The \LaTeX\ 2\epsilon package \texttt{ccfonts}

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1 Prerequisites

In order to make use of the package \texttt{ccfonts}, the following fonts and \texttt{.fd} files are required:

- The Concrete text fonts with traditional encoding (CTAN: \texttt{fonts/concrete/})

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- The Concrete text fonts with European encoding (CTAN: \texttt{fonts/ecc/})

- The mathematical Concrete fonts (CTAN: \texttt{fonts/concmath/})

- The \texttt{.fd} files for the traditional and mathematical Concrete fonts (CTAN: \texttt{macros/latex/contrib/support/concmath/})

- The \texttt{.fd} files for the European Concrete fonts, which are distributed and installed in conjunction with the \texttt{ccfonts} package

On CTAN the fonts are available in \texttt{METAFOnt} format. The Concrete typefaces are also provided in Type1 format from Micropress Inc, see \url{http://www.micropress-inc.com}.

2 Using the package

The \LaTeX{} macro package \texttt{ccfonts} supports typesetting with the font family `Concrete'. Loading this package through

\begin{verbatim}
\usepackage{ccfonts}
\end{verbatim}

will effect the following:

- The default roman font family is changed to \texttt{ccr}, i.e. Concrete.

- The default leading (\texttt{\baselineskip}) for the font sizes 8–12 pt is increased slightly.

- The `Concrete' fonts are used in math mode, too.

- The packages \texttt{amsfonts} or \texttt{amssymb}, if loaded additionally, will use the Concrete versions of the AMS symbol fonts.

Notice that you may still have to specify the option \texttt{psamsfonts} for these packages, so as to prevent them from using design sizes of the Euler Fraktur fonts, which may be unavailable within your TeX system; this works flawlessly with version 1.1 of the \texttt{ccfonts} package now. (You need not care for this subject, unless Euler Fraktur is actually used.)

2.1 Package options

\texttt{boldsans} The semibold series of CM Sans is used as a replacement for the missing bold series of Concrete. (The default behaviour is to use the bold extended version of CM Roman.)

\texttt{standard-baselineskips} disables the increased leading. This can be useful, e.g., when typesetting in narrow columns.
\texttt{exscale} implements scaling of the math extension font. For a discussion of this feature see the file \texttt{exscale.dtx}.

\texttt{slantedGreek} makes uppercase Greek letters slanted by default. Regardless of this option, the new commands \texttt{\upDelta} and \texttt{\upOmega} will always produce an upright $\Delta$ and $\Omega$.

\subsection*{2.2 Font encoding}

The package does \emph{not} change the default output font encoding from OT1. Switching to the extended T1 and TS1 encodings needs the following additional commands:

\begin{verbatim}
  \usepackage[T1]{fontenc}
  \usepackage{textcomp}
\end{verbatim}

\section*{3 Known problems}

- There are no bold math fonts available.

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

\section*{4 NFSS classification of the Concrete typefaces}

\begin{tabular}{|c|c|c|c|}
\hline
encoding & family & series & shape(s) \\
\hline
\texttt{Concrete} & & & \\
OT1, T1, TS1 & ccr & m & n, sl, it, sc \\
OT1 & ccr & c & sl \\
\hline
\texttt{Concrete Math} & & & \\
OML & ccm & m & it \\
OMS & ccsy & m & n \\
OMX & ccex & m & n \\
\hline
\texttt{Concrete AMS A, B} & & & \\
U & msa & m & n \\
U & msb & m & n \\
\hline
\end{tabular}
Notice, that

- the series c (condensed) is available as slanted and with a font size of 9 pt only;
- the Concrete AMS fonts are only defined through the package ccfonts, i.e., there are no related .fd files.

5 Implementation

5.1 Font setup for text mode

We make ccr the default font family:

```latex
\renewcommand{\rmdefault}{ccr}
```

The \baselineskip should be larger than with CM Roman. In order to overwrite the \baselineskip defined in the commands like \normalsize, \small, etc., we use a trick from Frank Jensen’s package beton. First we set up a table containing our \baselineskip values:

```latex
\def\cc@baselineskip@table
\{<\@viiipt>10<\@ixpt>11.5<\@xpt>13<\@xipt>14.5<\@xiipt>16\}
```

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 \cc@baselineskip@table for an alternative \baselineskip value:

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

Now we redefine \setfontsize:

```latex
\let\old@setfontsize=\setfontsize
\let\@setfontsize=\cc@setfontsize
```

5.2 Options

5.2.1 Standard leading

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

5.2.2 The option \exscale
The code is simply copied from exscale.sty, with xccex instead of cmex.
\DeclareOption{exscale}{%
\DeclareFontFamily{OMX}{ccex}{}
\DeclareFontShape{OMX}{ccex}{m}{n}{{}
<8>sfixed*xccex7%
<8>xccex8%
<9>xccex9%
<10><10.95><12><14.4><17.28><20.74><24.88>xccex10%
}}
\newdimen\big@size
\addto@hook\every@math@size\mbox{$($}kern\z@\global\big@size 1.2\ht\z@
\def\bBigg@#1#2{%
{\hbox{$\left\vcenter to#1\big@size{}\right.$}}
}\def\big{\bBigg@\@ne}
\def\Big{\bBigg@{1.5}}
\def\bigg{\bBigg@{2}}
\def\Bigg{\bBigg@{2.5}}
%

5.2.3 The option \slantedGreek
\let\upDelta\Delta
\let\upOmega\Omega
\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
%
}

5.3 The option \boldsans
\DeclareOption{boldsans}{%
5.3.1 Processing options

Note that `\old@setfontsize` must have been defined before!

5.4 Font setup for math mode

\begin{verbatim}
\DeclareSymbolFont{operators}{OT1}{ccr}{m}{n}
\DeclareSymbolFont{letters}{OML}{ccm} {m}{it}
\DeclareSymbolFont{symbols}{OMS}{ccsy}{m}{n}
\DeclareSymbolFont{largesymbols}{OMX}{ccex}{m}{n}
\DeclareMathAlphabet{\mathbf}{OT1}{ccr}{bx}{n}
\DeclareMathAlphabet{\mathit}{OT1}{ccr} {m}{it}
\end{verbatim}

In case the package `amsfonts` is loaded additionally, we must ensure that the Concrete versions of the AMS symbol fonts are used. We execute the font definitions AtBeginDocument, so that loading `amsfonts` with the option `psamsfonts` cannot do any harm. Notice that the option may be required for getting the Euler Fraktur fonts right.

\begin{verbatim}
\AtBeginDocument{
\DeclareFontFamily{U}{msa}{}
\DeclareFontShape{U}{msa} {m}{n}{{
\<5><6><7><8><9><10>gen*xccam%\}
\<10.95><12><14.4><17.28><20.74><24.88>xccam10}\{}
\DeclareFontFamily{U}{msb}{}
\DeclareFontShape{U}{msb} {m}{n}{{
\<5><6><7><8><9><10>gen*xccbm%\}
\<10.95><12><14.4><17.28><20.74><24.88>xccbm10}\{}
\end{verbatim}

5.5 Initialization

We ensure that any package loaded after `ccfonts` will find the new value of `\baselineskip`.

\begin{verbatim}
\normalsize
\end{verbatim}