The HEP-GRAPHIC package*

Plot macros

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Abstract

The HEP-GRAPHIC is a convenience wrapper for the PGF/TIKZ, PGFPLOTS, and STANDALONE packages.

1 Graphic

After loading the `hep-graphic` package the PGF/TIKZ [1] and STANDALONE [2] packages are loaded and externalisation is activated. The `plot` and `feynman` options load the neccessary packages for plotting and feynman diagrams. The macro `\includetikz[`⟨*width*⟩`]{`⟨*name*⟩`}` loads `tikz` pictures.

1.1 Plot

The HEP-PLOT package loads the PGFPLOTS package [3] and applies some optimisation.

1.2 Feynman

The HEP-FEYNMAN package loads the TIKZ-FEYNMAN package [4] and applies some optimisation.

A Implementation

A.1 Graphic

<*package>

Define a hepgraphic namespace for the options using the KVOPTIONS package [5].

```
\RequirePackage{kvoptions}
\SetupKeyvalOptions{
  family=hepgraphic,
  prefix=hepgraphic@
}
```

`plot` Define the `plot` switch for loading plot code.

```
\DeclareBoolOption[false]{plot}
```

*This document corresponds to HEP-GRAPHIC v1.0.

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`feynman` Define the `feynman` switch for loading feynman code.

```
\DeclareBoolOption[false]{feynman}

\ProcessKeyvalOptions*
```

Load the HEP-PLOT and HEP-FEYNMAN packages when required.

```
\ifhepgraphic@plot\RequirePackage{hep-plot}\fi
\ifhepgraphic@feynman\RequirePackage{hep-feynman}\fi
```

Load the TIKZ package with the EXTERNAL library [1].

```
\RequirePackage{tikz}
\usetikzlibrary{external}
\tikzexternalize[
 optimize=false,
 only named=true,
]
```

`\graphicpath` Load the STANDALONE package [2] and define the `\graphicpath` pointing to the folder with `pgf` files.

```
\RequirePackage{standalone}
\def\hep@graphic@path{.}
\newcommand{\graphicpath}[1]{\def\hep@graphic@path{#1}}
```

`\includetikz` Define a macro to include `tikz` figures using the XPARSE package [6].

```
\RequirePackage{xparse}
\NewDocumentCommand{\includetikz}{sO{1}m}{%
 \tikzsetnextfilename{#3}%
 \IfBooleanTF{#1}{%
  \includestandalone{\hep@graphic@path/#3}%
 }{%
  \linewidth=#2\linewidth
  \includestandalone[width=\linewidth]{\hep@graphic@path/#3}%
 }%
}
\newcommand{\includefeynman}[1]{%
 \vcenter{\hbox{\includestandalone{\hep@graphic@path/#1}}}%
}
```

</package>

A.2 Plots

<*plot>

Load the PGF/TIKZ package [1].

```
\RequirePackage{tikz}
```

dashdotdotdotted Add new line styles.
dashdotdotdotdotted

```
\tikzset{
 dashdotdotdotted/.style={dash pattern=on 3pt off 2pt
  on \the\pgflinewidth off 2pt on \the\pgflinewidth off 2pt
  on \the\pgflinewidth off 2pt
 },
 dashdotdotdotdotted/.style={dash pattern=on 3pt off 2pt
  on \the\pgflinewidth off 2pt on \the\pgflinewidth off 2pt
  on \the\pgflinewidth off 2pt on \the\pgflinewidth off 2pt
 },
}%
```

Change thousand separator

```
\pgfkeys{/pgf/number format/.cd,1000 sep={\,}}%
```

Load the PGFPLOTS package [3] and set global options.

```
\RequirePackage{pgfplots}
\pgfplotsset{
 compat=newest,
 width=\linewidth,
 height=\linewidth,
 enlargelimits=false,
}
```

Fix glitch.

```
\pgfplotsset{
 every y tick scale label/.append style={
  inner sep=1pt,
  xshift=-1pt,
  yshift=-1pt,
 },
}
```

Set default font size

```
\pgfplotsset{
  legend style={font=\footnotesize},
  tick label style={font=\footnotesize},
  label style={font=\small},
  title style={font=\small},
  max space between ticks=30,
}
```

three panels Set font size three panel versions

```
\pgfplotsset{
  three panels/.style={
    legend style={font=\scriptsize},
    tick label style={font=\scriptsize},
```

```
    label style={font=\footnotesize},
    title style={font=\footnotesize},
    max space between ticks=25,
    /tikz/mark size=1.5pt,
    major tick length=1mm,
    minor tick length=0.66mm,
    every axis title shift=0pt,
  },
}
```

colors
line styles
marks
horizontal marks
vertical marks

Create cycle lists

```
\colorlet{darkgreen}{green!50!black}
\pgfplotscreateplotcyclelist{colors}{
 blue, red, darkgreen, violet, orange, yellow!25!orange,
 brown, black
}
\pgfplotscreateplotcyclelist{line styles}{
 solid, dashed, {densely dotted, semithick}, dashdotted,
 dashdotdotted, dashdotdotdotted, dashdotdotdotdotted
}
\pgfplotscreateplotcyclelist{marks}{
 -, |, Mercedes star flipped, Mercedes star, +, x, star,
 asterisk, 10-pointed star
}
\pgfplotscreateplotcyclelist{vertical marks}{
 |, Mercedes star flipped, Mercedes star, x, star,
 asterisk, 10-pointed star
}
\pgfplotscreateplotcyclelist{horizontal marks}{
 -, Mercedes star flipped, Mercedes star, x, star, %asterisk,
 10-pointed star
}
\pgfplotsset{
 cycle multiindex* list={colors\nextlist line styles},
}
```

\cyclelistshift

Define the \cyclelistshift macro skiping one step in a cyclelist. Must be used in combination with \setcounter{cyclelistshift}{0}.

```
\newcounter{cyclelistshift}
\newcommand\cyclelistshift{
  \globaldefs=1\relax
%   \stepcounter{cyclelistshift}
  \addtocounter{cyclelistshift}{1}
  \pgfplotsset{cycle list shift=\value{cyclelistshift}}
  \globaldefs=0\relax
}
```

legend

Set the legend style.

```
\pgfplotsset{
 legend cell align=left,
 legend style={
  at={(1,1)},
  anchor=north east,
  inner sep=1pt,
  outer sep=6pt,
  draw=none,
  fill opacity=.9,
  draw opacity=1,
  text opacity=1,
  cells={align=left},
  /tikz/every even column/.append style={column sep=.5em},
%   fill=none,
 },
}
```

`contour legend` Define basic contour legend

```
\pgfplotsset{
 contour legend/.style={
  contour prepared={labels=false},
  colorbar sampled line,
  colorbar style={
   mark size=7pt,
   mark options={semithick},
   tickwidth=0pt,
   subtickwidth=0pt,
   },
 },
}
```

`contour legend x` Define horizontal contour legend.

```
\usepgfplotslibrary{colormaps}
\pgfplotsset{
 contour legend x/.style={
  colorbar horizontal,
  colormap/jet,
  contour legend,
  colorbar style={
   at={(0.5,1.025)},
   anchor=south,
   mark=|,
   axis x line*=top,
   axis y line=none,
   xticklabel pos=upper,
   title style={
    at={(-0.05,1)},
    anchor=east,
   },
```

```
    xlabel style={
     at={(-0.06,1)},
     anchor=south east,
    },
   },
  },
}
```

`contour legend y` Define vertical contour legend.

```
\pgfplotsset{
 contour legend y/.style={
  contour legend,
  colorbar style={
   at={(1.025,0.5)},
   anchor=west,
   mark=-,
   axis x line=none,
   title style={
    at={(1,-0.1)},
    anchor=north west,
   },
  },
 },
}
```

`contour plot x` Define vertical contour legend.
`contour plot y`

```
\pgfplotsset{
 contour plot x/.style={
  contour legend x,
  contour prepared={labels=false},
 },
 contour plot y/.style={
  contour legend y,
  contour prepared={labels=false},
 },
}
```

`error legend` Define error legend.

```
\pgfplotsset{
 error legend/.style n args={3}{
  legend image code/.code={
   \draw[draw=none,fill=#1,#3](0mm,-1mm)rectangle(6mm,1mm);
   \draw[draw=#1,#2] (0mm,0mm)--(6mm,0mm);
  }
 },
}
```

`\addlegendtitle` Define a legend title macro.

```
\newcommand{\addlegendtitle}[2][]{
 \addlegendimage{empty legend}
 \addlegendentry[#1]{\hspace{-7mm}#2}
}%
```

</plot>

A.3 Feynman graphs

<*feynman>

Load TIKZ-FEYNMAN package [4] to enable the drawing of Feynman diagrams. Deactivate warning

```
\RequirePackage{tikz-feynman}
\tikzfeynmanset{
 compat=1.1.0,
 warn luatex=false,
}
\makeatletter\def\tikzfeynman@luatex@required@path{}\makeatother
```

Redfine the arrow style

```
\tikzfeynmanset{
 with arrow/.style={%
  decoration={markings,mark=at position#1with\arrow{>}},
  postaction=decorate
 },
 with reversed arrow/.style={%
  decoration={markings,mark=at position#1with\arrow{<}},
  postaction=decorate
 },
 momentum/arrow style={->},
}
```

</feynman>

B Tests

<*test>

```
\documentclass{article}

\usepackage{hep-graphic}

\begin{document}

\end{document}
```

</test>

C Readme

<*readme>

```
# The ‘hep-graphic‘ package

A ‘LaTeX‘ package for publications in High Energy Physics.

## Introduction

...

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in ‘http://www.latex-project.org/lppl.txt‘ and version 1.3c or later is
part of all distributions of LaTeX version 2005/12/01 or later.
```

</readme>

References

[1] T. Tantau and H. Menke. ‘The pgf package: Create PostScript and PDF graphics in TEX’ (2005). CTAN: pgf.

[2] M. Scharrer. ‘The standalone package: Compile TEX pictures stand-alone or as part of a document’ (2010). CTAN: standalone.

[3] C. Feuersänger. ‘The pgfplots package: Create normal/logarithmic plots in two and three dimensions’ (2007). CTAN: pgfplots.

[4] J. Ellis. ‘The pgf package: Feynman diagrams with TikZ’ (2016). CTAN: tikz-feynman.

[5] H. Oberdiek. ‘The kvoptions package: Key value format for package options’ (2004). CTAN: kvoptions. GitHub: ho-tex/kvoptions.

[6] *LATEX3 Project*. ‘The xparse package: A generic document command parser’ (1999). CTAN: xparse.