Mathematical Font Art

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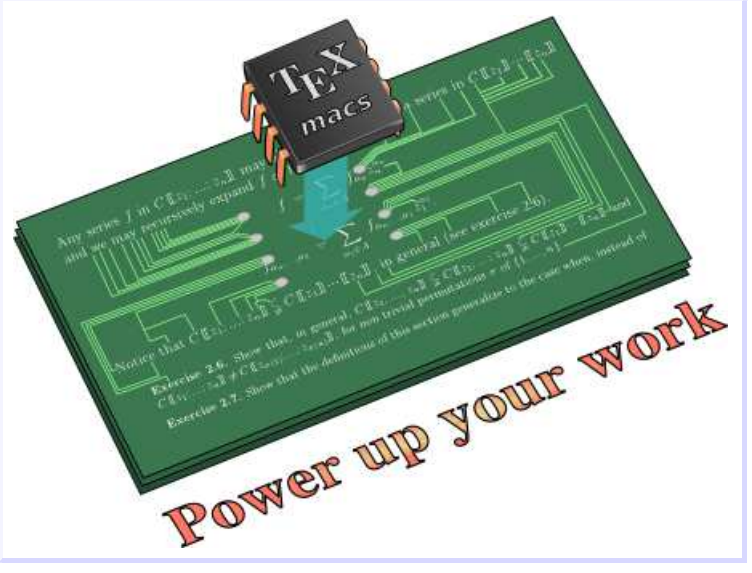

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http://www.TEXMACS.org

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Use standard fonts on your system as mathematical fonts.

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- Lack of the most important font declinations as needed in scientific documents: **Bold**, *Italic*, Small Capitals, Sans Serif, `Typewriter`.
- Lack of specific glyphs: non English languages, mathematical symbols, and in particular big operators, extensible brackets and wide accents.
- Inconsistencies: sloppy design of some glyphs that are important for mathematics (such as $-$, $<$, etc.), leading to inconsistencies.

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- Produce something that "looks nice" at first sight.
- May not be as good as hand designed fonts for high quality typesetting.

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Approach.

Combination of "substitution" and "emulation" both for fonts and glyphs.

The symbols α, β, γ are acceptable inside $x+\alpha+y+\beta+z+\gamma$.

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Typical characteristics.

- Discrete ones: sans serif, small capitals, handwritten, ancient, gothic, etc..
- Italic slant.
- Height of an "x" symbol, ascent above and descent below the "x" symbol.
- Horizontal and vertical stroke widths in "o" and "O" symbols.
- Average aspect-ratios of uppercase and lowercase letters ("narrowness").
- Average area of glyphs that is filled (related to weight).

Emboldened

Slanted

Small Capitals or Capitals

Emboldened

Slanted

Small Capitals or Capitals

Magnified or Extended

Emboldened

Slanted

Small Capitals or Capitals

Magnified or Extended

Blackboard Bold

$\mathbb{Z}$

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Slanted

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Magnified or Extended

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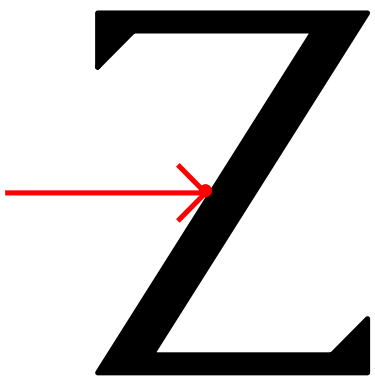

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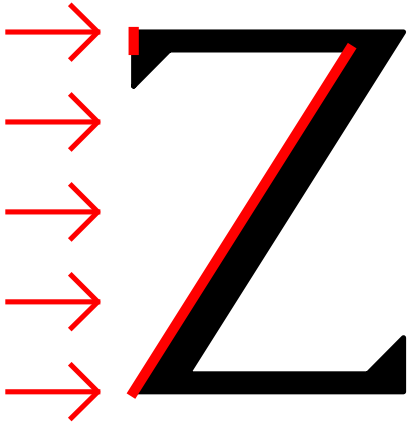

Emboldened

Slanted

Small Capitals or Capitals

Magnified or Extended

$\mathbb{B}\mathbb{l}\mathbb{a}\mathbb{c}\mathbb{k}\mathbb{b}\mathbb{o}\mathbb{a}\mathbb{r}\mathbb{d}\ \mathbb{B}\mathbb{o}\mathbb{l}\mathbb{d}$

$\mathbb{Z}$

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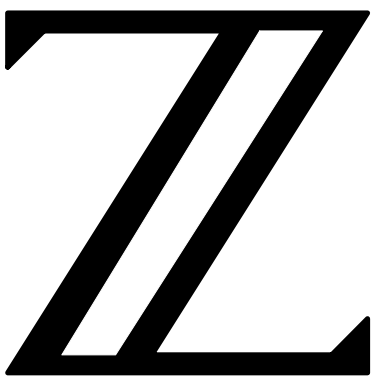

Regular	Bold	Italic	Small Caps	Blackboard Bold	Mathematics
Optima	**Bold***	*Italic*	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}$	$x^2+f(x,\frac{a}{b+c})$
Cochin	**Bold***	*Italic**	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}$	$x^2+f(x,\frac{a}{b+c})$
Chartrand	**Bold**	*Italic*	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}$	$x^2+f(x,\frac{a}{b+c})$
Essays1743	**Bold***	***Italic****	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}^*$	$x^2+f(x,\frac{a}{b+c})$
Meyne Textur	**Bold**	*Italic*	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}$	$x^2+f(x,\frac{a}{b+c})$
Chalkduster	Bold	*Italic*	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}$	$x^2+f(x,\frac{a}{b+c})$
Comic Sans	**Bold**	*Italic*	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}$	$x^2+f(x,\frac{a}{b+c})$
Papyrus	**Bold**	*Italic*	SMALL CAPS	$\mathbb{C}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \mathbb{Z}$	$x^2+f(x,\frac{a}{b+c})$

Figure 1. Emulation of bold, italic, small capitals and blackboard bold.

* These declinations are already supported by the original font.

Superposition.

$$+, - \quad \longrightarrow \quad \pm$$

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Clipping.

$\mapsto, \twoheadrightarrow \longrightarrow \shortmid, \twoheadrightarrow \longrightarrow \mapsto\!\!\!\twoheadrightarrow$

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$$+, - \longrightarrow \pm$$

Clipping.

$$\mapsto, \twoheadrightarrow \longrightarrow \vdash, \twoheadrightarrow \longrightarrow \mapsto\!\!\!\twoheadrightarrow$$

Linear transformations.

$$O, I \longrightarrow o, I \longrightarrow \Phi$$

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Simple graphical constructs. Lines, circles, ...

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Ad hoc operations.

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Ad hoc operations.

Figure 2. Emulation of various mathematical symbols in various fonts.

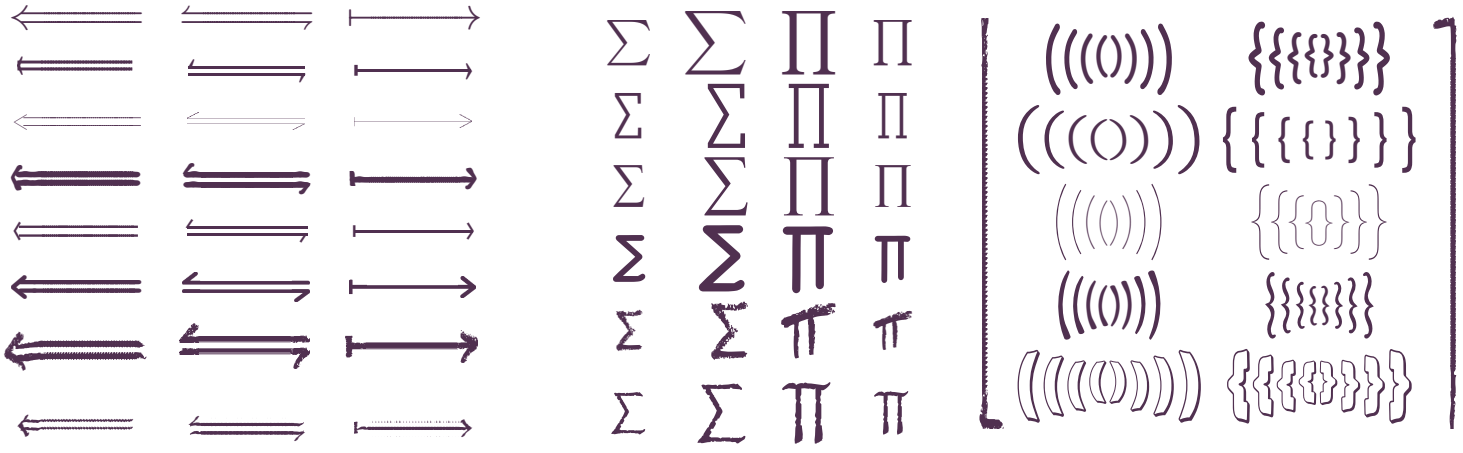

Figure 3. Assorted rubber symbols from various fonts.

Main news.

Medium quality scientific typesetting possible using a variety of fonts.

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Fingerprint of a font.

Reconstruction of essentially all mathematical symbols from a few ones:

$$+ \quad = \quad \sim \quad < \quad \prec \quad \subset \quad \rangle \text{ or } \to \quad . \quad \circ \quad \hat{} \quad (\quad [\quad \{$$

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To do.

- Toolkit for automatic analysis of fonts.
- Toolkit for automatic transformations of fonts.
- Systematically base such toolkits on vector graphics.