

The Symbol Font *wasy*

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The font *wasy* contains all *lasy* characters, and a lot more symbols. New characters were modified from the *mf* files of the standard \TeX fonts, and many were designed from scratch. Metafont sources for 5–10pt and a bold 10pt font are available.

An extension to PLAIN- \TeX for using the fonts is included in the file *wasyfont.tex*. This can probably be used in \LaTeX documents, but a new \LaTeX format with the bindings already included and with *wasy* replacing the *lasy* font would be the superior solution. This version includes all *lasy* characters at the proper codes (causing some incompatibilities with version 1 of *wasy*) to make such a procedure easy. The file *wasyfont.2* contains substitutes for some macros of *wasyfont.tex* to be used at installations, that do not support the *wasy* fonts.

A list of characters with their bindings in *wasyfont.tex* follows. Some macros are actually compositions of several characters useful in the given context. Macros using symbols which are already available from standard \TeX fonts are also included; these are marked with *.

general symbols

| | | | |
|------------------------|---|---------------------------|---|
| <code>\male</code> | ♂ | <code>\female</code> | ♀ |
| <code>\currency</code> | ⌘ | <code>\cent</code> | ¢ |
| <code>\lozenge</code> | ⌘ | <code>\kreuz</code> | ✝ |
| <code>\smiley</code> | ☺ | <code>\blacksmiley</code> | ☹ |
| <code>\frownie</code> | ☹ | <code>\sun</code> | ☼ |
| <code>\checked</code> | ✓ | <code>\brokenvert</code> | ‡ |
| <code>\diameter</code> | ∅ | <code>\invdiameter</code> | ∅ |
| <code>\phone</code> | ☎ | <code>\recorder</code> | Ⓛ |
| <code>\clock</code> | ⌚ | <code>\permil</code> | ‰ |
| <code>\bell</code> | 🔔 | <code>\ataribox</code> | Ⓛ |
| <code>\pointer</code> | ☞ | <code>\lightning</code> | ⚡ |
| <code>\agem0</code> | Ⓛ | | |

diagrams

| | | | |
|----------------------|-------|---------------------|------|
| <code>\photon</code> | ~~~~~ | <code>\gluon</code> | ⊗⊗⊗⊗ |
|----------------------|-------|---------------------|------|

music notes

| | | | |
|--------------------------|---|---------------------------|---|
| <code>\eighthnote</code> | ♪ | <code>\quarternote</code> | ♩ |
|--------------------------|---|---------------------------|---|

`\halfnote` ♩ `\fullnote` ◦
`\twonotes` ♪

electrical engineering

`\AC` ~ `\HF` ≈
`\VHF` ≅

APL

| | | | |
|-------------------------------|---|---------------------------------|---|
| <code>\APLup</code> | △ | <code>\APLdown</code> | ▽ |
| <code>\APLbox</code> | □ | <code>\APLinv</code> | ⊞ |
| <code>\APLleftarrowbox</code> | ← | <code>\APLrightarrowbox</code> | → |
| <code>\APLuparrowbox</code> | ↑ | <code>\APLdownarrowbox</code> | ↓ |
| <code>\APLinput</code> | □ | <code>\APLminus*</code> | — |
| <code>\APLlog</code> | ⊗ | <code>\APLstar</code> | * |
| <code>\APLvert*</code> | | <code>\APLvert{\APLdown}</code> | ∇ |
| <code>\APLnot*</code> | ~ | <code>\APLnot{\APLdown}</code> | ∇ |
| <code>\APLnot{\land}</code> | ∧ | <code>\APLnot{\lor}</code> | ∨ |
| <code>\APLcirc*</code> | ○ | <code>\APLcirc{\bot}</code> | ⊥ |
| <code>\notbackslash*</code> | ↖ | <code>\notslash*</code> | ↗ |
| <code>\APLcomment</code> | ⊞ | | |

astronomy

| | | | |
|------------------------|---|-------------------------|---|
| <code>\ascnode</code> | ♊ | <code>\descnode</code> | ♋ |
| <code>\vernal</code> | ♈ | <code>\astrosun*</code> | ☉ |
| <code>\newmoon</code> | ● | <code>\fullmoon</code> | ○ |
| <code>\leftmoon</code> | ☾ | <code>\rightmoon</code> | ☽ |
| <code>\mercury</code> | ♿ | <code>\venus</code> | ♀ |
| <code>\mars</code> | ♂ | <code>\jupiter</code> | ♃ |
| <code>\saturn</code> | ♄ | <code>\uranus</code> | ♅ |
| <code>\neptune</code> | ♆ | <code>\pluto</code> | ♇ |
| <code>\earth</code> | ♁ | | |

astrological symbols and zodiacal symbols

| | | | |
|---------------------------|---|---------------------------|---|
| <code>\conjunction</code> | ♌ | <code>\opposition</code> | ♍ |
| <code>\aries</code> | ♈ | <code>\libra</code> | ♎ |
| <code>\taurus</code> | ♉ | <code>\scorpio</code> | ♏ |
| <code>\gemini</code> | ♊ | <code>\sagittarius</code> | ♐ |
| <code>\cancer</code> | ♋ | <code>\capricornus</code> | ♑ |
| <code>\leo</code> | ♌ | <code>\aquarius</code> | ♒ |
| <code>\virgo</code> | ♍ | <code>\pisces</code> | ♓ |

geometrical shapes

| | | | |
|---------------------------|---|---------------------------|---|
| <code>\hexstar</code> | ✱ | <code>\varhexstar</code> | ✱ |
| <code>\davidstar</code> | ☆ | <code>\APLstar</code> | ✱ |
| <code>\Circle</code> | ○ | <code>\CIRCLE</code> | ● |
| <code>\Leftcircle</code> | ◐ | <code>\LEFTCIRCLE</code> | ◐ |
| <code>\Rightcircle</code> | ◑ | <code>\RIGHTCIRCLE</code> | ◑ |
| <code>\LEFTcircle</code> | ◐ | <code>\RIGHTcircle</code> | ◑ |
| <code>\LEFTarrow</code> | ◀ | <code>\RIGHTarrow</code> | ▶ |
| <code>\UParrow</code> | ▲ | <code>\DOWNarrow</code> | ▼ |
| <code>\Box</code> | □ | <code>\APLbox</code> | □ |
| <code>\XBox</code> | ⊠ | <code>\Bowtie</code> | ⊠ |
| <code>\Diamond</code> | ◇ | <code>\octagon</code> | ⬡ |
| <code>\hexagon</code> | ⬡ | <code>\varhexagon</code> | ⬡ |
| <code>\pentagon</code> | ⬠ | | |

general math & physics

| | | | |
|------------------------|---|---------------------------|---|
| <code>\varangle</code> | ∠ | <code>\$_\invneg\$</code> | ¬ |
| <code>\leftturn</code> | ↶ | <code>\rightturn</code> | ↷ |
| <code>\diameter</code> | ∅ | <code>\therefore</code> | ∴ |

math operators

| | | | |
|--|--------------------------|--|---------------------------|
| <code>\$_\ocircle b</code> | $a \circ b$ | <code>\$_\logof b</code> | $a \oplus b$ |
| <code>\$_\oplus^* b</code> | $a \oplus b$ | <code>\$_\otimes^* b</code> | $a \otimes b$ |
| <code>\$_\le^* b</code> | $a \leq b$ | <code>\$_\ge^* b</code> | $a \geq b$ |
| <code>\$_\apprle b</code> | $a \lesssim b$ | <code>\$_\apprge b</code> | $a \gtrsim b$ |
| <code>\$_\lhd b</code> | $a \triangleleft b$ | <code>\$_\rhd b</code> | $a \triangleright b$ |
| <code>\$_\unlhd b</code> | $a \trianglelefteq b$ | <code>\$_\unrhd b</code> | $a \trianglerighteq b$ |
| <code>\$_\LHD b</code> | $a \blacktriangleleft b$ | <code>\$_\RHD b</code> | $a \blacktriangleright b$ |
| <code>\$_\sqsubset b</code> | $a \sqsubset b$ | <code>\$_\sqsupset b</code> | $a \sqsupset b$ |
| <code>\$_\sqsubset\text{eq}^* b</code> | $a \sqsubseteq b$ | <code>\$_\sqsupset\text{eq}^* b</code> | $a \sqsupseteq b$ |
| <code>\$_\propto^* b</code> | $a \propto b$ | <code>\$_\varpropto b</code> | $a \propto b$ |
| <code>\$_\leadsto b</code> | $a \rightsquigarrow b$ | | |

integrals (text style)

| | | | |
|------------------------------------|---------------------|-------------------------------------|--------------------|
| <code>\$_\varint_a^b f(x)dx</code> | $\int_a^b f(x)dx$ | <code>\$_\iint_a^b f(x)dx</code> | $\iint_a^b f(x)dx$ |
| <code>\$_\iiint_a^b f(x)dx</code> | $\iiint_a^b f(x)dx$ | <code>\$_\varoint_a^b f(x)dx</code> | $\oint_a^b f(x)dx$ |
| <code>\$_\oiint_a^b f(x)dx</code> | $\oiint_a^b f(x)dx$ | | |

integrals (display style)

$$\int \iint \iiint \oint \oiint$$

With the control sequence `\newpropto` you can change the proportional sign to the thin wasy symbol (\propto), which is more distinct from alpha (α) than the default symbol (\propto).

With the control sequence `\newint` you can change the T_EX integrals from \int, \oint to the vertical ones \int, \oint , in display:

$$\int_a^b \rightarrow \int_a^b, \quad \oint_C \rightarrow \oint_C$$

There are also a few letters in roman style added (although these and some symbols as \mathcal{U}, \mathcal{V} should be in a separate font, to be created in different styles like italic, sans serif etc. – the `wasychr.mf` source is prepared for that.

```
\thorn  þ      \Thorn  Þ
\dh     ð      \Dh*   Ð
\inve   ə      \openo  ɔ
```

Examples

“We provide the ♪♪, you provide the ☺”

The planets ($\odot \rightarrow$ outer space): ☿ ♀ ☽ ♂ asteroids ♃ ♅ ♁ ♃ ♅ ♁

special characters on IBM PC's: ☺, ☹, ♥, ♦, ♣, ♠, ●, ○, ♂, ♀, ♪, ♫, ☼, ►, ◄, ⇕, !!, ¶, §, ==, ⇕, ↑, ↓, →, ←, ▲, ▼, †, ‡, ⋮, ...

special characters on Atari ST's: ♪, ♫, √, ⊖, ♠, ♪, ♫, ♪, ♫, ♪, ♫, ♪, ♫, ...

tube dimensions: $\varnothing 5 \text{ mm}, d = 0.5 \text{ mm}, l = 50 \text{ mm}$

display math:

$$\angle(\vec{a}, \vec{b}) = 30^\circ$$

$$\prod_{x \leq 5} a_x \otimes b_x \simeq \int_{x \geq 5} a \circ b \, dx \quad (\text{nonsense.1})$$

Gauss' law:
$$\iiint_V \nabla \mathbf{F}(\mathbf{x}) \, d^3x = \iint_{S(V)} \mathbf{F}(\mathbf{x}) \, d\mathbf{a}$$

Stokes' law:
$$\iint_A [\nabla \times \mathbf{F}(\mathbf{x})] \, d\mathbf{a} = \oint_{C(A)} \mathbf{F}(\mathbf{x}) \, d\mathbf{l}$$

APL Program:

`U ← -1 + G ← 2 × lN ← □` ♠ generate vectors of odd and even numbers

APL keyboard layout:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | + | × | ◇ |
| Q | W | E | R | T | Y | U | I | O | P | ← | → | |

A S D F G H J K L [] #
 T Z X C V B N M , . /
 .. - < ≤ = ≥ > ≠ ∨ ∧ - ÷ \$
 ? ω ε ρ ~ ↑ ↓ √ ∘ * { }
 α | | - ∇ Δ ∘ ' □ () ~
 † ‡ ⊃ ∩ ∪ ⊥ ⊤ | ; : \
 I √ ∇ ∆ ∅ ∘ ⊕ ∞ ∞ ! ☒ ☒
 Q W E R T Y U I O P ☒ ☒
 A S D F G H J K L ☒ ☒
 Δ Z X C V B N M ρ † /

⊗
 ↑ ↓

simple phonetic notation: corner [ˈkɔːnə], this [ðis], thrash [θræʃ]

check the appropriate box like this ☒ or that ☑:

- I need the **wasy** fonts
- I don't need the **wasy** fonts

Font Table

wasy:

| | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|
| 00 = Δ | 01 = ◁ | 02 = ◁ | 03 = ▷ | 04 = ▷ | 05 = ∴ | 06 = ∅ | 07 = 🗿 |
| 08 = ✓ | 09 = ♠ | 0A = ♠ | 0B = ♠ | 0C = ♠ | 0D = ♠ | 0E = ∘ | 0F = ♠ |
| 10 = ◀ | 11 = ▶ | 12 = ⚡ | 13 = Ω | 14 = ∪ | 15 = ∞ | 16 = ⊕ | 17 = ∩ |
| 18 = ♀ | 19 = ♀ | 1A = ♂ | 1B = ∞ | 1C = ⊕ | 1D = ∞ | 1E = ♀ | 1F = ∅ |
| 20 = ● | 21 = ⦿ | 22 = ⦿ | 23 = ○ | 24 = ☾ | 25 = ☽ | 26 = ♂ | 27 = ♀ |
| 28 = < | 29 = > | 2A = ^ | 2B = v | 2C = ☺ | 2D = ☹ | 2E = ☼ | 2F = ☺ |
| 30 = ∪ | 31 = ∩ | 32 = □ | 33 = ◇ | 34 = ☒ | 35 = ☒ | 36 = ✦ | 37 = ◊ |
| 38 = ○ | 39 = ◊ | 3A = ~ | 3B = ~ | 3C = □ | 3D = □ | 3E = ≤ | 3F = ≥ |
| 40 = ≈ | 41 = * | 42 = * | 43 = ☆ | 44 = ◊ | 45 = * | 46 = ∇ | 47 = ◐ |
| 48 = ◐ | 49 = ◑ | 4A = ◑ | 4B = ▲ | 4C = ▼ | 4D = | 4E = | 4F = |
| 50 = ∂ | 51 = ∂ | 52 = ∂ | 53 = | 54 = | 55 = ∅ | 56 = ∅ | 57 = ♂ |
| 58 = 4 | 59 = h | 5A = ♂ | 5B = ♀ | 5C = ♀ | 5D = ∅ | 5E = ∩ | 5F = ∅ |
| 60 = ∞ | 61 = ∞ | 62 = ∞ | 63 = ∞ | 64 = ∞ | 65 = ∞ | 66 = ∞ | 67 = ∅ |
| 68 = % | 69 = p | 6A = P | 6B = ∅ | 6C = ∅ | 6D = ☒ | 6E = ☒ | 6F = ☒ |
| 70 = ☒ | 71 = ☒ | 72 = ∫ | 73 = ∫ | 74 = ∫ | 75 = ∫ | 76 = ∫ | 77 = ∫ |
| 78 = ∫ | 79 = ∫ | 7A = ∫ | 7B = ∫ | 7C = ∫ | 7D = ☒ | 7E = ☒ | 7F = ρ |

wasyb:

| | | | | | | | |
|----------------------------|----------------------------|--------------------------|----------------------------|---------------------------|--------------------|--------------------|-----------------------|
| 00 = Δ | 01 = \triangleleft | 02 = \trianglelefteq | 03 = \triangleright | 04 = \trianglerighteq | 05 = \therefore | 06 = \oslash | 07 = \heartsuit |
| 08 = \surd | 09 = \rightrightarrows | 0A = \spadesuit | 0B = \clubsuit | 0C = \heartsuit | 0D = \heartsuit | 0E = \circ | 0F = \clubsuit |
| 10 = \blacktriangleleft | 11 = \blacktriangleright | 12 = \blacklightning | 13 = \mathcal{R} | 14 = \mathcal{U} | 15 = \mathcal{Q} | 16 = \otimes | 17 = Υ |
| 18 = \ulcorner | 19 = \female | 1A = \male | 1B = \mathcal{A} | 1C = \odot | 1D = ∞ | 1E = \mathcal{A} | 1F = \emptyset |
| 20 = \bullet | 21 = \circlearrowright | 22 = \circlearrowleft | 23 = \bigcirc | 24 = \mathcal{C} | 25 = \mathcal{D} | 26 = δ | 27 = \mathcal{A} |
| 28 = \lessdot | 29 = \gtrdot | 2A = $\hat{}$ | 2B = $\check{}$ | 2C = \odot | 2D = \odot | 2E = \star | 2F = \odot |
| 30 = \mathcal{U} | 31 = \boxtimes | 32 = \square | 33 = \diamond | 34 = \boxtimes | 35 = \mathcal{A} | 36 = \mathcal{A} | 37 = \square |
| 38 = \bigcirc | 39 = \square | 3A = \sim | 3B = \rightsquigarrow | 3C = \square | 3D = \square | 3E = \lesssim | 3F = \gtrsim |
| 40 = \approx | 41 = \mathcal{A} | 42 = \mathcal{A} | 43 = \mathcal{A} | 44 = \square | 45 = \mathcal{A} | 46 = ∇ | 47 = \blacktriangle |
| 48 = \blacktriangleright | 49 = \mathcal{D} | 4A = \mathcal{D} | 4B = \blacktriangle | 4C = \blacktriangledown | 4D = | 4E = | 4F = |
| 50 = \mathcal{A} | 51 = \mathcal{A} | 52 = \mathcal{A} | 53 = | 54 = | 55 = \mathcal{A} | 56 = \mathcal{A} | 57 = ∞ |
| 58 = \mathcal{A} | 59 = \mathcal{A} | 5A = \mathcal{A} | 5B = \mathcal{A} | 5C = \mathcal{A} | 5D = \mathcal{A} | 5E = \mathcal{A} | 5F = \mathcal{A} |
| 60 = \mathcal{A} | 61 = \mathcal{A} | 62 = \mathcal{A} | 63 = \mathcal{A} | 64 = \mathcal{A} | 65 = \mathcal{A} | 66 = \mathcal{A} | 67 = \mathcal{A} |
| 68 = $\%$ | 69 = \mathcal{A} | 6A = \mathcal{A} | 6B = \mathcal{A} | 6C = \mathcal{A} | 6D = \mathcal{A} | 6E = \mathcal{A} | 6F = \mathcal{A} |
| 70 = \mathcal{A} | 71 = \mathcal{A} | 72 = \mathcal{A} | 73 = \mathcal{A} | 74 = \mathcal{A} | 75 = \mathcal{A} | 76 = \mathcal{A} | 77 = \mathcal{A} |
| 78 = \mathcal{A} | 79 = \mathcal{A} | 7A = \mathcal{A} | 7B = \mathcal{A} | 7C = \mathcal{A} | 7D = \mathcal{A} | 7E = \mathcal{A} | 7F = \mathcal{A} |

Changes since version 1.0

version 1.1:

`\varangle` has been centered at the math axis

version 2.0:

new: letters $\mathcal{D}, \mathcal{b}, \mathcal{d}, \mathcal{e}, \mathcal{c}, \mathcal{U}$

new astrological and zodiacal symbols

new symbols permil, cent, ataribox

now the full set of `lasy` is included; for this purpose 9 characters (\odot , \bullet , \ominus , \star , \mathcal{A} , \mathcal{h} , \mathcal{d} , \mathcal{F} , \mathcal{E}) have **changed code!**

`wasyb10` font for bold math added