The `tikzpfeile` Package

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Version v1.0, 2012/03/28

Abstract

This package defines commands for drawing arrows using PGF/TikZ which should be used instead of the regular LaTeX arrows.

1   Introduction

In mathematical texts that contain commutative diagrams created with PGF/TikZ, it might be disturbing that regular arrows (such as `\rightarrow`: →) and the PGF/TikZ arrows in the diagrams have different heads. This package defines commands that draw arrows using PGF/TikZ. Using these instead of the regular arrows makes your document look more consistent. Moreover, using PGF/TikZ, a lot more different arrow types can be drawn.

2   Arrow commands

This package provides the following commands for drawing arrows:

Command	Arrow
`\ra`	$\longrightarrow$
`\la`	$\longleftarrow$
`\mapsto`	$\longmapsto$
`\lmapsto`	$\longmapsfrom$
`\inj`	$\hookrightarrow$
`\linj`	$\hookleftarrow$
`\surj`	$\twoheadrightarrow$
`\lsurj`	$\twoheadleftarrow$
`\isom`	$\xrightarrow{\sim}$
`\lisom`	$\xleftarrow{\sim}$
`\lra`	$\longleftrightarrow$
`\ppf`	$\dashrightarrow$
`\lppf`	$\dashleftarrow$
`\smapsto`	$\longmapsto$
`\lsmapsto`	$\longmapsfrom$
`\oldmapsto`	$\mapsto$

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By giving an optional argument, the arrows can be labeled. This does not work for the
`\isom` and `\lisom` arrows.

`\ra[$\psi$]`	$\xrightarrow{\psi}$
`\inj[$\iota$]`	$\overset{\iota}{\hookrightarrow}$
`\surj[$\pi$]`	$\xtwoheadrightarrow{\pi}$
`\lra[$\tau$]`	$\xleftrightarrow{\tau}$
`\ppf[$f$]`	$\overset{f}{\dashrightarrow}$

3   Package options

The package recognizes one option, `length`. Usually, the arrows are 1cm long. This
length is scaled by the value given by the `length` option. Its default value is, of course,
1.

4   Implementation

Of course, we need the `tikz` package with the `arrows` library. For the length option we
need `kvoptions`.

```
1 \RequirePackage{tikz}
2 \usetikzlibrary{arrows}
3 \RequirePackage{kvoptions}
```

Define the length option:

```
4 \DeclareStringOption[1]{length}
5 \DeclareLocalOptions{length}
6 \ProcessKeyvalOptions*
```

Now define the arrow commands using PGF/TikZ.

`\smapsto`

```
7 \newcommand*{\smapsto}{\raisebox{-1pt}{\tikz{%
8         \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, |->] (0,0)%
9                 node{\hspace*{0pt}}%
10                 -- node{} (0.7,0);}}\penalty1000\relax}
```

`\lsmapsto`

```
11 \newcommand*{\lsmapsto}{\raisebox{-1pt}{\tikz{%
12         \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, <-|] (0,0)%
13                 node{\hspace*{0pt}}%
14                 -- node{} (0.7,0);}}\penalty1000\relax}
```

`\ra`

```
15 \newcommand*{\ra}[1][]{\raisebox{-1pt}{\tikz{%
16         \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, ->,font=\scriptsize] (0,0)%
17                 node{\hspace*{-2pt}} -- (0.5,0) node[above] {#1}%
18                 -- node{} (1,0);}}\penalty1000\relax}
```

`\la`

```
19 \newcommand*{\la}[1][]{\raisebox{-1pt}{\tikz{%
```

```
20      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, <-,font=\scriptsize] (0,0)%
21              node{\hspace*{-2pt}} -- (0.5,0) node[above] {#1}%
22              -- node{} (1,0);}}\penalty1000\relax}
```

\mapsto

\oldmapsto   We save the old \mapsto arrow in \oldmapsto.

```
23 \let\oldmapsto\mapsto
24 \renewcommand*{\mapsto}{\raisebox{-1pt}{\tikz{%
25      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, |->] (0,0)%
26              node{\hspace*{0pt}}%
27              -- node{} (1,0);}}\penalty1000\relax}
```

\lmapsto

```
28 \newcommand*{\lmapsto}{\raisebox{-1pt}{\tikz{%
29      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, <-|] (0,0)%
30              node{\hspace*{0pt}}%
31              -- node{} (1,0);}}\penalty1000\relax}
```

\inj

```
32 \newcommand*{\inj}[1][]{\raisebox{-1pt}{\tikz{%
33      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, right hook->,%
34              font=\scriptsize] (0,0)%
35              node{\hspace*{0pt}} -- (0.5,0) node[above] {#1} --%
36              node{} (1,0);}}\penalty1000\relax}
```

\linj

```
37 \newcommand*{\linj}[1][]{\raisebox{-1pt}{\tikz{%
38      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, <-left hook,%
39              font=\scriptsize] (0,0)%
40              node{\hspace*{0pt}} -- (0.5,0) node[above] {#1} --%
41              node{} (1,0);}}\penalty1000\relax}
```

\surj

```
42 \newcommand*{\surj}[1][]{\raisebox{-1pt}{\tikz{%
43      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, ->>,font=\scriptsize] (0,0)%
44              node{\hspace*{0pt}} -- (0.5,0) node[above] {#1}%
45              -- node{} (1,0);}}\penalty1000\relax}
```

\lsurj

```
46 \newcommand*{\lsurj}[1][]{\raisebox{-1pt}{\tikz{%
47      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, <<-,font=\scriptsize] (0,0)%
48              node{\hspace*{0pt}} -- (0.5,0) node[above] {#1}%
49              -- node{} (1,0);}}\penalty1000\relax}
```

\isom

```
50 \newcommand*{\isom}{\raisebox{-1pt}{\tikz{%
51      \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, ->] %
52              (0,0) node{\hspace*{0pt}} -- node{} (1,0);%
53              \draw[xscale=\tikzpfeile@length] (0.4,0.1) node {$\sim$};}}%
54          \penalty1000\relax}
```

`\lisom`

```
55 \newcommand*{\lisom}{\raisebox{-1pt}{\tikz{%
56         \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, <-] %
57             (0,0) node{\hspace*{0pt}} -- node{} (1,0);%
58             \draw[xscale=\tikzpfeile@length] (0.4,0.1) node {$\sim$};}}%
59         \penalty1000\relax}
```

`\lra`

```
60 \newcommand*{\lra}[1][]{\raisebox{-1pt}{\tikz{%
61     \draw[xscale=\tikzpfeile@length,thin,shorten >=3pt, <->,font=\scriptsize] (0,0) %
62             node{\hspace*{-2pt}} -- (0.5,0) node[above] {#1} --%
63             node{} (1,0);}}\penalty1000\relax}
```

`\ppf`

```
64 \newcommand*{\ppf}[1][]{\raisebox{-1pt}{\tikz{%
65     \draw[xscale=\tikzpfeile@length,densely dashed,thin,shorten >=3pt,%
66             ->,font=\scriptsize] (0,0) %
67             node{\hspace*{0pt}} -- (0.5,0) node[above] {#1}%
68             -- node{} (1,0);}}\penalty1000\relax}
```

`\lppf`

```
69 \newcommand*{\lppf}[1][]{\raisebox{-1pt}{\tikz{%
70     \draw[xscale=\tikzpfeile@length,densely dashed,thin,shorten >=3pt,%
71             <-,font=\scriptsize] (0,0) %
72             node{\hspace*{0pt}} -- (0.5,0) node[above] {#1}%
73             -- node{} (1,0);}}\penalty1000\relax}
74
75 \endinput
```

Change History

Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.