Gelasiomath

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The newest versions of `newtx.sty` and `newtxmath.sty` and the new `gelasiomath.sty` provide support for the `Gelasio` text fonts and the associated `gelasio` package. Its main features are:

- Math support for `gelasio`;
- small caps (regular, italic, bold and bold italic) for `gelasio` by means of a work-around using `XCharter` small caps enlarged by 2%;
- access to numerator, denominator and inferior figures from `pdflatex`. (The `Gelasio` fonts have these figures but `gelasio.sty` does not offer support for them under `pdflatex`.)
- Math figures are lining, rather than simply following the text figure style, which is, by default, oldstyle. E.g., `$1X$` gives $1X$, not $1X$.

The simplest and most capable way to use these support macros is through the small `gelasiomath` package, which works with all LaTeX engines.

```
\usepackage[<options>]{gelasiomath}
```

The only options handled directly by `gelasiomath` are `scale` and `scosf`. The `scale` option sets appropriate scales for `gelasio`, `xcharter` and `newtxmath`, taking into account that `gelasio` requires a reduction by the factor `.92` to match `newtxmath`. Option `scosf` specifies that figures in amall caps should be transformed to oldstyle, no matter what the figure style for `gelasio` was set to.

All other options added to `gelasiomath` are passed along to `gelasio` and `newtxmath`. E.g., to use `gelasio` with lining figures except in small caps, at its natural size with matching math scale, you could write

```
\usepackage[scale=1.087,lining,scosf]{gelasiomath}
```

The insertion of `xcharter` small caps is complicated by the fact that xcharter capital letters are not a good match for gelasio capitals, and figures are an even worse mismatch. In `gelasiomath`, LaTeX's font switch `\scshape` is redefined to `xcharter` small caps at the appropriate scale, and

this in turn leads to a corresponding change of the macro \textsc. The following table illustrates the problems with capitals and figures.

Source	Typeset source	Comments
Reg. 2345 {\scshape SmCap 2345}	Reg. 2345 SmCap 2345	figures do not match
Reg. 2345 {\scshape SmCap} 2345	Reg. 2345 SmCap 2345	Caps not good match
S{\scshape mall} C{\scshape ap}	Small Cap	Better IMO

The macro \textsc is left as is and a new macro \textSC is defined so as to exclude capitals and figures from the font change to xcharter, making use of an expl3 regex method I learned from a posting by Enrico Gregorio. (The regex tries to find all capitals in the argument string—this depends on the use of macros to specify non-ASCII capitals.) I found no way to make an equivalent font switch \SCshape. The following lines compare the effects of \textSC versus \textsc for regular, italic, bold and bold italic.

Small Caps 2345 v. Small Caps 2345
Small Caps 2345 v. Small Caps 2345
Small Caps 2345 v. Small Caps 2345
Small Caps 2345 v. Small Caps 2345

Users of XeLaTeX/LuaLaTeX will have to contend with irritating LaTeX Font Warnings about TU/Gelasio(?)/m/sc[it] being undefined, but the output will be correct.

New Text Commands:

- In unicode tex, font switches \nufigures, \defigures and \infigures are defined for numerators, denominators and inferiors as well as the corresponding macros \textnum, \textde, and \textinf.
- (All engines) \textlf, \texttlf, \textosf, \texttosf give their arguments in lining figures, tabular lining figures, oldstyle figures and tabular oldstyle figures respectively.
- For pdflatex, macros \textnum, \textde, and \textinf are provided, but not the corresponding font switch commands. (These work by changing the baseline of the superior figures.)
- A \textfrac macro is provided, intended for regular weight only. E.g., \textfrac{3}{16} gives 3⁄16 and \textfrac[2]{3}{16} gives 2 3⁄16.
- There is a stacked fraction macro, \textsfrac. E.g., \textsfrac[1]{7}{32} gives $1\frac{7}{32}$. See the documentation for newtx for details about the options available. The small denominator figures have configurable size and are made available for general use with the macro \textsmde.

See the documentation for the newtx package for detailed information about math typesetting,

bearing in mind that `gelasiomath` takes care of loading `gelasio` and `newtxmath`. Here is a sample basic preamble using unicode latex.

```
% !TEX TS-program = lualatex
\documentclass[11pt,leqno]{article}
\usepackage[margin=1in]{geometry}
\usepackage[parfill]{parskip}
\usepackage{array,booktabs}
\usepackage[T1]{fontenc} % Active encoding for use in math text
\usepackage[type1,sfdefault,scale=1]{sourcesanspro}% used by \mathsf
\usepackage[scaled=.98,varqu,varl]{zi4} % for \mathtt
% the next line loads fontspec
\usepackage[amsthm,vvarbb,scosf]{gelasiomath}
%\setmonofont and \setsansfont could be set here if
% necessary for use in text passages
```

Here is a well-known nonsense fragment from *The TeXBook*.

With a price of £148, almost anything can be found Floating In **Fields**. — ¿But aren't Kafka's Schloß and Æsop's Œuvres often *naïve* vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés?

The following is borrowed from *The LaTeX Companion Third Edition*.

First some large operators both in text: $\iiint\limits_{Q} f(x,y,z)\,dx\,dy\,dz$ and $\prod_{\gamma\in\Gamma_{\widetilde{C}}}\partial(\widetilde{X}_\gamma)$; and also on display:

$$\begin{aligned}\iiiint\limits_{\mathbf{Q}} f(w,x,y,z)dwdxdydz &\leq \oint_{\partial Q} f\left(\max\left\{\frac{\|w\|}{|w^2+x^2|};\frac{\|z\|}{|y^2+z^2|};\frac{\|w\oplus z\|}{\|x\oplus y\|}\right\}\right)\\ &\precapprox \biguplus_{\mathbb{Q}\in\tilde{\mathbf{Q}}}\left[f^*\left(\frac{\lfloor\mathbb{Q}(t)\rfloor}{\sqrt{1-t^2}}\right)\right]_{t=\alpha}^{t=\vartheta} - (\Delta+\nu-\nu)^3\end{aligned} \tag{1}$$

For x in the open interval $]-1,1[$ the infinite sum in Equation (2) is convergent; however, this does not hold throughout the closed interval $[-1,1]$.

$$(1-x)^{-k} = 1+\sum_{j=1}^{\infty}(-1)^j\left\{{k \atop j}\right\}x^j \quad \text{for } k\in\mathbb{N};\, k\neq 0. \tag{2}$$