The old-arrows package

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Abstract

This package provides Computer Modern old-style arrows (→) with smaller arrowheads, associated with ordinary \LaTeX\ commands. It can be used in a document that contains other \texttt{amssymb} arrow characters, like \rightarrow, which also have small arrowheads. It is possible to use the usual new-style Computer Modern arrows (\rightarrow) together with the old-style ones.

Contents

1 Introduction 1

2 Licenses 2

3 Installation 2

3.1 Copying the files in the local \texttt{texmf} tree 2

3.2 Updating the filename database 3

3.3 Updating the font map files 3

4 Usage 4

4.1 Basic usage 4

4.2 Usage together with other packages 4

4.2.1 \texttt{amsmath} 4

4.2.2 \texttt{lmodern} 5

4.2.3 \texttt{stmaryrd} 5

4.2.4 \texttt{mathtools} 5

4.3 The option \texttt{new} 6

4.4 The option \texttt{old} 8

4.5 Additional arrow commands provided by \texttt{old-arrows} 8

1 Introduction

In 1992, Donald E. Knuth made some important corrections to Computer Modern fonts\textsuperscript{1}. As a consequence, the characters corresponding to arrows have been modified. Just to make things clearer,

$$A \rightarrow B$$

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\textsuperscript{1}See \url{http://www-cs-faculty.stanford.edu/~uno/cm.html}
became

\[ A \rightarrow B \]

that is, the character \(\rightarrow\) was replaced by \(\rightarrow\), which has a larger arrowhead. The same happened to other arrow characters. However, many arrow characters defined by \texttt{amssymb}, like \(\rightarrow, \rightarrow, \rightarrow\) and others, maintained a small arrowhead and seem too different from \(\rightarrow\).

The \texttt{old-arrows} package with Old Arrows font family allows the user to use the old-style arrows \((\rightarrow, \leftarrow, \ldots)\) with the traditional commands \texttt{\{\textbackslash rightarrow, \textbackslash leftarrow, \ldots\}}. Furthermore, the options \texttt{new} and \texttt{old} allow the user to obtain the new-style arrows \((\rightarrow, \leftarrow, \ldots)\) together with the old-style ones by putting \texttt{\var} before the corresponding commands \texttt{\{\textbackslash varrightarrow, \textbackslash varleftarrow, \ldots\}}\textsuperscript{2}.

Old Arrows font family was derived from an old version of Blue Sky Computer Modern Math Symbols (1991–1992, released by AMS) by deleting many characters with FontForge.

2 Licenses

The \LaTeX{} code in this package is licensed under the \LaTeX{} Project Public License, v1.3.

The fonts in this package are licensed under the SIL Open Font License, v1.1.

3 Installation

The \texttt{old-arrows} package is included in the latest MiKTeX and \TeX{} Live distributions. However, if you want to install it manually, follow the instructions below.

3.1 Copying the files in the local texmf tree

The Old Arrows fonts files are:

\begin{verbatim}
  oasy5.afm  oasy5.pfm  oasy5.tfm  oasy5.pfb
  oasy6.afm  oasy6.pfm  oasy6.tfm  oasy6.pfb
  oasy7.afm  oasy7.pfm  oasy7.tfm  oasy7.pfb
  oasy8.afm  oasy8.pfm  oasy8.tfm  oasy8.pfb
  oasy10.afm oasy10.pfm oasy10.tfm oasy10.pfb
  oabsy5.afm oabsy5.pfm oabsy5.tfm oabsy5.pfb
  oabsy6.tfm oabsy7.afm oabsy7.pfm oabsy7.tfm oabsy7.pfb
\end{verbatim}

These files were derived from Computer Modern fonts \texttt{cmbsy5}, \texttt{cmbsy7}, \texttt{cmbsy10}, \texttt{cmsy5}, \texttt{cmsy7}, \texttt{cmsy8}, \texttt{cmsy9} and \texttt{cmsy10}.

Call \texttt{\{local\textbackslash texmf\}} the path of your local \texttt{texmf} tree. For \TeX{} Live, the local tree is usually placed in /\texttt{usr/local/texlive/texmf-local}; for MiKTeX, it can be set up on any directory, by the \texttt{Roots} tab of “MiKTeX Options”\textsuperscript{2}.

\textsuperscript{2}See sections 4.3 and 4.4.
1. Copy the *.afm and *.tfm font files into the corresponding old-arrows directories (you have to create them, as shown below):

   <localtexmf>/fonts/afm/old-arrows
   <localtexmf>/fonts/tfm/old-arrows

2. Copy the *.pfb and *.pfm font files into the directory

   <localtexmf>/fonts/type1/old-arrows

3. Copy the oasy.enc and oasy.map files, respectively, into the directories

   <localtexmf>/fonts/enc/dvips/old-arrows
   <localtexmf>/fonts/map/dvips/old-arrows

4. Copy the old-arrows.sty file into the directory

   <localtexmf>/tex/latex/old-arrows

3.2 Updating the filename database

MiKTeX On the General tab of “MiKTeX Options (Admin)” click the Refresh FNDB button. Alternatively, in a DOS command prompt window run

   initexmf --update-fndb

TEX Live Start the “TEX Live Manager”. From Actions menu, select Update filename database. Alternatively, run in a terminal command line

   mktexlsr

3.3 Updating the font map files

MiKTeX To update the configuration file updmap.cfg, execute in a DOS command prompt

   initexmf --edit-config-file updmap

add to updmap.cfg (that will be opened) the following line

   Map oasy.map

save, close and execute (always in the DOS command prompt)

   initexmf --mkmaps

TEX Live Execute in a terminal command line

   updmap-sys --enable Map=oasy.map

Finally, it is better to make another update of the filename database (see 3.2).
4 Usage

4.1 Basic usage

Simply type in the preamble of your \LaTeX{} document

\begin{verbatim}
\usepackage{old-arrows}
\end{verbatim}

and every arrow command will be associated to the “old-style”, as indicated in table 1.

<table>
<thead>
<tr>
<th>Command</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>\leftarrow or \gets</td>
<td>\longleftarrow or \gets</td>
</tr>
<tr>
<td>\rightarrow or \to</td>
<td>\longrightarrow</td>
</tr>
<tr>
<td>\leftrightarrow</td>
<td>\longleftrightarrow</td>
</tr>
<tr>
<td>\mapsto</td>
<td>\longmapsto</td>
</tr>
<tr>
<td>\hookleftarrow</td>
<td>\mapsto</td>
</tr>
<tr>
<td>\hookrightarrow</td>
<td>\mapsto</td>
</tr>
</tbody>
</table>

Table 1: Old-style arrows provided by \texttt{old-arrows}.

The commands \texttt{\rightarrowfill} and \texttt{\leftarrowfill} allow to fill empty spaces with extensible arrows. For example, the first command written at the end of this paragraph gives the following result: $\rightarrowfill$

4.2 Usage together with other packages

4.2.1 amsmath

The \texttt{old-arrows} package does not require \texttt{amsmath}. However, if you want to use the \texttt{amsmath} package, you must load it \texttt{before} \texttt{old-arrows}:

\begin{verbatim}
\usepackage{amsmath}
\usepackage{old-arrows}
\end{verbatim}

The \texttt{amsmath} package provides over, under (table 2), extensible (table 3) arrows and operator names (table 4). Note that \texttt{amsmath} adds more space between the arrow above and the characters below, with a better typographical result. The commands \texttt{\overrightarrow{AB}} and \texttt{\overleftarrow{AB}}, without \texttt{amsmath}, produce respectively $\overrightarrow{AB}$ rather than $\overleftarrow{AB}$ and $\overrightarrow{AB}$ rather than $\overleftarrow{AB}$.

The \texttt{amsmath} package also provides the command \texttt{\textbf{symbol}} for obtaining bold mathematical symbols, which can be used together with \texttt{old-arrows}. For example, the commands

\begin{verbatim}
$\textbf{symbol}{A \to B}$ and $\textbf{symbol}{\overrightarrow{AB}}$
\end{verbatim}

produce $A \to B$ and $\overrightarrow{AB}$, respectively.
\[ \overrightarrow{AB} \quad \overrightarrow{AB} \quad \underleftarrow{AB} \quad \underleftarrow{AB} \]

Table 2: Old-style over and under arrows provided by \texttt{amsmath}.

\[ \xleftarrow{ABCDEF} \quad \xrightarrow{ABCDEF} \]

Table 3: Old-style extensible arrows provided by \texttt{amsmath}.

\[ \varinjlim \quad \varprojlim \]

Table 4: Old-style operator names provided by \texttt{amsmath}.

4.2.2 lmodern

The \texttt{old-arrows} package is fully compatible with the Latin Modern fonts, provided that you load the \texttt{lmodern} package \emph{before} \texttt{old-arrows}.

\begin{verbatim}
\usepackage{lmodern}
\usepackage{old-arrows}
\end{verbatim}

4.2.3 stmaryrd

The \texttt{old-arrows} package is also fully compatible with the St Mary’s Road symbol font, always provided that you load the \texttt{stmaryrd} package \emph{before} \texttt{old-arrows}.

\begin{verbatim}
\usepackage{stmaryrd}
\usepackage{old-arrows}
\end{verbatim}

The \texttt{stmaryrd} package provides several arrow characters with small arrowheads, like \texttt{\shortrightarrow} (\rightarrow) and \texttt{\nearrow} (\nearrow). However, without \texttt{old-arrows}, the commands \texttt{\mapsfrom} and \texttt{\longmapsfrom} produce the new-style arrows $\leftrightarrow$ and $\longleftrightarrow$. Instead, the \texttt{old-arrows} package allows you to obtain the old-style version of these arrows, as shown in table 5.

\begin{verbatim}
\mapsfrom \longrightarrow \longmapsfrom
\end{verbatim}

Table 5: Old-style arrows provided by \texttt{stmaryrd}.

4.2.4 mathtools

The \texttt{old-arrows} package can be used together with the \texttt{mathtools} package, always on condition that you load it \emph{before} \texttt{old-arrows}.

\begin{verbatim}
\usepackage{mathtools}
\usepackage{old-arrows}
\end{verbatim}
The `mathtools` package makes additional extensible arrows available (table 6).

Every extensible arrow can take an optional argument that produces a subscript. For example, the commands

\[ \xrightarrow[G]{ABCDEF} \quad \xmapsto[G]{ABCDEF} \]

produce

\[ \frac{ABCDEF}{G} \quad \frac{ABCDEF}{G} \]

Remark. It is very important that you load `old-arrows` after `amsmath`, `stmaryrd`, `lmodern` and `mathtools`, because many commands of these packages must be redefined by `old-arrows`. Otherwise, `old-arrows` won’t work properly.

\begin{verbatim}
\usepackage{lmodern}
\usepackage{amsmath}
\usepackage{stmaryrd}
\usepackage{mathtools}
\usepackage{old-arrows}
\end{verbatim}

4.3 The option new

Loading `old-arrows` with the option `new`

\begin{verbatim}
\usepackage[new]{old-arrows}
\end{verbatim}

allows you to use the new-style and the old-style arrows simultaneously. In order to obtain new-style arrows, just put `\var` before every ordinary command, as shown in tables 7, 8, 9, 10, 11 and 12.

\begin{verbatim}
\leftarrow \varleftarrow \text{ or } \vargets \quad \varlongleftarrow \quad \uparrow \varuparrow
\rightarrow \varrightarrow \text{ or } \varto \quad \varlongrightarrow \quad \downarrow \vardownarrow
\leftrightarrow \varleftrightharpoons \quad \varlongleftrightharpoons \quad \uparrow \varupdownarrow
\rightarrow \varmapsto \quad \varlongmapsto \quad \rightarrow \varnearsrrow \quad \varnwarrow
\leftrightarrow \varharpup \quad \varharpdown \quad \rightarrow \varharpup \quad \varharpdown
\end{verbatim}

Table 7: New-style arrows provided by option `new`. 

\begin{table}[h]
\centering
\begin{tabular}{cccc}
\hline
\text{$\leftarrow$} & \text{$\varleftarrow$ or $\vargets$} & $\varlongleftarrow$ & $\uparrow$ $\varuparrow$ \\
\text{$\rightarrow$} & $\varrightarrow$ or $\varto$ & $\varlongrightarrow$ & $\downarrow$ $\vardownarrow$ \\
\text{$\leftrightarrow$} & $\varleftrightharpoons$ & $\varlongleftrightharpoons$ & $\uparrow$ $\varupdownarrow$ \\
\text{$\rightarrow$} & $\varmapsto$ & $\varlongmapsto$ & $\rightarrow$ $\varnearsrrow$ \\
\text{$\leftrightarrow$} & $\varharpup$ & $\varharpdown$ & $\rightarrow$ $\varharpup$ \\
\text{$\rightarrow$} & $\varharpdown$ & $\varharpup$ & $\rightarrow$ $\varharpdown$ \\
\hline
\end{tabular}
\caption{New-style arrows provided by option new.}
\end{table}
Table 8: New-style over and under arrows provided by \texttt{amsmath} and the option \texttt{new} of \texttt{old-arrows}.

\begin{align*}
\xleftarrow{AB} & \quad \xrightarrow{AB} \\
\underleftarrow{AB} & \quad \underrightarrow{AB} \\
\overleftarrow{AB} & \quad \overrightarrow{AB} \\
\underleftrightarrow{AB} & \quad \overleftrightarrow{AB}
\end{align*}

Table 9: New-style extensible arrows provided by \texttt{amsmath} and the option \texttt{new} of \texttt{old-arrows}.

\begin{align*}
\xleftarrow{ABCDEF} & \quad \xrightarrow{ABCDEF} \\
\xhookleftarrow{ABCDEF} & \quad \xhookrightarrow{ABCDEF}
\end{align*}

Table 10: New-style operator names provided by \texttt{amsmath} and the option \texttt{new} of \texttt{old-arrows}.

\begin{align*}
\xleftarrow{\lim} & \quad \xrightarrow{\varinjlim} \\
\xrightarrow{\text{lim}} & \quad \xrightarrow{\varprojlim}
\end{align*}

Table 11: New-style arrows provided by \texttt{stmaryrd} and the option \texttt{new} of \texttt{old-arrows}.

\begin{align*}
\xleftarrow{\varmapsfrom} & \quad \xrightarrow{\varlongmapsfrom}
\end{align*}

Table 12: New-style extensible arrows provided by \texttt{mathtools} and the option \texttt{new} of \texttt{old-arrows}.

\begin{align*}
\xleftarrow{ABCDEF} & \quad \xrightarrow{ABCDEF} \\
\xhookleftarrow{ABCDEF} & \quad \xhookrightarrow{ABCDEF} \\
\xleftarrow{ABCDEF} & \quad \xrightarrow{ABCDEF}
\end{align*}
Note that the commands
\leftharpoonup, \rightharpoonup, \leftharpoondown, \rightharpoondown
have not been redefined by old-arrows, because the corresponding characters ↩, ↩, ↪, ↪ have not been modified by the introduction of the new-style arrows.

The commands \varrightarrowfill and \varleftarrowfill allow to fill empty spaces with extensible arrows. For example, the first command written at the end of this paragraph gives the following result: −−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−→

If you want to use the option new and the option only provided by the stmaryrd package, you must write the command you wish to define in both ordinary and \var versions in the option list. For example:
\usepackage[only,mapsfrom, varmapsfrom]{stmaryrd}
\usepackage[new]{old-arrows}
says that only the symbols ← and ↔ will be defined by stmaryrd.

Furthermore, with the option new it is also possible to use the command \boldsymbol provided by amsmath. The following commands
\\boldsymbol{A \varto B}$ and $\\boldsymbol{\varoverrightarrow{AB}}$ produce $A \rightarrow B$ and $\overrightarrow{AB}$ respectively.

### 4.4 The option old

If you want to use the old-style arrows only in a few cases, and maintain the new-style by default, then it is available the option old
\usepackage[old]{old-arrows}
that associates all of the commands with prefix \var to the old-style rather than the new one, which remains associated to the ordinary commands. For example, with the option old the commands
$A \varleftarrow B$ and $A \varto B$
produce $A \leftarrow B$ and $A \rightarrow B$, respectively, while
$A \leftarrow B$ and $A \to B$
produce $A \leftarrow B$ and $A \rightarrow B$, respectively.

It is not possible to load the options new and old simultaneously (if so, you will get an error message).

### 4.5 Additional arrow commands provided by old-arrows

The old-arrows package provides additional arrow commands that are listed in table 13. Finally, there are extensible “mapsfrom” arrows (table 14) that are available only if both mathtools and stmaryrd are loaded together with old-arrows (as they depend on commands defined by these two packages).
\[ \begin{array}{ll}
\mapsto & \text{longhookrightarrow} \\
\mapsto & \text{varlonghookrightarrow} \\
\longleftarrow & \text{longleftharpoonup} \\
\rightarrow & \text{longrightharpoonup} \\
\end{array} \]

\[ \begin{array}{ll}
\xmapsto & \text{varxmapsfrom} \{ABC\text{DEF}\} \\
\xmapsto & \text{xmapsfrom} \{ABC\text{DEF}\} \\
\end{array} \]

\[ \begin{array}{ll}
\mapsto & \text{longhookleftarrow} \\
\mapsto & \text{varlonghookleftarrow} \\
\longleftarrow & \text{longleftharpoondown} \\
\rightarrow & \text{longrightharpoondown} \\
\end{array} \]

\[ \begin{array}{ll}
\mapsto & \text{longhookrightarrow} \\
\mapsto & \text{varlonghookrightarrow} \\
\longleftarrow & \text{longleftharpoonup} \\
\rightarrow & \text{longrightharpoonup} \\
\end{array} \]

\[ \begin{array}{ll}
\xmapsto & \text{varxmapsfrom} \{ABC\text{DEF}\} \\
\xmapsto & \text{xmapsfrom} \{ABC\text{DEF}\} \\
\end{array} \]

\(\text{Table 13: Arrow commands provided by old-arrows.}\)

\(\text{Table 14: Extensible arrows provided by old-arrows together with mathtools and stmaryrd.}\)