The TeXPower bundle

TeXPower Example: Package `tpslifonts`

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This is the demonstration document for `tpslifonts`, TEXPower's slide fonts configuration package.

Beamer and overhead presentations are often viewed under peculiar circumstances. Especially for presentations which are projected directly 'out of the computer', low power of the beamer, low resolution and an abundance of colors can lead to severe readability problems.

It is therefore of utmost importance to optimize font selection as much as possible towards *readability*.

The package `tpslifonts` offers a couple of 'harmonising' combinations of text and math fonts from the (distant) relatives of computer modern fonts, with a couple of extras for optimising readability.

The package offers the following features:

1. Text fonts from computer modern roman, computer modern sans serif, SliTEX computer modern sans serif, computer modern bright, or concrete roman.
2. Math fonts from computer modern math, computer modern bright math, or Euler fonts.
3. Support of additional symbol fonts like AMS symbols or doublestroke.
4. All fonts configured for ‘smooth scaling’ (like in the `type1cm` package).
5. Avoiding fonts not freely available in Type 1 format.
6. Careful design size selection for optimum readability.

In the following, the fonts configured by this package are listed, augmented by font samples and some larger examples which hopefully allow to review the configuration parameters.

Note that there are a couple of options and parameter settings in the preamble of `slifontsexample.tex` which allow to try different configuration variants.

This document has been typeset using T1 font encoding.

1 Text Fonts

Package `tpslifonts` has configured the following text fonts:

European Computer Modern Roman Medium (`ecrm`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Roman Slanted (`ecsl`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Text Italic (`ecti`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Caps and Small Caps (`eccc`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Bold Extend Roman (`ecbx`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Roman Bold (Non-Extended) (`ecrb`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Bold Extended Text Italic (`ecbi`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Bold Extended Slanted Roman (`ecbl`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Bold Extended Caps and Small Caps (`ecxc`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Unslanted Italic (`ecui`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Dunhill Roman (`ecdh`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Fibonacci Font (`ecfb`):

The quick brown fox jumps over the lazy dog.

European Computer Modern Fibonacci Slanted Font (`ecfs`):

The quick brown fox jumps over the lazy dog.

2 Typewriter Fonts

Package `tpslifonts` has configured the following typewriter fonts:

European Computer Modern Typewriter (`ectt`):

`The quick brown fox jumps over the lazy dog.`

European Computer Modern Italic Typewriter Text (`ecit`):

`The quick brown fox jumps over the lazy dog.`

European Computer Modern Slanted Typewriter Text (`ecst`):

`The quick brown fox jumps over the lazy dog.`

European Computer Modern Typewritr Caps and Small Caps (`ectc`):

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG.

3 Math Fonts

The main math fonts are derived from the Computer Modern Math fonts.

Operators, digits, some symbols and upper case greek letters are taken from Computer Modern Roman (`cmr`):

$\min \max \sup \lim 12345 + = \Phi\Pi\Gamma\Theta$

Latin and lower case greek letters and some symbols are taken from Computer Modern Math Italic (`cmmi`):

$abcdABCD > / < \alpha\beta\gamma\delta$

Symbols and calligraphic letters are taken from Computer Modern Math Symbols (`cmsy`):

$\mathcal{ABC} - * \div \equiv \leq \forall \cap \cup \nabla \neq$

Large and growing symbols are taken from Computer Modern Math Extension (`cmex`).

$$\left(\begin{matrix}\left\{\bigcup\bigoplus\right\}\\ \displaystyle\sum\\ \left[\displaystyle\prod_{\biguplus}\right]\end{matrix}\right)$$

Fraktur letters, blackboard bold letters, and a lot of additional math symbols are taken from the AMS math fonts (`msam`, `msbm`, `eufm`):

$\mathfrak{a}\mathfrak{b}\mathfrak{c}\mathfrak{d}\mathfrak{A}\mathfrak{B}\mathfrak{C}\mathfrak{D}\mathbb{N}\mathbb{Z}\mathbb{Q}\mathbb{R}\ \Cap\ \boxtimes\ \gtrapprox\subseteqq\nsubseteq\curvearrowright\ \complement\varnothing$

Additional math symbols are taken from St Mary's Road symbol font (`stmary`):

$\boxast\ \merge\ \nplus\olessthan\ \subsetpluseq\ \lightning$

Additional symbols are taken from Waldis symbol font (`wasy`):

$\oiint$ ‰ ☎ $\diameter$ ☺ ♀ ♂

Upper case script letters are taken from Ralph Smith Formal Script (`rsfs`):

$\mathscr{A}\mathscr{B}\mathscr{C}\mathscr{D}\mathscr{E}\mathscr{F}\mathscr{G}\mathscr{H}\mathscr{I}\ \mathscr{J}\ \mathscr{K}\ \mathscr{L}\ \mathscr{M}\ \mathscr{N}\ \mathscr{O}\ \mathscr{P}\ \mathscr{Q}\mathscr{R}\mathscr{S}\ \mathscr{T}\ \mathscr{U}\ \mathscr{V}\ \mathscr{W}\ \mathscr{X}\ \mathscr{Y}\ \mathscr{Z}$

Double stroke letters are taken from Doublestroke Font (dsss):

$\mathbb{A}\mathbb{B}\mathbb{C}\mathbb{D}\mathbb{E}\mathbb{F}\mathbb{G}\mathbb{H}\mathbb{I}\mathbb{J}\mathbb{K}\mathbb{L}\mathbb{M}\mathbb{N}\mathbb{O}\mathbb{P}\mathbb{Q}\mathbb{R}\mathbb{S}\mathbb{T}\mathbb{U}\mathbb{V}\mathbb{W}\mathbb{X}\mathbb{Y}\mathbb{Z}\mathbb{1}\mathbb{h}\mathbb{k}$

3.1 Math Examples

Next, some examples of math formulae so you can see how the fonts work together (translations from german done by me).

From The Book.

(D) The functions f and g fulfil the same functional equation: $f\left(\frac{x}{2}\right) + f\left(\frac{x+1}{2}\right) = 2f(x)$ and $g\left(\frac{x}{2}\right) + g\left(\frac{x+1}{2}\right) = 2g(x)$.

For $f(x)$, we obtain this from the addition formulas for the sine and cosine:

$$f\left(\frac{x}{2}\right) + f\left(\frac{x+1}{2}\right) = \pi\left[\frac{\cos\frac{\pi x}{2}}{\sin\frac{\pi x}{2}} - \frac{\sin\frac{\pi x}{2}}{\cos\frac{\pi x}{2}}\right]$$

$$= 2\pi\frac{\cos\left(\frac{\pi x}{2} + \frac{\pi x}{2}\right)}{\sin\left(\frac{\pi x}{2} + \frac{\pi x}{2}\right)} = 2f(x).$$

The functional equation for g follows from

$$g_N\left(\frac{x}{2}\right) + g_N\left(\frac{x+1}{2}\right) = 2g_{2N}(x) + \frac{2}{x+2N+1}.$$

From an undergrad book on calculus.

$$c_k = \frac{1}{2\pi}\int_0^{2\pi} f(x)e^{-\mathrm{i}kx}\,\mathrm{d}x = \frac{1}{2\pi}\sum_{j=1}^{r}\int_{t_{j-1}}^{t_j} f(x)e^{-\mathrm{i}kx}\,\mathrm{d}x$$

$$= \frac{-\mathrm{i}}{2\pi k}\int_0^{2\pi} \varphi(x)e^{-\mathrm{i}kx}\,\mathrm{d}x = \frac{-\mathrm{i}\gamma_k}{k}.$$

As for all $\alpha, \beta \in \mathbb{C}$, $|\alpha\beta| \leq \frac{1}{2}\left(|\alpha|^2 + |\beta|^2\right)$, it holds that

$$|c_k| \leq \frac{1}{2}\left(\frac{1}{|k|^2} + |\gamma_k|^2\right).$$

From the convergence of $\sum_{k=1}^{\infty}\frac{1}{k^2}$ and $\sum_{k=-\infty}^{\infty}|\gamma_k|^2$, it follows that

$$\sum_{k=-\infty}^{\infty}|c_k| < \infty.$$

From an undergrad book on calculus (2nd volume).

By FUBINI's theorem,

$$\int_{Z_\varepsilon} \operatorname{div} F \,\mathrm{d}x = \sum_{k=1}^{n} \underbrace{\int_{Q'} \left(\int_{-\infty}^{h\left(x'\right)-\varepsilon} \partial_k F_k\left(x', x_n\right) \,\mathrm{d}x_n \right) \mathrm{d}x'}_{=:I_k}. \tag{9}$$

Evaluation of I_k: Obviously,

$$I_n = \int_{Q'} F_n\left(x', h(x' - \varepsilon)\right) \,\mathrm{d}x'.$$

In the case $1 \le k \le n-1$, we employ the identity

$$\partial_k \left(\int_{-\infty}^{h\left(x'\right)-\varepsilon} F_k\left(x', x_n\right) \,\mathrm{d}x_n \right) = \int_{-\infty}^{h\left(x'\right)-\varepsilon} \partial_k F_k\left(x', x_n\right) \,\mathrm{d}x_n + F_k\left(x', h(x' - \varepsilon)\right) \cdot \partial_k h\left(x'\right).$$

From a book on functional analysis.

Definition 25 Let $\mathcal{C}$ and $\mathcal{D}$ be categories and $\mathcal{F}, \mathcal{G}$ functors from $\mathcal{C}$ into $\mathcal{D}$. A mapping $\eta : \mathrm{Ob}\,\mathcal{C} \to \mathrm{Mor}\,\mathcal{D}$ is called a natural transformation between $\mathcal{F}$ and $\mathcal{G}$ if

(i) $\forall A \in \mathrm{Ob}\,\mathcal{C} : \eta(A) \in \mathrm{Mor}_{\mathcal{D}}\big(\mathcal{F}(A), \mathcal{G}(A)\big)$

(ii) $\forall A, B \in \mathrm{Ob}\,\mathcal{C}\ \forall f \in \mathrm{Mor}_{\mathcal{C}}(A, B)$:

$$\begin{tikzcd} \mathcal{F}(A) \arrow[r, "\mathcal{F}(f)"] \arrow[d, "\eta(A)"'] & \mathcal{F}(B) \arrow[d, "\eta(B)"] \\ \mathcal{G}(A) \arrow[r, "\mathcal{G}(f)"'] & \mathcal{G}(B) \end{tikzcd} \quad \text{or} \quad \begin{tikzcd} \mathcal{F}(A) \arrow[d, "\eta(A)"'] & \mathcal{F}(B) \arrow[l, "\mathcal{F}(f)"'] \arrow[d, "\eta(B)"] \\ \mathcal{G}(A) & \mathcal{G}(B) \arrow[l, "\mathcal{G}(f)"] \end{tikzcd}$$

respectively, commute, if $\mathcal{F}, \mathcal{G}$ are covariant or contravariant, respectively.

This is denoted as $\eta : \mathcal{F} \to \mathcal{G}$. Such a natural transformation is called a natural equivalence between $\mathcal{F}$ and $\mathcal{G}$ if $\eta(A)$ is an isomorphism for every $A \in \mathrm{Ob}\,\mathcal{C}$.

From an undergrad book on linear algebra.

Step 2. Determine an eigenvector v_2 for an eigenvalue λ_2 of F_2 (λ_2 is also an eigenvalue of F_1). Next, determine a $j_2 \in \{1, \dots, n\}$ such that

$$\mathfrak{B}_3 := (v_1, v_2, w_1, \dots, \widehat{w_{j_1}}, \dots, \widehat{w_{j_2}}, \dots, w_n)$$

is a base of V.

Next, calculate

$$M_{\mathfrak{B}_3}(F) = \begin{pmatrix} \lambda_1 & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ 0 & \lambda_2 & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & 0 & & & & & \\ \cdot & \cdot & & & & & \\ \cdot & \cdot & & & A_3 & & \\ \cdot & \cdot & & & & & \\ 0 & 0 & & & & & \end{pmatrix}.$$

If $W_3 := \operatorname{Span}(w_1, \dots, \widehat{w_{j_1}}, \dots, \widehat{w_{j_2}}, \dots, w_n)$, then A_3 determines a linear mapping $F_3 : W_3 \to W_3$.

From an undergrad book on linear algebra (2nd volume).

Remark. If $(Y_i)_{i\in I}$ is a family of affine subspaces Y_i of an affine space X, then

$$Y := \bigcup_{i\in I} Y_i \subset X$$

is again an affine subspace. If $Y \neq \emptyset$, then

$$T(Y) = \bigcup_{i\in I} T\left(Y_i\right).$$

Proof. For $Y = \emptyset$, nothing is to be proved. Otherwise, there is a fixed point $p_0 \in Y$ such that

$$\begin{aligned} T(Y) &= \left\{ \overrightarrow{p_0 q} \in T(X) \,\middle|\, q \in \bigcup_{i\in I} Y_i \right\} \\ &= \bigcup_{i\in I} \left\{ \overrightarrow{p_0 q} \in T(X) \,\middle|\, q \in Y_i \right\} = \bigcup_{i\in I} T\left(Y_i\right). \end{aligned}$$

From this, both claims follow.

From a book on measure theory.

Analogously, the general associativity of σ-Algebra products is shown, that is

$$(23.12)\qquad \left(\bigotimes_{i=1}^{m} \mathscr{A}_i\right) \otimes \left(\bigotimes_{i=m+1}^{n} \mathscr{A}_i\right) = \bigotimes_{i=1}^{n} \mathscr{A}_i \quad (1 \le m < n).$$

Statement (23.11) allows to prove the existence of the product measure for all $n \geq 2$ by induction.

23.9 Theorem *For σ-finite measures $\mu_1, \ldots, \mu_n$ on $\mathscr{A}_1, \ldots, \mathscr{A}_n$, there exists exactly one measure π on $\mathscr{A}_1 \otimes \cdots \otimes \mathscr{A}_n$ such that*

$$(23.13)\qquad \pi\,(A_1 \times \cdots \times A_n) = \mu_1(A_1) \cdot \cdots \cdot \mu_n(A_n)$$

for all $A_i \in \mathscr{A}_i$ $(i = 1, \ldots, n)$. Here, π is also σ-finite.

From a book on probability theory.

17.3 Lemma *If T takes values exclusively from $\mathbb{N}$, then X_T is an $\mathscr{F}_T$-measurable random variable with values in $(\Omega', \mathscr{A}')$. If only $P\{T < +\infty\} = 1$ holds, then up to P-almost certain equality there exists exactly one $\mathscr{F}_T$-measurable random variable X^* with values in $(\Omega', \mathscr{A}')$ which fulfils the condition*

$$X^*(\omega) = X_{T(\omega)}(\omega) \quad \textit{for all } \omega \in \{T < \infty\}. \tag{17.7}$$

Proof. It suffices to treat the second case and provide an $\mathscr{F}_T$-measurable random variable fulfilling the given condition. To this end, choose an arbitrary $\omega' \in \Omega'$. We set

$$X^*(\omega) := \begin{cases} X_{T(\omega)}(\omega), & \omega \in \{T < \infty\}, \\ \omega', & \omega \in \{T = \infty\}. \end{cases}$$

For every $A' \in \mathscr{A}'$, it is to be proved that $A := \{X^* \in A'\}$ is an element of $\mathscr{F}_T$.

From my MSc Thesis.

If we expand equations (4.102) and (4.103), we get

$$
\begin{aligned}
&\left(\sum_{q\in\mathrm{PV}} \max\left(M(q), M(\neg q)\right)\right) - \delta \\
&= \sum_{\substack{q\in\mathrm{PV}\\ q\neq p}} \max\begin{pmatrix} \frac{m}{M'_{>s}(\neg p)}\cdot M'_{>s}(q) + \frac{m}{M'_s(p)}\cdot M'_s(q), \\ \frac{m}{M'_{>s}(\neg p)}\cdot M'_{>s}(\neg q) + \frac{m}{M'_s(p)}\cdot M'_s(\neg q) \end{pmatrix} \\
&\quad - \frac{m}{M'_{>s}\left(\neg p\right)}\cdot \delta'_{>s} - \frac{m}{M'_s\left(p\right)}\cdot \delta'_s \\
&\quad - \left(\frac{m}{M'_{>s}\left(\neg p\right)} - 1\right)\cdot r_1 - \left(\frac{m}{M'_s\left(p\right)} - 1\right)\cdot r_2 \\
&\quad - \max(r_1, r_2) + m
\end{aligned}
$$

From my PhD Thesis.

By Lemma 2.2.7,

$$ {}^{d}\overline{a} \uplus {}^{d'}\overline{b} = {}^{\left(d \curlyvee \delta\left({}^{d'}\overline{b}\right)\right)}\overline{a \sqcap \alpha\left({}^{d'}\overline{b}\right)}. $$

Furthermore,

$$ d \preccurlyeq d \curlyvee \delta\left({}^{d'}\overline{b}\right), $$

$$ a \sqcap \alpha\left({}^{d'}\overline{b}\right) \sqsubseteq a. $$

From this,

$$ {}^{d}\overline{a} \subseteqq {}^{d}\overline{a} \uplus {}^{d'}\overline{b} $$

follows by (2.3).