The **lucidabr** package[*]

Sebastian Rahtz, David Carlisle,
TEX Users Group (`lucida@tug.org`)

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1 Introduction

This file contains LATEX 2_ε package files needed to use Lucida Bright fonts, and
`.fd` files for the fonts as named with the Berry naming scheme. It is accompanied
on CTAN by the metric and other support files. The actual outline fonts need to
be purchased from the TEX Users Group (`http://tug.org/lucida`) or another
source.

TUG is now the maintainer of this `lucidabr` LATEX support package (many
thanks to Morten Høgholm), which is separate from the `lucida` package containing
the basic font metric files (many thanks to Walter Schmidt).

The `lucida-sample.tex` file in the distribution describes basic usage of the
fonts and this package, and gives examples of all the fonts.

The Lucida Bright font families:

Note that the 'demi bold' Lucida fonts are classed as 'b' (bold) in LATEX. The
only 'bold' font in the Lucida collection is the bold sans serif font, which is classed
as 'ub' (ultra bold).

| Font File Name | | Font Name | LATEX |
Standard	Original		
hlxb8a	lfd	LucidaFax-Demi	hlx/b/n
hlxbi8a	lfdi	LucidaFax-DemiItalic	hlx/b/it
hlxr8a	lfr	LucidaFax	hlx/m/n
hlxri8a	lfi	LucidaFax-Italic	hlx/m/it
hlhb8a	lbd	LucidaBright-Demi	hlh/b/n
hlhbi8a	lbdi	LucidaBright-DemiItalic	hlh/b/it
hlhr8a	lbr	LucidaBright	hlh/m/n
hlhri8a	lbi	LucidaBright-Italic	hlh/m/it
hlhro8a	lbsl	LucidaBrightSlanted	hlh/m/sl

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[*]This file has version number v4.3, last revised 2005/11/29.

® Lucida is a trademark of Bigelow & Holmes Inc. registered in the U.S. Patent & Trademark
Office and other jurisdictions.

Font File Name		Font Name	LaTeX
Standard	Original		
hlhrc8a	lbrsc	LucidaBrightSmallcaps	hlh/m/sc
hlhbc8a	lbdsc	LucidaBrightSmallcaps-Demi	hlh/b/sc
hlsbi8a	lsdi	LucidaSans-DemiItalic	hls/b/it
hlsb8a	lsd	LucidaSans-Demi	hls/b/n
hlsri8a	lsi	LucidaSans-Italic	hls/m/it
hlsr8a	lsr	LucidaSans	hls/m/n
hlsu8a	lsb	LucidaSans-Bold	hls/ub/n
hlsui8a	lsbi	LucidaSans-BoldItalic	hls/ub/it
hlcrf8a	lbl	LucidaBlackletter	hlcf/m/n
hlcriw8a	lbh	LucidaHandwriting-Italic	hlcw/m/n
hlcrie8a	lbc	LucidaCalligraphy-Italic	hlce/m/it
hlcrn8a	lbkr	LucidaCasual	hlcn/m/n
hlcrin8a	lbki	LucidaCasual-Italic	hlcn/m/it
hlsrt8a	lstr	LucidaSans-Typewriter	hlst/m/n
hlsrot8a	lsto	LucidaSans-TypewriterOblique	hlst/m/sl
hlsbot8a	lstbo	LucidaSans-TypewriterBoldOblique	hlst/b/sl
hlsbt8a	lstb	LucidaSans-TypewriterBold	hlst/b/n
hlcrt8a	lbtr	LucidaTypewriter	hlct/m/n
hlcbt8a	lbtb	LucidaTypewriterBold	hlct/b/n
hlcrot8a	lbto	LucidaTypewriterOblique	hlct/m/sl
hlcbot8a	lbtbo	LucidaTypewriterBoldOblique	hlct/b/sl
hlcra	lbma	LucidaNewMath-Arrows	hlcm/m/n
hlcba	lbmad	LucidaNewMath-Arrows-Demi	hlcm/b/n
hlcrv	lbme	LucidaNewMath-Extension	hlcv/m/n
hlcry	lbms	LucidaNewMath-Symbol	hlcy/m/n
hlcdy	lbmsd	LucidaNewMath-Symbol-Demi	hlcy/b/n
hlcrim	lbmi	LucidaNewMath-Italic	hlcm/m/itx
hlcrima	lbmo	LucidaNewMath-AltItalic	hlcm/m/it
hlcdim	lbmdi	LucidaNewMath-DemiItalic	hlcm/b/itx
hlcdima	lbmdo	LucidaNewMath-AltDemiItalic	hlcm/b/it
hlcrm	lbmr	LucidaNewMath-Roman	hlcm/m/n
hlcdm	lbmd	LucidaNewMath-Demibold	hlcm/b/n

2 Packages

2.1 Lucmtime Package

Adobe Times with Lucida Math.

1 ⟨∗luctime⟩

```
 2 \def\rmdefault{ptm}
 3 \def\sfdefault{cmss}
 4 \def\ttdefault{cmtt}
 5 \def\Mathdefault{ptmluc}
 6 \DeclareSymbolFont{letters}{OML}{ptmluc}{m}{it}
 7 \DeclareSymbolFont{operators}{OT1}{ptm}{m}{n}
 8 \SetSymbolFont{letters}{normal}{OML}{ptmluc}{m}{it}
 9 \SetSymbolFont{letters}{bold}{OML}{ptmluc}{b}{it}
10 \SetSymbolFont{operators}{bold}{OT1}{ptm}{b}{n}
11 \SetSymbolFont{operators}{normal}{OT1}{ptm}{m}{n}
12 ⟨/luctime⟩
```

Monotype Times with Lucida Math.

```
13 ⟨*lucmtime⟩
14 \def\rmdefault{mntx}
15 \def\sfdefault{cmss}
16 \def\ttdefault{cmtt}
17 \def\Mathdefault{mntluc}
18 \DeclareSymbolFont{letters}{OML}{mntluc}{m}{it}
19 \DeclareSymbolFont{operators}{OT1}{mntx}{m}{n}
20 \SetSymbolFont{letters}{normal}{OML}{mntluc}{m}{it}
21 \SetSymbolFont{letters}{bold}{OML}{mntluc}{b}{it}
22 \SetSymbolFont{operators}{bold}{OT1}{mntx}{b}{n}
23 \SetSymbolFont{operators}{normal}{OT1}{mntx}{m}{n}
24 ⟨/lucmtime⟩
```

2.2   Lucmin Package

Adobe Minion with Lucida Math.

```
25 ⟨*lucmin⟩
26 \def\rmdefault{zmn}
27 \def\sfdefault{zmy}
28 \def\ttdefault{hlct}
29 \renewcommand{\bfdefault}{b}
30 \def\Mathdefault{zmnluc}
31 \DeclareSymbolFont{letters}{OML}{zmnluc}{m}{it}
32 \DeclareSymbolFont{operators}{OT1}{zmn}{m}{n}
33 \SetSymbolFont{letters}{normal}{OML}{zmnluc}{m}{it}
34 \SetSymbolFont{letters}{bold}{OML}{zmnluc}{b}{it}
35 \SetSymbolFont{operators}{bold}{OT1}{zmn}{b}{n}
36 \SetSymbolFont{operators}{normal}{OT1}{zmn}{m}{n}
37 ⟨/lucmin⟩
```

2.3   Lucidbrb and lucidbry Packages

Compatibility with earlier releases.

```
38 ⟨*lucidbrb⟩
39 \DeclareOption*{\PassOptionsToPackage{\CurrentOption}{lucidabr}}
40 \ProcessOptions
```

```
41 \RequirePackage[expert,vargreek]{lucidabr}
42 ⟨/lucidbrb⟩
43 ⟨*lucidbry⟩
44 \DeclareOption*{\PassOptionsToPackage{\CurrentOption}{lucidabr}}
45 \ProcessOptions
46 \RequirePackage[LY1]{fontenc}
47 \RequirePackage[expert,vargreek]{lucidabr}
48 ⟨/lucidbry⟩
```

2.4 Lucidbr and lucbmath Packages

Set text and math with Lucida Bright fonts. (Lucbmath package only sets the math fonts.)

```
49 ⟨*lucidabright | lucbmath⟩
50 \newif\iflucida@expert
51 \DeclareOption{expert}{\lucida@experttrue}
52 \DeclareOption{noexpert}{\lucida@expertfalse}
```

Set up the variant text and math sizes which Y&Y suggest for Lucida. The figures for these two options actually come from Frank Mittelbach (oh great one).

The default is to scale, but two options allow you to revert to normal behaviour, or get even smaller.

```
53 \DeclareOption{nolucidascale}{%
54   \def\DeclareLucidaFontShape#1#2#3#4#5#6{%
55      \DeclareFontShape{#1}{#2}{#3}{#4}{<->#5}{#6}}}
56 \DeclareOption{lucidascale}{%
57  \def\DeclareLucidaFontShape#1#2#3#4#5#6{%
58  \DeclareFontShape{#1}{#2}{#3}{#4}{%
59   <-5.5>s*[1.04]#5%
60   <5.5-6.5>s*[1.02]#5%
61   <6.5-7.5>s*[.99]#5%
62   <7.5-8.5>s*[.97]#5%
63   <8.5-9.5>s*[.96]#5%
64   <9.5-10.5>s*[.95]#5%
65   <10.5-11.5>s*[.94]#5%
66   <11.5-13>s*[.93]#5%
67   <13-15.5>s*[.92]#5%
68   <15.5-18.5>s*[.91]#5%
69   <18.5-22.5>s*[.9]#5%
70   <22.5->s*[.89]#5%
71   }{#6}}}
72 \DeclareOption{lucidasmallscale}{%
73  \def\DeclareLucidaFontShape#1#2#3#4#5#6{%
74  \DeclareFontShape{#1}{#2}{#3}{#4}{%
75   <-5.5>s*[.98]#5%
76   <5.5-6.5>s*[.96]#5%
77   <6.5-7.5>s*[.94]#5%
78   <7.5-8.5>s*[.92]#5%
79   <8.5-9.5>s*[.91]#5%
```

4

```
80    <9.5-10.5>s*[.9]#5%
81    <10.5-11.5>s*[.89]#5%
82    <11.5-13>s*[.88]#5%
83    <13-15.5>s*[.87]#5%
84    <15.5-18.5>s*[.86]#5%
85    <18.5-22.5>s*[.85]#5%
86    <22.5->s*[.84]#5%
87    }{#6}}}
```

Choose style of letters. Italic3 is not really italic at all, more a roman font with math spacing. Italic2 is not really slanted but a different style of italic, so use an 'itx' shape.

```
88  \DeclareOption{mathitalic1}{\def\letters@shape{it}}
89  \DeclareOption{mathitalic2}{\def\letters@shape{itx}}
90  \DeclareOption{mathitalic3}{\def\letters@shape{n}}
```

Choose between slanted and upright lowercase Greek.

```
91  \DeclareOption{slantedgreek}{\def\lcgreek@alphabet{letters}}
92  \DeclareOption{uprightgreek}{\def\lcgreek@alphabet{mathupright}}
```

Enable use of `\upalpha` and `\varGamma`.

```
93  \DeclareOption{vargreek}{\let\upalpha\relax\let\varGamma\relax}
```

Stop the AMS symbol names being declared.

```
94  \DeclareOption{noamssymbols}{\let\blacksquare\endinput}
```

Set up the text encoding used in the operators font.

```
95  \edef\operator@encoding{\encodingdefault}
96  \DeclareOption{OT1}{\def\operator@encoding{OT1}}
97  \DeclareOption{T1}{\def\operator@encoding{T1}}
98  \DeclareOption{LY1}{\def\operator@encoding{LY1}}
```

Set up the text encodings (not in the lucmath package).

```
99   ⟨∗lucidabright⟩
100  \renewcommand{\rmdefault}{hlh}
101  \renewcommand{\sfdefault}{hls}
102  \renewcommand{\ttdefault}{hlst}
103  \renewcommand{\bfdefault}{b}
104  \DeclareOption{seriftt}{\def\ttdefault{hlct}}
105  \DeclareOption{fax}{\def\rmdefault{hlx}}
106  \DeclareOption{casual}{\def\rmdefault{hlcn}}
107  \DeclareOption{calligraphic}{%
108    \normalfont
109    \DeclareFontShape\encodingdefault\rmdefault{m}{it}%
110                                  {<->ssub*hlce/m/it}{}}
111  \DeclareOption{handwriting}{%
112    \normalfont
113    \DeclareFontShape\encodingdefault\rmdefault{m}{it}%
114                                  {<->ssub*hlcw/m/it}{}%
115    \DeclareFontShape\encodingdefault\rmdefault{b}{it}%
116                                  {<->ssub*hlcw/m/it}{}}
```

The bullet in the lucida text fonts is rather small. Some people may prefer this option, to use a larger one from the math fonts.

```
117 \DeclareOption{altbullet}{%
118   \normalfont
119   \DeclareTextCommand
120     \textbullet\encodingdefault{\UseTextSymbol{OMS}\textbullet}}
```

121 ⟨/lucidabright⟩

This package makes a lot of redefinitions. The warnings can be rather annoying so some package options control whether the information is printed to the terminal or log file. More control can be obtained by loading the tracefnt package.

Just show font errors; Warning and info to the log file. The default for this package.

```
122 \DeclareOption{errorshow}{%
123     \def\@font@info#1{%
124         \GenericInfo{(Font)\@spaces\@spaces\@spaces\space\space}%
125                     {LaTeX Font Info:  \space\space\space#1}}%
126     \def\@font@warning#1{%
127         \GenericInfo{(Font)\@spaces\@spaces\@spaces\space\space}%
128                     {LaTeX Font Warning: #1}}}
```

The normal LaTeX default, Font Info to the log file and Font Warning to the terminal.

```
129 \DeclareOption{warningshow}{%
130     \def\@font@info#1{%
131         \GenericInfo{(Font)\@spaces\@spaces\@spaces\space\space}%
132                     {LaTeX Font Info:  \space\space\space#1}}%
133     \def\@font@warning#1{%
134         \GenericWarning{(Font)\@spaces\@spaces\@spaces\space\space}%
135                     {LaTeX Font Warning: #1}}}
```

On some machines writing all the log info may slow things down so extra option not to log font changes at all.

```
136 \DeclareOption{nofontinfo}{%
137     \let\@font@info\@gobble
138     \let\@font@warning\@gobble}
```

```
139 \ExecuteOptions{noexpert,lucidascale,slantedgreek,mathitalic1,errorshow}
140 \ProcessOptions
```

141 ⟨/lucidabright | lucbmath⟩

142 ⟨∗lucbmath⟩

New encoding scheme for Math Arrows font

```
143   \DeclareFontEncoding{LMR}{}{}
144   \DeclareFontSubstitution{LMR}{hlcm}{m}{n}
145 ⟨!luctim⟩ \DeclareSymbolFont{letters}{OML}{hlcm}{m}{\letters@shape}
146 \iflucida@expert
147 \DeclareSymbolFont{mathupright}{OML}{hlcm}{m}{n}
148 \fi
```

6

```
149 \DeclareSymbolFont{symbols}{OMS}{hlcy}{m}{n}
150 \DeclareSymbolFont{largesymbols}{OMX}{hlcv}{m}{n}
```

The new Expert set for bold math

```
151 \iflucida@expert
152 ⟨!luctim⟩ \SetSymbolFont{letters}{bold}{OML}{hlcm}{b}{\letters@shape}
153  \SetSymbolFont{mathupright}{bold}{OML}{hlcm}{b}{n}
154  \SetSymbolFont{symbols}{bold}{OMS}{hlcy}{b}{n}
155 \fi

156 % \DeclareSymbolFont{italics}{\encodingdefault}{\rmdefault}{m}{it}
157 \DeclareSymbolFont{arrows}{LMR}{hlcm}{m}{n}
158 \iflucida@expert
159 % \DeclareSymbolFont{boldarrows}{LMR}{hlcm}{b}{n}
160  \SetSymbolFont{arrows}{bold}{LMR}{hlcm}{b}{n}
161 \fi
162 ⟨/lucbmath⟩
163 ⟨*lucbmath⟩
164 ⟨*!luctim⟩
165 \DeclareSymbolFont{operators}{\operator@encoding}{\rmdefault}{m}{n}
166 \SetSymbolFont{operators}{bold}{\operator@encoding}{\rmdefault}{b}{n}
167 \SetSymbolFont{operators}{normal}{\operator@encoding}{\rmdefault}{m}{n}
```

Explicitly redeclare all the alphabets just in case, but differentiate between pure Lucida, and the Times mixture, since those have genuine OT1 mimics.

```
168 \DeclareMathAlphabet\mathbf  \operator@encoding{\rmdefault}{b}{n}
169 \DeclareMathAlphabet\mathrm  \operator@encoding{\rmdefault}{m}{n}
170 \DeclareMathAlphabet\mathsf  \operator@encoding{\sfdefault}{m}{n}
171 \DeclareMathAlphabet\mathit  \operator@encoding{\rmdefault}{m}{it}
172 \DeclareMathAlphabet\mathtt  \operator@encoding{\ttdefault}{m}{n}
173 \DeclareMathAlphabet\mathfrak\operator@encoding{hlcf}{m}{n}
174 \SetMathAlphabet{\mathbf}{bold}{\operator@encoding}{\rmdefault}{b}{n}
175 \SetMathAlphabet{\mathsf}{bold}{\operator@encoding}{\sfdefault}{b}{n}
176 \SetMathAlphabet{\mathrm}{bold}{\operator@encoding}{\rmdefault}{b}{n}
177 \SetMathAlphabet{\mathit}{bold}{\operator@encoding}{\rmdefault}{b}{it}
178 \SetMathAlphabet{\mathtt}{bold}{\operator@encoding}{\ttdefault}{b}{n}
179 ⟨/!luctim⟩
180 ⟨*luctim⟩
181 \DeclareMathAlphabet        {\mathbf}{OT1}{\Mathdefault}{b}{n}
182 \DeclareMathAlphabet        {\mathrm}{OT1}{\Mathdefault}{m}{n}
183 \DeclareMathAlphabet        {\mathsf}{OT1}{\sfdefault}{m}{n}
184 \DeclareMathAlphabet        {\mathit}{OT1}{\Mathdefault}{m}{it}
185 \DeclareMathAlphabet        {\mathtt}{OT1}{\ttdefault}{m}{n}
186 \SetMathAlphabet{\mathbf}{bold}{OT1}{\Mathdefault}{b}{n}
187 \SetMathAlphabet{\mathsf}{bold}{OT1}{\sfdefault}{b}{n}
188 \SetMathAlphabet{\mathrm}{bold}{OT1}{\Mathdefault}{b}{n}
189 \SetMathAlphabet{\mathit}{bold}{OT1}{\Mathdefault}{b}{it}
190 \SetMathAlphabet{\mathtt}{bold}{OT1}{\ttdefault}{b}{n}
191 ⟨/luctim⟩
192 \DeclareSymbolFontAlphabet{\mathbb}{arrows}
193 \DeclareSymbolFontAlphabet{\mathscr}{symbols}
```

```
194 \iflucida@expert
195   \DeclareSymbolFontAlphabet{\mathup}{mathupright}
196 \fi
197 \DeclareMathAccent\vec  {\mathord}{letters}{126}
```

Symbols taken from the operators font. Need to be careful here as different encodings may have been used.

First check that the AMS have not been redefining `\colon`. If it does not have this original plain TEX definition, don't redefine it below.

```
198 \let\@tempb\@undefined
199 \DeclareMathSymbol{\@tempb}{\mathpunct}{operators}{58}

200 \def\@tempa{T1}
201 \ifx\operator@encoding\@tempa
202   \DeclareMathSymbol{!}{\mathclose}{operators}{33}
203   \DeclareMathSymbol{:}{\mathrel}{operators}{58}
204   \DeclareMathSymbol{;}{\mathpunct}{operators}{59}
205   \DeclareMathSymbol{?}{\mathclose}{operators}{63}
206   \ifx\colon\@tempb
207     \DeclareMathSymbol{\colon}{\mathpunct}{operators}{58}
208   \fi
209   \DeclareMathAccent{\acute}{\mathalpha}{operators}{1}
210   \DeclareMathAccent{\grave}{\mathalpha}{operators}{0}
211   \DeclareMathAccent{\ddot}{\mathalpha}{operators}{4}
212   \DeclareMathAccent{\tilde}{\mathalpha}{operators}{3}
213   \DeclareMathAccent{\bar}{\mathalpha}{operators}{9}
214   \DeclareMathAccent{\breve}{\mathalpha}{operators}{8}
215   \DeclareMathAccent{\check}{\mathalpha}{operators}{7}
216   \DeclareMathAccent{\hat}{\mathalpha}{operators}{2}
217   \DeclareMathAccent{\dot}{\mathalpha}{operators}{10}

218 \else
219 \def\@tempa{OT1}
220 \ifx\operator@encoding\@tempa
221   \DeclareMathSymbol{!}{\mathclose}{operators}{33}
222   \DeclareMathSymbol{:}{\mathrel}{operators}{58}
223   \DeclareMathSymbol{;}{\mathpunct}{operators}{59}
224   \DeclareMathSymbol{?}{\mathclose}{operators}{63}
225   \ifx\colon\@tempb
226     \DeclareMathSymbol{\colon}{\mathpunct}{operators}{58}
227   \fi
228   \DeclareMathAccent{\acute}{\mathalpha}{operators}{19}
229   \DeclareMathAccent{\grave}{\mathalpha}{operators}{18}
230   \DeclareMathAccent{\ddot}{\mathalpha}{operators}{127}
231   \DeclareMathAccent{\tilde}{\mathalpha}{operators}{126}
232   \DeclareMathAccent{\bar}{\mathalpha}{operators}{22}
233   \DeclareMathAccent{\breve}{\mathalpha}{operators}{21}
234   \DeclareMathAccent{\check}{\mathalpha}{operators}{20}
235   \DeclareMathAccent{\hat}{\mathalpha}{operators}{94}
236   \DeclareMathAccent{\dot}{\mathalpha}{operators}{95}

237 \else
```

```
238 \def\@tempa{LY1}
239 \ifx\operator@encoding\@tempa
240   \DeclareMathSymbol{!}{\mathclose}{operators}{33}
241   \DeclareMathSymbol{:}{\mathrel}{operators}{58}
242   \DeclareMathSymbol{;}{\mathpunct}{operators}{59}
243   \DeclareMathSymbol{?}{\mathclose}{operators}{63}
244   \ifx\colon\@tempb
245       \DeclareMathSymbol{\colon}{\mathpunct}{operators}{58}
246   \fi
247   \DeclareMathAccent{\acute}{\mathalpha}{operators}{19}
248   \DeclareMathAccent{\grave}{\mathalpha}{operators}{18}
249   \DeclareMathAccent{\ddot}{\mathalpha}{operators}{127}
250   \DeclareMathAccent{\tilde}{\mathalpha}{operators}{126}
251   \DeclareMathAccent{\bar}{\mathalpha}{operators}{22}
252   \DeclareMathAccent{\breve}{\mathalpha}{operators}{21}
253   \DeclareMathAccent{\check}{\mathalpha}{operators}{20}
254   \DeclareMathAccent{\hat}{\mathalpha}{operators}{94}
255   \DeclareMathAccent{\vec}{\mathord}{letters}{126}
256   \DeclareMathAccent{\dot}{\mathalpha}{operators}{5}

257 \else
258   \PackageWarningNoLine{lucidabr}
259     {Unknown Operator Encoding!\MessageBreak
260      Math accents may be wrong: assuming OT1 positions}
261 \fi\fi\fi
```

This section derives mostly from Berthold Horn's files `lcdmacro.tex` and `amssymblb.tex` ©1991, 1992 Y&Y. All Rights Reserved Original from Version 1.2, 1992 June 14; updated *ad hoc*.

```
262 \@ifpackageloaded{amsmath}{%
```

(From M J Downes): it's possible the factors 1.5, 2, 2.5, 3, 3.5 should be adjusted for Lucida fonts. But that has to be determined by looking at printed tests which I cannot do at the moment. [mjd,24-Jun-1993]

```
263   \def\biggg{\bBigg@\thr@@}
264   \def\Biggg{\bBigg@{3.5}}
265 }{%
266   \def\big#1{{\hbox{$\left#1\vbox to8.20\p@{}\right.\n@space$}}}
267   \def\Big#1{{\hbox{$\left#1\vbox to10.80\p@{}\right.\n@space$}}}
268   \def\bigg#1{{\hbox{$\left#1\vbox to13.42\p@{}\right.\n@space$}}}
269   \def\Bigg#1{{\hbox{$\left#1\vbox to16.03\p@{}\right.\n@space$}}}
270   \def\biggg#1{{\hbox{$\left#1\vbox to17.72\p@{}\right.\n@space$}}}
271   \def\Biggg#1{{\hbox{$\left#1\vbox to21.25\p@{}\right.\n@space$}}}
272   \def\n@space{\nulldelimiterspace\z@ \m@th}
273 }
```

Define some extra large sizes — always done using extensible parts

```
274 \def\bigggl{\mathopen\biggg}
275 \def\bigggr{\mathclose\biggg}
276 \def\Bigggl{\mathopen\Biggg}
277 \def\Bigggr{\mathclose\Biggg}
```

Following is only really needed if the roman text font is not LucidaBright. Draw the small sizes of '[' and ']' from math italic instead of roman font

```
278 \DeclareMathSymbol{[}{\mathopen} {letters}{134}
279 \DeclareMathDelimiter{[}{letters}{134}{largesymbols}{2}
280 \DeclareMathSymbol{]}{\mathclose}{letters}{135}
281 \DeclareMathDelimiter{]}{letters}{135}{largesymbols}{3}
```

Draw the small sizes of '(' and ')' from math italic instead of roman font

```
282 \DeclareMathSymbol{(}{\mathopen} {letters}{132}
283 \DeclareMathDelimiter{(}{letters}{132}{largesymbols}{0}
284 \DeclareMathSymbol{)}{\mathclose}{letters}{133}
285 \DeclareMathDelimiter{)}{letters}{133}{largesymbols}{1}
```

Draw '=' and '+' from symbol font instead of roman

```
286 \DeclareMathSymbol{=}{\mathrel} {symbols}{131}
287 \DeclareMathSymbol{+}{\mathbin} {symbols}{130}
```

Draw small '/' from math italic instead of roman font

```
288 \DeclareMathSymbol{/}{\mathord} {letters}{61}
289 \DeclareMathDelimiter{/}{letters}{61}{largesymbols}{14}
```

Make open face brackets accessible, i.e. [[and]]

```
290 \DeclareMathDelimiter{\ldbrack}
291   {\mathopen}{letters}{130}{largesymbols}{130}
292 \DeclareMathDelimiter{\rdbrack}
293   {\mathclose}{letters}{131}{largesymbols}{131}
```

Provide access to surface integral signs (linked from text to display size)

```
294 \DeclareMathSymbol{\surfintop}{\mathop}{largesymbols}{144}
295 \def\surfint{\surfintop\nolimits}
```

Make medium size integrals available (NOT linked to display size)

```
296 \DeclareMathSymbol{\midintop}{\mathop}{largesymbols}{146}
297 \def\midint{\midintop\nolimits}
298 \DeclareMathSymbol{\midointop}{\mathop}{largesymbols}{147}
299 \def\midoint{\midointop\nolimits}
300 \DeclareMathSymbol{\midsurfintop}{\mathop}{largesymbols}{148}
301 \def\midsurfint{\midsurfintop\nolimits}
```

Extensible integral (use with \bigg, \Bigg, \biggg, \Biggg etc)

```
302 \DeclareMathDelimiter{\largeint}
303   {\mathop}{largesymbols}{90}{largesymbols}{149}
```

To close up gaps in special math characters constructed from pieces

```
304 \def\joinrel{\mathrel{\mkern-4mu}} % \def\joinrel{\mathrel{\mkern-3mu}}
```

The \mkern-2.5mu undoes the bogus 'italic correction' after joiners in LBMA

```
305 \DeclareMathSymbol{\relbar@}{\mathord}{arrows}{45}
306 \def\relbar{\mathrel{\smash\relbar@}\mathrel{\mkern-2.5mu}}

307 \DeclareMathSymbol{\Relbar@}{\mathrel}{arrows}{61}
308 \def\Relbar{\Relbar@\mathrel{\mkern-2.5mu}}
```

The `\mkern4mu` undoes the overhang at the ends of the joiners (and more)

```
309 \def\longleftarrow{\leftarrow\relbar\mathrel{\mkern4mu}}
310 \def\longrightarrow{\mathrel{\mkern4mu}\relbar\rightarrow}
311 \def\Longleftarrow{\Leftarrow\Relbar\mathrel{\mkern4mu}}
312 \def\Longrightarrow{\mathrel{\mkern4mu}\Relbar\Rightarrow}
```

If amsmath is loaded, need to redefine the arrow fill commands as the relative spacing around `\relbar` and `\rightarrow` is not what the AMS code expects.

```
313 \AtBeginDocument{%
314   \@ifpackageloaded{amsmath}{%
315     \def\rightarrowfill@#1{%
316       \m@th\setboxz@h{$#1\relbar$}\ht\z@\z@
317       $#1\mkern4.5mu\mathrel{\copy\z@}%
318       \kern-\wd\z@
319       \cleaders\hbox{$#1\mkern-2mu\box\z@\mkern-2mu$}\hfill%
320       \mkern-4.5mu %
321       \rightarrow$}%
322     \def\leftarrowfill@#1{%
323       \m@th\setboxz@h{$#1\relbar$}\ht\z@\z@
324       $#1\leftarrow
325       \mkern-4.5mu %
326       \cleaders\hbox{$#1\mkern-2mu\copy\z@\mkern-2mu$}\hfill
327       \kern-\wd\z@
328       \mathrel{\box\z@}\mkern4.5mu$}
329     \def\leftrightarrowfill@#1{\m@th\setboxz@h{$#1\relbar$}\ht\z@\z@
330       $#1\leftarrow
331       \mkern-12mu %
332       \cleaders\hbox{$#1\mkern-2mu\box\z@\mkern-2mu$}\hfill
333       \rightarrow$}}%
334   {}}
```

Some characters that need construction in CM exist complete in math italic or math symbol font.

```
335 \let\bowtie\undefined
336 \let\models\undefined
337 \let\doteq\undefined
338 \let\cong\undefined
339 \let\angle\undefined
340 \DeclareMathSymbol{\bowtie}{\mathrel}{letters}{246}
341 \DeclareMathSymbol{\models}{\mathrel}{symbols}{238}
342 \DeclareMathSymbol{\doteq}{\mathrel}{symbols}{201}
343 \DeclareMathSymbol{\cong}{\mathrel}{symbols}{155}
344 \DeclareMathSymbol{\angle}{\mathord}{symbols}{139}
```

These need undefining so that we can redeclare them.

```
345 \let\Box\undefined
346 \let\Diamond\undefined
347 \let\leadsto\undefined
348 \let\neq\undefined
349 \let\hookleftarrow\undefined
350 \let\hookrightarrow\undefined
```

```
351 \let\mapsto\undefined
352 \let\notin\undefined
353 \let\rightleftharpoons\undefined
```

Other characters may be found in LucidaNewMath-Arrows (more negated later).

```
354 \DeclareMathSymbol{\neq}{\mathrel}{arrows}{148}
355 \DeclareMathSymbol{\rightleftharpoons}{\mathrel}{arrows}{122}
356 \DeclareMathSymbol{\leftrightharpoons}{\mathrel}{arrows}{121}
357 \DeclareMathSymbol{\hookleftarrow}{\mathrel}{arrows}{60}
358 \DeclareMathSymbol{\hookrightarrow}{\mathrel}{arrows}{62}
359 \DeclareMathSymbol{\mapsto}{\mathrel}{arrows}{44}
360 \def\longmapsto{\mapstochar\longrightarrow}
```

Special LaTeX character definitions (originally from LaTeX symbol font)

```
361 \let\Join\undefined
362 \let\rhd\undefined
363 \let\lhd\undefined
364 \let\unrhd\undefined
365 \let\unlhd\undefined
366 \DeclareMathSymbol{\Join}{\mathrel}{letters}{246}
367 \DeclareMathSymbol{\rhd}{\mathrel}{letters}{46}
368 \DeclareMathSymbol{\lhd}{\mathrel}{letters}{47}
369 \DeclareMathSymbol{\unlhd}{\mathrel}{symbols}{244}
370 \DeclareMathSymbol{\unrhd}{\mathrel}{symbols}{245}
371 \DeclareMathSymbol{\Box}{\mathord}{arrows}{2}
372 \DeclareMathSymbol{\Diamond}{\mathord}{arrows}{8}
373 \DeclareMathSymbol{\leadsto}{\mathrel}{arrows}{142}
374 \DeclareMathSymbol{\leadsfrom}{\mathrel}{arrows}{141}
375 \def\mathstrut{\vphantom{f}}
```

In n-th root, don't want the 'n' to come too close to the radical

```
376 \def\r@@t#1#2{\setbox\z@\hbox{$\m@th#1\sqrt{#2}$}%
377   \dimen@\ht\z@ \advance\dimen@-\dp\z@
378   \mkern5mu\raise.6\dimen@\copy\rootbox \mkern-7.5mu\box\z@}
```

Here are some extra definitions of mathematical symbols and operators:

```
379 \DeclareMathSymbol{\defineequal}{\mathrel}{symbols}{214}
380 %\let\notleq\nleq
381 %\let\notgeq\ngeq
382 \DeclareMathSymbol{\notequiv}{\mathrel}{arrows}{149}
383 %\let\notprec\nprec
384 %\let\notsucc\nsucc
385 \DeclareMathSymbol{\notapprox}{\mathrel}{arrows}{152}
386 %\let\notpreceq\npreceq
387 %\let\notsucceq\nsucceq
388 \DeclareMathSymbol{\notasymp}{\mathrel}{arrows}{243}
389 \DeclareMathSymbol{\notsubset}{\mathrel}{arrows}{198}
390 \DeclareMathSymbol{\notsupset}{\mathrel}{arrows}{199}
391 \DeclareMathSymbol{\notsim}{\mathrel}{arrows}{150}
392 \DeclareMathSymbol{\notsubseteq}{\mathrel}{arrows}{200}
393 \DeclareMathSymbol{\notsupseteq}{\mathrel}{arrows}{201}
```

```
394 \DeclareMathSymbol{\notsimeq}{\mathrel}{arrows}{151}
395 \DeclareMathSymbol{\notsqsubseteq}{\mathrel}{arrows}{212}
396 \DeclareMathSymbol{\notsqsupseteq}{\mathrel}{arrows}{213}
397 \DeclareMathSymbol{\notcong}{\mathrel}{arrows}{153}
398 \DeclareMathSymbol{\notin}{\mathrel}{arrows}{29}
399 \DeclareMathSymbol{\notni}{\mathrel}{arrows}{31}
400 %\let\notvdash\nvdash
401 %\let\notmodels\nvDash
402 %\let\notparallel\parallel
403 %\let\noteq\neq
404 %\let\notless\nless
405 %\let\notgreater\ngtr
406 %\let\notmid\nmid
407 \let\Bbb\mathbb
```

Normal LaTeX draws upper case (upright) Greek from cmr10 — when using the Cork encoding, that isn't there.

```
408 \iflucida@expert
```

If we have the LucidaBright Expert set, we'll draw them from the upright math font. That way we can get bold math to work on upright upper case Greek.

Why doesn't this work?

```
\documentclass{article}
\usepackage{lucidabr}
$\mathbf{\Sigma}$
\end{document}
```

The answer lies in the meaning of `\mathbf`; as fntguide.tex says, it is for alphabetic switching. The straight lucida style says

```
\DeclareMathSymbol{\Sigma}{\mathalpha}{largesymbols}{'326}
```

and the `\mathalpha` signifies that the `\Sigma` can change with the alphabet; so this in fact looks for `\char'326` in the "mathbf" alphabet when we ask for that. That is defined with

```
\SetMathAlphabet{\mathbf}{bold}{\operator@encoding}{\rmdefault}{b}{n}
```

ie normal text Lucida bold. It all works in CMR because the text fonts have Greek, which is why the symbols are defined as ; in addition, the alphabets like `\mathbf` *explicitly* ask for OT1:

```
\DeclareMathAlphabet       {\mathbf}{OT1}{cmr}{bx}{n}
```

so it works in T1 encoding too.

When we get the symbols from other fonts in Lucida, we should no longer classify the fonts as `\mathalpha`, since the mechanism doesn't function. So we use `\mathord` instead, and you only get bold Greek if you change `\mathversion`. At least it's consistent.

If, however, we are using the Times mixture, we can keep `\mathalpha`, as we have the right font layouts around.

409 ⟨∗!luctim⟩
410 `\DeclareMathSymbol{\Gamma}{\mathord}{mathupright}{0}`
411 `\DeclareMathSymbol{\Delta}{\mathord}{mathupright}{1}`
412 `\DeclareMathSymbol{\Theta}{\mathord}{mathupright}{2}`
413 `\DeclareMathSymbol{\Lambda}{\mathord}{mathupright}{3}`
414 `\DeclareMathSymbol{\Xi}{\mathord}{mathupright}{4}`
415 `\DeclareMathSymbol{\Pi}{\mathord}{mathupright}{5}`
416 `\DeclareMathSymbol{\Sigma}{\mathord}{mathupright}{6}`
417 `\DeclareMathSymbol{\Upsilon}{\mathord}{mathupright}{7}`
418 `\DeclareMathSymbol{\Phi}{\mathord}{mathupright}{8}`
419 `\DeclareMathSymbol{\Psi}{\mathord}{mathupright}{9}`
420 `\DeclareMathSymbol{\Omega}{\mathord}{mathupright}{10}`
421 `\else`

It's in the extension font (largesymbols)

422 `\DeclareMathSymbol{\Gamma}{\mathord}{largesymbols}{'320}`
423 `\DeclareMathSymbol{\Delta}{\mathord}{largesymbols}{'321}`
424 `\DeclareMathSymbol{\Theta}{\mathord}{largesymbols}{'322}`
425 `\DeclareMathSymbol{\Lambda}{\mathord}{largesymbols}{'323}`
426 `\DeclareMathSymbol{\Xi}{\mathord}{largesymbols}{'324}`
427 `\DeclareMathSymbol{\Pi}{\mathord}{largesymbols}{'325}`
428 `\DeclareMathSymbol{\Sigma}{\mathord}{largesymbols}{'326}`
429 `\DeclareMathSymbol{\Upsilon}{\mathord}{largesymbols}{'327}`
430 `\DeclareMathSymbol{\Phi}{\mathord}{largesymbols}{'330}`
431 `\DeclareMathSymbol{\Psi}{\mathord}{largesymbols}{'331}`
432 `\DeclareMathSymbol{\Omega}{\mathord}{largesymbols}{'332}`
433 `\fi`
434 ⟨/!luctim⟩
435 ⟨∗luctim⟩
436 `\DeclareMathSymbol{\Gamma}{\mathalpha}{mathupright}{0}`
437 `\DeclareMathSymbol{\Delta}{\mathalpha}{mathupright}{1}`
438 `\DeclareMathSymbol{\Theta}{\mathalpha}{mathupright}{2}`
439 `\DeclareMathSymbol{\Lambda}{\mathalpha}{mathupright}{3}`
440 `\DeclareMathSymbol{\Xi}{\mathalpha}{mathupright}{4}`
441 `\DeclareMathSymbol{\Pi}{\mathalpha}{mathupright}{5}`
442 `\DeclareMathSymbol{\Sigma}{\mathalpha}{mathupright}{6}`
443 `\DeclareMathSymbol{\Upsilon}{\mathalpha}{mathupright}{7}`
444 `\DeclareMathSymbol{\Phi}{\mathalpha}{mathupright}{8}`
445 `\DeclareMathSymbol{\Psi}{\mathalpha}{mathupright}{9}`
446 `\DeclareMathSymbol{\Omega}{\mathalpha}{mathupright}{10}`
447 `\else`

It's in the extension font (largesymbols)

448 `\DeclareMathSymbol{\Gamma}{\mathord}{largesymbols}{'320}`
449 `\DeclareMathSymbol{\Delta}{\mathord}{largesymbols}{'321}`
450 `\DeclareMathSymbol{\Theta}{\mathord}{largesymbols}{'322}`
451 `\DeclareMathSymbol{\Lambda}{\mathord}{largesymbols}{'323}`
452 `\DeclareMathSymbol{\Xi}{\mathord}{largesymbols}{'324}`
453 `\DeclareMathSymbol{\Pi}{\mathord}{largesymbols}{'325}`
454 `\DeclareMathSymbol{\Sigma}{\mathord}{largesymbols}{'326}`
455 `\DeclareMathSymbol{\Upsilon}{\mathord}{largesymbols}{'327}`

```
456    \DeclareMathSymbol{\Phi}{\mathord}{largesymbols}{'330}
457    \DeclareMathSymbol{\Psi}{\mathord}{largesymbols}{'331}
458    \DeclareMathSymbol{\Omega}{\mathord}{largesymbols}{'332}
459  \fi
460  ⟨/luctim⟩

461  \DeclareMathSymbol{\alpha}{\mathord}{\lcgreek@alphabet}{11}
462  \DeclareMathSymbol{\beta}{\mathord}{\lcgreek@alphabet}{12}
463  \DeclareMathSymbol{\gamma}{\mathord}{\lcgreek@alphabet}{13}
464  \DeclareMathSymbol{\delta}{\mathord}{\lcgreek@alphabet}{14}
465  \DeclareMathSymbol{\epsilon}{\mathord}{\lcgreek@alphabet}{15}
466  \DeclareMathSymbol{\zeta}{\mathord}{\lcgreek@alphabet}{16}
467  \DeclareMathSymbol{\eta}{\mathord}{\lcgreek@alphabet}{17}
468  \DeclareMathSymbol{\theta}{\mathord}{\lcgreek@alphabet}{18}
469  \DeclareMathSymbol{\iota}{\mathord}{\lcgreek@alphabet}{19}
470  \DeclareMathSymbol{\kappa}{\mathord}{\lcgreek@alphabet}{20}
471  \DeclareMathSymbol{\lambda}{\mathord}{\lcgreek@alphabet}{21}
472  \DeclareMathSymbol{\mu}{\mathord}{\lcgreek@alphabet}{22}
473  \DeclareMathSymbol{\nu}{\mathord}{\lcgreek@alphabet}{23}
474  \DeclareMathSymbol{\xi}{\mathord}{\lcgreek@alphabet}{24}
475  \DeclareMathSymbol{\pi}{\mathord}{\lcgreek@alphabet}{25}
476  \DeclareMathSymbol{\rho}{\mathord}{\lcgreek@alphabet}{26}
477  \DeclareMathSymbol{\sigma}{\mathord}{\lcgreek@alphabet}{27}
478  \DeclareMathSymbol{\tau}{\mathord}{\lcgreek@alphabet}{28}
479  \DeclareMathSymbol{\upsilon}{\mathord}{\lcgreek@alphabet}{29}
480  \DeclareMathSymbol{\phi}{\mathord}{\lcgreek@alphabet}{30}
481  \DeclareMathSymbol{\chi}{\mathord}{\lcgreek@alphabet}{31}
482  \DeclareMathSymbol{\psi}{\mathord}{\lcgreek@alphabet}{32}
483  \DeclareMathSymbol{\omega}{\mathord}{\lcgreek@alphabet}{33}
484  \DeclareMathSymbol{\varepsilon}{\mathord}{\lcgreek@alphabet}{34}
485  \DeclareMathSymbol{\vartheta}{\mathord}{\lcgreek@alphabet}{35}
486  \DeclareMathSymbol{\varpi}{\mathord}{\lcgreek@alphabet}{36}
487  \DeclareMathSymbol{\varrho}{\mathord}{\lcgreek@alphabet}{37}
488  \DeclareMathSymbol{\varsigma}{\mathord}{\lcgreek@alphabet}{38}
489  \DeclareMathSymbol{\varphi}{\mathord}{\lcgreek@alphabet}{39}
```

'Individual' Upright lowercase Greek (not currently activated).

```
490  ⟨∗upalpha⟩
491  \ifx\upalpha\relax
492    \DeclareMathSymbol{\upalpha}{\mathord}{mathupright}{11}
493    \DeclareMathSymbol{\upbeta}{\mathord}{mathupright}{12}
494    \DeclareMathSymbol{\upgamma}{\mathord}{mathupright}{13}
495    \DeclareMathSymbol{\updelta}{\mathord}{mathupright}{14}
496    \DeclareMathSymbol{\upepsilon}{\mathord}{mathupright}{15}
497    \DeclareMathSymbol{\upzeta}{\mathord}{mathupright}{16}
498    \DeclareMathSymbol{\upeta}{\mathord}{mathupright}{17}
499    \DeclareMathSymbol{\uptheta}{\mathord}{mathupright}{18}
500    \DeclareMathSymbol{\upiota}{\mathord}{mathupright}{19}
501    \DeclareMathSymbol{\upkappa}{\mathord}{mathupright}{20}
502    \DeclareMathSymbol{\uplambda}{\mathord}{mathupright}{21}
503    \DeclareMathSymbol{\upmu}{\mathord}{mathupright}{22}
```

```
504  \DeclareMathSymbol{\upnu}{\mathord}{mathupright}{23}
505  \DeclareMathSymbol{\upxi}{\mathord}{mathupright}{24}
506  \DeclareMathSymbol{\uppi}{\mathord}{mathupright}{25}
507  \DeclareMathSymbol{\uprho}{\mathord}{mathupright}{26}
508  \DeclareMathSymbol{\upsigma}{\mathord}{mathupright}{27}
509  \DeclareMathSymbol{\uptau}{\mathord}{mathupright}{28}
510  \DeclareMathSymbol{\upupsilon}{\mathord}{mathupright}{29}
511  \DeclareMathSymbol{\upphi}{\mathord}{mathupright}{30}
512  \DeclareMathSymbol{\upchi}{\mathord}{mathupright}{31}
513  \DeclareMathSymbol{\uppsi}{\mathord}{mathupright}{32}
514  \DeclareMathSymbol{\upomega}{\mathord}{mathupright}{33}
515  \DeclareMathSymbol{\upvarepsilon}{\mathord}{mathupright}{34}
516 \fi
517 ⟨/upalpha⟩
```

Slanted upright Greek.

```
518 ⟨∗varGamma⟩
519 \ifx\varGamma\relax
520  \DeclareMathSymbol{\varGamma}{\mathord}{letters}{0}
521  \DeclareMathSymbol{\varDelta}{\mathord}{letters}{1}
522  \DeclareMathSymbol{\varTheta}{\mathord}{letters}{2}
523  \DeclareMathSymbol{\varLambda}{\mathord}{letters}{3}
524  \DeclareMathSymbol{\varXi}{\mathord}{letters}{4}
525  \DeclareMathSymbol{\varPi}{\mathord}{letters}{5}
526  \DeclareMathSymbol{\varSigma}{\mathord}{letters}{6}
527  \DeclareMathSymbol{\varUpsilon}{\mathord}{letters}{7}
528  \DeclareMathSymbol{\varPhi}{\mathord}{letters}{8}
529  \DeclareMathSymbol{\varPsi}{\mathord}{letters}{9}
530  \DeclareMathSymbol{\varOmega}{\mathord}{letters}{10}
531 \fi
532 ⟨/varGamma⟩
```

Definitions for math symbols and operators (normally found in the AMS symbol fonts) using LucidaNewMath fonts MSAM* equivalents:

Stop here if noamssymbols option given.

```
533 \ifx\blacksquare\endinput\endinput\fi

534 \DeclareMathSymbol{\boxdot}{\mathbin}{symbols}{237}
535 \DeclareMathSymbol{\boxplus}{\mathbin}{symbols}{234}
536 \DeclareMathSymbol{\boxtimes}{\mathbin}{symbols}{236}
537 \DeclareMathSymbol{\square}{\mathord}{arrows}{2}
538 \DeclareMathSymbol{\blacksquare}{\mathord}{arrows}{3}
539 \DeclareMathSymbol{\centerdot}{\mathbin}{arrows}{225}
540 \DeclareMathSymbol{\lozenge}{\mathord}{arrows}{8}
541 \DeclareMathSymbol{\blacklozenge}{\mathord}{arrows}{9}
542 \DeclareMathSymbol{\circlearrowright}{\mathrel}{arrows}{140}
543 \DeclareMathSymbol{\circlearrowleft}{\mathrel}{arrows}{139}
544 \DeclareMathSymbol{\rightleftharpoons}{\mathrel}{arrows}{122}
545 \DeclareMathSymbol{\leftrightharpoons}{\mathrel}{arrows}{121}
546 \DeclareMathSymbol{\boxminus}{\mathbin}{symbols}{235}
547 \DeclareMathSymbol{\Vdash}{\mathrel}{symbols}{240}
```

```
548 \DeclareMathSymbol{\Vvdash}{\mathrel}{letters}{211}
549 \DeclareMathSymbol{\vDash}{\mathrel}{symbols}{238}
550 \DeclareMathSymbol{\twoheadrightarrow}{\mathrel}{arrows}{37}
551 \DeclareMathSymbol{\twoheadleftarrow}{\mathrel}{arrows}{35}
552 \DeclareMathSymbol{\leftleftarrows}{\mathrel}{arrows}{113}
553 \DeclareMathSymbol{\rightrightarrows}{\mathrel}{arrows}{115}
554 \DeclareMathSymbol{\upuparrows}{\mathrel}{arrows}{114}
555 \DeclareMathSymbol{\downdownarrows}{\mathrel}{arrows}{116}
556 \DeclareMathSymbol{\upharpoonright}{\mathrel}{arrows}{117}
557 \DeclareMathSymbol{\downharpoonright}{\mathrel}{arrows}{119}
558 \DeclareMathSymbol{\upharpoonleft}{\mathrel}{arrows}{118}
559 \DeclareMathSymbol{\downharpoonleft}{\mathrel}{arrows}{120}
560 \DeclareMathSymbol{\rightarrowtail}{\mathrel}{arrows}{41}
561 \DeclareMathSymbol{\leftarrowtail}{\mathrel}{arrows}{40}
562 \DeclareMathSymbol{\leftrightarrows}{\mathrel}{arrows}{110}
563 \DeclareMathSymbol{\rightleftarrows}{\mathrel}{arrows}{109}
564 \DeclareMathSymbol{\Lsh}{\mathrel}{arrows}{123}
565 \DeclareMathSymbol{\Rsh}{\mathrel}{arrows}{125}
566 \DeclareMathSymbol{\rightsquigarrow}{\mathrel}{arrows}{142}
567 \DeclareMathSymbol{\leftsquigarrow}{\mathrel}{arrows}{141}
568 \DeclareMathSymbol{\leftrightsquigarrow}{\mathrel}{arrows}{145}
569 \DeclareMathSymbol{\looparrowleft}{\mathrel}{arrows}{63}
570 \DeclareMathSymbol{\looparrowright}{\mathrel}{arrows}{64}
571 \DeclareMathSymbol{\circeq}{\mathrel}{symbols}{208}
572 \DeclareMathSymbol{\succsim}{\mathrel}{symbols}{225}
573 \DeclareMathSymbol{\gtrsim}{\mathrel}{symbols}{221}
574 \DeclareMathSymbol{\gtrapprox}{\mathrel}{letters}{219}
575 \DeclareMathSymbol{\multimap}{\mathrel}{letters}{199}
576 \DeclareMathSymbol{\image}{\mathrel}{letters}{198}
577 \DeclareMathSymbol{\original}{\mathrel}{letters}{197}
578 \DeclareMathSymbol{\therefore}{\mathrel}{symbols}{144}
579 \DeclareMathSymbol{\because}{\mathrel}{symbols}{145}
580 \DeclareMathSymbol{\doteqdot}{\mathrel}{symbols}{202}
581 \DeclareMathSymbol{\triangleq}{\mathrel}{symbols}{213}
582 \DeclareMathSymbol{\precsim}{\mathrel}{symbols}{224}
583 \DeclareMathSymbol{\lesssim}{\mathrel}{symbols}{220}
584 \DeclareMathSymbol{\lessapprox}{\mathrel}{letters}{218}
585 \DeclareMathSymbol{\eqslantless}{\mathrel}{letters}{226}
586 \DeclareMathSymbol{\eqslantgtr}{\mathrel}{letters}{227}
587 \DeclareMathSymbol{\curlyeqprec}{\mathrel}{letters}{230}
588 \DeclareMathSymbol{\curlyeqsucc}{\mathrel}{letters}{231}
589 \DeclareMathSymbol{\preccurlyeq}{\mathrel}{letters}{228}
590 \DeclareMathSymbol{\leqq}{\mathrel}{symbols}{218}
591 \DeclareMathSymbol{\leqslant}{\mathrel}{letters}{224}
592 \DeclareMathSymbol{\lessgtr}{\mathrel}{symbols}{222}
593 \DeclareMathSymbol{\backprime}{\mathord}{letters}{200}
594 \DeclareMathSymbol{\axisshort}{\mathord}{arrows}{57}
595 \DeclareMathSymbol{\risingdotseq}{\mathrel}{symbols}{204}
596 \DeclareMathSymbol{\fallingdotseq}{\mathrel}{symbols}{203}
597 \DeclareMathSymbol{\succcurlyeq}{\mathrel}{letters}{229}
```

```
598 \DeclareMathSymbol{\geqq}{\mathrel}{symbols}{219}
599 \DeclareMathSymbol{\geqslant}{\mathrel}{letters}{225}
600 \DeclareMathSymbol{\gtrless}{\mathrel}{symbols}{223}
601 \let\sqsubset\undefined
602 \let\sqsupset\undefined
603 \DeclareMathSymbol{\sqsubset}{\mathrel}{symbols}{228}
604 \DeclareMathSymbol{\sqsupset}{\mathrel}{symbols}{229}
605 \DeclareMathSymbol{\vartriangleright}{\mathrel}{letters}{46}
606 \DeclareMathSymbol{\vartriangleleft}{\mathrel}{letters}{47}
607 \DeclareMathSymbol{\trianglerighteq}{\mathrel}{symbols}{245}
608 \DeclareMathSymbol{\trianglelefteq}{\mathrel}{symbols}{244}
609 \DeclareMathSymbol{\bigstar}{\mathord}{arrows}{171}
610 \DeclareMathSymbol{\between}{\mathrel}{letters}{242}
611 \DeclareMathSymbol{\blacktriangledown}{\mathord}{arrows}{7}
612 \DeclareMathSymbol{\blacktriangleright}{\mathrel}{letters}{241}
613 \DeclareMathSymbol{\blacktriangleleft}{\mathrel}{letters}{240}
614 \DeclareMathSymbol{\arrowaxisright}{\mathord}{arrows}{55}
615 \DeclareMathSymbol{\arrowaxisleft}{\mathord}{arrows}{54}
616 \DeclareMathSymbol{\vartriangle}{\mathrel}{arrows}{4}
617 \DeclareMathSymbol{\blacktriangle}{\mathord}{arrows}{5}
618 \DeclareMathSymbol{\triangledown}{\mathord}{arrows}{6}
619 \DeclareMathSymbol{\eqcirc}{\mathrel}{symbols}{207}
620 \DeclareMathSymbol{\lesseqgtr}{\mathrel}{letters}{232}
621 \DeclareMathSymbol{\gtreqless}{\mathrel}{letters}{233}
622 \DeclareMathSymbol{\lesseqqgtr}{\mathrel}{letters}{234}
623 \DeclareMathSymbol{\gtreqqless}{\mathrel}{letters}{235}
624 \DeclareMathSymbol{\Rrightarrow}{\mathrel}{arrows}{108}
625 \DeclareMathSymbol{\Lleftarrow}{\mathrel}{arrows}{106}
626 \DeclareMathSymbol{\veebar}{\mathbin}{letters}{210}
627 \DeclareMathSymbol{\barwedge}{\mathbin}{symbols}{246}
628 \DeclareMathSymbol{\angle}{\mathord}{symbols}{139}
629 \DeclareMathSymbol{\measuredangle}{\mathord}{symbols}{140}
630 \DeclareMathSymbol{\sphericalangle}{\mathord}{symbols}{141}
631 \DeclareMathSymbol{\varpropto}{\mathrel}{symbols}{47} % ?
632 \DeclareMathSymbol{\smallsmile}{\mathrel}{letters}{94} % ?
633 \DeclareMathSymbol{\smallfrown}{\mathrel}{letters}{95} % ?
634 \DeclareMathSymbol{\Subset}{\mathrel}{symbols}{248}
635 \DeclareMathSymbol{\Supset}{\mathrel}{symbols}{249}
636 \DeclareMathSymbol{\Cup}{\mathbin}{symbols}{250}
637 \DeclareMathSymbol{\Cap}{\mathbin}{symbols}{251}
638 \DeclareMathSymbol{\curlywedge}{\mathbin}{symbols}{132}
639 \DeclareMathSymbol{\curlyvee}{\mathbin}{symbols}{133}
640 \DeclareMathSymbol{\leftthreetimes}{\mathbin}{letters}{208}
641 \DeclareMathSymbol{\rightthreetimes}{\mathbin}{letters}{209}
642 \DeclareMathSymbol{\subseteqq}{\mathrel}{letters}{238}
643 \DeclareMathSymbol{\supseteqq}{\mathrel}{letters}{239}
644 \DeclareMathSymbol{\bumpeq}{\mathrel}{symbols}{200}
645 \DeclareMathSymbol{\Bumpeq}{\mathrel}{symbols}{199}
646 \DeclareMathSymbol{\lll}{\mathrel}{letters}{222}
647 \DeclareMathSymbol{\ggg}{\mathrel}{letters}{223}
```

```
648 \DeclareMathSymbol{\circledS}{\mathord}{letters}{202}
649 \DeclareMathSymbol{\pitchfork}{\mathrel}{letters}{243}
650 \DeclareMathSymbol{\dotplus}{\mathbin}{symbols}{137}
651 \DeclareMathSymbol{\backsim}{\mathrel}{letters}{248}
652 \DeclareMathSymbol{\backsimeq}{\mathrel}{letters}{249}
653 \DeclareMathSymbol{\complement}{\mathord}{letters}{148}
654 \DeclareMathSymbol{\intercal}{\mathbin}{letters}{217}
655 \DeclareMathSymbol{\circledcirc}{\mathbin}{symbols}{230}
656 \DeclareMathSymbol{\circledast}{\mathbin}{symbols}{231}
657 \DeclareMathSymbol{\circleddash}{\mathbin}{letters}{204}
```

 MSBM* equivalents

```
658 \DeclareMathSymbol{\lvertneqq}{\mathrel}{arrows}{222}
659 \DeclareMathSymbol{\gvertneqq}{\mathrel}{arrows}{223}
660 \DeclareMathSymbol{\nleq}{\mathrel}{arrows}{156}
661 \DeclareMathSymbol{\ngeq}{\mathrel}{arrows}{157}
662 \DeclareMathSymbol{\nless}{\mathrel}{arrows}{154}
663 \DeclareMathSymbol{\ngtr}{\mathrel}{arrows}{155}
664 \DeclareMathSymbol{\nprec}{\mathrel}{arrows}{229}
665 \DeclareMathSymbol{\nsucc}{\mathrel}{arrows}{230}
666 \DeclareMathSymbol{\lneqq}{\mathrel}{arrows}{220}
667 \DeclareMathSymbol{\gneqq}{\mathrel}{arrows}{221}
668 \DeclareMathSymbol{\nleqslant}{\mathrel}{arrows}{214}
669 \DeclareMathSymbol{\ngeqslant}{\mathrel}{arrows}{215}
670 \DeclareMathSymbol{\lneq}{\mathrel}{arrows}{218}
671 \DeclareMathSymbol{\gneq}{\mathrel}{arrows}{219}
672 \DeclareMathSymbol{\npreceq}{\mathrel}{arrows}{231}
673 \DeclareMathSymbol{\nsucceq}{\mathrel}{arrows}{232}
674 \DeclareMathSymbol{\precnsim}{\mathrel}{arrows}{235}
675 \DeclareMathSymbol{\succnsim}{\mathrel}{arrows}{236}
676 \DeclareMathSymbol{\lnsim}{\mathrel}{arrows}{224}
677 \DeclareMathSymbol{\gnsim}{\mathrel}{arrows}{226}
678 \DeclareMathSymbol{\nleqq}{\mathrel}{arrows}{216}
679 \DeclareMathSymbol{\ngeqq}{\mathrel}{arrows}{217}
680 \DeclareMathSymbol{\precneqq}{\mathrel}{arrows}{233}
681 \DeclareMathSymbol{\succneqq}{\mathrel}{arrows}{234}
682 \DeclareMathSymbol{\precnapprox}{\mathrel}{arrows}{237}
683 \DeclareMathSymbol{\succnapprox}{\mathrel}{arrows}{238}
684 \DeclareMathSymbol{\lnapprox}{\mathrel}{arrows}{227}
685 \DeclareMathSymbol{\gnapprox}{\mathrel}{arrows}{228}
686 \DeclareMathSymbol{\nsim}{\mathrel}{arrows}{150}
687 \DeclareMathSymbol{\ncong}{\mathrel}{arrows}{153}
688 \DeclareMathSymbol{\diagup}{\mathrel}{arrows}{11}
689 \DeclareMathSymbol{\diagdown}{\mathrel}{arrows}{12}
690 \DeclareMathSymbol{\varsubsetneq}{\mathrel}{arrows}{208}
691 \DeclareMathSymbol{\varsupsetneq}{\mathrel}{arrows}{209}
692 \DeclareMathSymbol{\nsubseteqq}{\mathrel}{arrows}{202}
693 \DeclareMathSymbol{\nsupseteqq}{\mathrel}{arrows}{203}
694 \DeclareMathSymbol{\subsetneqq}{\mathrel}{arrows}{206}
695 \DeclareMathSymbol{\supsetneqq}{\mathrel}{arrows}{207}
```

```
696 \DeclareMathSymbol{\varsubsetneqq}{\mathrel}{arrows}{210}
697 \DeclareMathSymbol{\varsupsetneqq}{\mathrel}{arrows}{211}
698 \DeclareMathSymbol{\subsetneq}{\mathrel}{arrows}{204}
699 \DeclareMathSymbol{\supsetneq}{\mathrel}{arrows}{205}
700 \DeclareMathSymbol{\nsubseteq}{\mathrel}{arrows}{200}
701 \DeclareMathSymbol{\nsupseteq}{\mathrel}{arrows}{201}
702 \DeclareMathSymbol{\nparallel}{\mathrel}{arrows}{247}
703 \DeclareMathSymbol{\nmid}{\mathrel}{arrows}{246}
704 \DeclareMathSymbol{\nshortmid}{\mathrel}{arrows}{244}
705 \DeclareMathSymbol{\nshortparallel}{\mathrel}{arrows}{245}
706 \DeclareMathSymbol{\nvdash}{\mathrel}{arrows}{248}
707 \DeclareMathSymbol{\nVdash}{\mathrel}{arrows}{250}
708 \DeclareMathSymbol{\nvDash}{\mathrel}{arrows}{249}
709 \DeclareMathSymbol{\nVDash}{\mathrel}{arrows}{251}
710 \DeclareMathSymbol{\ntrianglerighteq}{\mathrel}{arrows}{242}
711 \DeclareMathSymbol{\ntrianglelefteq}{\mathrel}{arrows}{241}
712 \DeclareMathSymbol{\ntriangleleft}{\mathrel}{arrows}{239}
713 \DeclareMathSymbol{\ntriangleright}{\mathrel}{arrows}{240}
714 \DeclareMathSymbol{\nleftarrow}{\mathrel}{arrows}{50}
715 \DeclareMathSymbol{\nrightarrow}{\mathrel}{arrows}{51}
716 \DeclareMathSymbol{\nLeftarrow}{\mathrel}{arrows}{102}
717 \DeclareMathSymbol{\nRightarrow}{\mathrel}{arrows}{104}
718 \DeclareMathSymbol{\nLeftrightarrow}{\mathrel}{arrows}{103}
719 \DeclareMathSymbol{\nleftrightarrow}{\mathrel}{arrows}{52}
720 \DeclareMathSymbol{\divideontimes}{\mathbin}{letters}{247}
721 \DeclareMathSymbol{\varnothing}{\mathord}{letters}{156}
722 \DeclareMathSymbol{\nexists}{\mathord}{arrows}{32}
723 \DeclareMathSymbol{\Finv}{\mathord}{letters}{144}
724 \DeclareMathSymbol{\Game}{\mathord}{letters}{145}
725 \let\mho\undefined
726 \DeclareMathSymbol{\mho}{\mathord}{letters}{146}
727 \DeclareMathSymbol{\simeq}{\mathrel}{symbols}{39}
728 \DeclareMathSymbol{\eqsim}{\mathrel}{symbols}{153}
729 \DeclareMathSymbol{\beth}{\mathord}{letters}{149}
730 \DeclareMathSymbol{\gimel}{\mathord}{letters}{150}
731 \DeclareMathSymbol{\daleth}{\mathord}{letters}{151}
732 \DeclareMathSymbol{\lessdot}{\mathrel}{letters}{220}
733 \DeclareMathSymbol{\gtrdot}{\mathrel}{letters}{221}
734 \DeclareMathSymbol{\ltimes}{\mathbin}{letters}{206}
735 \DeclareMathSymbol{\rtimes}{\mathbin}{letters}{207}
736 \DeclareMathSymbol{\shortmid}{\mathrel}{letters}{244}
737 \DeclareMathSymbol{\shortparallel}{\mathrel}{letters}{245}
738 \DeclareMathSymbol{\smallsetminus}{\mathbin}{letters}{216} %?
739 \DeclareMathSymbol{\thicksim}{\mathrel}{symbols}{24} %?
740 \DeclareMathSymbol{\thickapprox}{\mathrel}{symbols}{25} %?
741 \DeclareMathSymbol{\approxeq}{\mathrel}{symbols}{157}
742 \DeclareMathSymbol{\succapprox}{\mathrel}{letters}{237}
743 \DeclareMathSymbol{\precapprox}{\mathrel}{letters}{236}
744 \DeclareMathSymbol{\curvearrowleft}{\mathrel}{arrows}{135}
745 \DeclareMathSymbol{\curvearrowright}{\mathrel}{arrows}{136}
```

```
746 \DeclareMathSymbol{\digamma}{\mathord}{letters}{70} %?
747 \DeclareMathSymbol{\varkappa}{\mathord}{letters}{155}
748 \DeclareMathSymbol{\Bbbk}{\mathord}{arrows}{107}
749 \DeclareMathSymbol{\hslash}{\mathord}{letters}{157}
750 \DeclareMathSymbol{\hbar}{\mathord}{arrows}{27}
751 \DeclareMathSymbol{\backepsilon}{\mathrel}{letters}{251} %?
752 \DeclareMathSymbol{\dashrightarrow}{\mathord}{arrows}{58}
753 \DeclareMathSymbol{\dashleftarrow}{\mathord}{arrows}{56}
754 \DeclareMathSymbol{\dashuparrow}{\mathord}{arrows}{57}
755 \DeclareMathSymbol{\dashdownarrow}{\mathord}{arrows}{59}

756 \DeclareMathDelimiter\ulcorner{\mathopen}{arrows}{91}{arrows}{91}
757 \DeclareMathDelimiter\urcorner{\mathclose}{arrows}{92}{arrows}{92}
758 \DeclareMathDelimiter\llcorner{\mathopen}{arrows}{93}{arrows}{93}
759 \DeclareMathDelimiter\lrcorner{\mathclose}{arrows}{94}{arrows}{94}
760 \edef\checkmark{\noexpand\mathhexbox{\hexnumber@\symarrows}AC}
761 \edef\circledR{\noexpand\mathhexbox{\hexnumber@\symletters}C9}
762 \edef\maltese{\noexpand\mathhexbox{\hexnumber@\symletters}CB}
```

Changes to default for \Leftrightarrow. I (SPQR) don't like 22C, so:

```
763 \let\Leftrightarrow\undefined
764 \DeclareMathSymbol{\Leftrightarrow}{\mathrel}{arrows}{97}
```

Override AMS logo, just to ensure we don't use any CM fonts! (Not done in this version.)

```
\def\AmS{{\protect\AmSfont
  A\kern-.1667em\lower.5ex\hbox{M}\kern-.125emS}}
<lucidabright|lucbmath>%\def\AmSfont{\usefont{OMS}{hlcy}{m}{n}}
```

```
765 ⟨/lucbmath⟩
```

2.5   Lucfont test file

A test file for the Lucida fonts.

```
766 ⟨*lucfont⟩
767 \documentclass{article}
768 ⟨T1⟩\usepackage[T1]{fontenc}
769 ⟨LY1⟩\usepackage[LY1]{fontenc}
770 \begin{document}
771 \title{All the Lucida text fonts}
772 \author{prepared by Sebastian Rahtz}
773 \date{February 19th 1995}
774 \maketitle
775 \def\test#1#2#3#4#5{%
776  \item[#1/#2/#3]#4 (#5):
777  {\fontfamily{#1}\fontseries{#2}\fontshape{#3}\selectfont
778  Animadversion for a giraffe costs \pounds123. Wa\ss\ ist
779  das f\"ur ein Klopf?
780  We are often na{\"\i}ve vis-\'{a}-vis
781 the d{\ae}monic ph{\oe}nix's official r\^{o}le in fluffy souffl\'{e}s}
```

```
782 }
783
784 \begin{description}
785 \test{hlx}{b}{it}{hlxdi8t}{LucidaFax-DemiItalic}
786 \test{hlx}{b}{n}{hlxd8t}{LucidaFax-Demi}
787 \test{hlx}{m}{it}{hlxrir8t}{LucidaFax-Italic}
788 \test{hlx}{m}{n}{hlxr8t}{LucidaFax}
789
790 \test{hlh}{b}{it}{hlcdib8t}{LucidaBright-DemiItalic}
791 \test{hlh}{b}{n}{hlcdb8t}{LucidaBright-Demi}
792 \test{hlh}{m}{it}{hlcrib8t}{LucidaBright-Italic}
793 \test{hlh}{m}{n}{hlcrb8t}{LucidaBright}
794
795 \test{hlce}{m}{it}{hlcrie8t}{LucidaCalligraphy-Italic}
796
797 \test{hlcf}{m}{n}{hlcrf8t}{LucidaBlackletter}
798
799 \test{hlcn}{m}{it}{hlcrin8t}{LucidaCasual-Italic}
800 \test{hlcn}{m}{n}{hlcrn8t}{LucidaCasual}
801
802 \test{hlst}{b}{n}{hlsbt8t}{LucidaSans-TypewriterBold}
803 \test{hlst}{b}{sl}{hlsbot8t}{LucidaSans-TypewriterBoldOblique}
804
805 \test{hls}{ub}{it}{hlsbi8t}{LucidaSans-BoldItalic}
806 \test{hls}{ub}{n}{hlsb8t}{LucidaSans-Bold}
807 \test{hls}{b}{it}{hlsdi8t}{LucidaSans-DemiItalic}
808 \test{hls}{b}{n}{hlsd8t}{LucidaSans-Demi}
809 \test{hls}{m}{it}{hlsri8t}{LucidaSans-Italic}
810 \test{hls}{m}{n}{hlsr8t}{LucidaSans}
811
812 \test{hlct}{b}{n}{hlcbt8t}{LucidaTypewriterBold}
813 \test{hlct}{b}{sl}{hlcbot8t}{LucidaTypewriterOblique}
814 \test{hlcw}{m}{it}{hlcriw8t}{LucidaHandwriting-Italic}
815
816 \end{description}
817 \end{document}
818 ⟨/lucfont⟩
```