THE SYMBOL FONT DBNSYMB

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Abstract. This is the user manual for the symbol font dbnsymb.

Contents

1. Introduction

Over the last few years I occasionally needed new symbols for papers I was writing: overcrossings (⤯), undercrossings (⤮), pentagons (⬠), whatever. I've always settled for partial and ad-hoc solutions — drawing little LaTeX figures, combining existing symbols, etc. But if the AMS can have its own symbol package (amssymb.sty), why can't I have one too, with symbols to my liking, which are placed and scaled just like TeX's own?

dbnsymb is an attempt to create this personal font. I plan to use it in my own papers and ship it with those when I ship them out, just like I ship macros and figures. I plan to continue adding symbols to it as needed (or as requested by others) and to continue improving the existing symbols in it.

This document documents dbnsymb, its usage, and how it can be modified. If you also need wheels (⌑) or double points (⤲) or anything else that's in, feel free to use it yourself. Finally, if you need your own symbols too, you are welcome to download dbnsymb and use it as a basis for your own modifications. I will also be happy to add symbols to dbnsymb for you, provided they are likely to be of interest for me and/or others with similar research interests.

2. Usage

To use dbnsymb, you need to have the files dbnsymb.mf and dbnsymb.sty somewhere where LaTeX would see them — your current working directory or in any other place where LaTeX looks. These files are available at https://drorbn.net/dbnsymb.

This done, you should include the package dbnsymb.sty in your document, cross your fingers, and hope for the best.

dbnsymb is also available within MathJax (at least partially)! See the instructions at https://github.com/AmerMathSoc/mathjax-dbnsymb.

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3. Example

If all goes well and the files `dbnsymb.mf` and `dbnsymb.sty` really are in LaTeX's sight, the following example file should produce the output that follows it:

```
\documentclass{article}
\usepackage{dbnsymb}
\begin{document}
Here's a famous formula:
\[ V(\doublepoint) := V(\overcrossing) - V(\undercrossing), \]
and here's another way of writing it, with the new symbols as
superscripts:
\[ V(K^\doublepoint) := V(K^\overcrossing) - V(K^\undercrossing). \]
\end{document}
```

Here's a famous formula:

$$V(\doublepoint) := V(\overcrossing) - V(\undercrossing),$$

and here's another way of writing it, with the new symbols as superscripts:

$$V(K^{\doublepoint}) := V(K^{\overcrossing}) - V(K^{\undercrossing}).$$

A more extensive example is this manual page itself. See `dbnsymbman.tex` at `https://drorbn.net/dbnsymb`.

4. The symbol table

Symbol	LaTeXcommand	Usage example
	`\doublepoint`	$V(\doublepoint)$
	`\overcrossing`	$V(\overcrossing)$
	`\undercrossing`	$V(\undercrossing)$
	`\virtualcrossing`	Virtual crossings ($\virtualcrossing$) are endemic to quantum algebra
	`\semivirtualover`	Semi-virtuals are differences: $\semivirtualover \leftrightarrow \overcrossing - \virtualcrossing$.
	`\semivirtualunder`	$\virtualcrossing \leftrightarrow \semivirtualover - \semivirtualunder$.
	`\slashoverback`	$\langle\overcrossing\rangle$
	`\svslashoverback`	$\semivirtualover = \overcrossing - \virtualcrossing$
	`\backoverslash`	$\langle\undercrossing\rangle$
	`\svbackoverslash`	$\semivirtualunder = \undercrossing - \virtualcrossing$
	`\Associator`	$\Associator$ and $\backoverslash$ generate parenthesized tangles.
	`\righttwist`	"$\righttwist$" denotes a ribbon with a right-handed twist

Symbol	LaTeXcommand	Usage example
	`\lefttwist`	"$\rightarrowtail\!\!\leftarrowtail$" denotes a ribbon with a left-handed twist
	`\MobiusSymbol`	"$\circlearrowright$" denotes the trivially embedded Möbius band
	`\crossing`	
	`\smoothing`	$zC(\,)(\,)$
	`\upupsmoothing`	The Conway relation $C(\nearrow\!\!\nearrow) - C(\nwarrow\!\!\nearrow) = zC(\,)(\,)$
	`\hsmoothing`	The A_1 relation: $\asymp = 2\hbar(\rightrightarrows - \times)$
	`\HSaddleSymbol`	The cobordism $\asymp :)(\to \rightrightarrows$
	`\ISaddleSymbol`	The cobordism $\rightrightarrows : \rightrightarrows \to)($
	`\fourinwheel`	The cobordism $\circlearrowleft : \bigcirc \to \emptyset$
	`\twowheel`	$\Omega = 1 + \frac{\circ\!\!-\!\!\circ}{48}$
	`\fourwheel`	The wheeled Kontsevich integral $Z^{\circlearrowleft}(K)$
	`\pentagon`	The $\pentagon_m$ equation
	`\hexagon`	The $\hexagon_{\pm}$ relations
	`\tetrahedron`	$\triangle$ is $6j$
	`\isolatedchord`	The framing correction $e^{f\frown/2}$
	`\righttrefoil`	$J(\circledcirc) = -t^4 + t^3 + t$
	`\lefttrefoil`	$J(\circledcirc) = -t^{-4} + t^{-3} + t^{-1}$
	`\OpenHopfUp`	The open Hopf link $\clubsuit_x^y$
	`\OpenHopf`	The undirected open Hopf link $\clubsuit_x^y$
	`\HopfLink`	$Z^{\circlearrowleft}(\circledcirc) = \langle \Omega, \Omega \rangle \exp {}^{x}\!\frown^{y}$
	`\botright`	$\sigma_y Z(\clubsuit_x^y) = \Omega_y \exp_{\#}(\dashv\!\!\rightarrow_x^y)$
	`\SGraph`	The STU relation: $\curlyvee = \sqcup - \curlywedge$
	`\TGraph`	$\sqcup = \curlyvee + \curlywedge$
	`\UGraph`	$\curlywedge = \sqcup - \curlyvee$
	`\IGraph`	The IHX relation: $\rightrightarrows = \asymp - \times$
	`\HGraph`	$\asymp = \rightrightarrows + \times$

Symbol	LaTeX command	Usage example
$\XGraph$	`\XGraph`	$\XGraph =)(- ⌶$
$\YGraph$	`\YGraph`	The AS relation: $\YGraph + \TwistedY = 0$
$\FlippedYGraph$	`\FlippedYGraph`	The w-vertices: $\{\YGraph, \FlippedYGraph\}$
$\TwistedY$	`\TwistedY`	$\TwistedY = -\YGraph$
$\ThetaGraph$	`\ThetaGraph`	$Z(\ThetaGraph) = \nu^{1/2} \otimes \nu^{1/2} \otimes \nu^{1/2}$
$\dumbbell$	`\dumbbell`	
$\wiggle$	`\wiggle`	$Z^{\text{naive}}(\wiggle) = \nu^{-1}$
$\stonehenge$	`\stonehenge`	The Stonehenge pairing $\langle D, K\rangle_{\stonehenge}$
$\inup$	`\inup`	$\begin{matrix} X \\ \inup \\ x \end{matrix}$
$\actsonleft$	`\actsonleft`	G acts on X on the left: $G \actsonleft X$
$\actsonright$	`\actsonright`	G acts on X on the right: $X \actsonright G$
$\isotopic$	`\isotopic`	
$\horizontalchord$	`\horizontalchord`	$Z^u(\nwarrow\!\!\!\nearrow) = \exp(\horizontalchord)\times$
$\rightarrowdiagram$	`\rightarrowdiagram`	$Z^w(\nwarrow\!\!\!\nearrow) = \exp(\rightarrowdiagram)\times$
$\leftarrowdiagram$	`\leftarrowdiagram`	$Z^w(\nearrow\!\!\!\nwarrow) = \exp(-\leftarrowdiagram)\times$
$\cappededge$	`\cappededge`	$\mathcal{A}^w(\cappededge)$
$\upcap$	`\upcap`	In $\mathcal{A}^w(\upcap)$, only wheels survive
$\downcap$	`\downcap`	$\downcap(D)$ cups the bottoms of the strands of D
$\doubletree$	`\doubletree`	The $\doubletree$ map is key to associators and Z^w.
$\uppertriang$	`\uppertriang`	$\uppertriang \subset gl_n$ represents the upper triangular matrices.
$\lowertriang$	`\lowertriang`	$\lowertriang \oplus \uppertriang = gl_n \oplus \mathfrak{a}_n$.
$\OU$	`\OU`	$\OU$ means Over then Under.
$\CanadianFlag$	`\CanadianFlag`	`Canad$\overset{\smash{\CanadianFlag}}{\text{a}}$`: Canad$\overset{\CanadianFlag}{\text{a}}$
$\dbnframe$	`\dbnframe`	`\hbox to 0pt{$\slashoverback$}$\dbnframe$`: $\boxtimes$
$\dbnsymbsandbox$	`\dbnsymbsandbox`	A development sandbox $\dbnsymbsandbox$

5. Modifying dbnsymb

The symbols in dbnsymb were all drawn using xfig, an X-windows drawing program, and then converted to metafont using fig2dev (a standard companion program to xfig) assisted by a simple perl script that I wrote.

To add new symbols or create your own symbol font, follow the following steps:

- Pick a new name for your font or addition; I would much prefer that you don't reuse the name dbnsymb. For the sake of concreteness, I will assume below that the name you have picked is "dptsymb".
- Download the perl script makefont, save it, and make it executable on your machine.
- Create a directory for the xfig-generated .fig files containing the symbols (for the sake of concreteness, let's call this directory figs). You can start with an empty figs directory or start with the .fig files used for the creation of dbnsymb by downloading and unpacking the file figs.zip.
- Use xfig to draw your favorite symbols and to save them in the directory figs. You should fit your drawing within the 4in by 4in rectangle bounded by the horizontal and vertical 1in and 5in lines on the xfig canvas. The dbnsymb symbol \dbnframe (□) is precisely that rectangle; if you wish, you can extract the file figs/040dbnframe.fig from figs.zip and use it as your guide. When saving a symbol in the directory figs, use the file name format figs/nnnxxxxxx.fig, where "nnn" is the 3-digit decimal character code you wish to use for that symbol (0–255), and the arbitrary length string xxxxxx is that symbol's name.
- Run the script makefont to create the files dptsymb.mf and dptsymb.sty (in the current working directory) by typing "makefont -fn dptsymb -s figs".
- You are done. Use the files dptsymb.mf and dptsymb.sty as if they were the files dbnsymb.mf and dbnsymb.sty of Section 2.

The script makefont has an additional optional parameter, -f2m_opts *filename*, that may contain symbol by symbol options for fig2dev. See the manual page for fig2dev and the options file dbnsymb.f2m-opts used for the creation of dbnsymb.

6. Acknowledgement

I wish to thank Dylan P. Thurston for his comments, suggestions and extra symbols and Peter Krautzberger for the MathJax version. The base for the Canadian flag symbol 🇨🇦 came from the (unreachable) Xfig Flag Library.

7. Revision History

July 10, 2025: Web page moved to Dror Bar-Natan: Academic Pensieve: Projects: dbnsymb; added link to the MathJax version.
July 9, 2025: ⊠ added.
March 3, 2020: ⅄ added.
September 29, 2019: ⸮ added.
April 1, 2017: ⓤ added.
January 28, 2017: ◹ and ◺ added.
October 8, 2015: ⇂ added.
January 27, 2014: ⊬ added.
August 12, 2013: Minor tweaking.
November 30, 2011: ⚲ added.
May 29, 2010: ❢ added.
September 25, 2009: ⌧ and ⌦ added.
April 19, 2009: ↑ added.

November 28, 2008: $\backepsilon$ and $\backepsilon$ added.
November 12, 2008: $\nVdash$ and $\nVdash$ added.
September 25, 2008: $\nVDash$ and $\nVDash$ added.
August 22, 2008: $\diagdown$ added.
October 29, 2003: Canadä added!
October 27, 2003: Move to Toronto, some new symbols.
November 11, 2001: Some new symbols.
October 21, 2001: Some new symbols.
March 22, 2001: Bigger sized symbols in Section 4 in the html version.
January 25, 2001: Some new symbols.
May 18, 2000: Some new symbols, sizes adjusted so that $\square \simeq \square$ (`$\dbnframe\simeq\square$`).
May 7, 2000: Minor modifications and some extra symbols added.
April 26, 2000: Minor modifications.
April 25, 2000: Added "full mirror" download option.
April 24, 2000: Added a few symbols and Sections 5, 6 and 7 and made a few minor modifications.
March 19, 2000: First version posted.

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