

MiKTeX FGA (Frequently Given Answers)

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Abstract

This MiKTeX FGA describes how to install MiKTeX 2.2 and its related programs, how to create EPS files, and how to create PDF files and slides, and some valuable tips.

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1 Installation

1.1 Ghostscript and Ghostview

Ghostscript is an interpreter for the PostScript page description language that is used by laser printers, and **GSView** (ghostview) is a graphical interface for Ghostscript.

They can do the following jobs (not conclusive):

- view and print PS and PDF files,
- convert PS to PDF files,
- convert PS and PRN to various raster type graphics (BMP, EPS, JPEG, PBM, PCX, PNG, and TIF),
- convert PS to vector formats including AI (Adobe Illustrator), EMF, WMF, and FIG.
- can also convert PS to GNU Plot source code, MetaPost code, and \LaTeX pic code,
- convert PS to Java source code, Java applet code, and tk applet code, and
- extract texts from PS file.

What you should do are:

1. You can download these files from <http://www.cs.wisc.edu/ghost/>. The current versions (as of 4/3/2003) are Ghostscript 8.00 and GSView 4.3. During the installation, specify `c:\aladdin` (or whatever you want) as the home directory for these two programs.
2. You *should* enter the path (e.g., `c:\aladdin\gs8.00\bin;c:\aladdin\gs8.00\lib`) of Ghostscript binary and library directories in your system. This can go in `autoexec.bat` under Windows9x

and in System-Advanced-Environment Variables (or equivalent) under Windows NT/2k/XP. Restart your computer if you are a Windows 9x user.

3. In GSView, make sure that Options-EPS Clips is selected. If you do not select this option, you may see some white space (i.e., big bounding box) around your EPS file. This can happen to EPS files generated using the Print to File option of your print driver (see Section 2.3).

Tip! You may want to copy your equations and tables to MS Power Point. There are several methods as described below. But I prefer the last method since I can precisely control the quality of the equations including Math fonts and color.

- TexPoint v1.5.4 (<http://raw.cs.berkeley.edu/texpoint/index.htm>). This \LaTeX add-in for Power Point only works with Power Point 2000 and later.
- Math'n Table. For detailed description, refer to Section 1.5.
- Workhorse method. Zoom in the PS file that has your equations. Click Edit-Copy, click Edit-Paste to, and save it as a BMP file. Open this file using Microsoft Paint or other graphic programs, and cut out (i.e., crop) the unwanted white space. This will reduce the file size greatly. Insert this file to Power Point.

For better result, click the right mouse button of the inserted figure and select Format AutoShape-Picture. Set Brightness with 40% and Contrast with 80%.

1.2 MikTeX 2.2

MikTeX (pronounced miktek) is one of the famous Windows implementations of \LaTeX and is totally free. The current version is 2.2 as of Apr. 2, 2003. What you should do are:

1. Download the setup file from the MikTeX (<http://www.miktex.org>) home page, and run it.
2. You are asked if you download files or directly install them. Download files is recommended.
3. After downloading all, run the setup file again and select "Full installation" if you have enough disk space (recommended).
4. The default paper size of \LaTeX is letter size; however, the default paper size of dvips is A4. This may cause some paper layout problems. Open config.ps file in your `c:\texmf\dvips\config\` directory with any text editor, and switch the order of A4 and letter size configurations. The following should be the first among paper size settings

```
@ letter 8.5in 11in
@+ %%BeginPaperSize: Letter
@+ letter
@+ %%EndPaperSize
```

5. Also open config in the `\texmf\dvipdfm\config` directory and change 'p a4' to 'p letter'.

6. Run `initexmf --mkmaps` in DOS prompt.
7. YAP, MikTeX's DVI viewer, needs some option changes under View-Options-Display. You may change printer driver and paper size. If your printer supports 1200 dpi, you can directly print DVI file at 1200 dpi resolution.
8. One important function of YAP is *inverse search*. When you click any point of the DVI file, YAP will call your L^AT_EX editor and shows the source code that you clicked on DVI. For setup this function, please refer to Section 1.3 after installing WinEdt.

After you make any changes in L^AT_EX, you should update your L^AT_EX file name database. Click MikTeX Options and press the Refresh Now button.

1.3 WinEdt 5.3

WinEdt¹ (<http://www.winedt.com>) is a powerful, extremely flexible and versatile native editor and shell for MS Windows with a strong predisposition towards the creation of L^AT_EX documents and much more!

Download the file and install it! The current official version is 5.3. Some advanced options and tips are:

- **Inverse search:** Open DVI Viewer (=YAP) and go to View-Options-Inverse Search. Select the program as WinEdt. If you can not seed WinEdt, then copy the following line into the Command Line.

```
Editor=C:\Program Files\WinEdt\WinEdt.exe -F "[Open(|%f|);SelPar(%1,7)]"
```

- **Error debugging:** When you encounter an error message during L^AT_EX compiling, typing 'e' at the T_EX prompt leads to the point where the error occurs in your source T_EX file. Open `miktex.ini` that is in `\texmf\miktex\config`, and find the line starting with

```
;; Editor=notepad ....
;; Editor=winedt ...
;; Editor=emacs ...
```

Add the following line (it should be a single line).

```
Editor=C:\Program Files\WinEdt\WinEdt.exe -F "[Open(|%f|);SelPar(%1,7)]"
```

- L^AT_EX pause after compiling ?: In WinEdt 5.2 you may choose the regular pause version (Options-Configurations-MiKTeX) or the no-pause version (Options-Configuration-MiKTeX Direct!).
- Color setting in the equation environment: Start the Options-Highlighting Dialog, go to the Switches Tab Page and disable the highlighting of the Equation environment.

¹Remember that the name is NOT WinEd*it*.

1.4 GNU Emacs for Windows

Instead of using WinEdt, you can also use GNU Emacs for Windows 9x/NT/2k/XP (freeware). To use L^AT_EX specific commands, you need to install AUC-T_EX over GNU Emacs. Further, to use international languages under foreign Windows, you need to install Mule that uses the fonts in the Microsoft Input Method Editors (IME).

Too many things? Don't worry. Go to the HPack Project² (http://physics.kyunghee.ac.kr/~reds/Hpack_Project/k-download.htm) and download a combined version of GNU Emacs, AUC-T_EX, and Mule. If you are an Emacs fan, you'd better use this instead of WinEdt.

1.5 Math'n Table

Do you want to copy L^AT_EX equations and tables to Power Point? You can use Math'n Table from the [HPack Project](#) home page. Equations and tables (in Huge font) are inserted as BMP files. For better result, click the right mouse button of the inserted figure and select Format AutoShape-Picture. Set Brightness with 40% and Contrast with 80%.

1.6 Mayura Draw

Do you know what format of MS Clip Arts files are? They are in WMF (windows meta file). Using Mayura Draw (<http://www.mayura.com>) you can create illustrations composed of graphical shapes such as rectangles, ellipses, polygons, bezier curves, bitmapped images and text. Mayura Draw has powerful tools for editing and transforming graphical shapes. *All shapes including images and text can be scaled, rotated, skewed and reflected.* Bezier curves can be edited by manipulating handles [from its home page]. See the example files of Mayura Draw then you will love this program.

- Mayura Draw can export figures to EPS (works only for the registered version).
- You can modify your EPS figures. Convert your EPS file to AI (Adobe Illustrator) format using `ps2ai.bat` file. Import this AI file into Mayura Draw, modify it, and export it to EPS file.

2 How to Obtain EPS Figures

2.1 What and Why EPS

Encapsulated PostScript (EPS) is a *standard* format for importing and exporting PostScript language files in all environments. It is usually a single page PostScript language program that describes

²Even though this page is mixed with Hangul and English, you can easily find the program.

an illustration. The purpose of the EPS file is to be included as an illustration in other PostScript language page descriptions. The EPS file can contain any combination of text, graphics, and images. An EPS file is the same as any other PostScript language page description, with some restrictions [from <http://www.eng.cam.ac.uk/help/tpl/graphics/postscript.html>].

You can use any types of graphic files such as EPS, BMP, GIF, JPEG, or PDF in your \LaTeX . \LaTeX does not care what types of figures you are using; however, your DVI to PS conversion program, DVI driver, such as `dvips`, `windvi`, or `dviout` cares! Your DVI file does not contain actual font and figure information. Instead, it just contains white boxes which represent sizes and locations of each character and figure. Think about a book publishing process. Then the DVI driver fills all the white boxes with actual fonts and figures. If the driver supports, for example, JPEG, then you can directly use JPEG file in your \LaTeX source code. However, this picture format is not standard in PostScript, and hence your source file may not be compiled in other computer boxes (UNIX, LINUX, OS/2, PC, ...) having different \LaTeX implementations.

2.2 Getting From EPS-Export Applications

If your program supports *EPS Export* function, using this function is the best way to get EPS files. You don't need to adjust bounding boxes which are the EPS figure size. In this case, the EPS figure size is exactly same to your figure or drawing size. In addition, they are in high resolution.

All mathematical softwares such as GNU Plot, Mathematica, MatLab, MathCad, Maple, (and others) provide EPS output as default. Many of plotting softwares such as Sigma Plot and Origin also support EPS export. Some of drawing softwares such as XFIG, Adobe Illustrator, Mayura Draw, AutoCAD, and MS Visio provide EPS export, too.

All the above programs may have different EPS export engines, and thus the EPS files may be different in their file sizes and compatibility. Some comments on these programs are:

- Of course, Adobe Illustrator is the *de facto* since PS, EPS, and PDF are Adobe standards,
- Sigma Plot 2000 does not support EPS export even though you can find this function in the menu. The result is just bitmap. Lower versions of Sigma Plot have an excellent EPS export engine, and
- MS Visio has bad reputation for EPS export. EPS files from MS Visio are not properly included in the PS file.

2.3 Getting From Non EPS-Export Applications

Now we need some manual jobs!

You may need to put PPT (power point) drawings or Excel plots into your \LaTeX documents. Since MS programs do not support EPS, the only option that you can use is the Print to File option of your printer (actually printer driver so you don't need to have an actual printer).

The output file from Print to File is **PRN**, and this PRN will be converted to EPS using Ghostscript. Please note that the PRN file has only one page in this case.

You can also create a multiple-page PRN file but you cannot convert it to EPS file (why?). However you can convert this to PDF file using ps2pdf or Adobe Distiller. You can imagine why this function is very useful. Ideally you can convert any printable application to PDF file for your electronic archive. For more details please refer to Section 3.

The steps to create EPS files from non EPS-Export applications such as MS Power Point, Excel, and more are:

1. Install any PS printer driver if your current printer does not support PS. You can use one of the printer drivers in your system, or can download one from **HP** or **Apple**. For WindowsXP users you can use the following system printer drivers: Tektronix Phaser 850DP for color EPS and PDF and Linotronic 930 for high resolution color EPS (more than 2400dpi).
2. Your PPT should be in portrait mode.
3. On the page that has the drawings to be converted to EPS, click Print. You should first select EPS in Print-Properties-PS Output Options³. And also should check Current Page and UNcheck gray color in your Print popup window. If you miss the first two options, your PRN file cannot be converted to EPS!
4. The figure size of the PRN file is exactly same to your default paper size. This means that your file has lots of white space (i.e, large bounding box). Open the PRN file using GSView. Go to File-PS to EPS, uncheck automatic calculation of bounding box, and click the Yes button. Now you can make bounding box using your mouse from left, bottom, right, to top. Save this file as *.EPS (Do not forget to put the extension).
5. Due to the bounding box adjust, you need the clip option in your L^AT_EX source code. For example, `\includegraphics[clip=true,scale=0.8]{foo.eps}`.

3 PDF from Non L^AT_EX Sources

This is already explained. First of all, in any case, always try to use a new version of Acrobat Reader since a new reader has more fonts.

Do you want to convert your MS Word, PPT, Excel or other document files to PDF for free of charge? Even though MS does not support PostScript, your print drivers can do it for you! Open your applications and click Print. Just select Print to File. You do not need to select EPS output in this case since you are going to dump the whole document to Print to File. Unlike the EPS conversion, the page layout of your applications in your applications can be in landscape.

If your file is `foo.prn`, then typing `ps2pdf foo.prn foo.pdf` will convert it to the PDF file. If you encounter an out of environment error message in the command line mode, this is your

³The location of this option may vary.

path problem. The path may not be properly specified (in Windows 9x/NT/2000) or your current `autoexec.bat` file is beyond the given RAM memory (in Windows9x). In the latter case, you can increase the RAM memory allocation for the `bat` file in `config.sys`. You do not know how? Please find it!

Instead of using `ps2pdf`, you can also use Adobe distiller. This is basically same to `ps2pdf`. For high quality PDF creation you need to change some setting values of distiller. For more information on distiller options, please get the author's <http://www.geocities.com/kijoo2000/latex.html> file.

4 PDF from L^AT_EX

There are three methods: `ps2pdf`, `dvipdfm`, and `pdflatex`. Hyperref packages supports PDF information, bookmarks, WWW links, internal links, and more. For more information for obtaining high quality PDF from L^AT_EX, please refer to "L^AT_EX2PDF.pdf" file from <http://www.geocities.com/kijoo2000/latex.html>.

4.1 ps2pdf or Adobe Distiller

Just type this command or click the "ps→pdf" button in WinEdt. This is the easiest and reliable method. You can convert any PS, EPS, or PRN file (even without the source codes) to PDF. But this method does not support hyper reference nor bookmarks.

4.2 dvipdfm

`dvipdfm` can converts the DVI file to PDF file (again, even without the source file), and this conversion can be the *easiest and best* method when you have EPS figures⁴.

One example with hyperref package is given below.

```
\documentclass{article}
\usepackage[dvips]{graphicx,color}
\usepackage[dvipdfm]{hyperref}
\hypersetup{%
  pdftitle={},
  pdfauthor={},
  pdfsubject={},
  pdfkeywords={},
  pdfpagemode={UseOutlines},
  bookmarksopen,
  pdfstartview={FitH},
```

⁴`dvipdfm` automatically converts EPS figures to PDF figures using Ghostscript.


```
colorlinks,linkcolor={blue},citecolor={blue},
urlcolor={red},
}%
\begin{document}
```

For URL and mailto links, use `\url{http://...}` and `\url{mailto:e-mail address}`. For page reference, use `\pageref{key}` at the link page and `\label{key}` at the target page. Similarly for internal links, use `\hyperlink{key}{text1}` at the link and `\hypertarget{key}{text2}` at the target.

4.3 pdflatex

This is a variant (not a package) of L^AT_EX and aims direct PDF generation from its L^AT_EX source (thus, there is no DVI file generation). In the preamble of your L^AT_EX source file, add

```
\documentclass[pdftex]{article}
\usepackage[dvips]{graphicx,color}
\usepackage[pdftex]{hyperref}
```

in the preamble. To compile the L^AT_EX source code, type `pdflatex foo.tex`.

The minor problem is that pdfL^AT_EX does not support EPS figures, and thus you have to convert all EPS files to PDF figure files with proper bounding box information. The quick solution is to use `epstopdf` program.

4.4 PDF Presentation

If you have lots of equations and L^AT_EX related figures, it is better to use PDF as your presentation tool. You can also add PPT-like presentation skills such as animation, transition, backgrounds, and etc.

Use Prosper package which is developed for L^AT_EX . You can get PS for transparencies or PDF for beam projection. `Ctrl+L` in Acrobat Reader is a toggle key for full screen.

It is really easy to use. Just read the manual in the package and see the example file. You may change font size and color at the background style file if you don't like the default. If you have time, you can create your own background style file. Since this package is not included in the full installation of MikT_EX 2.2, you should get it from its home page (<http://prosper.sourceforge.net>) and manually install it.

5 MetaPost for Creative Drawings

5.1 Intro

For complicated *scientific and artistic* drawings, you may use MS Visio or AutoCAD. As explained earlier, Visio has a bad EPS export engine. AutoCAD is for professional designers such as civil engineers and thus is very expensive and heavy to use. You can use MetaPost and Pstricks package. Since I have no experience with Pstricks, I describe only MetaPost.

MetaPost is closely related to METAFONT. Dr. Knuth also developed METAFONT for professional postscript font designs. Dr. Hobby who was his Ph.D. student, developed MetaPost for scientific drawings and plots based on METAFONT. MetaPost is already in your system. Go to `c:\texmf\doc\metapost\base` and read `mpman.pdf` if you want to use MetaPost. It is art!

5.2 How to Use

Copy the following code and name it as `test.mp`. To use \LaTeX commands, you can add the codes between `verbatimtex` and `etex;`, and you can load as many packages between them as you want.

```
verbatimtex
%&latex
\documentclass[12pt]{article}
\usepackage{txfonts}
\begin{document}
etex;
beginfig(1);
a=.7in; b=.5in; z0=(0,0); z1--z3=(a,0);z2--z4=(0,b);
draw z1..z2..z3..z4..cycle;
draw z1--z0--z2;
label.top(btex $a$ etex, 0.5[z0,z1]);
label.lft(btex $b$ etex, 0.5[z0,z2]);
makelabel.bot(btex $(0,0)$ etex, z0);
endfig;
end
```

Type `mpost test` or `mp test` that will create `test.1` file. This file is a PS file with a proper bounding box and can be inserted in your \LaTeX file using `\includegraphics{test.1}` command in the figure environment. By changing the extension of this file to “`test_1.mps`”, this file can be directly inserted to `pdflatex`. No need to convert to pdf figures. Do not try to see the DVI file since YAP, MiKTeX DVI viewer, cannot render the figure. Check the final PS file.

If you encounter “... unable to write *.mpx file” error message⁵, you need manual procedure or a small batch file. Follow the procedure that the MetaPost manual suggests.

⁵This error may occur when you use `verbatimtex...etex;`. But this is a computer-dependent problem.

You can see the MetaPost-generated PS file in your final PS file using GSView. However, when you open the MetaPost-generated PS file using GSView, you can only see the PS figure above the positive x and y coordinates. For instance, in the above example, you can only see the first quarter of the figure. Further, if you have any text in your MetaPost generated figure, you cannot see anything in GSView. This is due to different definitions of font names between MetaPost and GSView. Of course, you can match both font names and see it in GSView. You want to know how? And how to convert MetaPost generated PS figure to EPS format? [The answer is already given.]

5.3 More Examples

Go to <http://www.math.jussieu.fr/~zoonek/LaTeX/Metapost/metapost.html> and see more than 300 MetaPost examples. Figure 1 shows some examples taken from this web site. For figures that have repeating units, the code to draw these figures are very simple. For example, the third figure (*Koch fractal!*) in the first column in this figure is generated from the following code.

```
beginfig(201)
u:=2cm;
vardef koch(expr A,B,n) = save C; pair C;
  C = A rotatedaround(1/3[A,B], 120);
  if n>0:
    koch( A,      1/3[A,B], n-1);
    koch( 1/3[A,B], C,      n-1);
    koch( C,      2/3[A,B], n-1);
    koch( 2/3[A,B], B,      n-1);
  else:
    draw A--1/3[A,B]--C--2/3[A,B]--B;
  fi;
enddef;
z0=(u,0);
z1=z0 rotated 120;
z2=z1 rotated 120;
koch( z0, z1, 4 );
koch( z1, z2, 4 );
koch( z2, z0, 4 );
endfig;
```

Of course, you can make *animated* MetaPost figures!

6 Useful Tips

6.1 Font Selection

- `\usepackage{mathptmx}` gives Times text and math fonts.

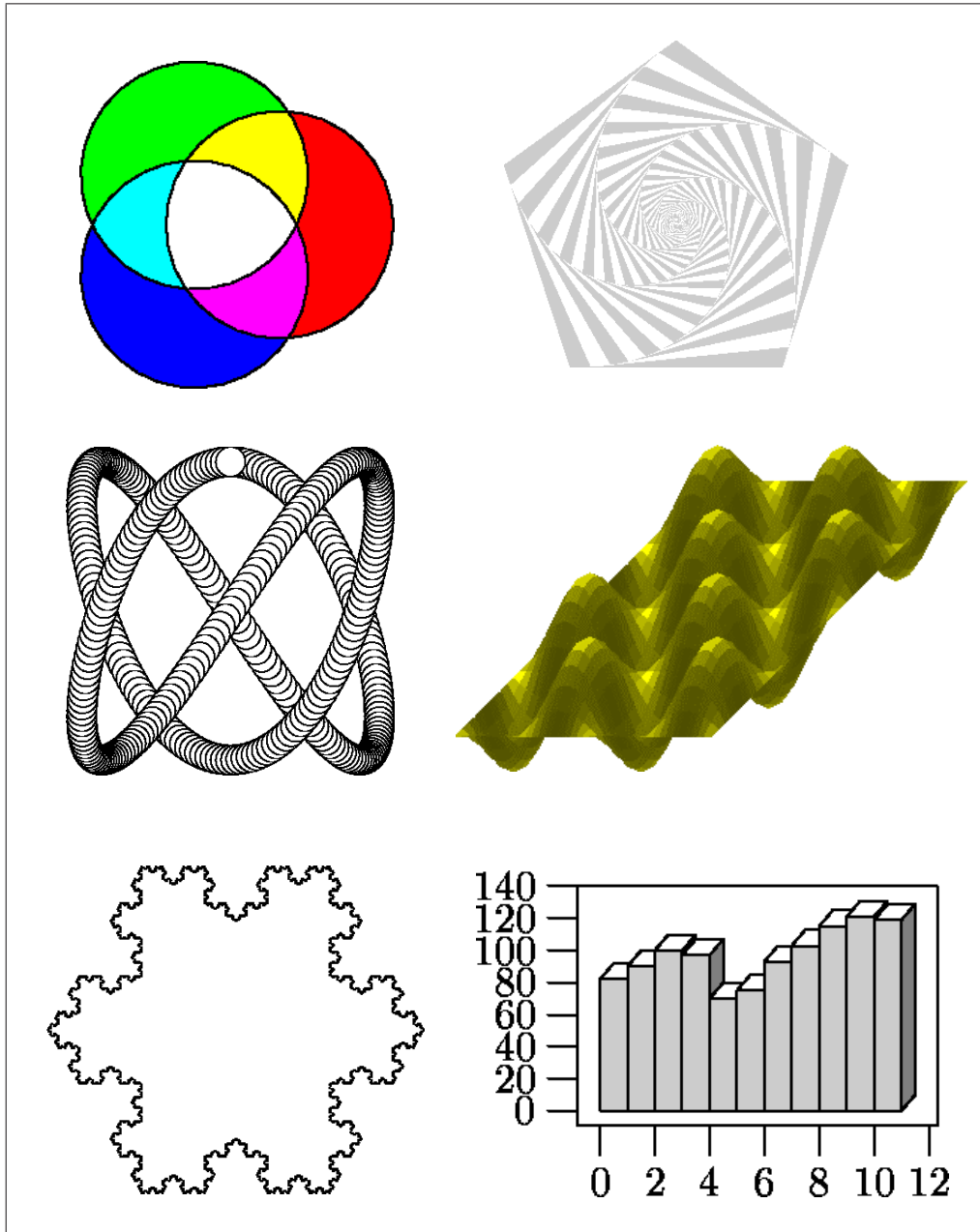


Figure 1: MetaPost examples.

- `\usepackage{mathpazo}` gives Palatino text and math fonts. These `mathptmx` and `mathpazo` fonts are already in your \LaTeX system (parts of PSNFSS collection) and are substitution of the obsolete `times` and `palatino` fonts.
- `\usepackage{txfonts}` gives Times text and math fonts.
- `\usepackage{pxfonts}` gives Palatino text and math fonts. These `txfonts` and `pxfonts` will be installed when you choose full installation of MikTeX2.2 (At version 2.1 there is a configuration problem). These two fonts are more complete than the `mathptmx` and `mathpazo` fonts.
- How to temporarily change font in the middle of texts? See the following example:

```
This is txfonts, {\fontfamily{phv}\selectfont but this is Helvetica!}
```

generates "This is txfonts, but this is Helvetica!"

- Now how can I find the `fontfamily` name? Please see the `psnfss2e.pdf` file in your `\texmf\doc\latex\psnfss` directory.

6.2 DVIPS Options

If `imsi.dvi` is your DVI file,

<code>dvips imsi</code>	Converts to <code>imsi.ps</code> file
<code>dvips -Ppdf imsi</code>	Converts to <code>imsi.ps</code> which is optimized for PDF conversion
<code>dvips -G0 imsi</code>	Under MikTeX 2.0, 'fi' is changed to £ when you use <code>times</code> or <code>palatino</code> font. This option will keep the original font encoding. The default setting of WinEdt is <code>dvips -Ppdf -G0</code> .
<code>dvips -j0 imsi</code>	If you use <code>txfonts</code> or <code>pxfonts</code> , some HP printers cannot print anything. In this case, use this option.

Of course, you can combine all the options. For more information, see `c:\texmf\doc\dvips\dvips.dvi`.

6.3 Others

- Manuals? : First check the `c:\texmf\doc` directory.
- Where do I put my new style files? : You can put your new style files in `c:\localtexmf\your_directory` or `c:\texmf\tex\latex\misc`. Do not forget to refresh the \LaTeX file name database.
- CTAN Search: When you search package files, do not put file extension in the search box.
- `*.ins` and `*.dtx` files? : If your search result files are `foo.ins` and `foo.dtx` files, not `foo.sty` file, download both files. Type `latex foo.ins` (two or more times) to get `foo.sty` file, and type `latex foo.dtx` (two or more times) to get `foo.dvi` guide file.

- How to merge two or more PS files? : With ghostscript you can do the following : `gswin32 -dBATCH -dNOPAUSE -sDEVICE=pswrite -sOutputFile=merged.ps coverletter.ps doc.ps`. If you have Acrobat Distiller, Distiller can also perform this job more easily.
- How to merge two or more PDF files? See `LaTeX2PDF.pdf` from <http://www.geocities.com/kijoo2000/latex.html>.

7 \LaTeX Links and Help

7.1 Where to Find Further Information

- CTAN–Comprehensive \TeX Archive Network (<http://www.ctan.org>): CTAN means everything to \TeX users.
- `news:comp.text.tex` user group. You can find any types of answers that you want to know. Where is it? It is your assignment to find it.
- (La) \TeX navigator (<http://www.loria.fr/services/tex/english/index.html>): Very good navigator site. Tells you what to read and what you need.

7.2 Recommendations

- *The Not So Short Introduction to \LaTeX 2 ϵ* – A complete beginners’ guide. Can get it from LaTeX navigator. Even though this is a good introductory guide, you should remember that this is not enough!
- *\LaTeX for Word Processor Users* – This document explains how \LaTeX performs the common tasks and features of word processors.
- *\TeX FAQ* – The official \TeX FAQ. You can find it here (<http://tex.loria.fr/english/general.html>).
- *A Guide to \LaTeX* by Helmut Kopka & Matrick W. Daly – The best \LaTeX guide book for beginners and advanced users.

8 Note

There are some more useful documents in my web page (<http://www.geocities.com/kijoo2000/latex.html>). Some of them are:

- How to Create PDF from \LaTeX (`latex2pdf.pdf`) describes how to create high quality PDF files from LaTeX sources. Also contains lots of valuable tips.
- A Bib \TeX Guide via Examples (`bibtex_guide.pdf`): This document describes how to (i) modify citation styles in your body text, (ii) make your own bibliography style (.bst) file, and (iii) modify the bibliography style file.

If you find any errors or have suggestions, please contact me at [kijoo2000 at yahoo dot com](mailto:kijoo2000@yahoo.com) or [kim dot ki-joo at epa dot gov](mailto:kim.ki-joo@epa.gov).