

The asyfig packages

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Abstract

This suite of packages provides an alternate method of including stand-alone Asymptote figures within L^AT_EX 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^AT_EX 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^AT_EX 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 \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 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^AT_EX 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>

```