TEX PDF and Html Document Production

1. Introduction

For course presentation, I have a system for producing TEX (dvi), PDF, and Html versions of documents for students. Examples of exams, notes, and problem solutions are at

http://www.math.uic.edu/~lewis/mtht430/notes.htm

http://www.math.uic.edu/~lewis/hon201/notes.htm

The TEXsoftware I am using is MiKTEX (Versions 1.20e and 2.1.9) on Windows operating systems 95/98/NT/2000..., with WinEdt as the shell and text editor.

N. B. As of March 10, 2002 at 18:54, my favorite method of producing PDF is `dvipdfm` .

2. Producing PDF Files from TEX

Most lab machines and users have the Adobe Acrobat Reader installed as a browser plugin. Printed quality of PDF documents is excellent, but smaller fonts may not be legible on the screen. A PDF version of the document should be available for printing[1]. The PDF version this document is production.pdf. The Html version of this document is production.htm. There are several methods for moving a dvi (with various specials) to PDF.

2.1 Producing PDF with dvips and Distiller or Ghostscript

PDF is produced using dvips with the option `-Ppdf`:

```
dvips -Ppdf foo.tex
```

which produces `foo.ps` with full font information. The option `-Ppdf` calls the file

`/texmf/dvips/config/config.pdf`,

which in turn calls for information on the PostScript BlueSky/AMS/Y&Y Type 1 fonts.

[1] Some students have told me that PDF produced directly by Adobe's PdfWriter are slow to print if all fonts are not embedded.

In turn, `foo.pdf` is produced by using Acrobat Distiller[2]:

`...\Distillr\ACRODIST.EXE "foo.ps"`

Encapsulated PostScript graphics are easily handled using `epsf.tex`. In contrast, the TEX processor PDFTEX is not friendly to EPS graphics.

PiCTEX graphics are handled as easily as mathematics text.

2.2 Producing PDF using `dvipdfm`

The current MiKTEX distribution includes the filter program `dvipdfm`, developed by Mark A. Wicks. `dvipdfm` translates a dvi file to pdf.

Advantages:

- **Several Platforms:** `dvipdfm` is available on several platforms. See
  http://gaspra.kettering.edu/dvipdfm/
  I have tried Red Hat Linux `dvipdfm` on Intel and Alpha processors.
- **Hyperlinks:** The current version puts the hyperlinks in the PDF file: Try it:
  http://gaspra.kettering.edu/dvipdfm/
  The TEX code for this example is

```
\def\href#1#2{ \special{html:<a href="#1"> } { \tt #2 }
\special{html:</a>}}
\href{http://gaspra.kettering.edu/dvipdfm/}
{http://gaspra.kettering.edu/dvipdfm/}
```

  One must be especially careful with characters which have special and different different meanings in TEX and html. Examples are the tilde ~ (a tie in TEX and the signal for a user in a url) and # (a signal for a macro argument in TEXand a reference to a name in a url).

- **Including EPS graphics:** The current version of `dvipdfm` (0.13.2b) transparently uses Ghostscript to handle EPS graphics files. There is some support for handling JPEG and GIF images. Care must be taken for the program to find the appropriate postscript resources (fonts, ghostscript, ...); I have been unsuccessful in converting EPS graphics to PDF images with the correct bounding box.

- **PiCTEX Graphics:** Since PiCTEX uses standard TEX fonts and placements in boxes of various (small) dimensions, `dvipdfm` converts PiCTEX seamlessly.

3. Producing HTML from TeX Source Files with TtH

[2] An alternate method is to use the script `ps2pdf13.bat` installed with Ghostscript 6+. Care must be taken to change the batch files with a program such as `unix2dos.exe`. Ghostscript $6-\epsilon$ produces poor fonts for the screen.

My choice for producing html files is the noncommercial program TtH available at
http://hutchinson.belmont.ma.us/tth/
The program acts as a filter directly on the TEX or LaTEX source file so that a call looks like

```
...\tth.exe -u <foo.tex >foo.htm
```

Production is easily automated with a batch file `tth.bat` with a line such as

```
...\tth.exe -u <%1.tex >%1.htm %2 %3 %4 %5
```

The option `-u` forces a *unicode* option which resolves the problem of properly using the symbol fonts to present mathematics.
The TtH Manual at

http://hutchinson.belmont.ma.us/tth/manual.cgi

suggests several macros to be used in the TEX file.

4. Graphics and TtH and `dvipdfm`

4.1 EPS Graphics:

Most of us start with Encapsulated PostScript produced by various programs. Most browsers expect graphics as GIF or JPEG files. Since mathematics papers have line drawings, GIF files are relatively small and contain full information.
Programs such as *Maple* will also export figures as EPS or GIF - using right mouse clicks. An alternate method to produce GIF files is a capture program such as *Hypersnap–DX* available at http://www.hyperionics.com
Ghostscript can also produce JPG (and GIF?) files from EPS, but I am not familiar with the details.
If both `foopicture.eps` and `foopicture.gif` are available, then the `-e2` option on TtH interprets `\epsfbox{foopictureo.eps}` to embed `foopicture.gif` as an image:

```
...\tth.bat foo -e2
```

As noted in Section 2.2, `dvipdfm` used in conjunction with `epsf.tex` handles EPS graphics transparently.

4.2 PiCTEX Graphics:

TtH does not handle PiCTEX graphics. My method is to use code such as

```
\tthdump{ .  .  pictex code ..}
```

and then capture the image as a gif and use the TtH macro for the html for the image. An excellent preprocessor for PiCTEX is mathsPIC by R. W. D. Nickalls. Version 2.1 of mathsPIC available at

http://www.ctan.org/tex-archive/graphics/pictex/mathspic/.

4.3 Sample EPS Graphics

An example is given:

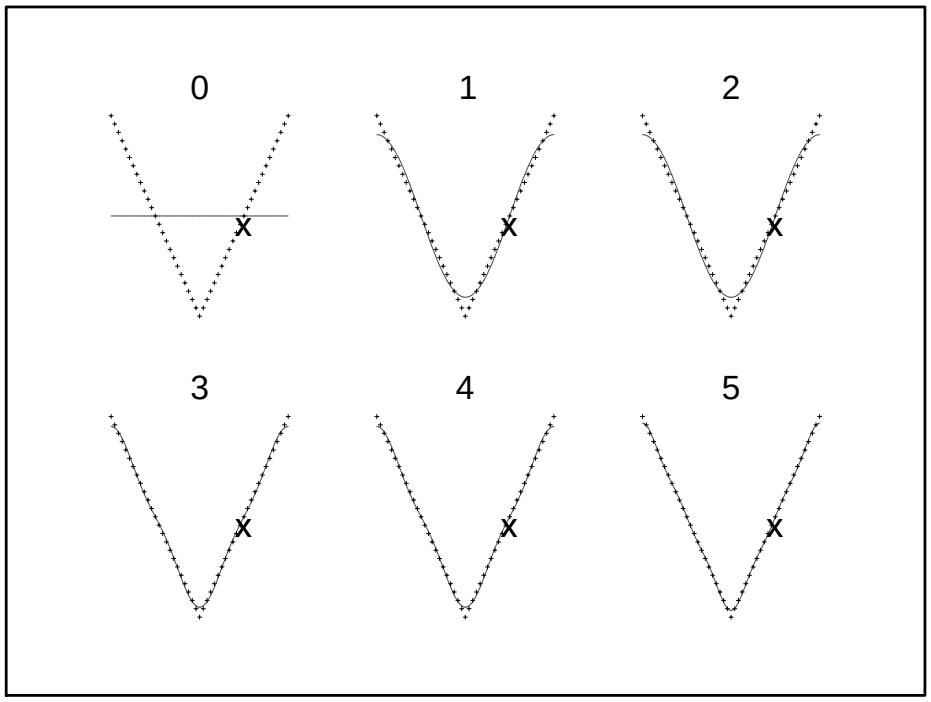
- Let f be periodic with period 2π and

$$f(x) = \pi - |x|\,, -\pi \le x < \pi$$

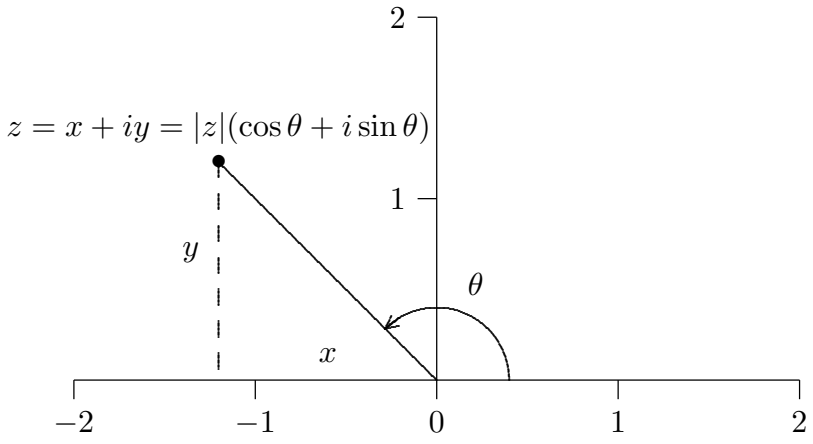
Courtesy of *Maple 6*, the Fourier (cosine) polynomial of degree 6 is[3]

$$\pi/2 + 4\,\frac{\cos(x)}{\pi} + 4/9\,\frac{\cos(3\,x)}{\pi} + \frac{4}{25}\,\frac{\cos(5\,x)}{\pi}$$

The graph of $f(x)$ and six Fourier (cosine) polynomials are shown:



Sample PiCTEX graphics:



[3] The LaTEX code for this example was produced by Maple.

Resources

1. http://hutchinson.belmont.ma.us/tth/manual.cgi The TtH Manual suggests several macros to be used in the TEX file.
2. http://www.math.uic.edu/~lewis/tex/index.htm Jeff Lewis's Presenting Mathematics on the Web
3. http://www.math.uic.edu/~lewis/tex/production.tex TEX source for this document
4. http://www.math.uic.edu/~lewis/tex/docurl.tex TEX macros for this document using hyperref with TEX and `TtH`, mostly due to Ian Hutchinson
5. http://www.math.uic.edu/~lewis/tex/basipic1.tex TEX source for the PiCTEX figure
6. http://www.math.uic.edu/~lewis/tex/basipic1.m Source processed by MathsPiC to create `basipic1.tex` source for the PiCTEX figure