The `tikzpfeile` Package

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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`: $\rightarrow$) 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:

`\ra`	$\longrightarrow$
`\la`	$\longleftarrow$
`\mapsto`	$\longmapsto$
`\lmapsto`	$\longleftarrow\!\shortmid$
`\inj`	$\lhook\!\!\longrightarrow$
`\linj`	$\longleftarrow\!\!\rhook$
`\surj`	$\longrightarrow\!\!\!\!\rightarrow$
`\lsurj`	$\leftarrow\!\!\!\!\longleftarrow$
`\isom`	$\xrightarrow{\sim}$
`\lisom`	$\xleftarrow{\sim}$
`\lra`	$\longleftrightarrow$
`\ppf`	$\dashrightarrow$
`\lppf`	$\dashleftarrow$
`\smapsto`	$\shortmid\!\!\longrightarrow$
`\lsmapsto`	$\longleftarrow\!\!\shortmid$
`\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[$\iota$]`	$\xhookrightarrow{\iota}$
`\surj[$\pi$]`	$\xrightarrow{\pi}\!\!\!\!\rightarrow$
`\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`.

```
\RequirePackage{tikz}
\usetikzlibrary{arrows}
\RequirePackage{kvoptions}
```

Define the length option:

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

Now define the arrow commands using PGF/TikZ.

`\smapsto`

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

`\lsmapsto`

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

`\ra`

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

`\la`

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

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

\mapsto

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

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

\lmapsto

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

\inj

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

\linj

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

\surj

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

\lsurj

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

\isom

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

\lisom

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

\lra

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

\ppf

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

\lppf

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

\endinput
```

Change History

v0.1

General: Started project 4

v1.0

General: First public version 4

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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.