

# The asyfig packages

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## Abstract

This suite of packages provides an alternate method of including stand-alone Asymptote figures within L<sup>A</sup>T<sub>E</sub>X documents via the `\asyfig` command.

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## Part I

## User documentation

### 1 Introduction

Asymptote (or `asy`) is a vector graphics programming language inspired by MetaPost but based around an extended C-like language and full support for 3D bezier curves. Asymptote uses an auxiliary L<sup>A</sup>T<sub>E</sub>X process to typeset its labels, and figures can be either generated as stand-alone graphics or in an ‘inline’ form in which labels get placed by the main typesetting process at the figure is inserted into a document.

Support for `asy` in a L<sup>A</sup>T<sub>E</sub>X document is provided by the `asymptote` package, which defines the `\begin{asy}` environment in which `asy` figures may be directly typed. In this case, the source file contains the complete specification

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for the text and graphics in the document. However, for large documents it can be quite inconvenient to maintain `asy` graphics that are inline with the document source, because the whole document requires two compilations before any changes in the graphic can be visualised.

This package, `asyfig`, provides an alternative, whereby all `asy` figures are defined *separately* from the source in their own individual `.asy` files. `asyfig` uses Asymptote's inline mode so that labels in the graphics are produced by the main typesetting run; this ensures consistent font and size selection of text within the graphics. In addition, each individual `.asy` graphic can be very quickly processed individually to facilitate easy maintenance and editing of the graphics.

## 2 *Getting started*

Load the `asyfig` package like any other. I'll discuss the workflow of the package with an illustrative example.

*An asy graphic* First we need an example Asymptote graphic. This package is distributed with one such, `frf.asy`:

```
texpreamble("\usepackage[sc]{mathpazo}");
unitsize(10mm);
draw( (0,0){right}..{up}(3,2){down}..
      {down}(4,-2){up}..{right}(7,0) );
draw( "Resonance" , align=E, (3,2) );
draw( "Anti-resonance" , align=W, (4,-2) );
```

Material within `texpreamble` is *not* used in the final typesetting of the labels; it is purely for the 'proof' graphic that is produced before the graphic is integrated within the main document.

*Inserting the graphic* After processing (see the next step), this graphic can be included in the document with the `\asyfig{<graphic name>}` command. It does *not* take any option arguments like a regular graphic (cf. `\includegraphics`) to affect the scaling or rotation of the graphic; you are expected to produce the figure in the correct size and orientation within Asymptote.

*Processing the graphic* But before the graphic can be inserted it must be processed (in the future I might make this an automatic option within the package). The processing is performed by the `asyprocess` package in an auxiliary  $\text{\LaTeX}$  execution. Here is the shell script, called (say) `asyprocess`, that I use to do this: (so figure processing would be '`asyprocess frf`' in this example)

```
#!/bin/sh
pdflatex -shell-escape -interaction=batchmode -jobname=$1-comp
"\RequirePackage{asyprocess}\ProcessAsy
\documentclass{article}\begin{document}\ShowAsy\end{document}"
```

Simply change pdflatex to latex to have EPS graphics produced by Asymptote.

### 3 *Package information*

The most recent publicly released version of asyfig will be available at CTAN:

<http://tug.ctan.org/pkg/asyfig/>

Historical and developmental versions are available at GitHub:

<http://github.com/wspr/asyfig/>

While general feedback at [wspr81@gmail.com](mailto:wspr81@gmail.com) is welcomed, specific bugs should be reported through the bug tracker at FogBugz: <https://wspr.fogbugz.com/> (click ‘TASKS: Enter a New Case’).

This package is freely modifiable and distributable under the terms and conditions of the L<sup>A</sup>T<sub>E</sub>X Project Public Licence, version 1.3c or greater (your choice). The latest version of this license is available at: <http://www.latex-project.org/lppl.txt>. This work is maintained by WILL ROBERTSON.

## Part II

# Implementation

### 4 *The asyfig package*

LaTeX2e file ‘asyfig.sty’ generated by the ‘filecontents’ environment from source ‘asyfig’ on 2008/08/31.

```
1 \ProvidesPackage{asyfig}[2008/08/30_v0.1
2   Commands_for_using_asymptote_figures]
3 \RequirePackage{graphicx,color,import}
4 \RequirePackage{inversep} [2008/07/31_v0.2]
5 \RequirePackage{asyalign}
\ImportIfFileExists 6 \newcommand\ImportIfFileExists[4]{%
7   \IfFileExists{#1#2}
8     {\import{#1}{#2}#3}
9     {#4}}
\asypath 10 \providecommand\asypath{}
\asyfig 11 \def\asyfig{%
12   \begingroup
13     \catcode'\_ =11\relax_% just to be sure
14     \@asyfig}
\@asyfig 15 \newcommand\@asyfig[2][{}]{%
16   \inversep*{#2}%
17   \ImportIfFileExists{\asypath\ip@directpath}{%
18     \ip@lastelement_}{%
19     \PackageWarning{asyfig}{^^J%
20       \space\space_\asypath\ip@directpath%
21       \ip@lastelement_\not_found.^^J%
22       This_warning_occurred}}
23   \endgroup}
<eof>
```

### 5 *The asyalign package*

LaTeX2e file ‘asyalign.sty’ generated by the ‘filecontents’ environment from source ‘asyfig’ on 2008/08/31.

```
1 \ProvidesPackage{asyalign}
```

```

2 \RequirePackage{ifpdf}

\ASYbox 3 \newbox\ASYbox
\ASYdimen 4 \newdimen\ASYdimen

\ASYbase 5 \def\ASYbase#1#2{%
6 \setbox\ASYbox=\hbox{#1}%
7 \ASYdimen=\ht\ASYbox
8 \setbox\ASYbox=\hbox{#2}%
9 \lower\ASYdimen\box\ASYbox}

10 \ifpdf
\ASYalign 11 \def\ASYalign(#1,#2)(#3,#4)#5#6{%
12 \leavevmode
13 \setbox\ASYbox=\hbox{#6}%
14 \setbox\ASYbox\hbox{%
15 \ASYdimen=\ht\ASYbox%
16 \advance\ASYdimen_\by\dp\ASYbox
17 \kern#3\wd\ASYbox
18 \raise#4\ASYdimen\box\ASYbox}%
19 \put(#1,#2){%
20 \special{pdf:q_\#5_0_0_cm}%
21 \wd\ASYbox\z@\dp\ASYbox\z@\ht\ASYbox\z@
22 \box\ASYbox%
23 \special{pdf:Q}%
24 }}
25 \let\ASYraw\@firstofone

26 \else
\ASYalign 27 \def\ASYalign(#1,#2)(#3,#4)#5#6{%
28 \leavevmode
29 \setbox\ASYbox=\hbox{#6}%
30 \setbox\ASYbox\hbox{%
31 \ASYdimen=\ht\ASYbox
32 \advance\ASYdimen_\by\dp\ASYbox
33 \kern#3\wd\ASYbox
34 \raise#4\ASYdimen\box\ASYbox}%
35 \put(#1,#2){%
36 \special{%
37 ps:gsave_\currentpoint_\currentpoint_\translate
38 [#5_0_0]_\concat_neg_exch_neg_exch_translate}%
39 \box\ASYbox

```

```

40      \special{ps:currentpoint_grestore_moveto}%
41    }}
\ASYraw 42    \def\ASYraw#1{%
43      currentpoint_currentpoint_translate_matrix_currentmatrix
44      100_12_div_-100_12_div_scale
45      #1
46      setmatrix_neg_exch_neg_exch_translate}
47    \fi

<eof>

```

## 6 *The asyprocess package*

LaTeX2e file ‘asyprocess.sty’ generated by the ‘filecontents’ environment from source ‘asyfig’ on 2008/08/31.

```

1  \ProvidesPackage{asyprocess}
2  \nofiles

3  \RequirePackage{ifpdf,catchfile,ifplatform,color,graphicx}
4  \RequirePackage[active,tightpage]{preview}

\@par@macro 5  \def\@par@macro{\par}

\asy@status 6  \def\asy@status{asyprocess-statusfile.txt}

7  \edef\@tempa{\detokenize{-comp}}
\asy@strip@comp 8  \@temptokena{\def\asy@strip@comp#1}
9  \expandafter\the\expandafter\@temptokena\@tempa#2\@nil{#1}
10 \edef\asy@compname{\expandafter\asy@strip@comp\jobname-comp%
    \@nil}

\ProcessAsy 11 \newcommand\ProcessAsy{%
12   \immediate\write18{%
13     asy_-wait_-inlinetex_-tex_ \ifpdf_pdf\fi_latex
14     \asy@compname\space_2>_\asy@status}%
15   \CatchFileDef{\@tempb}{\asy@status}{}%
16   \immediate\write18{\ifwindows_del_\else_rm_\fi_\asy@status}
17   \ifx\@tempb\@par@macro
18     \expandafter\@gobble
19   \else
20     \g@addto@macro\@tempb{^^J%

```

```

21      -----_ASY_ERROR_-----^^J%
22      -----}%
23      \expandafter\@firstofone
24      \fi{%
25      \nonstopmode
26      \typeout{%
27      -----^^J%
28      -----_ASY_ERROR_-----^^J}
29      \typeout{\expandafter\strip@prefix\meaning\@tempb\@nil}
30      \batchmode
31      \end{document}}}}

\ShowAsy 32 \newcommand\ShowAsy{%
33      \begin{preview}
34      \input{\asy@compname_}
35      \end{preview}}

36 \AtBeginDocument{\InputIfFileExists{\asy@compname_.pre}{}{}}

<eof>

```