Lucida OpenType fonts from TUG

\TeX Users Group

https://tug.org/lucida

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1 Introduction

This document contains examples of the Lucida OpenType fonts available through TUG. They can be used with any OpenType-aware application, including the Lua\TeX and X\TeX extensions of \TeX (but not pdf\TeX). A brief overview:

- Math fonts: Lucida Bright Math and Lucida Bright Math Demi, extended OpenType versions of the original Type 1 Lucida math fonts.

- Three text families (regular, italic, bold, bold italic) also coming from the original Type 1 distribution: Lucida Bright, Lucida Sans, and Lucida Sans Typewriter.

- Three specialized fonts from the original Type 1 distribution: Blackletter, Calligraphy, and Handwriting. These are straight conversions of the Type 1 fonts with no additional characters or features.

- Two additional monospaced font families (same four variants): Lucida Grande Mono DK and Lucida Console DK. These have O (oh), and Q glyphs modified to a somewhat squarish shape, and the 0 (zero) glyph open rather than slashed, as preferred by Don Knuth. As usual, Lucida Console has shorter capitals than Grande Mono, among other smaller changes.

Samples of all the fonts follow.

For information on the OpenType features in these fonts, see section 3. If you’re using the Lucida OpenType fonts with \TeX, examples and other details are in section 4.

For more information about the Lucida fonts available from TUG, and an order form, please see https://tug.org/lucida.

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

The basic text family is LucidaBrightOT, with the usual four variants—regular, italic, bold, and bold italic, all with oldstyle figures; small caps are available in the upright shapes:

LucidaBrightOT

For £45, almost anything can be found floating in fields.
¡THE DAZED BROWN FOX QUICKLY GAVE 12345–67890 JUMPS! — ¿But aren't Kafka’s Schloß and Æsop’s Œuvres often naïve vis-à-vis the daemonic phœnix’s official rôle in fluffy soufflés? SPHINX OF BLACK QUARTZ, JUDGE MY VOW. 0123456789.

LucidaBrightOT-Italic

For £45, almost anything can be found floating in fields.
¡THE DAZED BROWN FOX QUICKLY GAVE 12345–67890 JUMPS! — ¿But aren't Kafka’s Schloß and Æsop’s Œuvres often naïve vis-à-vis the daemonic phœnix's official rôle in fluffy soufflés? SPHINX OF BLACK QUARTZ, JUDGE MY VOW. 0123456789.

LucidaBrightOT-Demi

For £45, almost anything can be found floating in fields.
¡THE DAZED BROWN FOX QUICKLY GAVE 12345–67890 JUMPS! — ¿But aren't Kafka’s Schloß and Æsop’s Œuvres often naïve vis-à-vis the daemonic phœnix’s official rôle in fluffy soufflés? SPHINX OF BLACK QUARTZ, JUDGE MY VOW. 0123456789.

LucidaBrightOT-DemiItalic

For £45, almost anything can be found floating in fields.
¡THE DAZED BROWN FOX QUICKLY GAVE 12345–67890 JUMPS! — ¿But aren't Kafka’s Schloß and Æsop’s Œuvres often naïve vis-à-vis the daemonic phœnix’s official rôle in fluffy soufflés?

2.1 Samples: Lucida Sans OT

The sans serif, LucidaSansOT, is available in the same four variants (no small caps or oldstyle figures):

LucidaSansOT

For £45, almost anything can be found floating in fields.
¡THE DAZED BROWN FOX QUICKLY GAVE 12345–67890 JUMPS! — ¿But aren't Kafka’s Schloß and Æsop’s Œuvres often naïve vis-à-vis the daemonic phœnix’s official rôle in fluffy soufflés?
For £45, almost anything can be found floating in fields. ¡THE DAZED BROWN FOX QUICKLY GAVE 12345–67890 JUMPS! — ¿But aren’t Kafka’s Schloß and Æsop’s Œuvres often naïve vis-à-vis the ðæmonic phœnix’s official rôle in fluffy soufflés?

— ¿But aren’t Kafka’s Schloß and Æsop’s Œuvres often naïve vis-à-vis the ðæmonic phœnix’s official rôle in fluffy soufflés?

2.2 Samples: Lucida Sans Typewriter OT

The monospaced LucidaSansTypewriterOT family is again available in the usual four variants; no small caps or oldstyle figures.
For £45, almost anything can be found floating in fields. "THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ?'But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

2.3 Samples: Lucida Grande Mono DK

The monospaced LucidaGrandeMonoDK family is available in the usual four variants; no small caps or oldstyle figures.

As mentioned at the beginning, the principal design difference from LucidaSansTypewriter is a squarish style for O (oh), Q, and related characters, and an open, rather than slashed, zero by default. A few other characters differ as well.

In addition, the Grande Mono fonts support the WGL4 (Windows Glyph List) repertoire, thus including Greek and Cyrillic.

For £45, almost anything can be found floating in fields. "THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ?'But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

For £45, almost anything can be found floating in fields. "THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ?'But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

For £45, almost anything can be found floating in fields. "THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ?'But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

For £45, almost anything can be found floating in fields. "THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ?'But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?
2.4 Samples: Lucida Console DK

The monospace LucidaConsoleDK family is available in the usual four variants; no small caps or oldstyle figures.

The Console design has shorter capitals than LucidaGrandeMono, with the same style of O, Q, 0, and related. The Console fonts also support WGL4.

For £45, almost anything can be found floating in fields. ! `THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ? `But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

2.5 Samples: Blackletter, Calligraphy, Handwriting

These three specialized text fonts are included: LucidaBlackletterOT, LucidaCalligraphyOT, and LucidaHandwritingOT.

For £45, almost anything can be found floating in fields. ! `THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ? `But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?
For $\approx 45, almost anything can be found floating in fields. ! 'THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ? 'But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

For $\approx 45, almost anything can be found floating in fields. ! 'THE DAZED BROWN FOX QUICKLY GAVE 12345--67890 JUMPS! --- ? 'But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

2.6 Samples: Lucida Bright Math OT

Finally, two OpenType math fonts are provided: LucidaBrightMathOT and LucidaBrightMathOT-Demi. The -Demi variant has bold letters in the normal positions, to be used for typesetting math within bold text, such as section headings. This is distinct from the math characters which are specified as bold in Unicode for specific semantics; those are bold in both math fonts.

\[
e^{i\pi} + 1 = 0
\]

\[
e^{i\pi} + 1 = 0
\]

(The above bold math is typeset with \boldmath $$e...$$)

The above are the Lucida OpenType fonts available from TUG. Many more fonts are available from B&H: see https://lucidafonts.com.

3 Font features in Lucida OpenType

3.1 General features in Lucida OpenType text fonts

The following are the OpenType features available in (at least some of) the Lucida text fonts:

<table>
<thead>
<tr>
<th>feature</th>
<th>description</th>
<th>default(*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>dlig</td>
<td>discretionary ligatures (f-ligatures in typewriter font)</td>
<td>off</td>
</tr>
<tr>
<td>liga</td>
<td>standard ligatures (f-ligatures in most fonts)</td>
<td>on</td>
</tr>
<tr>
<td>onum</td>
<td>old style numbers</td>
<td>off</td>
</tr>
<tr>
<td>smcp</td>
<td>small caps</td>
<td>off</td>
</tr>
<tr>
<td>zero</td>
<td>slashed zero</td>
<td>off</td>
</tr>
</tbody>
</table>
The **locl** feature is described in the next section.

(*) Which features are on or off by default is controlled by the application program, not the font. The settings listed here are the most common defaults for OpenType-aware applications.

One more feature, **ss01**, has different meanings in different fonts:

<table>
<thead>
<tr>
<th>feature</th>
<th>font description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss01</td>
<td>use dotted zero: 0 vs. default 0.</td>
</tr>
<tr>
<td>ss01</td>
<td>use Lucida-standard shapes: 0Q vs. default 0Q;</td>
</tr>
<tr>
<td></td>
<td>0Q vs. default 0Q.</td>
</tr>
</tbody>
</table>

The following table shows which features are available—not necessarily on by default—in which text fonts. (Math features follow.)

<table>
<thead>
<tr>
<th>font name</th>
<th>dlig</th>
<th>liga</th>
<th>onum</th>
<th>smcp</th>
<th>zero</th>
<th>ss01</th>
</tr>
</thead>
<tbody>
<tr>
<td>LucidaBrightOT</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaBrightOT-Demi</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaBrightOT-Italic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaBrightOT-DemiItalic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansOT</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansOT-Demi</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansOT-Italic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansOT-DemiItalic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansTypewriterOT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansTypewriterOT-Bold</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansTypewriterOT-Oblique</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaSansTypewriterOT-BoldOblique</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaGrandeMonoDK</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaGrandeMonoDK-Bold</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaGrandeMonoDK-Italic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaGrandeMonoDK-BoldItalic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaConsoleDK</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaConsoleDK-Bold</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaConsoleDK-Italic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaConsoleDK-BoldItalic</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaBlackletterOT</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaCalligraphyOT</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LucidaHandwritingOT</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Incidentally, two additional features are present in the fonts: **mark** and **mkmk**. These are related to accent positioning, but at this time they are experimental, not supported, and hence not documented.
3.2 **Language-specific features in Lucida OpenType**

The Lucida text fonts have two language-specific features:

- with language NLD (Dutch) and when both of the `locl` and `liga` features are on, `ij` and `IJ` ligatures are activated: `ij IJ`. Available in the four Lucida Bright fonts.

- with language TRK (Turkish) and when both `locl` and `smcp` are on, the small cap `i` has a dot to differentiate it from dotless `i`: `i ı`. If just `locl` is on, the ‘fi’ and ‘ffi’ ligatures are disabled: `fi ffi`. Available in the four Lucida Bright and four Lucida Sans Typewriter fonts.

3.3 **Math features in Lucida OpenType**

Following are the OpenType features for the math fonts. All math font features work only when the OpenType script `Math` is specified; this is the default in \TeX math mode.

- **ss01** alternate Latin lower case math italic identical to text italic. This option is not recommended as Greek \( \nu \) (nu) and Latin \( \nu \) (vee) become too similar; cf. the default vee: \( \nu \).

- **ss02** smaller arrows (original Type 1 size): \( \uparrow \) vs. default \( \uparrow \).

- **ss03** smaller operators and geometric shapes (original Type 1 size) \( \Sigma \) vs. default \( \Sigma \). Works for text size only, not display size.

- **ss04** calligraphic alternative (similar to the Type 1 design) to the math script alphabet: \( \mathcal{ABC} \ xy \) vs. default \( \mathcal{ABC} \ xyz \).

- **ss05** use a slashed-zero style for the empty set character (U+2205): \( \emptyset \) vs. default \( \varnothing \). Also available in the bold math font: \( \emptyset \) vs. default \( \varnothing \).

- **ss08** emphasize right and bottom edges of the d'Alembertian operator (U+29E0, \texttt{\laplace}) and the Laplace operator (U+2206, \texttt{\laplace}) to follow the design of the \texttt{\laplace} and \( \Delta \); the default design follows the standard, emphasizing the left and upper edges: \( \sqcup \) vs. default \( \sqcup \). Also available in the bold math font: \( \sqcup \) vs. default \( \sqcup \).

The Lucida math fonts were originally released (and are still available) in Type 1 format for use with \LaTeX and \TeX. Some design changes have been made in these OpenType versions. For those who want to use the Type 1
designs, the ss02, ss03, and ss04 alternatives above are offered; the ss01 feature also corresponds to an option in the Type 1 support.

Which math features are available in which fonts:

<table>
<thead>
<tr>
<th>font name</th>
<th>ss01</th>
<th>ss02</th>
<th>ss03</th>
<th>ss04</th>
<th>ss05</th>
<th>ss08</th>
</tr>
</thead>
<tbody>
<tr>
<td>LucidaBrightMathOT</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>LucidaBrightMathOT-Demi</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As you might gather from the above descriptions, the bold math font (LucidaBrightMathOT-Demi) has had considerably less development than the regular-weight math font: a smaller character repertoire, fewer features supported, etc.

Finally, for completeness: the regular-weight math font also defines the \texttt{dtls} feature (dotless math characters for accents) and both math fonts define \texttt{ssty} (script-size versions of primes and related); these are used internally by typesetting programs and generally not set by the user. In addition, the ss06 and ss07 features are experimental, and not described here.
4 \TeX{} and Lucida OpenType

In the \TeX{} world, OpenType fonts can be found in either of two ways: as files within the usual \TeX{} trees (examples given here), or as "system fonts" (example given in the \texttt{lucidaot-sys-example} document).

To load Lucida OpenType as \TeX{} files, of course they must first be installed in your \TeX{} setup; please see the \texttt{INSTALL-\TeX{}.txt} file in the Lucida distribution for how to do that.

Lucida OpenType can be used with \LaTeX{}, Con\TeX{}, or any macro package (or non-\TeX{} application, for that matter) supporting OpenType text and math typesetting.

4.1 Prerequisite \LaTeX{} packages

In \LaTeX{}, the Lucida OpenType fonts are used in conjunction with the core packages \texttt{fontspec} and \texttt{unicode-math}. The former handles text fonts, the latter math. Reading their (extensive) documentation is highly recommended.

You should already have these macro packages installed as part of your \TeX{} distributions. If either is missing, please look for help with your distribution, or you can install the packages yourself: \url{https://ctan.org/pkg/fontspec} and \url{https://ctan.org/pkg/unicode-math} respectively.

4.2 Loading Lucida text fonts in \LaTeX{}: \texttt{fontspec}

Once the Lucida OpenType fonts and required packages are installed, using them for the main text fonts in a \LaTeX{} document requires first loading the \texttt{fontspec} package, and then using its \texttt{\setmainfont} command. The argument, \texttt{LucidaBrightOT.otf}, is specified here with the explicit extension \texttt{.otf}; this is what tells the engines to search the \TeX{} trees (instead of looking it up as a system font).

\begin{verbatim}
\usepackage{fontspec} % support for OpenType text fonts
\defaultfontfeatures{Scale=.92}
\setmainfont[Ligatures=TeX]{LucidaBrightOT.otf}
\end{verbatim}

The \texttt{Ligatures=TeX} option makes conventional \TeX{} input sequences, such as ---, still work as expected. (This is the default in \texttt{fontspec} as of version 2.4.) The scaling brings the visually large Lucida fonts closer to typical design sizes of other typefaces. Of course these settings are completely optional.
You will probably also want to switch the sans and typewriter (monospaced) families to Lucida.

\setsansfont[Ligatures=TeX]{LucidaSansOT.otf}
\setmonofont{}{LucidaSansTypewriterOT.otf}

With current fontspec, the italic, bold, and bold italic variants of each family should be automatically found and used (via the lucidabrightot. fontspec and sibling files). In older versions of fontspec, when specifying OpenType fonts by filename (though not with system font lookups), it was necessary to explicitly specify the italic, bold, and bold italic file names. It should no longer be necessary, but the fallback code is available in the source of this document (lucidaot.tex) in case it’s helpful.

4.3 Loading Lucida math fonts in \LaTeX: unicode-math

Using Lucida OpenType for typesetting math in \LaTeX requires loading the package unicode-math and then calling its \setmathfont command. If you want the \boldmath command, the font for that also has to be set:

\usepackage{unicode-math} % support for OpenType math fonts
\setmathfont{LucidaBrightMathOT.otf}
[BoldFont=LucidaBrightMathOT-Demi.otf]

It is best to load both the fontspec and unicode-math packages before defining any fonts.

Naturally, you should change any and all options according to your own needs. For a starting point, you can copy the exact commands from this document's source (lucidaot.tex) or the companion document that uses system font loading (lucidaot-sys-example.tex).
4.4 Basic \LaTeX example

Given the above preamble, here’s a small example of input:

```
\documentclass{article}
% ... preamble from above ...
\begin{document}
Here’s some text. And here’s some math:
\[ \phi(x) = \int_{-\infty}^{x} e^{-x^2/2} \]
Euro and copyright symbols are available:
\texteuro \textcopyright.
\end{document}
```

This results in the following output:

```
Here’s some text. And here’s some math:
\[ \phi(x) = \int_{-\infty}^{x} e^{-x^2/2} \]
Euro and copyright symbols are available: € ©.
```

The fontspec package can be used to enable and disable the OpenType features listed in section 3. As an example, to enable the ss04 math feature (alternate calligraphic) the \setmathfont call would look like this:

```
\setmathfont[RawFeature={+ss04}]{LucidaBrightMathOT.otf}
```

fontspec provides higher-level interfaces to some features, which are greatly preferable when available. For further examples and much more information, please see the fontspec documentation.

5 Closing

If you have questions or problems regarding installation or use, please email lucida@tug.org; this is an open and publicly archived list for Lucida discussion; you can subscribe on the web at https://lists.tug.org/lucida. On the other hand, questions or problems related to ordering or licensing should go to lucida-admin@tug.org.

Finally, B&H’s web site for Lucida is https://lucidafonts.com, and TUG’s home page for Lucida and \LaTeX is https://tug.org/lucida.