The Computer Modern Bright fonts and the LaTeX package cmbright

Walter Schmidt*

(v7.1 – 2000/06/30)

Contents

*walter.schmidt@arcormail.de

1 The CM Bright fonts

'Computer Modern Bright' is a family of sans serif fonts, based on Donald Knuth's CM fonts. It includes OT1, T1 and TS1 encoded text fonts of various shapes as well as all the fonts necessary for mathematical typesetting, incl. the AMS symbols.

CM Bright has been designed as a well legible standalone font. It is 'lighter' and less obtrusive than CM Sans Serif, which, in contrast, is more appropriate for markup purposes within a CM Roman environment.

Together with CM Bright there comes a family of typewriter fonts, named 'CM Typwewriter Light', which look better in combination with CM Bright than the ordinary `cmtt` fonts would do.

The CM Bright fonts in METAFONT format are distributed free from the CTAN archives, directory `fonts/cmbright`.

The fonts are also available in Type1 format from MicroPress, Inc, see `<http://www.micropress-inc.com/samples/cmbright.htm>`.

2 The LaTeX macro package cmbright

2.1 Description

The LaTeX macro package cmbright supports typesetting with the font family CM Bright. Loading the package

```
\usepackage{cmbright}
```

effects the following:

- The default sans serif font family for typesetting text and math will be `cmbr`, i.e. CM Bright.
- The sans serif font family will be the default for the whole document.
- A new mathematical alphabet `\mathbold` provides bold slanted letters, inluding uppercase and lowercase Greek.
- The packages amsfonts or amssymb, when loaded additionally, will use the 'Bright' versions of the AMS symbol fonts.

  Notice that you may still have to specify the option `psamsfonts` for these packages, so as to prevent them from using design sizes of the CM Math Extension and Euler Fraktur fonts, which may be unavailable within your TeX system; this works flawlessly with version 7.1 of the cmbright package now.
- The default typewriter font family is changed to `cmtl`, i.e. CM Typewriter Light.

- The line spacing (`\baselineskip`) for the font sizes 8–12 pt is increased to approx. 1.25 × size.

2.2 Package options

`standard-baselineskips` This option will prevent the package from enlarging the default line spacing. This may, e.g., be useful with a twocolumn layout.

`slantedGreek` When the macro package is loaded using this option, uppercase Greek letters will, by default, be slanted. Regardless of the option the new commands `\upDelta` and `\upOmega` will *always* provide an upright Δ and Ω.

2.3 Font encoding

The package does *not* change the default output font encoding from OT1. It is, however, recommended to make use of CM Bright through the extended T1 and TS1 encodings, since doing so does not imply any drawback. This is enabled by the following additional commands:

```
\usepackage[T1]{fontenc}
\usepackage{textcomp}
```

2.4 Scaling of the 'large' math symbols

In order to achieve proper scaling of the 'large' math symbols, you may load the packages exscale, amsfonts or amssymb additionally; they will work in conjunction with cmbright, too.

2.5 Known bugs and deficiencies

- In order to enlarge the default `\baselineskip`, the size-changing macros have been redefined, and they are no longer as robust as the original definitions. This may result in LaTeX errors with 'moving arguments'. As a workaround, you may protect any font-related commands in moving arguments with a `\protect` command. In case this does not help, the package should be loaded with the option standard-baselineskips which will prevent the commands from being redefined; you will, however, have to care for an appropriate line spacing by other means then.

- There is no 'bold' `\mathversion` to bolden complete formulae. (See, however, the mathematical alphabet `\mathbold`.)

- The textcomp package, if required, must be input *after* `cmbright`, otherwise the symbol ® (`\textregistered`) is not taken from the text companion font. The same problem might occur, if (e.g. with future versions of LaTeX) the TS1 encoding is included in the LaTeX format. In both cases the symbol is typeset in roman style, instead of sans serif.

- Within the mathematical mode the symbol £ is treated as a text symbol, so its size and the surrounding space might be wrong under some circumstances.

- The package oldlfont cannot be used in conjunction with `cmbright`. (There should be no real need for doing so!)

- The package newlfont, if used in conjunction with the CM Bright fonts, must be input before `cmbright`.

3 Frequently asked questions

- Can I use the CM Bright fonts with a 300 dpi printing engine?

  With large font sizes this is no problem at all. At 11 pt and below, however, the only advice which can be given, is: Try it out! When using the Metafont version of the fonts, certain letters may be corrupt, depending on the MF mode; problems are known to occur with the caret accent,

- Typesetting a complete book using the CM Bright fonts, how would that look?

  See the Proceedings of the Ninth European TeX Conference (1995). The fonts used were a beta release of CM Bright; the small sizes ($<$ 10 pt) have been improved very much in the meantime. The book was printed at 600 dpi.

- Help! CM Bright does not provide 'small capitals'.

  Company names, acronyms, trade marks and similar material may be typeset capitalized instead. In order to make the result less obtrusive, the font size should be one 'step' smaller than the surrounding text. A 'quick and dirty' way to make LaTeX perform this task is the following style file `smcaps.sty`. It defines the new command `\textc`, which may be used in place of `\textsc`:

```
\ProvidesPackage{smcaps}
\DeclareRobustCommand{\sm@ller}{%
   \dimen@\f@size\p@
   \ifdim \dimen@ > 12\p@
```

```
    \dimen@=0.83333\dimen@
  \else
    \advance \dimen@ -2\p@
  \fi
  \math@fontsfalse
  \fontsize{\the\dimen@}\z@
  \selectfont
}
\newcommand{\textc}[1]{{\sm@ller\uppercase{#1}}}
```

Table 1: NFSS classification of the Computer Modern Bright fonts

encoding	**family**	**series**	**shape(s)**
CM Bright			
OT1, T1, TS1	cmbr	m	n, sl
T1, TS1	cmbr	sb	n, sl
OT1, T1, TS1	cmbr	bx	n
CM Typewriter Light			
OT1, T1, TS1	cmtl	m	n, sl
CM Bright Math			
OML	cmbrm	m, b	it
OMS	cmbrs	m	n
CM Bright AMS A, B			
U	msa, msb	m	n

4 NFSS classification of the fonts

Table 1 lists the font series and shapes available in the CM Bright and CM Typewriter Light families. Notice, that

- the bx series of the text fonts is supported at sizes of 9 pt and above only;
- the usual font substitutions are set up so as to map OML and OMS encoded text fonts to the math fonts;
- there is no special CM Bright font for the 'extensible math symbols'; OMX/cmex should be used instead;
- there are no `.fd` files for the AMS fonts; instead, the package `cmbright` will set up the appropriate font definitions, so as to prevent LaTeX from loading the default `.fd` files of the (roman) AMS fonts.

5 The package code

5.1 Text font families

The sans serif font family is made the default one:

```
⟨*cm⟩
\renewcommand{\familydefault}{\sfdefault}
```

CM Bright is to be used as the default sans serif font family:

```
\renewcommand{\sfdefault}{cmbr}
```

CM Typewriter Light is to be used as the default typewriter font family, because the `cmtt` fonts look too dark in combination with CM Bright:

```
\renewcommand{\ttdefault}{cmtl}
```

5.2 Mathematical fonts

Default definitions which remain unchanged are commented out:

```
\DeclareSymbolFont      {operators} {OT1}{cmbr}{m}{n}
\DeclareSymbolFont        {letters} {OML}{cmbrm}{m}{it}
\DeclareSymbolFont        {symbols} {OMS}{cmbrs}{m}{n}
% \DeclareSymbolFont {largesymbols} {OMX}{cmex}{m}{n}
%
% \DeclareSymbolFontAlphabet    {\mathrm} {operators}
% \DeclareSymbolFontAlphabet{\mathnormal} {letters}
% \DeclareSymbolFontAlphabet   {\mathcal} {symbols}
%
\DeclareMathAlphabet{\mathit} {OT1}{cmbr}{m}{sl}
\DeclareMathAlphabet{\mathbf} {OT1}{cmbr}{bx}{n}
\DeclareMathAlphabet{\mathtt} {OT1}{cmtl}{m}{n}
```

Despite its name, `\mathrm` is not a font with serifs, but it is, what the user expects it to be: the upright font used e.g. for operator names.

We do not set up a bold `\mathversion`, but we make a bold slanted mathematical alphabet available:

```
\DeclareMathAlphabet{\mathbold}{OML}{cmbrm}{b}{it}
```

The command `\mathbold` should act on lowercase greek letters, too:

```
\DeclareMathSymbol{\alpha}{\mathalpha}{letters}{11}
\DeclareMathSymbol{\beta}{\mathalpha}{letters}{12}
\DeclareMathSymbol{\gamma}{\mathalpha}{letters}{13}
\DeclareMathSymbol{\delta}{\mathalpha}{letters}{14}
\DeclareMathSymbol{\epsilon}{\mathalpha}{letters}{15}
\DeclareMathSymbol{\zeta}{\mathalpha}{letters}{16}
\DeclareMathSymbol{\Gamma}{\mathalpha}{letters}{0}
\DeclareMathSymbol{\eta}{\mathalpha}{letters}{17}
\DeclareMathSymbol{\theta}{\mathalpha}{letters}{18}
\DeclareMathSymbol{\iota}{\mathalpha}{letters}{19}
\DeclareMathSymbol{\kappa}{\mathalpha}{letters}{20}
\DeclareMathSymbol{\lambda}{\mathalpha}{letters}{21}
```

```
\DeclareMathSymbol{\mu}{\mathalpha}{letters}{22}
\DeclareMathSymbol{\nu}{\mathalpha}{letters}{23}
\DeclareMathSymbol{\xi}{\mathalpha}{letters}{24}
\DeclareMathSymbol{\pi}{\mathalpha}{letters}{25}
\DeclareMathSymbol{\rho}{\mathalpha}{letters}{26}
\DeclareMathSymbol{\sigma}{\mathalpha}{letters}{27}
\DeclareMathSymbol{\tau}{\mathalpha}{letters}{28}
\DeclareMathSymbol{\upsilon}{\mathalpha}{letters}{29}
\DeclareMathSymbol{\phi}{\mathalpha}{letters}{30}
\DeclareMathSymbol{\chi}{\mathalpha}{letters}{31}
\DeclareMathSymbol{\psi}{\mathalpha}{letters}{32}
\DeclareMathSymbol{\omega}{\mathalpha}{letters}{33}
\DeclareMathSymbol{\varepsilon}{\mathalpha}{letters}{34}
\DeclareMathSymbol{\vartheta}{\mathalpha}{letters}{35}
\DeclareMathSymbol{\varpi}{\mathalpha}{letters}{36}
\DeclareMathSymbol{\varrho}{\mathalpha}{letters}{37}
\DeclareMathSymbol{\varsigma}{\mathalpha}{letters}{38}
\DeclareMathSymbol{\varphi}{\mathalpha}{letters}{39}
```

The `slantedGreek` option:

```
\DeclareOption{slantedGreek}{%
  \DeclareMathSymbol{\Gamma}{\mathalpha}{letters}{0}
  \DeclareMathSymbol{\Delta}{\mathalpha}{letters}{1}
  \DeclareMathSymbol{\Theta}{\mathalpha}{letters}{2}
  \DeclareMathSymbol{\Lambda}{\mathalpha}{letters}{3}
  \DeclareMathSymbol{\Xi}{\mathalpha}{letters}{4}
  \DeclareMathSymbol{\Pi}{\mathalpha}{letters}{5}
  \DeclareMathSymbol{\Sigma}{\mathalpha}{letters}{6}
  \DeclareMathSymbol{\Upsilon}{\mathalpha}{letters}{7}
  \DeclareMathSymbol{\Phi}{\mathalpha}{letters}{8}
  \DeclareMathSymbol{\Psi}{\mathalpha}{letters}{9}
  \DeclareMathSymbol{\Omega}{\mathalpha}{letters}{10}
}
\let\upOmega\Omega
\let\upDelta\Delta
```

5.3 Leading

The `\baselineskip` should be larger than with CM Roman. For text sizes, i.e. 8–12 pt, a value of 1.25 × size is recommended. In order to overwrite the `\baselineskip` defined in the commands like `\normalsize`, `\small`, etc., we use a trick from Frank Jensen's package `beton` (v1.3). First we set up a table containing our `\baselineskip` values:

```
\def\bright@baselineskip@table
   {<\@viiipt>10<\@ixpt>11.25<\@xpt>12.5<\@xipt>13.7<\@xiipt>15}
```

All the standard LaTeX size-changing commands (`\small`, `\large`, etc.) are defined in terms of the `\@setfontsize` macro. This macro is called with the following three arguments: `#1` is the size-changing command; `#2` is the font

size; #3 is the \baselineskip value. We modify this macro to check the above \bright@baselineskip@table for an alternative \baselineskip value:

```
\def\bright@setfontsize#1#2#3%
   {\edef\@tempa{\def\noexpand\@tempb####1<#2}%
    \@tempa>##2<##3\@nil{\def\bright@baselineskip@value{##2}}%
    \edef\@tempa{\noexpand\@tempb\bright@baselineskip@table<#2}%
    \@tempa><\@nil
    \ifx\bright@baselineskip@value\@empty
       \def\bright@baselineskip@value{#3}%
    \fi
    \old@setfontsize{#1}{#2}\bright@baselineskip@value}
```

Now we redefine \@setfontsize:

```
\let\old@setfontsize=\@setfontsize
\let\@setfontsize=\bright@setfontsize
```

The \baselineskip values specified in the above table should be appropriate for most purposes, i.e., for one-column material in the normal article/report/book formats. However, it is sometimes desirable to use a smaller value for \baselineskip, e.g. in two-column material. We therefore provide an option to turn off the above automatic mechanism for \baselineskip settings:

```
\DeclareOption{standard-baselineskips}{%
 \let\@setfontsize=\old@setfontsize}
```

Note that the \let-assignment has to be executed after \old@setfontsize has been defined; this is ensured by the fact that options are processed at the end of the package.

5.4 Old-style numerals

Old-style numerals are to be taken from CM Bright, too:

```
\def\oldstylenums#1{%
   \begingroup
    \spaceskip\fontdimen\tw@\font
    \usefont{OML}{cmbrm}{\f@series}{it}%
    \mathgroup\symletters #1%
   \endgroup
}
```

In the future this may change; old-style numerals could be taken from the text companion font, thus even providing 'oldstyle bold extended' etc.

5.5 Missing symbols

The OT1 encoded CM Bright fonts do not contain the symbol £. We must therefore redefine the commands \textsterling and \mathsterling. They will now use the roman text font family:

```
\DeclareTextCommand{\textsterling}{OT1}{{%
   \rmfamily
   \ifdim \fontdimen\@ne\font >\z@
      \itshape
   \else
      \fontshape{ui}\selectfont
   \fi
   \char`\$}}
\def\mathsterling{\textsl{\textsterling}}
```

Since there is no 'caps and small caps' font shape, the definition of ® must be changed:

```
\DeclareTextCommandDefault{\textregistered}{%
   \textcircled{{\rmfamily\scshape r}}}
```

5.6 Defining the AMS symbol fonts

In case the package amsfonts is loaded additionally, the CM Bright versions of the AMS symbol fonts are to be used. The amsfonts package, when loaded with the [psamsfonts] option, will issue its own font definition commands, so we have to defer ours after loading of the packages, so as not to let them be overwritten.

```
\AtBeginDocument{%
  \DeclareFontFamily{U}{msa}{}
  \DeclareFontShape{U}{msa}{m}{n}{%
  <5><6><7><8>cmbras8%
  <9>cmbras9%
  <10><10.95><12><14.4><17.28><20.74><24.88>cmbras10%
  }{}
  \DeclareFontFamily{U}{msb}{}
  \DeclareFontShape{U}{msb}{m}{n}{%
  <5><6><7><8>cmbrbs8%
  <9>cmbrbs9%
  <10><10.95><12><14.4><17.28><20.74><24.88>cmbrbs10%
  }{}
}
```

5.7 Patches for obsolete LaTeX releases

With a LaTeX release previous to 1995/06/01 some macros from the LaTeX kernel and the standard classes must be redefined, because they explicitely select a font with serifs:

```
⟨*patch⟩
\typeout{* This package 'cmbright' contains patches}
\typeout{* to be used with obsolete versions of LaTeX.}
\typeout{* However, if your LaTeX is from 1995/06/01 or newer,}
\typeout{* you MUST redo the installation of the package,}
\typeout{* in order to generate it again, without the patches!}
```

```
\def\@dottedtocline#1#2#3#4#5{\ifnum #1>\c@tocdepth \else
  \vskip \z@ \@plus.2\p@
  {\leftskip #2\relax \rightskip \@tocrmarg \parfillskip -\rightskip
    \parindent #2\relax\@afterindenttrue
   \interlinepenalty\@M
   \leavevmode
   \@tempdima #3\relax
   \advance\leftskip \@tempdima \hbox{}\hskip -\leftskip
    {#4}\nobreak\leaders\hbox{$\m@th \mkern \@dotsep mu.\mkern \@dotsep
       mu$}\hfill \nobreak
           \hbox to\@pnumwidth{\hfil\reset@font #5}\par}\fi}
\def\@eqnnum{{\reset@font(\theequation)}}
\DeclareOption{leqno}{
\renewcommand\@eqnnum{\hbox to .01\p@{}%
                      \rlap{\reset@font%
                        \hskip -\displaywidth(\theequation)}}}
\def\ps@plain{\let\@mkboth\@gobbletwo
     \let\@oddhead\@empty\def\@oddfoot{\reset@font\hfil\thepage
     \hfil}\let\@evenhead\@empty\let\@evenfoot\@oddfoot}
\pagestyle{plain}
⟨/patch⟩
```

5.8 Processing the options

```
\ProcessOptions\relax
```

5.9 Initialization

We ensure that any package loaded after `cmbright` will find the new value of `\baselineskip` and the new `\normalfont`, which has a larger 'em' than CM Roman.

```
\normalfont\normalsize
⟨/cm⟩
```

This file ...

... `cmbright.dtx` contains the following DocStrip modules:

module:	contents:
`cm`	package `cmbright`
`driver`	driver for documentaion
`patch`	patches for LaTeX release < June 1995

The module `patch` should only be selected together with `cm`.

The next line of code prevents DocStrip from adding the character table to all modules:

```
\endinput
```