings are 'old' in the sense that we hope that they will be superseded soon by encoding standards defined by the TeX user community. Therefore this set of default encodings may change in the future.

The first candidate is `OT1` which will soon be replaced by `T1`, the official TeX text encoding.

> **Warning:** If you add additional encodings to this file there is no guarantee any longer that files processable at your installation will also be processable at other installations. Thus, if you make use of such an encoding in your document, e.g. if you intend to typeset in Cyrillic (`OT2` encoding), you need to specify this encoding in the preamble of your document prior to sending it to another installation. Once the encoding is specified in that place in your document, the document is processable at all LaTeX installations (provided they have suitable fonts installed).
>
> For this reason we suggest that you define a short package file that sets up an additional encoding used at your site (rather than putting the encoding into this file) since this package can easily be shipped with your document.

3 The `docstrip` modules

The following modules are used to direct `docstrip` in generating external files:

driver	produce a documentation driver file
text	produce the file `fonttext.ltx`
math	produce the file `fontmath.ltx`
cfgtext	produce a dummy `fonttext.cfg` file
cfgmath	produce a dummy `fontmath.cfg` file

A typical `docstrip` command file would then have entries like:

```
\generateFile{fonttext.ltx}{t}{\from{fontdef.dtx}{text}}
```

4 A driver for this document

The next bit of code contains the documentation driver file for TEX, i.e. the file that will produce the documentation you are currently reading. It will be extracted from this file by the DOCSTRIP program.

```
⟨*driver⟩
\documentclass{ltxdoc}
\GetFileInfo{fontdef.dtx}
\begin{document}
   \DocInput{fontdef.dtx}
\end{document}
⟨/driver⟩
```

5 The `fonttext.ltx` file

The identification is done earlier on with a `\ProvidesFile` declaration.

```
⟨*text⟩
\typeout{=== Don't modify this file, use a .cfg file instead ===^^J}
```

5.1 Encodings

This file declares the standard encodings for text and math fonts. All others should be declared in packages or in the documents directly.

For every text encoding there are normally a number of encoding specific commands, e.g. accents, special characters, etc. (The definition for such a command might have to change when the encoding is changed, because the character is in a different position, or not available at all, or the accent is produced in a different way.) This is handled by a general mechanism which is described in `ltoutenc.dtx`.

By convention, text encoding specific declarations, including the declaration `\DeclareFontEncoding`, are kept in separate file of the form ⟨*enc*⟩`enc.def`, e.g. `ot1enc.def`. This allows other applications to make use of the declarations as well.

Similar to the default encoding, the loading of the encoding files for the two major text encodings shouldn't be changed. In particular, the `inputenc` package depends on this.

```
\input {omlenc.def}
\input  {t1enc.def}
\input {ot1enc.def}       % <- should come after T1 for speed
\input {omsenc.def}

\ifx\Umathchar\@undefined
```

We then set set the default text font encoding. This will hopefully change some day to `T1`. This setting should *not* be changed to produce a portable format.

```
\fontencoding{OT1}
\else
```

Unicode.

```
\input {tuenc.def}
\fontencoding{TU}
\DeclareFontSubstitution{TU}{lmr}{m}{n}
\begingroup
\nfss@catcodes
\input  {tulmr.fd}
\input  {tulmss.fd}
\input  {tulmtt.fd}
\endgroup
\DeclareFontSubstitution{TU}{lmr}{m}{n}
```

End of Unicode branch.

```
\fi
```

If different encodings for text fonts are in use one could put the common setup into `\DeclareFontEncodingDefaults`. There is now a better mechanism so using this interface is discouraged!

```
\DeclareFontEncodingDefaults{}{}
```

Then we define the default substitution for every encoding. This release of LaTeX 2$_\varepsilon$ assumes that the ec fonts are available. It is possible to change this to point to some other font family (e.g., Times with the appropriate encoding if it is available) without making documents non-portable. However, in such a case documents will produce different page breaks at other sites. The substitution defaults can all be changed without losing portability as long as there are font shape definitions for the selected substitutions.

```
\DeclareFontSubstitution{T1}{cmr}{m}{n}
\DeclareFontSubstitution{OT1}{cmr}{m}{n}
```

For every encoding declaration, LaTeX 2$_\varepsilon$ will try to verify that the given substitution information makes sense, i.e. that it is impossible to go into an endless loop if font substitution happens. This is done at the moment the `\begin{document}` is encountered. LaTeX 2$_\varepsilon$ will then check that for every encoding the substitution defaults form a valid font shape group, which means that it will check if there is a `\DeclareFontShape` declaration for this combination. We will therefore load the corresponding `.fd` files now. If we don't do this they would be loaded at verification time (i.e. at `\begin{document}` which would delay processing unnecessarily.

> **Warning:** Please note that this means that you have to regenerate the format whenever you change any of these `.fd` files since LaTeX 2$_\varepsilon$ will not read `.fd` files if it already knows about the encoding/family combination.

The `\nfss@catcodes` ensures that white space is ignored in any definitions made in the fd files.

```
\begingroup
\nfss@catcodes
\input  {t1cmr.fd}
\input  {ot1cmr.fd}
\endgroup
```

We also load some other font definition files which are normally needed in a document. This is only done for processing speed and you can comment the next two lines out to save some memory. If necessary these files are then loaded when your document is processed. (Loading `.fd` files is a less drastic step compared to preloading fonts because the number of fonts is limited 255 at (nearly) every TEX installation, while the amount of main memory is not a limiting factor at most installations.)

```
\begingroup
\nfss@catcodes
\input {ot1cmss.fd}
\input {ot1cmtt.fd}
\endgroup
```

Even with all the precautions it is still possible that NFSS will run into problems, for example, when a `.fd` file contains corrupted data. To guard against such cases NFSS has a very low-level fallback font that is installed with the following line.

```
\DeclareErrorFont{OT1}{cmr}{m}{n}{10}
```

This means, "if everything else fails use Computer Modern Roman normal shape at 10pt in the old text encoding". You can change the font used but the encoding should be the same as the one specified with `\fontencoding` above.

5.2 Defaults

To allow the use of `\rmfamily`, `\sffamily`, etc. in documents even if non-standard families are used we provide nine macros which hold the name of the corresponding families, series, and so on. This makes it easy to use other font families (like Times Roman, etc.). One simply has to redefine these defaults.

All these hooks have to be defined in this file but you can change their meaning (except for `\encodingdefault`) without making documents non-portable.

`\encodingdefault` `\rmdefault` `\sfdefault` `\ttdefault`

The following three definitions set up the meaning for `\rmfamily`, `\sffamily`, and `\ttfamily`.

```
⟨/text⟩
⟨*text | latexrelease⟩
⟨latexrelease⟩\IncludeInRelease{2017/04/01}%
⟨latexrelease⟩                    {\encodingdefault}{TU encoding default}%
\ifx\Umathchar\@undefined
\newcommand\encodingdefault{OT1}
\newcommand\rmdefault{cmr}
```

```
\newcommand\sfdefault{cmss}
\newcommand\ttdefault{cmtt}
\else
\newcommand\encodingdefault{TU}
\newcommand\rmdefault{lmr}\fontfamily{\rmdefault}
\newcommand\sfdefault{lmss}
\newcommand\ttdefault{lmtt}
\fi
⟨latexrelease⟩\EndIncludeInRelease
⟨latexrelease⟩\IncludeInRelease{2017/01/01}%
⟨latexrelease⟩                    {\encodingdefault}{TU encoding default}%
⟨latexrelease⟩\ifx\Umathchar\@undefined
⟨latexrelease⟩\renewcommand\encodingdefault{OT1}
⟨latexrelease⟩\renewcommand\rmdefault{cmr}
⟨latexrelease⟩\renewcommand\sfdefault{cmss}
⟨latexrelease⟩\renewcommand\ttdefault{cmtt}
⟨latexrelease⟩\else
⟨latexrelease⟩\renewcommand\encodingdefault{TU}
⟨latexrelease⟩\renewcommand\rmdefault{lmr}
⟨latexrelease⟩\renewcommand\sfdefault{lmss}
⟨latexrelease⟩\renewcommand\ttdefault{lmtt}
⟨latexrelease⟩\fi
⟨latexrelease⟩\EndIncludeInRelease
⟨latexrelease⟩\IncludeInRelease{0000/00/00}%
⟨latexrelease⟩                    {\encodingdefault}{TU encoding default}%
⟨latexrelease⟩\renewcommand\encodingdefault{OT1}
⟨latexrelease⟩\renewcommand\rmdefault{cmr}
⟨latexrelease⟩\renewcommand\sfdefault{cmss}
⟨latexrelease⟩\renewcommand\ttdefault{cmtt}
⟨latexrelease⟩\EndIncludeInRelease
⟨/text | latexrelease⟩
⟨*text⟩
```

`\bfdefault` `\mddefault`

Series changing commands are influenced by the following hooks.

```
\newcommand\bfdefault{bx}
\newcommand\mddefault{m}
```

`\itdefault` `\sldefault` `\scdefault` `\updefault`

Shape changing commands use the following hooks.

```
\newcommand\itdefault{it}
\newcommand\sldefault{sl}
\newcommand\scdefault{sc}
\newcommand\updefault{n}
```

`\familydefault` `\seriesdefault` `\shapedefault`

Finally we have the hooks that describe the behaviour of the `\normalfont` command. To stay portable, the definition of `\encodingdefault` should *not* be changed and should match the setting above for `\fontencoding`. All other values can be set according to your taste.

```
\newcommand\familydefault{\rmdefault}
\newcommand\seriesdefault{\mddefault}
\newcommand\shapedefault{\updefault}
```

This finishes the low-level setup in `fonttext.ltx`.

90 ⟨/text⟩

6 The `fontmath.ltx` file

The identification is done earlier on with a `\ProvidesFile` declaration.

91 ⟨*math⟩
92 `\typeout{=== Don't modify this file, use a .cfg file instead ===^^J}`

6.1 The font encodings used

```
93 \DeclareFontEncoding{OML}{}{}
94 \DeclareFontEncoding{OMS}{}{}
95 \DeclareFontEncoding{OMX}{}{}
```

Finally a declaration for `U` encoding which serves for all fonts that do not fit standard encodings. For math this sets up `\noaccents@` providing for AMS-LaTeX. This macro is used therein to handle accented characters if they are not supported by the font. In other words, if fonts with `U` encoding are used in math, all accents (like from `\breve`) are obtained from some other font that has them.

```
96 \DeclareFontEncoding{U}{}{\noaccents@}
```

The encodings for math are next:

```
97 \DeclareFontSubstitution{OML}{cmm}{m}{it}
98 \DeclareFontSubstitution{OMS}{cmsy}{m}{n}
99 \DeclareFontSubstitution{OMX}{cmex}{m}{n}
100 \DeclareFontSubstitution{U}{cmr}{m}{n}
```

```
101 \begingroup
102 \nfss@catcodes
103 \input  {omlcmm.fd}
104 \input  {omscmsy.fd}
105 \input  {omxcmex.fd}
106 \input  {ucmr.fd}
107 \endgroup
```

6.1.1 Symbolfont and Alphabet declarations

We now define the basic symbol fonts used by LaTeX. These four symbol fonts must be defined by this file.

It is possible to make the symbol fonts point to other external fonts without losing the ability to process documents written at other sites, as long as one defines the same symbol font names with the same encodings, e.g. `operators` with `OT1` etc. If other encodings are used documents become non-portable. Such a change should therefore be done in a package file.

```
108 \DeclareSymbolFont{operators}   {OT1}{cmr} {m}{n}
109 \DeclareSymbolFont{letters}     {OML}{cmm} {m}{it}
110 \DeclareSymbolFont{symbols}     {OMS}{cmsy}{m}{n}
111 \DeclareSymbolFont{largesymbols}{OMX}{cmex}{m}{n}
```

```
\SetSymbolFont{operators}{bold}{OT1}{cmr} {bx}{n}
\SetSymbolFont{letters}  {bold}{OML}{cmm} {b}{it}
\SetSymbolFont{symbols}  {bold}{OMS}{cmsy}{b}{n}
```

Below are the seven math alphabets which are defined by NFSS. Again they must be defined by this file. However, as before you can change the fonts used without losing portability, but you should be careful when changing the encoding since that may make documents come out wrong.

```
\DeclareSymbolFontAlphabet{\mathrm}    {operators}
\DeclareSymbolFontAlphabet{\mathnormal}{letters}
\DeclareSymbolFontAlphabet{\mathcal}   {symbols}
\DeclareMathAlphabet       {\mathbf}{OT1}{cmr}{bx}{n}
\DeclareMathAlphabet       {\mathsf}{OT1}{cmss}{m}{n}
\DeclareMathAlphabet       {\mathit}{OT1}{cmr}{m}{it}
\DeclareMathAlphabet       {\mathtt}{OT1}{cmtt}{m}{n}
```

Given the currently available fonts we cannot bold-en `\mathbf` and `\mathtt` but in principle one could use 'ultra bold' or something. The alphabets defined via `\DeclareSymbolFontAlphabet` will change automatically in a new math version if the corresponding symbol font changes.

```
\SetMathAlphabet\mathsf{bold}{OT1}{cmss}{bx}{n}
\SetMathAlphabet\mathit{bold}{OT1}{cmr}{bx}{it}
```

6.2 Math font sizes

The declarations below declare the text, script and scriptscript size to be used for each text font size.

All occurrences of sizes longer than a single character are replaced with the macro name that holds them, saving a number of tokens (but losing a bit of speed, so this may not stay this way).

```
\DeclareMathSizes{5}{5}{5}{5}
\DeclareMathSizes{6}{6}{5}{5}
\DeclareMathSizes{7}{7}{5}{5}
\DeclareMathSizes{8}{8}{6}{5}
\DeclareMathSizes{9}{9}{6}{5}
\DeclareMathSizes{\@xpt}{\@xpt}{7}{5}
\DeclareMathSizes{\@xipt}{\@xipt}{8}{6}
\DeclareMathSizes{\@xiipt}{\@xiipt}{8}{6}
\DeclareMathSizes{\@xivpt}{\@xivpt}{\@xpt}{7}
\DeclareMathSizes{\@xviipt}{\@xviipt}{\@xiipt}{\@xpt}
\DeclareMathSizes{\@xxpt}{\@xxpt}{\@xivpt}{\@xiipt}
\DeclareMathSizes{\@xxvpt}{\@xxvpt}{\@xxpt}{\@xviipt}
```

6.3 The math symbol assignments

We start by setting up math codes for most of the characters typed in directly from the keyboard. Most of them are normally already setup up in the same way by IniTEX. However, we repeat them here to have a complete setup which can be exchanged with another if desired.

6.3.1 The letters

```
\DeclareMathSymbol{a}{\mathalpha}{letters}{`a}
\DeclareMathSymbol{b}{\mathalpha}{letters}{`b}
\DeclareMathSymbol{c}{\mathalpha}{letters}{`c}
\DeclareMathSymbol{d}{\mathalpha}{letters}{`d}
\DeclareMathSymbol{e}{\mathalpha}{letters}{`e}
\DeclareMathSymbol{f}{\mathalpha}{letters}{`f}
\DeclareMathSymbol{g}{\mathalpha}{letters}{`g}
\DeclareMathSymbol{h}{\mathalpha}{letters}{`h}
\DeclareMathSymbol{i}{\mathalpha}{letters}{`i}
\DeclareMathSymbol{j}{\mathalpha}{letters}{`j}
\DeclareMathSymbol{k}{\mathalpha}{letters}{`k}
\DeclareMathSymbol{l}{\mathalpha}{letters}{`l}
\DeclareMathSymbol{m}{\mathalpha}{letters}{`m}
\DeclareMathSymbol{n}{\mathalpha}{letters}{`n}
\DeclareMathSymbol{o}{\mathalpha}{letters}{`o}
\DeclareMathSymbol{p}{\mathalpha}{letters}{`p}
\DeclareMathSymbol{q}{\mathalpha}{letters}{`q}
\DeclareMathSymbol{r}{\mathalpha}{letters}{`r}
\DeclareMathSymbol{s}{\mathalpha}{letters}{`s}
\DeclareMathSymbol{t}{\mathalpha}{letters}{`t}
\DeclareMathSymbol{u}{\mathalpha}{letters}{`u}
\DeclareMathSymbol{v}{\mathalpha}{letters}{`v}
\DeclareMathSymbol{w}{\mathalpha}{letters}{`w}
\DeclareMathSymbol{x}{\mathalpha}{letters}{`x}
\DeclareMathSymbol{y}{\mathalpha}{letters}{`y}
\DeclareMathSymbol{z}{\mathalpha}{letters}{`z}

\DeclareMathSymbol{A}{\mathalpha}{letters}{`A}
\DeclareMathSymbol{B}{\mathalpha}{letters}{`B}
\DeclareMathSymbol{C}{\mathalpha}{letters}{`C}
\DeclareMathSymbol{D}{\mathalpha}{letters}{`D}
\DeclareMathSymbol{E}{\mathalpha}{letters}{`E}
\DeclareMathSymbol{F}{\mathalpha}{letters}{`F}
\DeclareMathSymbol{G}{\mathalpha}{letters}{`G}
\DeclareMathSymbol{H}{\mathalpha}{letters}{`H}
\DeclareMathSymbol{I}{\mathalpha}{letters}{`I}
\DeclareMathSymbol{J}{\mathalpha}{letters}{`J}
\DeclareMathSymbol{K}{\mathalpha}{letters}{`K}
\DeclareMathSymbol{L}{\mathalpha}{letters}{`L}
\DeclareMathSymbol{M}{\mathalpha}{letters}{`M}
\DeclareMathSymbol{N}{\mathalpha}{letters}{`N}
\DeclareMathSymbol{O}{\mathalpha}{letters}{`O}
\DeclareMathSymbol{P}{\mathalpha}{letters}{`P}
\DeclareMathSymbol{Q}{\mathalpha}{letters}{`Q}
\DeclareMathSymbol{R}{\mathalpha}{letters}{`R}
\DeclareMathSymbol{S}{\mathalpha}{letters}{`S}
\DeclareMathSymbol{T}{\mathalpha}{letters}{`T}
\DeclareMathSymbol{U}{\mathalpha}{letters}{`U}
\DeclareMathSymbol{V}{\mathalpha}{letters}{`V}
```

```
\DeclareMathSymbol{W}{\mathalpha}{letters}{`W}
\DeclareMathSymbol{X}{\mathalpha}{letters}{`X}
\DeclareMathSymbol{Y}{\mathalpha}{letters}{`Y}
\DeclareMathSymbol{Z}{\mathalpha}{letters}{`Z}
```

6.3.2 The digits

```
\DeclareMathSymbol{0}{\mathalpha}{operators}{`0}
\DeclareMathSymbol{1}{\mathalpha}{operators}{`1}
\DeclareMathSymbol{2}{\mathalpha}{operators}{`2}
\DeclareMathSymbol{3}{\mathalpha}{operators}{`3}
\DeclareMathSymbol{4}{\mathalpha}{operators}{`4}
\DeclareMathSymbol{5}{\mathalpha}{operators}{`5}
\DeclareMathSymbol{6}{\mathalpha}{operators}{`6}
\DeclareMathSymbol{7}{\mathalpha}{operators}{`7}
\DeclareMathSymbol{8}{\mathalpha}{operators}{`8}
\DeclareMathSymbol{9}{\mathalpha}{operators}{`9}
```

6.3.3 Punctuation, brace, etc. keys

```
\DeclareMathSymbol{!}{\mathclose}{operators}{"21}
\DeclareMathSymbol{*}{\mathbin}{symbols}{"03} % \ast
\DeclareMathSymbol{+}{\mathbin}{operators}{"2B}
\DeclareMathSymbol{,}{\mathpunct}{letters}{"3B}
\DeclareMathSymbol{-}{\mathbin}{symbols}{"00}
\DeclareMathSymbol{.}{\mathord}{letters}{"3A}
\DeclareMathSymbol{:}{\mathrel}{operators}{"3A}
\DeclareMathSymbol{;}{\mathpunct}{operators}{"3B}
\DeclareMathSymbol{=}{\mathrel}{operators}{"3D}
\DeclareMathSymbol{?}{\mathclose}{operators}{"3F}
```

The following symbols are defined as delimiters below which automatically defines them as math symbols.

```
%\DeclareMathSymbol{(}{\mathopen}{operators}{"28}
%\DeclareMathSymbol{)}{\mathclose}{operators}{"29}
%\DeclareMathSymbol{/}{\mathord}{letters}{"3D}
%\DeclareMathSymbol{[}{\mathopen}{operators}{"5B}
%\DeclareMathSymbol{]}{\mathclose}{operators}{"5D}
%\DeclareMathSymbol{|}{\mathord}{symbols}{"6A}
%\DeclareMathSymbol{<}{\mathrel}{letters}{"3C}
%\DeclareMathSymbol{>}{\mathrel}{letters}{"3E}
```

Should all of the following being activated by default? Probably not.

```
%\DeclareMathSymbol{`\{}{\mathopen}{symbols}{"66}
%\DeclareMathSymbol{`\}}{\mathclose}{symbols}{"67}
%\DeclareMathSymbol{`\\}{\mathord}{symbols}{"6E} % \backslash
\mathcode`\ ="8000 % \space
\mathcode`\'="8000 % ^\prime
\mathcode`\_="8000 % \_
```

6.3.4 Delimitercodes for characters

[to be completed]

Finally, IniTEX sets all `\delcode` values to -1, except `\delcode‘.=0`

```
\DeclareMathDelimiter{(}{\mathopen} {operators}{"28}{largesymbols}{"00}
\DeclareMathDelimiter{)}{\mathclose}{operators}{"29}{largesymbols}{"01}
\DeclareMathDelimiter{[}{\mathopen} {operators}{"5B}{largesymbols}{"02}
\DeclareMathDelimiter{]}{\mathclose}{operators}{"5D}{largesymbols}{"03}
```

The next two are considered to be relations when not used in the context of a delimiter! And worse, they do even represent different glyphs when being used as delimiter and not as delimiter. This is a user level syntax inherited from plain TEX. Therefore we explicitly redefine the math symbol definitions for these symbols afterwards.

```
\DeclareMathDelimiter{<}{\mathopen}{symbols}{"68}{largesymbols}{"0A}
\DeclareMathDelimiter{>}{\mathclose}{symbols}{"69}{largesymbols}{"0B}
\DeclareMathSymbol{<}{\mathrel}{letters}{"3C}
\DeclareMathSymbol{>}{\mathrel}{letters}{"3E}
```

And here is another case where the non-delimiter version produces a glyph different from the delimiter version.

```
\DeclareMathDelimiter{/}{\mathord}{operators}{"2F}{largesymbols}{"0E}
\DeclareMathSymbol{/}{\mathord}{letters}{"3D}

\DeclareMathDelimiter{|}{\mathord}{symbols}{"6A}{largesymbols}{"0C}

\expandafter\DeclareMathDelimiter\@backslashchar
                        {\mathord}{symbols}{"6E}{largesymbols}{"0F}
```

N.B. `{` and `}` should NOT get delcodes; otherwise parameter grouping fails!

6.4 Symbols accessed via control sequences

6.4.1 Greek letters

```
\DeclareMathSymbol{\alpha}{\mathord}{letters}{"0B}
\DeclareMathSymbol{\beta}{\mathord}{letters}{"0C}
\DeclareMathSymbol{\gamma}{\mathord}{letters}{"0D}
\DeclareMathSymbol{\delta}{\mathord}{letters}{"0E}
\DeclareMathSymbol{\epsilon}{\mathord}{letters}{"0F}
\DeclareMathSymbol{\zeta}{\mathord}{letters}{"10}
\DeclareMathSymbol{\eta}{\mathord}{letters}{"11}
\DeclareMathSymbol{\theta}{\mathord}{letters}{"12}
\DeclareMathSymbol{\iota}{\mathord}{letters}{"13}
\DeclareMathSymbol{\kappa}{\mathord}{letters}{"14}
\DeclareMathSymbol{\lambda}{\mathord}{letters}{"15}
\DeclareMathSymbol{\mu}{\mathord}{letters}{"16}
\DeclareMathSymbol{\nu}{\mathord}{letters}{"17}
\DeclareMathSymbol{\xi}{\mathord}{letters}{"18}
\DeclareMathSymbol{\pi}{\mathord}{letters}{"19}
\DeclareMathSymbol{\rho}{\mathord}{letters}{"1A}
\DeclareMathSymbol{\sigma}{\mathord}{letters}{"1B}
\DeclareMathSymbol{\tau}{\mathord}{letters}{"1C}
\DeclareMathSymbol{\upsilon}{\mathord}{letters}{"1D}
\DeclareMathSymbol{\phi}{\mathord}{letters}{"1E}
```

```
\DeclareMathSymbol{\chi}{\mathord}{letters}{"1F}
\DeclareMathSymbol{\psi}{\mathord}{letters}{"20}
\DeclareMathSymbol{\omega}{\mathord}{letters}{"21}
\DeclareMathSymbol{\varepsilon}{\mathord}{letters}{"22}
\DeclareMathSymbol{\vartheta}{\mathord}{letters}{"23}
\DeclareMathSymbol{\varpi}{\mathord}{letters}{"24}
\DeclareMathSymbol{\varrho}{\mathord}{letters}{"25}
\DeclareMathSymbol{\varsigma}{\mathord}{letters}{"26}
\DeclareMathSymbol{\varphi}{\mathord}{letters}{"27}
\DeclareMathSymbol{\Gamma}{\mathalpha}{operators}{"00}
\DeclareMathSymbol{\Delta}{\mathalpha}{operators}{"01}
\DeclareMathSymbol{\Theta}{\mathalpha}{operators}{"02}
\DeclareMathSymbol{\Lambda}{\mathalpha}{operators}{"03}
\DeclareMathSymbol{\Xi}{\mathalpha}{operators}{"04}
\DeclareMathSymbol{\Pi}{\mathalpha}{operators}{"05}
\DeclareMathSymbol{\Sigma}{\mathalpha}{operators}{"06}
\DeclareMathSymbol{\Upsilon}{\mathalpha}{operators}{"07}
\DeclareMathSymbol{\Phi}{\mathalpha}{operators}{"08}
\DeclareMathSymbol{\Psi}{\mathalpha}{operators}{"09}
\DeclareMathSymbol{\Omega}{\mathalpha}{operators}{"0A}
```

6.4.2 Ordinary symbols

```
\DeclareMathSymbol{\aleph}{\mathord}{symbols}{"40}
\def\hbar{{\mathchar'26\mkern-9muh}}
\DeclareMathSymbol{\imath}{\mathord}{letters}{"7B}
\DeclareMathSymbol{\jmath}{\mathord}{letters}{"7C}
\DeclareMathSymbol{\ell}{\mathord}{letters}{"60}
\DeclareMathSymbol{\wp}{\mathord}{letters}{"7D}
\DeclareMathSymbol{\Re}{\mathord}{symbols}{"3C}
\DeclareMathSymbol{\Im}{\mathord}{symbols}{"3D}
\DeclareMathSymbol{\partial}{\mathord}{letters}{"40}
\DeclareMathSymbol{\infty}{\mathord}{symbols}{"31}
\DeclareMathSymbol{\prime}{\mathord}{symbols}{"30}
\DeclareMathSymbol{\emptyset}{\mathord}{symbols}{"3B}
\DeclareMathSymbol{\nabla}{\mathord}{symbols}{"72}
\def\surd{{\mathchar"1270}}
\DeclareMathSymbol{\top}{\mathord}{symbols}{"3E}
\DeclareMathSymbol{\bot}{\mathord}{symbols}{"3F}
\def\angle{{\vbox{\ialign{$\m@th\scriptstyle##$\crcr
      \not\mathrel{\mkern14mu}\crcr
      \noalign{\nointerlineskip}
      \mkern2.5mu\leaders\hrule \@height.34pt\hfill\mkern2.5mu\crcr}}}}
\DeclareMathSymbol{\triangle}{\mathord}{symbols}{"34}
\DeclareMathSymbol{\forall}{\mathord}{symbols}{"38}
\DeclareMathSymbol{\exists}{\mathord}{symbols}{"39}
\DeclareMathSymbol{\neg}{\mathord}{symbols}{"3A}
    \let\lnot=\neg
\DeclareMathSymbol{\flat}{\mathord}{letters}{"5B}
\DeclareMathSymbol{\natural}{\mathord}{letters}{"5C}
\DeclareMathSymbol{\sharp}{\mathord}{letters}{"5D}
```

```
\DeclareMathSymbol{\clubsuit}{\mathord}{symbols}{"7C}
\DeclareMathSymbol{\diamondsuit}{\mathord}{symbols}{"7D}
\DeclareMathSymbol{\heartsuit}{\mathord}{symbols}{"7E}
\DeclareMathSymbol{\spadesuit}{\mathord}{symbols}{"7F}
```

6.4.3 Large Operators

```
\DeclareMathSymbol{\coprod}{\mathop}{largesymbols}{"60}
\DeclareMathSymbol{\bigvee}{\mathop}{largesymbols}{"57}
\DeclareMathSymbol{\bigwedge}{\mathop}{largesymbols}{"56}
\DeclareMathSymbol{\biguplus}{\mathop}{largesymbols}{"55}
\DeclareMathSymbol{\bigcap}{\mathop}{largesymbols}{"54}
\DeclareMathSymbol{\bigcup}{\mathop}{largesymbols}{"53}
\DeclareMathSymbol{\intop}{\mathop}{largesymbols}{"52}
    \def\int{\intop\nolimits}
\DeclareMathSymbol{\prod}{\mathop}{largesymbols}{"51}
\DeclareMathSymbol{\sum}{\mathop}{largesymbols}{"50}
\DeclareMathSymbol{\bigotimes}{\mathop}{largesymbols}{"4E}
\DeclareMathSymbol{\bigoplus}{\mathop}{largesymbols}{"4C}
\DeclareMathSymbol{\bigodot}{\mathop}{largesymbols}{"4A}
\DeclareMathSymbol{\ointop}{\mathop}{largesymbols}{"48}
    \def\oint{\ointop\nolimits}
\DeclareMathSymbol{\bigsqcup}{\mathop}{largesymbols}{"46}
\DeclareMathSymbol{\smallint}{\mathop}{symbols}{"73}
```

6.4.4 Binary symbols

```
\DeclareMathSymbol{\triangleleft}{\mathbin}{letters}{"2F}
\DeclareMathSymbol{\triangleright}{\mathbin}{letters}{"2E}
\DeclareMathSymbol{\bigtriangleup}{\mathbin}{symbols}{"34}
\DeclareMathSymbol{\bigtriangledown}{\mathbin}{symbols}{"35}
   \let \varbigtriangledown \bigtriangledown
   \let \varbigtriangleup \bigtriangleup
```

These last two synonyms are needed because the stamryrd package redefines them as Operators.

```
\DeclareMathSymbol{\wedge}{\mathbin}{symbols}{"5E}
   \let\land=\wedge
\DeclareMathSymbol{\vee}{\mathbin}{symbols}{"5F}
   \let\lor=\vee
\DeclareMathSymbol{\cap}{\mathbin}{symbols}{"5C}
\DeclareMathSymbol{\cup}{\mathbin}{symbols}{"5B}
\DeclareMathSymbol{\ddagger}{\mathbin}{symbols}{"7A}
\DeclareMathSymbol{\dagger}{\mathbin}{symbols}{"79}
\DeclareMathSymbol{\sqcap}{\mathbin}{symbols}{"75}
\DeclareMathSymbol{\sqcup}{\mathbin}{symbols}{"74}
\DeclareMathSymbol{\uplus}{\mathbin}{symbols}{"5D}
\DeclareMathSymbol{\amalg}{\mathbin}{symbols}{"71}
\DeclareMathSymbol{\diamond}{\mathbin}{symbols}{"05}
\DeclareMathSymbol{\bullet}{\mathbin}{symbols}{"0F}
\DeclareMathSymbol{\wr}{\mathbin}{symbols}{"6F}
\DeclareMathSymbol{\div}{\mathbin}{symbols}{"04}
```

```
\DeclareMathSymbol{\odot}{\mathbin}{symbols}{"0C}
\DeclareMathSymbol{\oslash}{\mathbin}{symbols}{"0B}
\DeclareMathSymbol{\otimes}{\mathbin}{symbols}{"0A}
\DeclareMathSymbol{\ominus}{\mathbin}{symbols}{"09}
\DeclareMathSymbol{\oplus}{\mathbin}{symbols}{"08}
\DeclareMathSymbol{\mp}{\mathbin}{symbols}{"07}
\DeclareMathSymbol{\pm}{\mathbin}{symbols}{"06}
\DeclareMathSymbol{\circ}{\mathbin}{symbols}{"0E}
\DeclareMathSymbol{\bigcirc}{\mathbin}{symbols}{"0D}
\DeclareMathSymbol{\setminus}{\mathbin}{symbols}{"6E}
\DeclareMathSymbol{\cdot}{\mathbin}{symbols}{"01}
\DeclareMathSymbol{\ast}{\mathbin}{symbols}{"03}
\DeclareMathSymbol{\times}{\mathbin}{symbols}{"02}
\DeclareMathSymbol{\star}{\mathbin}{letters}{"3F}
```

6.4.5 Relations

```
\DeclareMathSymbol{\propto}{\mathrel}{symbols}{"2F}
\DeclareMathSymbol{\sqsubseteq}{\mathrel}{symbols}{"76}
\DeclareMathSymbol{\sqsupseteq}{\mathrel}{symbols}{"77}
\DeclareMathSymbol{\parallel}{\mathrel}{symbols}{"6B}
\DeclareMathSymbol{\mid}{\mathrel}{symbols}{"6A}
\DeclareMathSymbol{\dashv}{\mathrel}{symbols}{"61}
\DeclareMathSymbol{\vdash}{\mathrel}{symbols}{"60}
\DeclareMathSymbol{\nearrow}{\mathrel}{symbols}{"25}
\DeclareMathSymbol{\searrow}{\mathrel}{symbols}{"26}
\DeclareMathSymbol{\nwarrow}{\mathrel}{symbols}{"2D}
\DeclareMathSymbol{\swarrow}{\mathrel}{symbols}{"2E}
\DeclareMathSymbol{\Leftrightarrow}{\mathrel}{symbols}{"2C}
\DeclareMathSymbol{\Leftarrow}{\mathrel}{symbols}{"28}
\DeclareMathSymbol{\Rightarrow}{\mathrel}{symbols}{"29}
\def\neq{\not=} \let\ne=\neq
\DeclareMathSymbol{\leq}{\mathrel}{symbols}{"14}
   \let\le=\leq
\DeclareMathSymbol{\geq}{\mathrel}{symbols}{"15}
   \let\ge=\geq
\DeclareMathSymbol{\succ}{\mathrel}{symbols}{"1F}
\DeclareMathSymbol{\prec}{\mathrel}{symbols}{"1E}
\DeclareMathSymbol{\approx}{\mathrel}{symbols}{"19}
\DeclareMathSymbol{\succeq}{\mathrel}{symbols}{"17}
\DeclareMathSymbol{\preceq}{\mathrel}{symbols}{"16}
\DeclareMathSymbol{\supset}{\mathrel}{symbols}{"1B}
\DeclareMathSymbol{\subset}{\mathrel}{symbols}{"1A}
\DeclareMathSymbol{\supseteq}{\mathrel}{symbols}{"13}
\DeclareMathSymbol{\subseteq}{\mathrel}{symbols}{"12}
\DeclareMathSymbol{\in}{\mathrel}{symbols}{"32}
\DeclareMathSymbol{\ni}{\mathrel}{symbols}{"33}
    \let\owns=\ni
\DeclareMathSymbol{\gg}{\mathrel}{symbols}{"1D}
\DeclareMathSymbol{\ll}{\mathrel}{symbols}{"1C}
\DeclareMathSymbol{\not}{\mathrel}{symbols}{"36}
```

```
\DeclareMathSymbol{\leftrightarrow}{\mathrel}{symbols}{"24}
\DeclareMathSymbol{\leftarrow}{\mathrel}{symbols}{"20}
   \let\gets=\leftarrow
\DeclareMathSymbol{\rightarrow}{\mathrel}{symbols}{"21}
   \let\to=\rightarrow
\DeclareMathSymbol{\mapstochar}{\mathrel}{symbols}{"37}
   \def\mapsto{\mapstochar\rightarrow}
\DeclareMathSymbol{\sim}{\mathrel}{symbols}{"18}
\DeclareMathSymbol{\simeq}{\mathrel}{symbols}{"27}
\DeclareMathSymbol{\perp}{\mathrel}{symbols}{"3F}
\DeclareMathSymbol{\equiv}{\mathrel}{symbols}{"11}
\DeclareMathSymbol{\asymp}{\mathrel}{symbols}{"10}
\DeclareMathSymbol{\smile}{\mathrel}{letters}{"5E}
\DeclareMathSymbol{\frown}{\mathrel}{letters}{"5F}
\DeclareMathSymbol{\leftharpoonup}{\mathrel}{letters}{"28}
\DeclareMathSymbol{\leftharpoondown}{\mathrel}{letters}{"29}
\DeclareMathSymbol{\rightharpoonup}{\mathrel}{letters}{"2A}
\DeclareMathSymbol{\rightharpoondown}{\mathrel}{letters}{"2B}
```

Here cometh much profligate robustification of math constructs. Warning: some of these commands may become non-robust if an AMS package is loaded.

Further potential problems: some math font packages may make unfortunate assumptions about some of these definitions that are not true of the robust versions we need.

```
\DeclareRobustCommand
  \cong{\mathrel{\mathpalette\@vereq\sim}} % congruence sign
\def\@vereq#1#2{\lower.5\p@\vbox{\lineskiplimit\maxdimen\lineskip-.5\p@
    \ialign{$\m@th#1\hfil##\hfil$\crcr#2\crcr=\crcr}}}
\DeclareRobustCommand
  \notin{\mathrel{\m@th\mathpalette\c@ncel\in}}
\def\c@ncel#1#2{\m@th\ooalign{$\hfil#1\mkern1mu/\hfil$\crcr$#1#2$}}
\DeclareRobustCommand
  \rightleftharpoons{\mathrel{\mathpalette\rlh@{}}}
\def\rlh@#1{\vcenter{\m@th\hbox{\ooalign{\raise2pt
          \hbox{$#1\rightharpoonup$}\crcr
        $#1\leftharpoondown$}}}}
\DeclareRobustCommand
  \doteq{\buildrel\textstyle.\over=}
```

6.4.6 Arrows

```
\DeclareRobustCommand
  \joinrel{\mathrel{\mkern-3mu}}
\DeclareRobustCommand
  \relbar{\mathrel{\smash-}} % \smash, because -
                             % has the same height as +
```

In contrast to `plain.tex` `\Relbar` got braces around the equal sign to guard against it being "math active" expanding to `\futurelet...`. This might be the case when packages are implementing shorthands for math, e.g. `=>` meaning `\Rightarrow` etc. It would actually be better not to use `=` in such definitions

but instead define something like \mathequalsign and use this. However we can't do this now as it would break other math layouts where characters are in different places (since those wouldn't know about the need for a new command name).

```
\DeclareRobustCommand
  \Relbar{\mathrel{=}}
\DeclareMathSymbol{\lhook}{\mathrel}{letters}{"2C}
   \def\hookrightarrow{\lhook\joinrel\rightarrow}
\DeclareMathSymbol{\rhook}{\mathrel}{letters}{"2D}
   \def\hookleftarrow{\leftarrow\joinrel\rhook}
\DeclareRobustCommand
  \bowtie{\mathrel\triangleright\joinrel\mathrel\triangleleft}
\DeclareRobustCommand
  \models{\mathrel{|}\joinrel\Relbar}
\DeclareRobustCommand
  \Longrightarrow{\Relbar\joinrel\Rightarrow}
```

LaTeX Change: \longrightarrow and \longleftarrow redefined to make then robust.

```
\DeclareRobustCommand\longrightarrow
     {\relbar\joinrel\rightarrow}
\DeclareRobustCommand\longleftarrow
     {\leftarrow\joinrel\relbar}
\DeclareRobustCommand
  \Longleftarrow{\Leftarrow\joinrel\Relbar}
\DeclareRobustCommand
  \longmapsto{\mapstochar\longrightarrow}
\DeclareRobustCommand
  \longleftrightarrow{\leftarrow\joinrel\rightarrow}
\DeclareRobustCommand
  \Longleftrightarrow{\Leftarrow\joinrel\Rightarrow}
\DeclareRobustCommand
  \iff{\;\Longleftrightarrow\;}
```

6.4.7 Punctuation symbols

```
\DeclareMathSymbol{\ldotp}{\mathpunct}{letters}{"3A}
\DeclareMathSymbol{\cdotp}{\mathpunct}{symbols}{"01}
\DeclareMathSymbol{\colon}{\mathpunct}{operators}{"3A}
```

This is commented out, since \ldots is now defined in ltoutenc.dtx.

```
%\def\@ldots{\mathinner{\ldotp\ldotp\ldotp}}
%\DeclareRobustCommand\ldots
%          {\relax\ifmmode\@ldots\else\mbox{$\m@th\@ldots\,$}\fi}
\DeclareRobustCommand
  \cdots{\mathinner{\cdotp\cdotp\cdotp}}
\DeclareRobustCommand
  \vdots{\vbox{\baselineskip4\p@ \lineskiplimit\z@
    \kern6\p@\hbox{.}\hbox{.}\hbox{.}}}
\DeclareRobustCommand
  \ddots{\mathinner{\mkern1mu\raise7\p@
    \vbox{\kern7\p@\hbox{.}}\mkern2mu
```

```
    \raise4\p@\hbox{.}\mkern2mu\raise\p@\hbox{.}\mkern1mu}}
```

6.4.8 Math accents

```
\DeclareMathAccent{\acute}{\mathalpha}{operators}{"13}
\DeclareMathAccent{\grave}{\mathalpha}{operators}{"12}
\DeclareMathAccent{\ddot}{\mathalpha}{operators}{"7F}
\DeclareMathAccent{\tilde}{\mathalpha}{operators}{"7E}
\DeclareMathAccent{\bar}{\mathalpha}{operators}{"16}
\DeclareMathAccent{\breve}{\mathalpha}{operators}{"15}
\DeclareMathAccent{\check}{\mathalpha}{operators}{"14}
\DeclareMathAccent{\hat}{\mathalpha}{operators}{"5E}
\DeclareMathAccent{\vec}{\mathord}{letters}{"7E}
\DeclareMathAccent{\dot}{\mathalpha}{operators}{"5F}
\DeclareMathAccent{\widetilde}{\mathord}{largesymbols}{"65}
\DeclareMathAccent{\widehat}{\mathord}{largesymbols}{"62}
```

For some reason plain TEX never bothered to provide a ring accent in math (although it is available in the fonts), but since we got a request for it here we go:

```
\DeclareMathAccent{\mathring}{\mathalpha}{operators}{"17}
```

6.4.9 Radicals

```
\DeclareMathRadical{\sqrtsign}{symbols}{"70}{largesymbols}{"70}
```

6.4.10 Over and under something, etc

```
\def\overrightarrow#1{\vbox{\m@th\ialign{##\crcr
      \rightarrowfill\crcr\noalign{\kern-\p@\nointerlineskip}
      $\hfil\displaystyle{#1}\hfil$\crcr}}}
\def\overleftarrow#1{\vbox{\m@th\ialign{##\crcr
      \leftarrowfill\crcr\noalign{\kern-\p@\nointerlineskip}%
      $\hfil\displaystyle{#1}\hfil$\crcr}}}
\def\overbrace#1{\mathop{\vbox{\m@th\ialign{##\crcr\noalign{\kern3\p@}%
      \downbracefill\crcr\noalign{\kern3\p@\nointerlineskip}%
      $\hfil\displaystyle{#1}\hfil$\crcr}}}\limits}
\def\underbrace#1{\mathop{\vtop{\m@th\ialign{##\crcr
   $\hfil\displaystyle{#1}\hfil$\crcr
   \noalign{\kern3\p@\nointerlineskip}%
   \upbracefill\crcr\noalign{\kern3\p@}}}}\limits}
```

(quite a waste of tokens, IMHO — Frank)

```
\def\skew#1#2#3{{\muskip\z@#1mu\divide\muskip\z@\tw@ \mkern\muskip\z@
    #2{\mkern-\muskip\z@{#3}\mkern\muskip\z@}\mkern-\muskip\z@}{}}
\def\rightarrowfill{$\m@th\smash-\mkern-7mu%
  \cleaders\hbox{$\mkern-2mu\smash-\mkern-2mu$}\hfill
  \mkern-7mu\mathord\rightarrow$}
\def\leftarrowfill{$\m@th\mathord\leftarrow\mkern-7mu%
  \cleaders\hbox{$\mkern-2mu\smash-\mkern-2mu$}\hfill
  \mkern-7mu\smash-$}
\DeclareMathSymbol{\braceld}{\mathord}{largesymbols}{"7A}
\DeclareMathSymbol{\bracerd}{\mathord}{largesymbols}{"7B}
\DeclareMathSymbol{\bracelu}{\mathord}{largesymbols}{"7C}
```

```
\DeclareMathSymbol{\braceru}{\mathord}{largesymbols}{"7D}
\def\downbracefill{$\m@th \setbox\z@\hbox{$\braceld$}%
  \braceld\leaders\vrule \@height\ht\z@ \@depth\z@\hfill\braceru
  \bracelu\leaders\vrule \@height\ht\z@ \@depth\z@\hfill\bracerd$}
\def\upbracefill{$\m@th \setbox\z@\hbox{$\braceld$}%
  \bracelu\leaders\vrule \@height\ht\z@ \@depth\z@\hfill\bracerd
  \braceld\leaders\vrule \@height\ht\z@ \@depth\z@\hfill\braceru$}
```

6.4.11 Delimiters

```
\DeclareMathDelimiter{\lmoustache}   % top from (, bottom from )
   {\mathopen}{largesymbols}{"7A}{largesymbols}{"40}
\DeclareMathDelimiter{\rmoustache}   % top from ), bottom from (
   {\mathclose}{largesymbols}{"7B}{largesymbols}{"41}
\DeclareMathDelimiter{\arrowvert}    % arrow without arrowheads
   {\mathord}{symbols}{"6A}{largesymbols}{"3C}
\DeclareMathDelimiter{\Arrowvert}    % double arrow without arrowheads
   {\mathord}{symbols}{"6B}{largesymbols}{"3D}
\DeclareMathDelimiter{\Vert}
   {\mathord}{symbols}{"6B}{largesymbols}{"0D}
\let\|=\Vert
\DeclareMathDelimiter{\vert}
   {\mathord}{symbols}{"6A}{largesymbols}{"0C}
\DeclareMathDelimiter{\uparrow}
   {\mathrel}{symbols}{"22}{largesymbols}{"78}
\DeclareMathDelimiter{\downarrow}
   {\mathrel}{symbols}{"23}{largesymbols}{"79}
\DeclareMathDelimiter{\updownarrow}
   {\mathrel}{symbols}{"6C}{largesymbols}{"3F}
\DeclareMathDelimiter{\Uparrow}
   {\mathrel}{symbols}{"2A}{largesymbols}{"7E}
\DeclareMathDelimiter{\Downarrow}
   {\mathrel}{symbols}{"2B}{largesymbols}{"7F}
\DeclareMathDelimiter{\Updownarrow}
   {\mathrel}{symbols}{"6D}{largesymbols}{"77}
\DeclareMathDelimiter{\backslash}    % for double coset G\backslash H
   {\mathord}{symbols}{"6E}{largesymbols}{"0F}
\DeclareMathDelimiter{\rangle}
   {\mathclose}{symbols}{"69}{largesymbols}{"0B}
\DeclareMathDelimiter{\langle}
   {\mathopen}{symbols}{"68}{largesymbols}{"0A}
\DeclareMathDelimiter{\rbrace}
   {\mathclose}{symbols}{"67}{largesymbols}{"09}
\DeclareMathDelimiter{\lbrace}
   {\mathopen}{symbols}{"66}{largesymbols}{"08}
\DeclareMathDelimiter{\rceil}
   {\mathclose}{symbols}{"65}{largesymbols}{"07}
\DeclareMathDelimiter{\lceil}
   {\mathopen}{symbols}{"64}{largesymbols}{"06}
\DeclareMathDelimiter{\rfloor}
   {\mathclose}{symbols}{"63}{largesymbols}{"05}
```

```
\DeclareMathDelimiter{\lfloor}
   {\mathopen}{symbols}{"62}{largesymbols}{"04}
```

\lgroup
\rgroup
\bracevert

There are three plain TEX delimiters which are not fully supported by NFSS, since they partly point into a bold cmr font. Allocating a full symbol font, just to have three delimiters seems a bit too much given the limited space available. For this reason only the extensible sizes are supported. If this is not desired one can use, without losing portability, define `\mathbf` and `\mathtt` as font symbol alphabet (setting up `cmr/bx/n` and `cmtt/m/n` as symbol fonts first) and modify the delimiter declarations to point with their small variant to those symbol fonts. (This is done in `oldlfont.dtx` so look there for examples.)

```
\DeclareMathDelimiter{\lgroup} % extensible ( with sharper tips
     {\mathopen}{largesymbols}{"3A}{largesymbols}{"3A}
\DeclareMathDelimiter{\rgroup} % extensible ) with sharper tips
     {\mathclose}{largesymbols}{"3B}{largesymbols}{"3B}
\DeclareMathDelimiter{\bracevert} % the vertical bar that extends braces
     {\mathord}{largesymbols}{"3E}{largesymbols}{"3E}
```

6.5 Math versions of text commands

The `\mathunderscore` here is really a text definition, so it has been put back into `ltoutenc.dtx` (by Chris, 30/04/97) and should be removed from here.

These symbols are the math versions of text commands such as `\P`, `\$`, etc.

\mathparagraph
\mathsection
\mathdollar
\mathsterling
\mathunderscore

These math symbols are not in plain TEX.

```
\DeclareMathSymbol{\mathparagraph}{\mathord}{symbols}{"7B}
\DeclareMathSymbol{\mathsection}{\mathord}{symbols}{"78}
\DeclareMathSymbol{\mathdollar}{\mathord}{operators}{"24}
\def\mathsterling{\mathit{\mathchar"7024}}
\def\mathunderscore{\kern.06em\vbox{\hrule\@width.3em}}
```

\mathellipsis

This is plain TEX's `\ldots`.

```
\def\mathellipsis{\mathinner{\ldotp\ldotp\ldotp}}%
```

6.6 Other special functions and parameters

6.6.1 Biggggg

```
⟨/math⟩
⟨*math | latexrelease⟩
⟨latexrelease⟩\IncludeInRelease{2018/12/01}%
⟨latexrelease⟩                    {\Big}{Start LR-mode}%
\def\big#1{\leavevmode@ifvmode
   {\hbox{$\left#1\vbox to8.5\p@{}\right.\n@space$}}}
\def\Big#1{\leavevmode@ifvmode
   {\hbox{$\left#1\vbox to11.5\p@{}\right.\n@space$}}}
\def\bigg#1{\leavevmode@ifvmode
   {\hbox{$\left#1\vbox to14.5\p@{}\right.\n@space$}}}
\def\Bigg#1{\leavevmode@ifvmode
```

```
    {\hbox{$\left#1\vbox to17.5\p@{}\right.\n@space$}}}
⟨/math | latexrelease⟩
⟨latexrelease⟩\EndIncludeInRelease
⟨latexrelease⟩\IncludeInRelease{0000/00/00}%
⟨latexrelease⟩                   {\Big}{Start LR-mode}%
⟨latexrelease⟩\def\big#1{{\hbox{$\left#1\vbox to8.5\p@{}\right.\n@space$}}}
⟨latexrelease⟩\def\Big#1{{\hbox{$\left#1\vbox to11.5\p@{}\right.\n@space$}}}
⟨latexrelease⟩\def\bigg#1{{\hbox{$\left#1\vbox to14.5\p@{}\right.\n@space$}}}
⟨latexrelease⟩\def\Bigg#1{{\hbox{$\left#1\vbox to17.5\p@{}\right.\n@space$}}}
⟨latexrelease⟩\EndIncludeInRelease
⟨*math⟩
\def\n@space{\nulldelimiterspace\z@ \m@th}
```

6.6.2 The log-like functions

`\operator@font` The `\operator@font` determines the symbol font used for log-like functions.

```
\def\operator@font{\mathgroup\symoperators}
```

6.6.3 Parameters

```
\thinmuskip=3mu
\medmuskip=4mu plus 2mu minus 4mu
\thickmuskip=5mu plus 5mu
```

This finishes the low-level setup in `fontmath.ltx`.

```
⟨/math⟩
```

7 Default cfg files

We provide default `cfg` files here to ensure that on installations that search large file trees we do not pick up some strange customisation files from somewhere.

```
⟨*cfgtext | cfgmath | cfgprel⟩
%%
%%
%%
%% Load the standard setup:
%%
⟨+cfgtext⟩\input{fonttext.ltx}
⟨+cfgmath⟩\input{fontmath.ltx}
⟨+cfgprel⟩\input{preload.ltx}
%%
%% Small changes could go here; see documentation in cfgguide.tex for
%% allowed modifications.
%%
%% In particular it is not allowed to misuse this configuration file
%% to modify internal LaTeX commands!
%%
%% If you use this file as the basis for configuration please change
%% the \ProvidesFile lines to clearly identify your modification, e.g.,
%%
```

```
⟨+cfgtext⟩%%   \ProvidesFile{fonttext.cfg}[2001/06/01
⟨+cfgmath⟩%%   \ProvidesFile{fonttext.cfg}[2001/06/01
⟨+cfgprel⟩%%   \ProvidesFile{preload.cfg}[2001/06/01
%%                                  Customised local font setup]
%%
%%
⟨/cfgtext | cfgmath | cfgprel⟩
```