

MTPro2 Math

Font guide

v1.4

Use the generated font with LuaLaTeX and `unicode-math`:

```
\usepackage{unicode-math}
\setmathfont{MTPro2Math.otf}
```

Use `MTPro2MathLite.otf` for Lite. The examples in this guide use Full. No `mtp2.sty` is needed. Building the font and using it in Word are described in `mtp2otf.pdf`.

1 Letters and Greek

Ordinary letters are mathematical italic. Use `\symup`, `\symit`, `\symbfup` and `\symbfit` to select a mathematical alphabet explicitly:

<code>\symup {ABGMXYZabcxyz}</code>	ABGMXYZabcxyz
<code>\symit {ABGMXYZabcxyz}</code>	<i>ABGMXYZabcxyz</i>
<code>\symbfup {ABGMXYZabcxyz}</code>	ABGMXYZabcxyz
<code>\symbfit {ABGMXYZabcxyz}</code>	<i>ABGMXYZabcxyz</i>

The `\sym . . .` commands use the math font rather than the document's text font. Bold italic requires Full. For Greek, the same selectors give $\alpha\beta\Gamma\Omega$, $\alpha\beta\Gamma\Omega$, $\alpha\beta\Gamma\Omega$ and $\alpha\beta\Gamma\Omega$.

Character variants select alternative designs for the whole document. For example, swash z is selected in the preamble:

```
\setmathfont{MTPro2Math.otf}[RawFeature={+cv01}]
```

Default	<i>z</i>	<i>z</i>	swash z
cv01	<i>z</i>	<i>z</i>	
Default	$\beta\delta$	$\beta\delta$	beta, delta
cv02	$\beta\delta$	$\beta\delta$	
Default	$\hbar$	Planck sign	
cv03	$\hbar$		

These choices are available in both editions; their bold counterparts require Full. Under `unicode-math`, `\hbar` and `\hslash` name the same character, whose design is selected by `cv03`.

Features can be combined: `RawFeature={+cv01,+cv02}` selects both. For a feature with numbered choices, use, for example, `RawFeature={cv24=2}`. Omit a feature to keep its default design.

2 Blackboard

Blackboard is available in Full. Use `\symbb { . . . }` for double-struck letters and digits. The default design and three upright alternatives are shown below.

`\symbb {ABGMXYZ\;abcxyz\;0123456789}`

Default	ABGMXYZ abcxyz 0123456789
cv33	ABGMXYZ abcxyz 0123456789
cv34	ABGMXYZ abcxyz 0123456789
cv33, cv34	ABGMXYZ abcxyz 0123456789

cv33 selects heavier upright letters. cv34 selects the Holey Roman family; combine them for its heavier upright design. For example:

`\setmathfont{MTPro2Math.otf}[RawFeature={+cv33,+cv34}]`

Four Greek characters and five italic characters have standard Unicode inputs. cv34 changes these to the corresponding Holey designs; cv33 leaves them unchanged.

	Greek	Italic
Default	$\Gamma \Pi \gamma \pi$	<i>D d e i j</i>
cv34	$\Gamma \Pi \gamma \pi$	<i>D d e i j</i>

`\BbbGamma \BbbPi \Bbbgamma \Bbbpi`
`\mitBbbD \mitBbbd \mitBbbe \mitBbbi \mitBbbj`

The italic Blackboard selection is limited to these five characters.

3 Script and Fraktur

These alphabets are available in Full. Use `\symscr` and `\symbfscr` for regular and bold Script. `cv31` changes selected letters in both weights. Curly Script is selected with `ss01`; it also has alternatives under `cv31`. `ss02` selects a second Curly series directly.

```
\symscr {CGILQSYZrz}
```

Default	<i>CGILQSYZrz</i>
<code>cv31</code>	<i>CgILQSYZrz</i>
<code>ss01</code>	<i>CgLLQSYZrz</i>
<code>ss01, cv31</code>	<i>CgLLQSYZrz</i>
<code>ss02</code>	<i>CgLLQSYZrz</i>

```
\setmathfont{MTPro2Math.otf}[RawFeature={+ss01,+cv31}]
```

`ss02` takes precedence over the other regular Script choices. The Curly selectors affect regular Script; bold Script retains its own design, with its alternatives controlled by `cv31`.

```
\symbfscr {CGILQSYZrz}
```

Default	<i>CGILQSYZrz</i>
<code>cv31</code>	<i>CgILQSYZrz</i>

Fraktur is selected with `\symfrac` or `\symbfrac`. Its alternatives use `cv32`, independently of the Script choices.

	<code>\symfrac {IRYxy}</code>	<code>\symbfrac {IRYxy}</code>
Default	<i>IRYxy</i>	<i>IRYxy</i>
<code>cv32</code>	<i>IRYxy</i>	<i>IRYxy</i>

```
\setmathfont{MTPro2Math.otf}[RawFeature={+cv31,+cv32}]
```

4 Parentheses and braces

Use `\left` and `\right` to size delimiters to a formula. The default series uses the original ordinary growth range, followed by an assembly of repeatable parts. The default braces use the morphed design, which approaches the assembled shape as it grows.

`cv22` extends parentheses through the large ready-made designs. The two examples below use the same input and font size.

$$\begin{array}{l} \text{Default} \\ \text{cv22} \end{array} \left(\begin{array}{cccc} 2 & -1 & 0 & 0 \\ -1 & 2 & -1 & 0 \\ 0 & -1 & 2 & -1 \\ 0 & 0 & -1 & 2 \end{array} \right)$$

```
\setmathfont{MTPro2Math.otf}[RawFeature={+cv22}]
```

For braces, `cv21` selects straight braces with the ordinary growth range. `cv23` selects Curly braces with an extended ready-made range.

At larger sizes the default and straight series use the same assembly. Each row shows a small set and a larger piecewise function:

$$\begin{array}{ll} \text{Default} & \left\{ \frac{1}{n} : n \in \mathbb{N} \right\} \quad \Lambda(x) = \begin{cases} 1+x, & -1 \leq x < 0, \\ 1-x, & 0 \leq x \leq 1, \\ 0, & \text{otherwise.} \end{cases} \\ \text{cv21} & \left\{ \frac{1}{n} : n \in \mathbb{N} \right\} \quad \Lambda(x) = \begin{cases} 1+x, & -1 \leq x < 0, \\ 1-x, & 0 \leq x \leq 1, \\ 0, & \text{otherwise.} \end{cases} \\ \text{cv23} & \left\{ \frac{1}{n} : n \in \mathbb{N} \right\} \quad \Lambda(x) = \begin{cases} 1+x, & -1 \leq x < 0, \\ 1-x, & 0 \leq x \leq 1, \\ 0, & \text{otherwise.} \end{cases} \end{array}$$

```
\setmathfont{MTPro2Math.otf}[RawFeature={+cv22,+cv23}]
```

Use paired delimiters, or end with `\right` . for a one-sided brace:

```
\left( ... \right)      \left\{ ... \right\}
\left\{ ... \right.
```

The large series reaches 28.8 em before continuing with the ordinary assembly. `cv21` takes precedence over `cv23`; choose one brace style. Parenthesis selection remains independent.

5 Accents and horizontal braces

Use a fixed accent for a letter and a wide accent for a group. These constructions are available in both editions.

<code>\hat {x}, \widehat {ABC}</code>	$\hat{x}$	$\widehat{ABC}$
<code>\tilde {x}, \widetilde {ABC}</code>	$\tilde{x}$	$\widetilde{ABC}$
<code>\check {x}, \widecheck {ABC}</code>	$\check{x}$	$\widecheck{ABC}$
<code>\bar {M}, \wideoverbar {M+N}</code>	$\bar{M}$	$\wideoverbar{M+N}$
<code>\vec {v}, \overrightarrow {AB}</code>	$\vec{v}$	$\overrightarrow{AB}$
<code>\overleftarrow {AB}</code>		$\overleftarrow{AB}$
<code>\dot {x}, \ddot {x}, \hat {i}</code>	$\dot{x}$	$\ddot{x} \hat{i}$

`\bar` and `\overbar` select the fixed accent; `\wideoverbar` selects the stretching accent. `\overline` draws a rule instead. An operator such as $\hat{H}$ uses the ordinary `\hat {H}`.

Horizontal parentheses and braces cover their contents. For example:

`\overparen{AB} \quad \underbrace{V\times\cdots\times V}_{n}`

$$\overparen{AB} \quad \underbrace{V \times \cdots \times V}_n$$

cv24 selects the design of both overbraces and underbraces:

Default	$\overbrace{a+b+c}^s$	$\underbrace{x+y+z}_t$
cv24=1: plain	$\overbrace{a+b+c}^s$	$\underbrace{x+y+z}_t$
cv24=2: Curly	$\overbrace{a+b+c}^s$	$\underbrace{x+y+z}_t$

`\setmathfont{MTPro2Math.otf}[RawFeature={cv24=2}]`

This choice is independent of the vertical-brace features. Use:

`\overbrace{\dots}^{\dots}` `\underbrace{\dots}_{\dots}`

6 Operators and formula sizes

To use the math font's upright letters for named operators such as `\sin` and `\cos`, set:

```
\setoperatorfont{\symup}
```

Large operators have text and display designs. The math style selects them automatically; `\limits` and `\nolimits` control the placement of limits.

$$\sum_{k=1}^n a_k \quad \int_0^1 f(x) dx \quad \sum_{k=1}^n a_k \quad \int_0^1 f(x) dx$$

`cv11` selects slanted sums, products and coproducts in both sizes.

$$\begin{array}{l} \text{Default} \quad \sum_{k=1}^n a_k \quad \prod_{k=1}^n b_k \quad \coprod_{i \in I} X_i \\ \text{cv11} \quad \sum_{k=1}^n a_k \quad \prod_{k=1}^n b_k \quad \coprod_{i \in I} X_i \end{array}$$

```
\setmathfont{MTPro2Math.otf}[RawFeature={+cv11}]
```

`cv12` changes conjunction signs, both `\wedge` and `\bigwedge`:

$$\begin{array}{l} \text{Default} \quad p \wedge q \quad \bigwedge_{i=1}^n P_i \\ \text{cv12} \quad p \& q \quad \&_{i=1}^n P_i \end{array}$$

Both operator features are available in Full and Lite. Other operators retain their own designs:

$$\bigcap_{i=1}^n A_i \quad \bigcup_{i=1}^n A_i \quad \bigotimes_{i=1}^n V_i \quad \oint_C \vec{F} \cdot d\vec{r}$$

Subscripts and superscripts select the source's optical sizes without an explicit feature setting:

$$x + \alpha \quad 2^{x+\alpha} \quad 2^{2^{x+\alpha}}$$

Radicals and fractions use the ordinary commands:

```
\sqrt{\frac{a^2+b^2}{c^2+d^2}} \quad \sqrt[3]{x+y}
```

$$\sqrt{\frac{a^2 + b^2}{c^2 + d^2}} \quad \sqrt[3]{x + y}$$

The original package's explicit extra-large operator commands are not provided.

7 Relations

The following Full-edition features change relation designs without changing their input commands or mathematical meanings.

Default	$\subsetneq \supsetneq \subsetneqq \supsetneqq$	
cv41	$\subsetneq \supsetneq \subsetneqq \supsetneqq$	<code>\subsetneq \supsetneq</code> <code>\subsetneqq \supsetneqq</code>
Default	$\leqq \geqq$	
cv42	$\leqq \geqq$	<code>\lneqq \gneqq</code>
Default	$\mid \nmid \parallel \nparallel$	
cv43	$\mid \nmid \parallel \nparallel$	<code>\mid \nmid \parallel \nparallel</code>
Default	$\sim \approx$	
cv44	$\sim \approx$	<code>\sim \approx</code>
Default	$\propto \smile \frown$	
cv45	$\propto \smile \frown$	<code>\propto \smile \frown</code>

cv43 selects shorter relation bars; it does not change the delimiter bars in `\left | x \right |` or `\left \lVert v \rVert`. cv44 selects thicker similarity and approximation signs.

Negated comparisons and inclusions have two further choices under cv46. Use their direct commands:

`a \nleq b \quad a \ngeq b \quad A \nsubseteq B \quad A \nsupseteq B`

Default	$a \not\leq b \quad a \not\geq b \quad A \not\subseteq B \quad A \not\supseteq B$
cv46=1	$a \not\leq b \quad a \not\geq b \quad A \not\subseteq B \quad A \not\supseteq B$
cv46=2	$a \not\leq b \quad a \not\geq b \quad A \not\subseteq B \quad A \not\supseteq B$

The not-similar sign is independent:

Default	$a \not\sim b \quad a \nsim b$
cv47	$a \sim b$

`\setmathfont{MTPro2Math.otf}[RawFeature={cv46=1,+cv47}]`

8 Other symbols

cv51 selects the alternative empty-set sign in Full. `\emptyset` and `\varnothing` refer to the same Unicode character under `unicode-math`.

Default	$\emptyset$	<code>\emptyset</code>
cv51	$\varnothing$	
Default	$\spadesuit$ $\clubsuit$	<code>\spadesuit</code> <code>\clubsuit</code>
cv52	$\spadesuit$ $\clubsuit$	
Default	¥ ®	<code>\mathyen</code> , U+00AE
cv53	¥ ®	

cv52 gives shaded spades and clubs in both editions. cv53 changes the yen and registered signs in Full.

The usual symbol commands include `\ell` , `\partial` , `\nabla` , `\infty` , `\dagger` and `\ddagger` :

$$\ell \quad \partial \quad \nabla \quad \infty \quad \dagger \quad \ddagger$$

Mathematical sans-serif and monospace alphabets, a complete bold-symbol version, and a compatibility package for MTPro2-specific macros are not included.

9 Three math sizes

Each group repeats an expression at normal size, in a superscript and in an exponent of a superscript. The exponent construction is used here only to compare the three optical sizes.

$$A, \dots, Z \quad a, \dots, z \quad \Gamma, \Omega \quad \alpha_i, \omega^j$$

$$2^{A, \dots, Z} \quad 2^{a, \dots, z} \quad 2^{\Gamma, \Omega} \quad 2^{\alpha_i, \omega^j}$$

$$2^2^{A, \dots, Z} \quad 2^2^{a, \dots, z} \quad 2^2^{\Gamma, \Omega} \quad 2^2^{\alpha_i, \omega^j}$$

$$(f \circ g)'(x) = f'(g(x)) g'(x)$$

$$2^{(f \circ g)'(x) = f'(g(x)) g'(x)}$$

$$2^2^{(f \circ g)'(x) = f'(g(x)) g'(x)}$$

$$\sum_{k=1}^n \frac{1}{k(k+1)} = \frac{n}{n+1}$$

$$2^{\sum_{k=1}^n \frac{1}{k(k+1)} = \frac{n}{n+1}}$$

$$2^2^{\sum_{k=1}^n \frac{1}{k(k+1)} = \frac{n}{n+1}}$$

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$$

$$2^{\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}}$$

$$2^2^{\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}}$$

$$\omega = v dx + w dy, \quad d\omega = \left(\frac{\partial w}{\partial x} - \frac{\partial v}{\partial y} \right) dx \wedge dy$$

$$2^{\omega = v dx + w dy, \quad d\omega = \left(\frac{\partial w}{\partial x} - \frac{\partial v}{\partial y} \right) dx \wedge dy}$$

$$2^2^{\omega = v dx + w dy, \quad d\omega = \left(\frac{\partial w}{\partial x} - \frac{\partial v}{\partial y} \right) dx \wedge dy}$$

$$R_{ijkl} = -R_{jikl} = -R_{ijlk} = R_{klij}$$

$$2^{R_{ijkl} = -R_{jikl} = -R_{ijlk} = R_{klij}}$$

$$2^2^{R_{ijkl} = -R_{jikl} = -R_{ijlk} = R_{klij}}$$