

# The feynmp-auto package\*

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## 1 The package

This package is just a wrapper around `feynmp`; it receives exactly the same options as that package and works in exactly the same way, so refer to its documentation for the specific commands and environments.

What the present package adds is the automatic call of METAPOST at `\end{fmffile}`, taking advantage of the fact that, starting from T<sub>E</sub>X Live 2012, METAPOST has been added to the external programs that are available in the *restricted shell escape*, that is, programs that are considered safe and so callable from inside every run of L<sup>A</sup>T<sub>E</sub>X (with all available engines).

However the call of METAPOST can be made only when the output file containing the METAPOST code is closed, so two runs of L<sup>A</sup>T<sub>E</sub>X are necessary anyway in order to include the graphics. The benefit of using this package is that it's not necessary to go to the shell or to open the output file for compiling it.

With pdfL<sup>A</sup>T<sub>E</sub>X or LuaL<sup>A</sup>T<sub>E</sub>X the METAPOST run will not be performed if the file hasn't changed from the previous run thanks to the `\pdfmdfivesum` feature available with pdfT<sub>E</sub>X and emulated for LuaT<sub>E</sub>X via Heiko Oberdiek's `pdftexcmds` package. This feature is not available with X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X, so when using X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X the call of METAPOST will be performed at each run.

Finally, we add also the `\DeclareGraphicsRule` commands that are needed for loading the MPS files.

## Notes

Some T<sub>E</sub>X distributions, notably MiK<sub>T</sub>E<sub>X</sub>, may not have enabled METAPOST in the restricted shell, so this package will do no good in this case, but it doesn't harm either. This fact is easily discoverable, because L<sup>A</sup>T<sub>E</sub>X won't be able to find the compiled MPS files.

Also any T<sub>E</sub>X Live distribution earlier than the 2012 release won't have METAPOST enabled in the restricted shell escape, so the package won't work.

---

\*This document corresponds to `feynmp-auto` v1.0, dated 2013/03/12.

In both the above cases, adding the `-shell-escape` option to the call of the  $\text{\LaTeX}$  run is sufficient (but beware for security risks and run with the option only files from safe sources).

The package will emit a warning if shell escape is not enabled, which may happen if the call of the engine has the option `-no-shell-escape` (possibly via the front-end settings).

## 2 Implementation

The usual presentation, that we repeat here for completeness.

```
\ProvidesFile{feynmp-auto.dtx}
\NeedsTeXFormat{LaTeX2e}[2008/04/05]
\ProvidesPackage{feynmp-auto}
[2013/03/12 v1.0 Automatic processing of feynmp graphics]
```

Now the real macros. First of all we check that the typesetting engine is sufficiently recent to include  $\varepsilon\text{-TeX}$  extensions.

```
1 \@ifundefined{eTeXversion}
2   {\PackageError{feynmp-auto}{LaTeX engine too old, aborting}
3    {Please upgrade your TeX system}\@@end}{}
```

### 2.1 Options

All options are passed to feynmp

```
4 \DeclareOption*{\PassOptionsToPackage{\CurrentOption}{feynmp}}
5 \ProcessOptions\relax
```

### 2.2 Required packages and preliminary code

```
6 \RequirePackage{feynmp}
7 \RequirePackage{ifpdf,ifxetex}
8 \RequirePackage{pdftexcmds}
9 \ifnum\pdf@shellescape=\z@
10  \PackageWarningNoLine{feynmp-auto}
11    {The automatic feature can't be used\MessageBreak
12     because 'shell escape' is disabled}
13 \fi
14 \ifpdf
15  \DeclareGraphicsRule{*}{mps}{*}{}
16 \fi
17 \ifxetex
18  \DeclareGraphicsRule{*}{eps}{*}{}
19 \fi
```

### 2.3 Avoiding useless runs

With the `pdfmdfivesum` feature, we can spare useless runs of METAPOST. Its presence is controlled by checking if `\pdf@filemdfivesum` has been defined by

pdftexcmds.

```
20 \ifdefined\pdf@filemdfivesum
```

In this case we define a default value for `fnmpa@mdfivesum` and three macros for doing comparison. If the METAPOST file doesn't exist in the first place, we'll simply run METAPOST when `\end{fmffile}` is scanned. Otherwise we store in `fnmpa@mdfivesum` the MD-5 hash of the file for later comparison.

```
21 \def\fnmpa@mdfivesum{0}
22 \def\fnmpa@gethash{%
23   \IfFileExists{\thefmffile.mp}
24     {\edef\fnmpa@mdfivesum{\pdf@filemdfivesum{\thefmffile.mp}}}
25   }%
26 }
27 \def\fnmpa@processmp{%
28   \IfFileExists{\thefmffile.mp}
29     {\fnmpa@compare}
30   }%
31 }
32 \def\fnmpa@compare{%
33   \ifnum\pdf@strcmp{\fnmpa@mdfivesum}{\pdf@filemdfivesum{\thefmffile.mp}}=\z@
34     % do nothing, the files is unmodified
35   \else
36     \immediate\write18{mpost \thefmffile}%
37   \fi
38 }
```

If the MD-5 feature is not available (that is, with  $\text{\TeX}$ ), we don't set up any check.

```
39 \else
40   \let\fnmpa@gethash\relax
41   \def\fnmpa@processmp{%
42     \IfFileExists{\thefmffile.mp}{\immediate\write18{mpost \thefmffile}}{}%
43   }
44 \fi
```

## Patching the macros of feynmp

We finally need to inject the code in the macros responsible for the `fmffile` environment. In `\fmffile` we add the checks for the MD-5 sums:

```
45 \def\fmffile#1{%
46   \def\thefmffile{#1}%
47   \equaltojobname{\thefmffile}{%
48     \PackageError{feynmp}
49       {The argument of \fmffile MUST NOT be identical\MessageBreak
50        to the name of your main input file! I will use fmffiledefault.mf\MessageBreak
51        this time around, but you'd better fix your code now!}%
52     {Invalid argument to \string\fmffile!}%
53   \def\thefmffile{fmffiledefault}}{}%
54 \if@fmfio
```

```

55 \fnmpa@gethash % Added
56 \@ifundefined{ifmeasuring@}%
57 {}%
58 {\def\if@fmfio{\ifmeasuring@}\else}}%
59 \immediate\openout\@outfmf=\thefmffile.mp\relax
60 \fmfcmd{\p@rcent\space \thefmffile.mp -- do not edit, %
61         generated automatically by \jobname.tex^^J%
62         input feynmp^^J%
63         require_RCS_revision "\fmf@revision";}%
64 \fi
65 \setcounter{fmfgraph}{0}}
In \endfmffile we add the processing of the METAPOST file:
66 \def\endfmffile{%
67 \fmfcmd{\p@rcent\space the end.^^J%
68         end.^^J%
69         endinput;}%
70 \if@fmfio
71 \immediate\closeout\@outfmf
72 \fi
73 \fnmpa@processmp % Added
74 \let\thefmffile\relax
75 }

```

## Change History

v1.0  
 General: Initial version . . . . . 1

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