

# Can L<sup>A</sup>T<sub>E</sub>X Profiles be Rendered Adequately with Static CSS?

*William F. Hammond*

San Diego

TUG 2014

Portland Oregon

July 2014

**Abstract**

**Can L<sup>A</sup>T<sub>E</sub>X Profiles be Rendered Adequately with Static CSS?**

*MathJax* demonstrates that heavy customization of CSS with JavaScript and webfonts provides good platform-dependent rendering. The issue with *MathJax* is speed, not quality. There has been and continues to be intense development with CSS. One may speculate that, as CSS continues to evolve, static CSS may entirely suffice not only for HTML documents but also for the direct online rendering of profiled L<sup>A</sup>T<sub>E</sub>X documents when presented using XML syntax.

## 1 Disclaimer



**This is about Work in Progress**

- CSS: *cascading style sheets*
- CSS is “designer language” for XML (and HTML)
- Author not an expert on CSS
- CSS itself is under development, particularly with respect to vertical alignment
- CSS styling of XML (math in particular) has improved greatly in the last 5 years

## 2 About These Slides

**These slides are an example of the subject of the talk.**

source markup	profilesViaCss.glm
Latin Modern XML	profilesViaCss-lm.xml
XITS XML	profilesViaCss-xi.xml
GNU Freefont	profilesViaCss-gf.xml

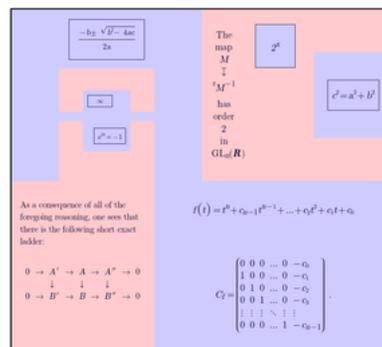
(Files are at <http://www.albany.edu/~hammond/presentations/Tug2014/>)

### 3 A Thematic Poster

Frivolity. Empty colored flexible rows and columns were drawn somewhat haphazardly. Some boxes were given borders, but many were not. Finally little bits of mathematics were entered.

CSS Flexible Box Scatter Painting  
`fscratch-lm.html`

(This poster was written in HTML rather than in profiled L<sup>A</sup>T<sub>E</sub>X, but it relies only on static CSS.)



`fscratch-poster.png`

### 4 A calculus handout

Online notes on the Gamma function from an honors freshman calculus class that I taught in 1995

- CSS with Latin Modern  
`gamma-lm.xml`
- CSS with Times-like “XITS”  
`gamma-xi.xml`
- CSS with GNU Free Font  
`gamma-gf.xml`

These three fonts are nearly consistent with respect to CSS. Aside from font invocation, the variations have to do with margin settings for

- `\sqrt` (radical symbol and index).
- `\overset` and `\underset`.
- the eight math accents in the profile.

## 5 Handling of Fractions

Fractions are handled as CSS tables. BUT

- Must be treated as if `\frac{{a}}{{b}}` so that the 2 x 1 table has both rows and cells
- Bar in middle is “collapsed” common horizontal border (the “row” role)
- Content of numerator & denominator must be allowed to contain fractions (the “cell” role)
- Wanted: a CSS model for columns

## 6 Nested Parentheses

Compare

- profiled  $\LaTeX$  via CSS  
`nesting-lm.xml`
- profiled  $\LaTeX$  via MathJax  
`nesting.html`
- profiled  $\LaTeX$  via pdflatex  
`nesting.pdf`

## 7 Handling of Parentheses

- Implemented as CSS borders using `border-radius`.
- Perfectly-sized.
- This approach not presently useable with brackets and braces.

See `gamma-lm.xml`

$$\begin{aligned}\psi(x) + \frac{1}{x} &= \sum_{k=1}^{\infty} \left( \log \left( 1 + \frac{1}{k} \right) - \frac{1}{k} \right) \\ &= \lim_{n \rightarrow \infty} \sum_{k=1}^n \left( \log \frac{k+1}{k} - \frac{1}{k} \right) \\ &= \lim_{n \rightarrow \infty} \left( \log(n+1) - \sum_{k=1}^n \frac{1}{k} \right) \\ &= \lim_{n \rightarrow \infty} \left( \log(n+1) - \sum_{k=1}^n \frac{1}{k} + \sum_{k=1}^n \left( \frac{1}{k} - \frac{1}{x+k} \right) \right) \\ &= \lim_{n \rightarrow \infty} \left( \log(n+1) - \sum_{k=1}^n \frac{1}{k} + x \sum_{k=1}^n \frac{1}{k(x+k)} \right) \\ &= -\gamma + x \sum_{k=1}^{\infty} \frac{1}{k(x+k)},\end{aligned}$$

`dloggamma.png`

## 8 Math that is challenging to set

Maintaining vertical alignment is a challenge for things like infinite series, oversets, math accents, and especially for fractions.

Lots of examples:

- CSS with Latin Modern  
`diffic-lm.xml`
- CSS with XITS  
`diffic-xi.xml`
- CSS with GNU Free Font  
`diffic-gf.xml`
- MathML via MathJax's HTML/CSS  
`diffic.html`
- MathML via “native” rendering  
`diffic.xhtml`
- PDF made by pdflatex  
`diffic.pdf`

## 9 CSS Flexible Boxes

In the second instance the flexible rows have blue horizontal borders, while the flexible columns have red vertical borders.

- A Few Examples  
`smcssd1-lm.xml`
- Again with markings  
`smcssd2-lm.xml`

## 10 Typesetting on paper

Shouldn't  $\text{\LaTeX}$  engines be taught to typeset profiled  $\text{\LaTeX}$  with CSS? A good CSS engine gives one fine control of margins, borders, and padding.

## 11 The CSS Future

- **Disclaimer:** I know relatively little about CSS.
- There is a very large amount of CSS development under way at W3C.  
See <http://www.w3.org/Style/CSS/>.
- I have a CSS Wish List  
`cssWishes-1m.xml`.

**END**