The contour package

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Abstract
This package generates a colored contour around a given text in order to enable printing text over a background without the need of a color box around the text. By default this is done by placing copies of the text around the text itself and can be switched to use real outlines if supported by the backend driver.

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1 Introduction

Sometimes it is necessary to print text over a background that is not pure white, e.g., in gnuplot plots. It is not always wished to plot the text in a rectangular box since this can cover important information or look poor. This package provides a solution to cover less space with the text and ensure readable text in the same time.

The used technique is quite simple. By default, in a circle around the original text position the same text is printed evenly distributed 16, 32, or a given number times. The default radius for the circle is 0.03\,em. If requested and supported by the used driver (dvips, pdf\TeX, V\TeX, DVIPS\,ONE) a real outline can be chosen instead of text copies.

2 User interface

To use this package place

\usepackage[<options>]{contour}

in the preamble of your document.

If loaded without package option or with the option copies the contour is printed by placing copies of the text around the original text, as described below. This can be changed by the option outline. If specified this option the contour is printed by a real outline of the text instead of copies. This increases speed as well as quality\footnote{Especially in Acrobat Reader, the quality is better.} and reduces the file size. But some prerequisites have to be fulfilled:

- The backend driver has to be supported. Currently, dvips, pdf\TeX, V\TeX, and DVIPS\,ONE are supported. Normally, the file contour.cfg tries to find out which driver has to be loaded.\footnote{DVIPS\,ONE cannot be determined automatically.} But you can also specify the driver by giving one of the package options dvips, xdvi, pdftex, vtex, or dvipsone. xdvi refers to dvips as driver. In xdvi and DVI\,Windo, the contours are silently ignored.

- Outline (vector) fonts have to be used. With dvips, this means that Type 1 fonts have to be used. With pdf\TeX, Type 1 or TrueType fonts are supported. If you are using METAFONT fonts you have to use copies (package option copies).

\texttt{\contour} The package provides the commands

\texttt{\contour{<color>}{<text>}}
\texttt{\contour[<number>]{<color>}{<text>}}
\texttt{\contour*{<color>}{<text>}}

which produce the text \textlangle text\textrangle with a \textlangle color\textrangle\,ed contour around. The text itself is typeset in the normal active color. The normal \texttt{\contour} command produces 16
copies of the text while the * variant makes 32 copies. If ⟨number⟩ is given, the
given number of copies is generated around the text. If ⟨number⟩ is auto instead
of a number, the number of copies is calculated automatically depending on the
font size.

\contourlength

The radius of the circle (= thickness of the contour) can be changed using the
command \contourlength{⟨length⟩}, where ⟨length⟩ is a length understood by \LaTeX. The length is not expanded when defining the contour length but when
using it. For example when using 0.05em, 0.05 em of the font used in the command
\contour are used.

\contournumber

By default, \contour generates 16 copies of the text. You can change this by
using \contournumber, e.g.,

\contournumber{27}

If you specify auto instead of a number, \contour will use the automatically
calculated number of copies. You may also use the package option auto to reach
this behaviour:

\usepackage[auto]{contour}

If using outlines the number of copies is ignored.

3 Examples

The command

\colorbox{black}{This text is not visible
\contour{white}{but this is.}}

produces:

```
but this is.
```

Another example is shown in Figure 1.

In Figure 2, you can see how the output depends on the number of copies.
4 Advanced internals

Normally, it is not planned to switch between outline and copy mode. If you really have to do it you can use the boolean \ifcon@outline. \con@outlinetrue switches on outlines, while replacing true by false switches them off. Don’t forget to surround it by \makeatletter and \makeatother to allow @ in command names.

See the difference between copy and outline mode:

\begin{center}
\begin{tabular}{ccc}
Copies & Copies & Copies \\
Outline & Outline & Outline
\end{tabular}
\end{center}

5 Acknowledgements

Thanks to Richard Pfeiffer who had the idea for this package and wrote some code that did it.

Thanks to Dietrich Grau who asked me for support of DVIPSONE and who did the testing of all my code ideas for this driver since I do not have Y&Y TeX.

6 The implementation

Heading of the package:

\begin{verbatim}
1 \package{\NeedsTeXFormat{LaTeX2e}
2 \dvips\ProvidesFile{dvips.cnt}
3 \pdftex\ProvidesFile{pdftex.cnt}
4 \vtex\ProvidesFile{vtex.cnt}
\end{verbatim}
6.1 The package

This package requires the color package from the graphics bundle:
\RequirePackage{color}

This package requires the trig package:
\RequirePackage{trig}

A command that makes \color inactive prevent the background text color from being changed:
\def\con@coloroff{\def\@undeclaredcolor[#1][##1]##2{}\def\@declaredcolor##1{}}

Set text to a specified relative position without using space:
\newcommand*\con@put[3]{\rlap{\hskip#1\raisebox{#2}[0pt]{#3}}}

\contourlength Define the commands for changing the base length:
\newcommand*\contourlength[1]{\def\con@base@length{#1}}
\contourlength{0.03em}

\contournumber Define the commands for changing the number of text copies:
\newcommand*\contournumber[1]{\def\con@default@copies{#1}}
\contournumber{16}

Define new offset length:
\newlength{\con@length}

Define the angles for using ‘(#1)’ copies unless they’ve previously been defined. We use ‘trig’ for this.
\newcommand*\con@define@copyangles[1]{\edef\con@tempa{auto}\edef\con@tempb{#1}}
\edef\con@tempa{auto}\edef\con@tempb{16}

Set the number of copies automatically.
\ifx\con@tempa\con@tempb
\expandafter\ifdim\f@size pt<15pt\relax\edef\con@tempb{16}\else\edef\con@tempb{32}\fi\else\edef\con@tempb{16}\fi
\contour The starred version of \contour prints 32 copies.
\newcommand*\contour[\number\con@default@copies][32]{%}
\ifvmode
\leavevmode
\fi
\setlength\con@length{\con@base@length}\%\]
\ifcon@outline\typeout{contour: Using real outline for ‘#3’\on@line.}\%
\@contour@outline{#2}{#3}\%
\else\begingroup\Calculate the copy angles.
\con@define@copyangles{#1}\%
\typeout{contour: Using \the\@tempcnta copies for ‘#3’\on@line.}\%
\@tempdima=360\p\%
\divide\@tempdima by \@tempcnta\%
\@tempdimb=\z\%
\@tempcntb=\z\%
\loop\ifnum\@tempcntb<\@tempcnta\%
\edef\con@temp@fdim{\strip@pt\@tempdimb}\%
\CalculateSin{\con@temp@fdim}\%
\CalculateCos{\con@temp@fdim}\%
\advance\@tempcntb \@ne\%
\advance\@tempdimb \@tempdima\relax\repeat\}
\}{%\]
\let\con@tempa\@undefined\%
\let\con@tempb\@undefined\%
\contour The starred version of \contour prints 32 copies.
Set color ans switch off color command inside argument.
\color{#2}\%
\con@coloroff

Print the copies.
\loop
\ifnum\@tempcntb<\@tempcnta\relax
\edef\con@temp@fdim{\strip@pt\@tempdimb}\%
\con@put
\{\UseSin{\con@temp@fdim}\con@length}\%
\{\UseCos{\con@temp@fdim}\con@length}\%
\{#3}\%
\advance\@tempcntb \@ne\relax
\advance\@tempdimb \@tempdima\relax
\repeat
\endgroup

Print the main text.
\mbox{#3}\%
\fi
}

By default, no driver is active.
\providecommand*\con@driver{\@empty}

Boolean for using outline or copies.
\newif\con@outline

Options:
\DeclareOption{auto}{\contournumber{auto}}
\DeclareOption{dvips}{\def\con@driver{dvips.cnt}}
\DeclareOption{xdvi}{\ExecuteOptions{dvips}}
\DeclareOption{pdfTeX}{\def\con@driver{pdfTeX.cnt}}
\DeclareOption{vtex}{\def\con@driver{vtex.cnt}}
\DeclareOption{dvipsone}{\def\con@driver{dvipsone.cnt}}
\DeclareOption{outline}{\con@outlinetrue}
\DeclareOption{copies}{\con@outlinetruefalse}

Load configuration file if existing.
\InputIfFileExists{contour.cfg}{%
\typeout{Loading configuration file `contour.cfg'.}%
}\%
\typeout{No configuration file `contour.cfg' found.}%
}

Process the options.
\ProcessOptions\relax

Load the driver file.
\expandafter\ifx\con@driver\@empty
\ifcon@outline
\PackageError{contour}{Chosen package option `outline' but no driver defined}{Leave out the `outline' option or define a driver}%
\else
\PackageWarning{contour}{No driver defined (which does not matter when using copies)}%
\fi
\else
\InputIfFileExists{\con@driver}{%
\typeout{contour: Using driver file '\con@driver'.}%
}%
\PackageError{contour}{Driver file '\con@driver' does not exist}{}%
\fi
\fi
⟨/package⟩

6.2 Driver Files

6.2.1 Dvips

\@contour@outline Prints the text and contour using real outlines. \@contour@outline{(color)}{(text)}
\newcommand*{\@contour@outline}[2]{% 
  \begingroup
  Double the width of the contour since the inner half is overprinted by the normal text; convert pt to bp.
  \setlength{\con@length}{2\con@length}%
  \setlength{\con@length}{\strip@pt\con@length\space \ mul setlinewidth}%
  Set the contour color and disable color command.
  \color{#1}%
  \con@coloroff
  PostScript preamble to print an outline for the text.
  \special{ps:
    First, save all graphics settings to avoid side effects.
    \gsave
    Start a new path and choose a round pen.
    \newpath
    1 setlinejoin
    1 setlinecap
    Set the line width and scale it according to the PostScript scale.
    Resolution 72 div DVImag mul
    \strip@pt\con@length\space \ mul setlinewidth
    Save show to be able to restore it later.
    /cntorigshow /show load def
    Redefine the show command that prints a text to do the outline instead of the text.
    /show { false charpath } def
  }%
Typeset the outline text.
\rlap{\#2}\

PostScript postamble.
\special{ps:
Finally, do the outline.
  \stroke
Restore the original settings.
/show /cntorigshow load def
grestore
\endgroup

Print the main text.
\mbox{\#2}\
\langle
\dvips\rangle

6.2.2 pdf\TeX

@contour@outline\ Prints the text and contour using real outlines. \@contour@outline{(color){(text)}

\pdf\TeX\newcommand{@contour@outline}[2]{%
  \begingroup
  \setlength{\con@length}{2 \con@length}\
  \setlength{\con@length}{0.99626400996 \con@length}\
  \color{#1}\
  \con@coloroff

  PDF preamble.
  \pdf\literal{%
    Save the graphics settings.
    q
    Choose a round pen.
  1 j
  1 J
  Switch text to print an outline instead of fill.
  1 Tr
  Set the line width.
  \strip@pt \con@length \space w
}

9
Typeset the outline text.
\rlap{#2} %

PDF postamble.
\pdfliteral{%

Restore original settings.
Q \}%
\endgroup

Print the main text.
\mbox{#2} %
}
⟨/pdftex⟩

### 6.2.3 VT EX

\@contour@outline \texttt{Prints the text and contour using real outlines.} \@contour@outline{⟨\texttt{color}⟩}{⟨\texttt{text}⟩}

\begin{verbatim}
⟨∗vtex⟩

\newcommand\@contour@outline[2]{% 
  \begingroup 
  Double the width of the contour since the inner half is overprinted by the normal 
text; convert pt to bp.
  \setlength\con@length{2\con@length} %
  \setlength\con@length{0.99626400996\con@length} %
  Set the contour color and disable color command.
  \color{#1} %
  \con@coloroff 
  PostScript preamble to print an outline for the text.
  At this point, VT EX does an ugly job since it interprets this code immediately 
and thus puts the path itself into the output instead of just let the printer do the 
work. I do not know how to change this.
  \special{pS:}
  First, save all graphics settings to avoid side effects.
  \save 
  Start a new path and choose a round pen.
  \newpath 1 setlinejoin 1 setlinecap 
  Set the line width.
  \strip@pt\con@length\space setlinewidth 
  Redefine the command that prints a text to do the outline instead of the text.
  \show { false charpath } def
\end{verbatim}

10
Typeset the outline text.
\rlap{#2}\
PostScript postamble.
\special{pS:
Finally, do the outline.
\stroke
Restore the original settings.
\restore
\endgroup
Print the main text.
\mbox{#2}\
⟨
/\text
\⟩

6.2.4 DVIPSONE
\@contour@outline\(\{\text\}\{\text\}\)
Prints the text and contour using real outlines. \@contour@outline\{\text\}\{\text\}\n\newcommand+\@contour@outline[2]{%
First, print the text. This is a hack and avoids problems when \contour is used in some contexts, e.g., at the begin of the text.
\rlap{#2}\
\begingroup
Double the width of the contour since the inner half is overprinted by the normal text; convert pt to bp.
\setlength\con@length{2\con@length}\
\setlength\con@length{0.99626400996\con@length}\
Set the contour color and disable color command.
\color{#1}\
\con@coloroff
PostScript preamble to print an outline for the text.
\special{ps:
First, save all graphics settings to avoid side effects.
\gsave
Save the current position to be used for the new path.
\currentpoint
Start a new path and go back to the old position.
newpath
moveto

Choose a round pen.

Set the line width and scale it according to the PostScript scale. The factor 65693.4 is chosen by trial and error and may be inexact.

Save show to be able to restore it later.

Redefine the show command that prints a text to do the outline instead of the text.

Typeset the outline text.

PostScript postamble.

Finally, do the outline and save the position.

Restore the original settings and position.

Print the main text.

6.3 Configuration Files

This configuration file is just a copy of a part of graphics.cfg from TeXLive.
% check VTeX
\@ifundefined{OpMode}{\% \chardef\x=2 \%}{\expandafter\endgroup}
\ifcase\x
% default case
\ExecuteOptions{dvips}\%
or
% pdfTeX is running in pdf mode
\ExecuteOptions{pdftex}\%
\else
% VTeX is running
\ExecuteOptions{vtxe}\%
\fi
\langle
/\cfgfile
\rangle

Change History

1.04
General: Avoid usage of \textversion etc. ............ 1

2.00
General: Allow arbitrary numbers of text copies ............ 1

2.10
General: Bugfix: enable switching colors inside \contour argument ............ 5
Print text with real outlines for vector fonts ............ 1

2.11
General: Restricted outline support

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