

# Summary of `qsymbols`

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## Abstract

`qsymbols` is a  $\text{\LaTeX}$  [1] package defining systematic mnemonic abbreviations, starting with a single open quote, `'`, for symbols and arrows from the `amssymb` and `stmaryrd` packages. Optionally a very large class of arrows can be typeset using  $\text{\Xy-pic}$  [2].

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## 1 Introduction

`qsymbols` sets up a number of mnemonic and compact abbreviations for math symbols from  $\text{\LaTeX}$  and the packages `amssymb` and `stmaryrd`, which it loads. The abbreviations all start with the backquote character `'`. Some are a single character, some a more complicated pattern, but always the idea is to use abbreviations that hint at the *visual* appearance of the symbol. Finally it is possible for the user to add more abbreviations of the simpler categories.

You can retrieve `qsymbols` as well as the `amssymb` and `stmaryrd` packages by anonymous ftp from all CTAN archives in directory `/tex-archive/macros/latex/contrib/supported/`<sup>1</sup> (each package has its own subdirectory).

The following sections describe the various classes of symbols that are loaded.

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<sup>1</sup>The 'home' of `qsymbols` is `ftp.diku.dk` in directory `/diku/users/kris/TeX/`.

## 2 Simple symbols

### 2.1 Greek letters

All the standard greek letters used in math are available as ‘ followed by a letter: either lowercase:

$x$	a	b	c	d	e	f	g	h	i	j	k	l	m	n	p	q	r	s	t	w	x	y	z
‘ $x$	$\alpha$	$\beta$	$\chi$	$\delta$	$\epsilon$	$\phi$	$\gamma$	$\eta$	$\iota$	$\psi$	$\kappa$	$\lambda$	$\mu$	$\nu$	$\pi$	$\theta$	$\rho$	$\sigma$	$\tau$	$\omega$	$\xi$	$\upsilon$	$\zeta$

or uppercase:

$x$	D	F	G	J	L	P	Q	S	W	X	Y
‘ $x$	$\Delta$	$\Phi$	$\Gamma$	$\Psi$	$\Lambda$	$\Pi$	$\Theta$	$\Sigma$	$\Omega$	$\Xi$	$\Upsilon$

### 2.2 Common symbols

Simple symbols are available using ‘ followed by a symbolic representation of the symbol. The most common have single character representations:

$x$	+	*	:	;	/	U	-	_	o	0	.	=	~	E	A	!	^	V
‘ $x$	$\pm$	$\times$	$\in$	$\notin$	$\setminus$	$\cup$	$\vdash$	$\perp$	$\circ$	$\emptyset$	$\cdot$	$\equiv$	$\sim$	$\exists$	$\forall$	$\neg$	$\wedge$	$\vee$

### 2.3 Circled and Boxed Symbols

These are represented using round and square brackets, respectively:

$x$	+	-	*	/		’	/	’	.	*	’	o	’	^	’	V	<	>	?	!	:-	a	
‘ $(x)$	$\bigcirc$	$\oplus$	$\ominus$	$\otimes$	$\oslash$	$\odot$	$\circledast$	$\circledcirc$	$\circledR$	$\circledV$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$	$\circledless$
‘ $[x]$	$\square$	$\boxplus$	$\boxminus$	$\boxtimes$	$\boxdiv$	$\boxdot$	$\boxminus$	$\boxplus$	$\boxtimes$	$\boxdiv$	$\boxdot$	$\boxminus$	$\boxplus$	$\boxtimes$	$\boxdiv$	$\boxdot$	$\boxminus$	$\boxplus$	$\boxtimes$	$\boxdiv$	$\boxdot$	$\boxminus$	$\boxplus$

As it can be seen, ‘undefined’ codes like ‘(a) and ‘[a] result in the contents being circled and boxed, respectively.

### 2.4 Bold symbols

The  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  `\boldsymbol` command is available by using the special abbreviation ‘“ $x$  for the bold version  $\boldsymbol{x}$  of  $x$  as well as ‘“‘ $x$  where  $x$  is on one of the forms described in this section, i.e., ‘“‘a gives  $\boldsymbol{\alpha}$ .

### 2.5 Adding new symbols

Symbols of all the above forms can be added using the form

$$\backslash\text{newqsymbol}\{‘code\}\{expansion\}$$

which makes ‘code behave as *expansion* in math mode. `code` should be either a single character or some characters in `()`, `[]`, or `\{}`.

### 3 Orderings

Two to four consecutive ‘s indicate an ordering relation.

$\epsilon, \vartheta$	$\epsilon$	$\epsilon/\epsilon$	$\epsilon=\epsilon$	$\epsilon/\epsilon$	$\epsilon$	$\epsilon$	$\vartheta$	$\vartheta/\vartheta$	$\vartheta=\vartheta$	$\vartheta/\vartheta$	$\vartheta$
$<, >$	$<$	$\not<$	$\leq$	$\not\leq$	$\wedge$	$\bigwedge$	$>$	$\not>$	$\geq$	$\not\geq$	$\vee$
$(, )$	$\subset$	$\not\subset$	$\supset$	$\not\supset$	$\cap$	$\bigcap$	$\supset$	$\not\supset$	$\supseteq$	$\not\supseteq$	$\cup$
$[, ]$	$\sqsubset$	$\not\sqsubset$	$\sqsupset$	$\not\sqsupset$	$\sqcap$	$\sqcap$	$\sqsupset$	$\not\sqsupset$	$\sqsupseteq$	$\not\sqsupseteq$	$\sqcup$
$\setminus, \setminus$	$\setminus$	$\not\setminus$	$\setminus$	$\not\setminus$	$\setminus$	$\setminus$	$\setminus$	$\not\setminus$	$\setminus$	$\not\setminus$	$\setminus$
$\setminus, \setminus$	$\triangleleft$	$\not\triangleleft$	$\triangleleft$	$\not\triangleleft$	$\triangle$	$\triangle$	$\triangleleft$	$\not\triangleleft$	$\triangleleft$	$\not\triangleleft$	$\triangle$
$\sim, \sim$	$\sim$	$\not\sim$	$\approx$	$\not\approx$	$\sim$	$\sim$	$\sim$	$\not\sim$	$\sim$	$\not\sim$	$\int$
$- , \setminus$	$\vdash$	$\not\vdash$	$\vDash$	$\not\vDash$	$\top$		$\vdash$	$\not\vdash$	$\vDash$	$\not\vDash$	$\perp$

Some abbreviations are provided for convenience:

$x$	$\cup$	$\sim$	$\vee$	$\sum$	$\prod$
$\epsilon x$	$\cup$	$\wedge$	$\vee$	$\sum$	$\prod$

There is no simple way to add more orderings.

### 4 Arrows

Double quotes “...” make it possible to typeset arrows.

#### 4.1 Canned arrows

The available arrows are shown in figure 1. A notation similar to the X<sub>Y</sub>-pic [2] ‘arrow’ feature notation variant-tail-shaft-tip is used to.

#### 4.2 Adding new arrows:

You can add more ‘canned’ arrows of this kind with commands

$$\backslash\newqsymbol {"arrow"} {expansion}$$

which makes “arrow” behave as *expansion* in math mode.

#### 4.3 Using X<sub>Y</sub>-pic for arrows:

If the option [xy] is used in the \usepackage command, or if X<sub>Y</sub>-pic [2]<sup>2</sup> is already loaded, then the X<sub>Y</sub>-pic arrow feature (with the ‘cmtip’ extension) is used to allow a much more general class of arrows, constructed according to the following rules (with examples where they extend the notation used for the standard):

- Basic arrows are composed by combining the variants 23^\_, the tips  $\langle \rangle | \mathbf{x} \mathbf{o} \langle \rangle$ , and the connectors  $- = . : \sim$ .

<sup>2</sup>X<sub>Y</sub>-pic version 2.12 or later is needed for this to work.

"<-"	←	"<-!"	←	"->"	→	"-!>"	→
"<="	←	"<=!"	←	"=>"	⇒	"=!>"	⇒
"<3"	≡			"3>"	≡		
"</-"	↯			"-/>"	↯		
"</="	↯			"=/>"	↯		
"<->"	↔	"<-!>"	↔	"</->"	↯		
"<=>"	↔	"<=!>"	↔	"</=>"	↯		
"<- "	←	"<-! "	←	" ->"	→	" -!>"	→
"<= "	←	"<=! "	←	" =>"	→	" =!>"	→
"<-)"	↵			"(->"	↵		
"^<-"	↖	"_<-"	↖	"^->"	↗	"_->"	↗
"<--"	←			"-->"	→		
"<<-"	↤			"->>"	↤		
"<<="	↤			"=>>"	↤		
"<-<"	↵	"<~>"	↵	"~>"	↵		
				">->"	↵		
				"-o"	↯		
				"->o"	↯		
				"->>o"	↯		
"< -"	←	"< ->"	↔	"- >"	→		

Figure 1: Standard arrow symbols

- The character / ‘negates’ the arrow (once or twice) similar to the way `\not` does for relations, and the characters `?+*` are used to mark the arrow with a symbol corresponding to the reflexive, transitive, and reflexive transitive, closures:

$x$	"</>"	"-/>"	"=>?"	"<->+"	" ->*"
" $x$ "	↯	↯	⇒	↵	↵

- Each ! character makes the arrow a bit longer.

$x$	"->"	"-!>"	"-!!>"	"-!!!>"
" $x$ "	→	→	→	→

*Note:* Some arrows are automatically made a bit longer, e.g., the `<~>` arrow shown above.

- The form `{ℓ}` adds the  $ℓ$  material to the end of the `Xy-pic` arrow. All `Xy-pic` (labels) can be used as described in [2, §16], for example,

$x$	"-_{1}>"	"={^{\sin}}!>>"	"={ {'b'}}!!!>"
" $x$ "	→ <sub>1</sub>	⇒ <sup>sin</sup>	⇒ <sub>β</sub>

Use this with care!

- The forms `( $x$ )` and `[ $x$ ]` insert a break with  $x$  in a circle/box, respectively:

$x$	"(1)>"	"[1]>>"
" $x$ "	→ <sub>⊙</sub>	→ <sub>⊠</sub>

## References

- [1] Leslie Lamport. *LaTeX—A Document Preparation System*. Addison-Wesley, 2nd edition, 1994.
- [2] Kristoffer H. Rose and Ross Moore. X<sub>Y</sub>-pic reference manual. Mathematics Report 94-155, MPCE, Macquarie University, NSW 2109, Australia, June 1994. For version 2.10+. Latest version available by anonymous ftp in `ftp.diku.dk: /diku/users/kris/TeX/xyrefer.ps.Z`.