Through the looking glass, and what Joseph found there

Joseph Wright

IAT_EX Project

The **xfp** package Floating Point Unit

The LAT_EX3 Project[∗]

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This package provides a $L^3T_EX_{2c}$ document-level interface to the $L^3T_EX_3$ floating point unit (part of expl3). It also provides a parallel integer expression interface for convenience.

 \fpeval *
 The expandable command \fpeval takes as its argument a floating point expression and produces a result using the normal rules of mathematics. As this command is expandable it can be used where TpX requires a number and for example within a low-level \edef operation to give a purely numerical result.

Briefly, the floating point expressions may comprise:

The $\[Mathebar{E}T_{E}X 2_{\mathcal{E}}\]$ environment

- picture mode

The $\[Mathbb{E}\] X 2_{\mathcal{E}}$ environment

- picture mode
- color and graphicx
- pdftex.def, etc.

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- xxcolor, colorspace, ...

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LICENSE	GitHub-friendly license file			6 months ago	
E README.md	Release date			4 months ago	
🗎 build.lua	Tidy up build script			5 months ago	
dvipdfmx.def	Support for bitmap decode arrays			4 months ago	
dvips.def	Use private space macro (fixes #11)			4 months ago	
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Colo(u)r expressions

2.3.2 Meaning of standard color expressions

We explain now how an expression

 $\langle prefix \rangle \langle name \rangle ! \langle pct \rangle_1 ! \langle name \rangle_1 ! \langle pct \rangle_2 ! \dots ! \langle pct \rangle_n ! \langle name \rangle_n \langle postfix \rangle$

is being interpreted and processed:

- First of all, the model and color parameters of (name) are extracted to define a temporary color (temp). If (posfiz) has the form '!! ((num))', then (temp) will be the corresponding (direct-accessed) color (num) from the series (name).
- Then a color mix, consisting of ⟨pct⟩₁% of color ⟨temp⟩ and (100 − ⟨pct⟩₁)% of color ⟨name⟩₁ is computed; this is the new temporary color ⟨temp⟩.
- The previous step is being repeated for all remaining parameter pairs ((pct)₂,(name)₂),..., ((pct)_n,(name)_n).
- If (prefix) consists of an odd number of minus signs '-', then (temp) will be changed into its complementary color.
- If (postfix) has the form '!!+', '!!++', '!!+++', etc., a number of step commands (= number of '+' signs) are performed on the underlying color series (name). This has no consequences for the color (temp).
- Now the color (temp) is being displayed or serves as an input for other operations, depending on the invoking command.

Note that in a typical step 2 expression (temp)!(pct),.!(name),., if (pct),.=100

Model interconversion

- Red-Green-Blue
- Cyan–Magenta–Yellow–blacK
- Grayscale
- Spot color

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Interconversion is non-trivial!

Motivation

- 'Feature complete' aims of expl3

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- 'Feature complete' aims of expl3
- API consistency
- Exploit expl3 features: the FPU

Drawing layers

Layer			
System			
Base			
Interface			

Drawing layers

Layer	Tikz/pgf
System	\pgfsys@moveto
Base	\pgfpathmoveto
Interface	\draw

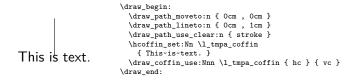
Drawing layers

Layer	Ti <i>k</i> z/pgf	l3draw
System	\pgfsys@moveto	\driver_draw_moveto:nn
Base	\pgfpathmoveto	\draw_path_moveto:n
Interface	\draw	—

Drawing

```
\draw_begin:
\draw_path_corner_arc:nn { 4pt } { 4pt }
\draw_path_moveto:n
    { \draw_point_polar:nn { 0 } { 1cm } }
    \int_step_inline:nnnn { 72 } { 72 } { 359 }
    {
        \draw_path_lineto:n
        { \draw_path_lineto:n
        { \draw_point_polar:nn { #1 } { 1cm } }
    }
    \draw_path_close:
    \draw_path_use_clear:n { stroke }
    \draw_end:
```

Integration with expl3 concepts



Expandable expressions

- Many core pgf functions working

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- More driver work still required

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- Perhaps an interface to TikZ ...