

The \LaTeX file
graphdoc.tex
which produces graphic output

```
\documentclass[12pt]{article}
\usepackage{color}
\usepackage{verbatim}
\usepackage[ps2pdf,
            bookmarks=true,
            bookmarksnumbered=false, % true means numbered bookmarks
                                     % appear in the left window
            bookmarksopen=false,    % true means bookmarks within a
                                     % section are open by default
            colorlinks=true,
            linkcolor=webred]{hyperref}
\usepackage{epsfig}
\usepackage{psfrag}
\usepackage{graphicx}
% Define colors on the rgb scale
% The first parameter is the name
\definecolor{webgreen}{rgb}{0, 0.5, 0} % less intense green
\definecolor{webblue}{rgb}{0, 0, 0.5} % less intense blue
\definecolor{webred}{rgb}{0.5, 0, 0}   % less intense red

\title{Including Graphics in  $\LaTeX$  Files}
\author{Duane Broline and Bill Slough}
\begin{document}

\maketitle

\pdfbookmark[1]{Contents}{table} % table.1
\tableofcontents

\section{Purpose}

This short manual discusses one way to include screen shots, Maple
graphics, and ‘‘hand-drawn’’ graphics into a  $\LaTeX$  document.
In order have Maple graphics to appear with  $\LaTeX$  fonts, it is
necessary to use \tt psfrag, as discussed below.
```

The documents that result from these methods can either be printed, or, using `{\tt dvi2pdf}`, turned into PDF documents viewable using Acrobat Reader. Graphics inclusion in slides and web-pages is discussed elsewhere

```
\subsection{ScreenShots using {\tt gimp}}
```

```
\subsubsection{Prerequisites}
```

`{\tt gimp}` is a graphic tool which has many features and can be obtained at `{\tt http://www.gimp.org}`.

```
\subsubsection{Preamble}
```

In order to include the PostScript files generated by `{\tt gimp}`, it is necessary to have

```
\begin{quote}
\begin{verbatim}
\usepackage{graphicx}
\end{verbatim}
\end{quote}
```

in the preamble of the `\LaTeX` document.

```
\subsubsection{Example}
```

Use `{\tt gimp}` to capture screens as follows:

Generate the desired window and start `{\tt gimp}`. Ultimately, the following window will appear

```
\begin{center}
\includegraphics[scale=0.4]{gimp}
\end{center}
```

Under the pulldown menu for `{\tt Xtns}` make the choice `{\tt Screen Shot}`. The Screen Shot window appears

```
\begin{center}
\includegraphics[scale=0.3]{screenshot}
\end{center}
```

Be sure the options are set to `{\tt Grab a single window}` and that the window you wish to grab is completely visible. Left click on `{\tt grab}`. You have about a second to move to the desired window and left click.

```
\begin{center}
  \includegraphics[scale=0.3]{maple}
\end{center}
```

A sound occurs indicating the selection has been made. Soon another copy of the chosen window appears.

If you wish to crop the image, you can use the crop tool of `{\tt gimp}`. Once the image is as desired, right click somewhere on the window to get the `{\tt File/SaveAs}` option. After the mouse button is released, the following window appears.

```
\begin{center}
\includegraphics[scale=0.3]{saveimage}
\end{center}
```

Enter the appropriate filename with a `{\tt .ps}` suffix and click on `{\tt OK}`. A final window allows for some final adjustment. Be sure that `{\tt Rotation}` is set to zero in this window

```
\begin{center}
\includegraphics[scale=0.3]{savepostscript}
\end{center}
```

Press `{\tt OK}` to conclude the process.

Lines similar to

```
\begin{quote}
\begin{verbatim}
  \begin{center}
    \includegraphics[scale=0.3]{maple}
  \end{center}
\end{verbatim}
\end{quote}
```

must appear in the document at the place the graphic is to be included. (No file suffix is needed. The `{\tt scale}` option scales down the graphic.

```
\subsection{Maple graphics}
```

```
\subsubsection{Prerequisites}
```

The most recent version of Maple and `{\tt psfilter}`, written by Bill Slough, are needed.

`\subsubsection{Preamble}`

In order to include PostScript files generated by Maple, it is necessary to have

```
\begin{quote}
\begin{verbatim}
\usepackage{graphicx}
\end{verbatim}
\end{quote}
in the preamble of the \LaTeX\ document.
```

`\subsubsection{Example}`

Activate Maple and generate the desired graphic. In this case, we want a graph of $f(x) = (x+2)\sqrt{x^2+1}$ and its derivative.

In the following example, a variable `{\tt gr}` is defined to hold the plot structure. Variables `{\tt s}` and `{\tt t}` are used to hold text plots located on the graph at $(3,1)$ and $(1,2)$, respectively. Using the `{\tt display}` command from the `{\tt plots}` package a variable `{\tt graphic}` is created which stores the graphic to be displayed. Finally, `{\tt psfilter}` (written by Bill Slough) is used to place the graphic in a file, `{\tt fandfprime.ps}`.

The Maple session for this example is

```
\begin{center}
\includegraphics[scale=0.3]{maple2}
\end{center}
```

The result of this session is

```
\begin{center}
\includegraphics[scale=0.8]{newtex}
\end{center}
```

If no border is desired, there is an option in `{\tt psfilter}` which would do this. In this example, no border would be produced if the `{\tt psfilter}` command was

```

\begin{quote}
\begin{verbatim}
psfilter(graphic, file='fandfprime.ps', noborder);
\end{verbatim}
\end{quote}

```

A line similar to

```

\begin{quote}
\begin{verbatim}
\begin{center}
\includegraphics[scale=0.8]{fandfprime}
\end{center}
\end{verbatim}
\end{quote}

```

must appear in the document at the location where the graphic is to be included.

```

\subsection{Using {\tt psfrag} for font substitution}

```

```

\subsubsection{Preamble}

```

The line

```

\begin{quote}
\begin{verbatim}
\usepackage{psfrag}
\end{verbatim}
\end{quote}

```

must appear in the preamble to use this font substitution package.

```

\subsubsection{Example}

```

In the preceding example, the characters `{\tt y = f(x)}` and `{\tt y = g(x)}` and `{\tt x}` are not in `\LaTeX\` fonts. `{\tt psfrag}` can be used to make this substitutions to get the following graphic.

```

\psfrag{y = f(x)}{ $y=f(x)$ }
\psfrag{y = g(x)}{ $y=g(x)$ }
\psfrag{x}{ $x$ }
\begin{center}

```

```
\includegraphics[scale=0.8]{fandfprime}
\end{center}
```

Lines similar to

```
\begin{quote}
\begin{verbatim}
\psfrag{y = f(x)}{$y=f(x)$}
\psfrag{y = g(x)}{$y=g(x)$}
\psfrag{x}{$x$}
\end{verbatim}
\end{quote}
```

must appear before the `\tt includegraphics` command to give the substitutions that `\tt psfrag` is to perform. These substitutions do not appear upon viewing, but do appear upon printing. In this case, the viewer shows

```
\begin{center}
\includegraphics[scale=0.4]{psfrag}
\end{center}
```

while the printed version shows the previous graph.

```
\subsection{User-created graphics using \tt xfig}
```

```
\subsubsection{Introduction}
```

By using the `\tt xfig` drawing program, one can draw a figures which can be exported in a variety of formats.

For slides, it appears the PNG format is the best. Two methods for inclusion in print document, `\tt Combined PS/LaTeX` and `\tt Encapsulated Postscript` are discussed.

```
\subsubsection{Prerequisites}
```

The most recent version of `\tt xfig` is in `\tt local-installations` on `\tt facshare`. Instructions for installing it are in `\tt doc`.

```
\subsubsection{Preamble}
```

The necessary preamble varies with the inclusion method.

`\subsubsection{Encapsulated PostScript}`

Encapsulated Postscript is the easiest to use if you only want to use `\LaTeX` character fonts in the graphic. If you need mathematical symbols, you must use the combined form.

In the preamble, the line

```
\begin{quote}
\begin{verbatim}
\usepackage{graphicx}
\end{verbatim}
\end{quote}
```

must be included.

The following steps are necessary to produce the example below.

```
\begin{itemize}
```

- ```
\item Select the polyline drawing tool
\includegraphics[scale=0.05]{polyline}. Place the cursor at start of
each axis, depress the left mouse button, move to the end, and
release the button. To fix the line, press the middle mouse button.
```
- ```
\item Select the arrow tool
\includegraphics[scale=0.05]{arrow} and place arrows on the ends of
the axis.
```
- ```
\item Select the approximated spline drawing tool
\includegraphics[scale=0.05]{spline} and determine the control points
for the curve.
```
- ```
\item Select the move points drawing tool
\includegraphics[scale=0.05]{movepoint} and move points
appropriately.
```
- ```
\item To enter the fonts, select the TextFont from the lower right
and use \LaTeX italic fonts.
```
- ```
\item Select the text tool
\includegraphics[scale=0.05]{text} and enter the text.
```
- ```
\item Select {\tt Save} and save the file in {\tt fig} format
for later editing.
```

```
\item Select {\tt Export} and export the file in {\tt
 Encapsulated Postscript} format for inclusion in the \LaTeX\ file.
\end{itemize}
```

An example of a drawing produced in this manner is:

```
\begin{center}
\includegraphics{function.eps}
\end{center}
```

In order to include this drawing, lines similar to

```
\begin{quote}
\begin{verbatim}
\begin{center}
\includegraphics{function.eps}
\end{center}
\end{verbatim}
\end{quote}
```

must appear in the file

```
\subsubsection{Combined PS/\LaTeX\ format}
```

This form is necessary if you need mathematical symbols in the drawing.

In the preamble, the lines

```
\begin{quote}
\begin{verbatim}
\usepackage{epsfig}
\usepackage{graphicx}
\end{verbatim}
\end{quote}
```

must be included.

Proceed as above, until you begin to enter the text.

```
\begin{itemize}
```

```
\item Select the text tool
\includegraphics[scale=0.05]{text} and enter text, using \LaTeX\
 syntax.
\item Select the edit tool
```

```

\includegraphics[scale=0.05]{edit} and then select the desired text.
Make sure that the special flag is set as follows
\begin{center}
\includegraphics[scale=0.3]{flags}
\end{center}
in order for the text to be properly displayed. Do not forget to
click {\tt Apply} to effect the change.
\item Select {\tt File} and save the graph as a {\tt .fig} graphic
for later editing.
\item Select {\tt Export} and export the document in
{\tt Combined PS/Latex} format. This produces two files - one
containing the graphics and one for the text.

\end{itemize}

```

The following is a graph produced in this manner.

```

\begin{center}
\input{function2.pstex_t}
\end{center}

```

The lines,

```

\begin{quote}
\begin{verbatim}
\begin{center}
\input{function2.pstex_t}
\end{center}
\end{verbatim}
\end{quote}

```

must be included in the text. The {\tt .pstex\string\_t} contains text information and also causes a PostScript file to be included.

```

\subsection{PDF documents}

```

The {\tt dvi} documents produced by the methods outlined above can be turned into PDF documents with {\tt dvi2pdf} and viewed using Acrobat Reader. For example, to process a file with  $\LaTeX$ , convert it, and then view it, the commands would be

```

\begin{quote}
\begin{verbatim}

```

```
latex graphic
dvi2pdf graphic
acroread graphic.pdf
\end{verbatim}
\end{quote}
```

To have pull-down menu choices for the various packages for foils, web-pages, and PDF documents, you might add the following lines to `{\tt \string~/elisp/tex-site.el}`

```
\begin{quote}
\begin{verbatim}
(list "Dvi2Pdf" "dvi2pdf %s" 'TeX-run-shell nil t)
(list "LaTeX4ht Interactive" "ht latex %s" 'TeX-run-interactive nil t)
(list "PdfLaTeX Interactive" "pdflatex %s" 'TeX-run-interactive nil t)
(list "PP4" "pp4 %s.pdf" 'TeX-run-shell nil t)
(list "Acrobat Reader" "acroread %s.pdf" 'TeX-run-interactive nil t)
;; Not part of standard TeX.
\end{verbatim}
\end{quote}
```

```
\section{Bibliography}
```

Further information can be found in

```
\begin{enumerate}
\item The {\tt xfig} help file.
\item Michael Goossens, Sebastian Rahtz, and Frank Mittlebach, The
 \LaTeX\ Graphics Companion, Addison-Wesley, 1997.
\end{enumerate}

\end{document}
```

