The **ETbb** package—Edward Tufte’s version of Bembo

Michael Sharpe

**Background**

The fonts in this package were derived ultimately from the collection of fonts commissioned by Edward Tufte for his own books, and released in 2015 as **ET-Bembo** under the MIT license. (The sources for that collection were fonts using the family name **ET-book**.) That collection was enhanced in 2019 under the name **XETBook** by Daniel Benjamin Miller, and it is his package which was the starting point for **ETbb**, where the *bb* denotes the Berry abbreviation for Bembo. The final section of this document makes a detailed comparison with the earlier **fbb** package, which is also Bembo-like, derived from **Cardo**. The most significant differences are that **ETbb** has a regular upright that is about 20% darker than the corresponding **fbb**, and its ascender height is noticeably less. These differences make **ETbb** have a less spindly appearance that is closer in spirit to the print produced by traditional metal versions of Bembo.

**Package properties**

The package makes a number of changes to the **XETBook** fonts:

- The released version of **ET-Bembo** lacks kerning tables—a serious omission—rectified in **ETbb**.
- The scale has been increased by 3.36% so that the x-height of the upright regular face is 431, very close to Computer Modern and Libertine.
- The lining figures in some faces were reduced so as to be a bit less than the cap-heights.
- The lining figures in **XETBook** were proportional rather than tabular. I’ve added new tabular lining and old-style figures.
- Added superior letters and figures to all faces. E.g., \textsuperscript{ABCabc123} renders as \text{ABCabc123}.
- Added inferior figures to all faces.
- The originals comprised glyphs in the Adobe Standard Encoding, forming a rather sparse subset of the T1 encoding. I’ve added accented and composite glyphs that provide complete coverage of the T1 encoding as well as many glyphs required in the orthography of a number Eastern European countries.
- Small caps have been added to all faces.
- There is a new glyph for the German capital sharp S (ẞ, großes eszett, U+1E9E), approved in 2017 for optional use in German orthography. Small cap versions are also provided.
- The glyph capital P has been changed from its default closed shape, as used in almost all modern digital renderings of Bembo, to the more historically accurate open shape. See, for example, the

(A higher resolution rendering of a two-page sample is available from https://upload.wikimedia.org/wikipedia/commons/8/89/De_Aetna_1495.jpg.)

Package options and macros

This package has most of the same features and options as the `fbb` package and even includes the `altP` option, though that has no effect because the alternate P shapes in `fbb` are the default in `ETbb`.

Text figures may be selected from four types:

- Proportional lining (LF), selected by options `lining`, proportional [or `p`]; (lining, or `lf`, is the default figure style;)
- Tabular lining (TLF), selected by options `lining` [or `lf`], tabular [or `t`]; (tabular is the default figure alignment;)
- Proportional oldstyle (OsF), selected by option `oldstyle` [or `osf`], proportional [or `p`];
- Tabular oldstyle (TOsF), selected by options `oldstyle` [or `osf`], tabular [or `t`].

The package also defines macros that allow you use alternate figure styles locally:

<table>
<thead>
<tr>
<th>Macro</th>
<th>result</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textlf{0123456789}</td>
<td>0123456789</td>
<td>print 0123456789 in proportional lining figures</td>
</tr>
<tr>
<td>\textttlf{0123456789}</td>
<td>0123456789</td>
<td>print 0123456789 in tabular lining figures</td>
</tr>
<tr>
<td>\texttosf{0123456789}</td>
<td>0123456789</td>
<td>print 0123456789 in proportional oldstyle figures</td>
</tr>
<tr>
<td>\textttosf{0123456789}</td>
<td>0123456789</td>
<td>print 0123456789 in tabular oldstyle figures</td>
</tr>
<tr>
<td>\textsu{0123456789}</td>
<td>0123456789</td>
<td>print 0123456789 in superior figures</td>
</tr>
<tr>
<td>\textin{0123456789}</td>
<td>0123456789</td>
<td>print 0123456789 in inferior figures</td>
</tr>
</tbody>
</table>

The macro `\textlf{123}` is identical in effect to `{\lfstyle 123}`, and similarly for the other lining and oldstyle macros, while `\textsu{123}` has the same effect as `{\sufigures 123}` and `\textin{123}` has the same effect as `{\infigures 123}`. If you prefer typing longer names, you may use `\textinferior` as a synonym for `\textin`, and similarly for `\textsu`.

The `\textfrac` macro constructs fractions using `\textsu` and `\textin`, raising the result to align with the text baseline. The behavior is quite configurable, there being three parameters available to control the kerns before and after the fraction solidus, and the amount to raise the resulting box. The three parameters are passed as options to `ETbb`, named

foresolidus % default value -.03em
afTsolidus % default value .02em
raisefrac % default value .111em

(The values should always be `em` units in order to behave correctly with respect to scaling.) If you were to change the default behavior with the option

raisefrac=0em
you would get a fraction with the denominator's baseline at the baseline of the \text{in} figures, namely $-0.111\text{em}$. Those who wish the fractional part to be vertically centered with respect to lining figures should specify
\begin{verbatim}
raisefrac=.053\text{em}
\end{verbatim}
All the above have to do with globally defined settings for \text{frac}, but that macro allows one optional argument that can override the effect of raisefrac, with, e.g., \text{frac}[.1\text{em}][6][11] raising the fraction 6/11 by .1\text{em} instead of the default specified in the original options.

**Examples:**
- \text{2\frac{17}{32}} renders as $2\frac{17}{32}$ with default settings.
- \text{2\frac[.053\text{em}]{17}{32}} produces a fraction centered on the mid-height of lining figures: $2\frac{17}{32}$.
- \text{2\frac[0\text{em}]{17}{32}} produces a fraction with numerator and denominator at the normal heights of superior and inferior figures: $2\frac{17}{32}$.

Option sups changes the form of footnote markers to use ETbb's superior figures, unless you have re-defined the meaning of \text{thefootnote} prior to loading ETbb. For more control over size, spacing and position of footnote markers, use the supers package: E.g.,
\begin{verbatim}
\usepackage[supstfm=ETbb-Regular-sup-t1]{supers}
\end{verbatim}

Option sharpS replaces SS in the T1 encoding by the new \text{U+1E9E} glyph and replaces the small cap ss by the small cap version of \text{U+1E9E}. Only figure-styles TLF, LF, 0sF and T0sF are handled, and only in the T1 encoding.

Option scosf forces the use of 0sF figures in a small caps block, no matter what the default figure settings.

There is a scaled \texttt{[or scale]} option (e.g., scaled=.97) that allow you to adjust the text size against, say, a math package.

### A suggested math companion

This text package works well with newtxmath with the libertine option, because the latter has italics of the same italic angle as ETbb and of very similar xheight and weight. If you have the MinionPro fonts (version 2.0 or higher) and have set them up with FontPro and the minion2newtx ctan package, then the minion option to newtxmath provides a very good math companion with better Greek letters than libertine. The suggested invocation for libertine math is:

% load babel package and options here
\texttt{\usepackage[p,osf]{ETbb} % osf in text, tabular lining figures in math}
\texttt{\usepackage[scaled=.95,type1]{cabin} % sans serif in style of Gill Sans}
\texttt{\usepackage[varqu,varl]{zi4} % inconsolata typewriter}
\texttt{\usepackage[T1]{fontenc} % LY1 also works}
\texttt{\usepackage[libertine,vvarbb]{newtxmath}}
\texttt{\%usepackage[cal=boondoxo,bb=boodox,frak=boondox]{mathalfa}}

Here is a short sample based on this preamble:

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the
use of upright shapes for d, e and π. (The first two are entered as \text{d} and \text{e}, and in fonts derived from newtxmath or mtpro2, the latter is entered as \uppi.)

**Simplest form of the Central Limit Theorem:** Let $X_1, X_2, \ldots$ be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathcal{F}, \mathbb{P})$. Then

$$\mathbb{P}\left(\frac{X_1 + \cdots + X_n}{\sqrt{n}} \leq y\right) \to \mathcal{N}(y) := \int_{-\infty}^{y} e^{-t^2/2} \, dt \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f(S_n/\sqrt{n}) \to \int_{-\infty}^{\infty} f(t) e^{-t^2/2} \, dt \quad \text{as } n \to \infty, \quad \text{for every } f \in \mathcal{bC}(\mathbb{R}).$$

**Glyphs in TS1 encoding**

The layout of the TS1 encoded Text Companion font, which is rendered in regular style only, is as follows.
List of macros to access the TS1 symbols in text mode:
(The commented lines are in \textbb but not \ETbb.)

\% 0 \textcapitallgrave
\% 1 \textcapitallacute
\% 2 \textcapitallcircumflex
\% 3 \textcapitalltilde
\% 4 \textcapitalldieresis
\% 5 \textcapitallhungarumlaut
\% 6 \textcapitallring
\% 7 \textcapitallcaron
\% 8 \textcapitallbreve
\% 9 \textcapitallmacron
\% 10 \textcapitalldotaccent
11 \textcapitallcedilla
12 \textcapitalllogonek
13 \textquotestraightbase
18 \textquotestraightdblbase
21 \texttwelveveudash
22 \textthrequartersemdash
23 \textcapitalcompwordmark
\% 24 \textleftarrow
\% 25 \textrightarrow
\% 26 \texttie % tie accent, skewed right
\% 27 \textcapitaltie % skewed right
\% 28 \textnewtie % tie accent centered
\% 29 \textcapitalnewtie % ditto
\% 31 \textascendercompwordmark
32 \textblank
36 \textdollar
39 \textquotesingle
42 \textasteriskcentered
\% 45 \textdblhyphen
47 \textfracssolidus
\% 48 \textzeroldstyle
\% 49 \textoneoldstyle
\% 50 \texttwooldstyle
\% 49 \textthreeoldstyle
\% 50 \textfouroldstyle
\% 51 \textfiveoldstyle
\% 52 \textsixoldstyle
\% 53 \textsevenoldstyle
\% 54 \texteightoldstyle
\% 55 \textnineoldstyle
\% 60 \textlangle
61 \textminus
\% 62 \texttriangle
\% 77 \textmho
There is a macro \textcircled that may be used to construct a circled version of a single letter using \textbigcirc. The letter is always constructed from the small cap version, so, in effect, you can only construct circled uppercase letters: \textcircled{M} and \textcircled{m} have the same effect, namely ©.

**Usage with fontspec**

Because the package supplies a file named ETbb.fontspec whose contents list the otf files that correspond to each of Regular, Bold, Italic and BoldItalic, you may load ETbb with just

\usepackage{fontspec}
\setmainfont{ETbb}

Other than the usual choices of figure style, the only remaining choice available is through StylisticSet=2,
which substitutes the new Sharp S glyphs in place of the familiar β, SS and ss. See the table in the next section for details.

**Selection of the new Sharp S in LaTeX**

The following table summarizes the behavior of the text macros \SS, \ss and the macro \MakeUppercase.

<table>
<thead>
<tr>
<th>sharpS option</th>
<th>\ss</th>
<th>\SS</th>
<th>\MakeUppercase{\ss}</th>
<th>\textsc{\ss}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not set</td>
<td>β</td>
<td>SS</td>
<td>SS</td>
<td>ss</td>
</tr>
<tr>
<td>sharpS</td>
<td>β</td>
<td>β</td>
<td>β</td>
<td>β</td>
</tr>
</tbody>
</table>

In unicode TeX, the behavior laid out in the table above is achieved using **StylisticSet=2**.

**Detailed comparison with fbb**

The following picture, in which the units are approximately in bp, shows some of the differences between \texttt{ETbb-Regular} and \texttt{fbb-Regular}, the first scaled up by 10 and the second by 9.8 so that their x-heights (and Cap-heights) are the same. From the picture below you can note the following.

- The serifs are much more substantial in ETbb.
- The ascenders a considerably higher in fbb—in fact, by 50 em units. Those very tall ascenders make for poor positioning of quotes, superscripts and the like.
- Stems are a little thicker (by about 10%) in ETbb.
- There is a slight bowing out in the letter h and similar letters like n of ETbb that is not present in fbb, making for more visual interest, IMO. This would not be of any importance at small print sizes.
- Overall, ETbb has lower contrast (ratio of thickest to thinnest strokes) than fbb, making for a more uniform gray appearance on the printed page.

![Comparison of ETbb and fbb](image)

The following page presents a comparison of a ETbb and fbb with identical text rendered in two columns. For me, there is no question that ETbb is the preferable font for document text.
