Xdvipsk: dvips ready for OpenType fonts and more image formats

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premises
predilections
predictions
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Introduction

Motivation

- Continuity of TEX depends on continuity of its friends
- Long living tools keeps users happy
- Stable production requires renovation of old tools
- Modern fonts are pushing dvips aside

Support for more bitmap types

Dvips and OpenType fonts

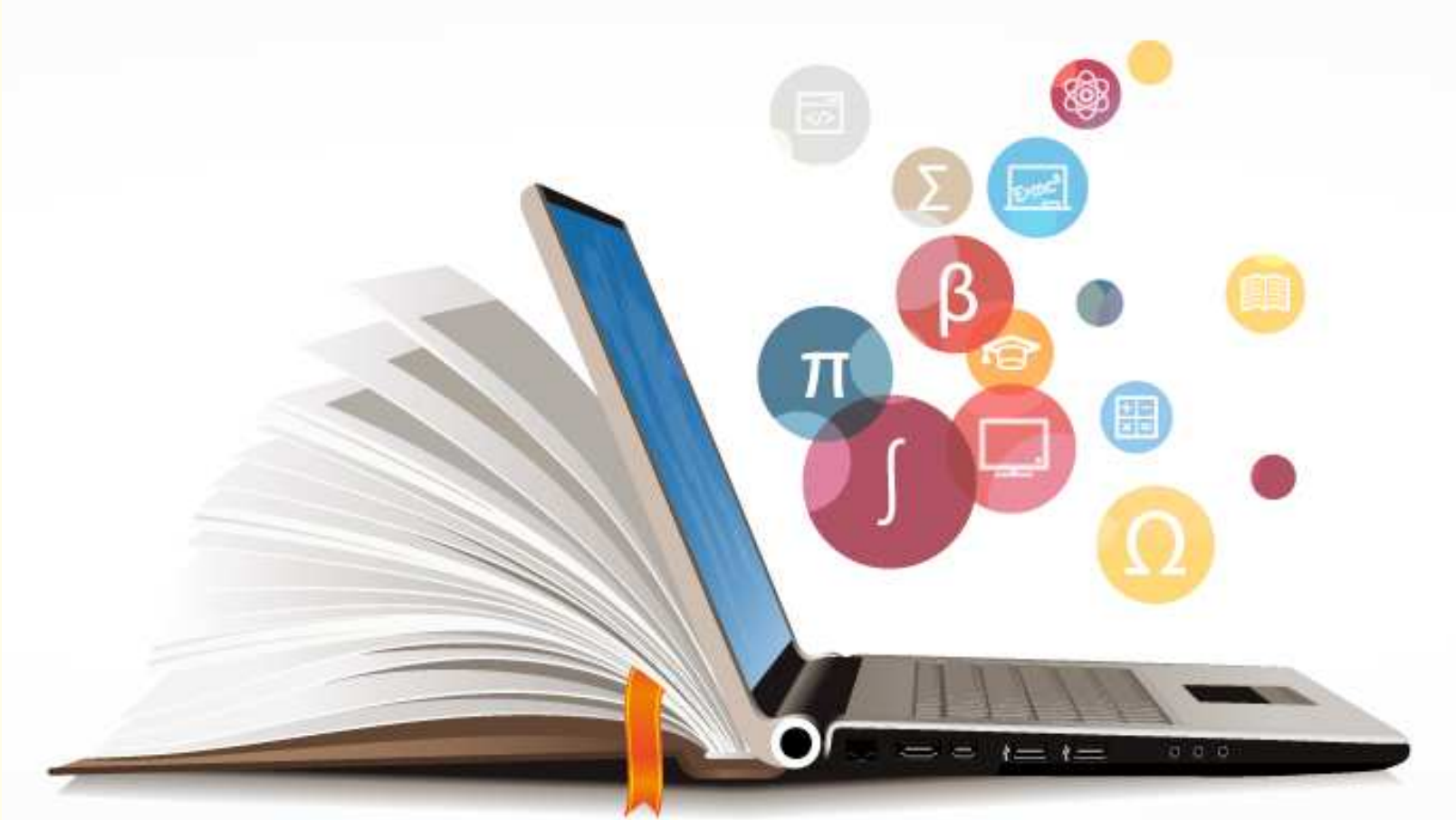
LaTeX-Emacs-AucTeX setup

```
\documentclass[paper=screen,display=slides,
  mode=present,style=elcolors]{powerdot}
```

```
(custom-set-variables
 ...
'(TeX-command-list
  (("LaTeX+dvips"
    "dvilualatex %s.tex ; xdvipsk %d -o %f"
    TeX-run-interactive nil
    (latex-mode)
    :help "Run LaTeX and dvips")
   ("LaTeX+dvips+ps2pdf"
    "dvilualatex %s.tex ; xdvipsk %d -o - | ps2pdf - %s.pdf"
    TeX-run-interactive nil
    (latex-mode)
    :help "Run LaTeX with PStricks to PDF")
    ...
```

Support for more bitmap types

Scale example: R&D logo



```
\includegraphics[width=\textwidth,natwidth=684,
  natheight=387,type=bmp]{vtex-logos/RnD684x387.png}
```

Example: no alpha

- No transparency yet

```
\includegraphics[bb=0 0 153 48,type=bmp]
  {vtex-logos/logo-blue-alpha-153x48.png}
```

Example: no alpha

- No transparency yet

```
\includegraphics[bb=0 0 153 48,type=bmp]
  {vtex-logos/logo-blue-alpha-153x48.png}
```

- With glued layers

```
\includegraphics[bb=0 0 153 48,type=bmp]
  {vtex-logos/logo-blue-153x48.png}
```

BMP scaled: `\includegraphics [scale=.15, natwidth=256, natheight=256] {logos/windows.bmp}`

JPG scaled rotated: `\includegraphics [angle=80, height=40pt, natwidth=256, natheight=256] {logos/jpg.jpg}`

PCX scaled: `\includegraphics [scale=.2, natwidth=360, natheight=216] {logos/pcx.pcx}`

TIFF scaled rotated: `\includegraphics [width=2em, natwidth=256, natheight=256] {logos/opera.tiff}`

```
\includegraphics [angle=30, width=2em,
natwidth=256, natheight=256]
{logos/opera.tiff}
```

What is changed?

In `graphics.sty`, one line added for the driver:

```
\DeclareOption{dvipsx}{\def\Gin@driver{dvipsx.def}}
```

In the driver file (comparing with `dvips.def`) lines

```
\special{em: graph #1,\Gin@urx bp}%
\special{em: graph #1,\Gin@urx bp,\Gin@ury bp}%
```

are changed, respectively, to

```
\special{em: graph #1, \number\Gin@req@width sp}%
\special{em: graph #1, \number\Gin@req@width sp,
\number\Gin@req@height sp}%
```

What is changed?

In the driver file (comparing with `dvips.def`) lines added:

```
\@namedef{Gin@rule@.tif}#1{{bmp}{.tif.bb}{#1}}
\@namedef{Gin@rule@.tiff}#1{{bmp}{.tiff.bb}{#1}}
\@namedef{Gin@rule@.jpeg}#1{{bmp}{.jpeg.bb}{#1}}
\@namedef{Gin@rule@.jpg}#1{{bmp}{.jpg.bb}{#1}}
\@namedef{Gin@rule@.png}#1{{bmp}{.png.bb}{#1}}
```

New options for dvips

```
-g*  write log file
-H*  Turbo mode for PS graphics
-I*  Resize mode for emTeX graphics
-J*  Download OpenType fonts partially
-L*  Extended search for emTeX graphics
-noluatex   Disable LuaTeX extensions
-noToUnicode   Disable ToUnicode CMap file generation
               for OpenType fonts
-Q*  Skip VTeX private specials
```

Dvips and OpenType fonts

Example: Russian

А.А. Гришаев
ЭТОТ «ЦИФРОВОЙ» ФИЗИЧЕСКИЙ МИР

Действительно, для малого тела с массой m и радиусом r, дальность отчуждения $D_{от}$ от большого тела с массой M есть

$$D_{от} = r(M/m)^{1/2}.$$

В таблице приведены рассчитанные по этой формуле дальности отчуждения от Солнца для некоторых малых планет (a — расстояние от Солнца в афелии; справочные данные взяты из [К2]).

Малая планета	r, м	m, кг	a, а.е.	$D_{от}$, а.е.
Церера	$3.5 \cdot 10^5$	$6.0 \cdot 10^{20}$	2.99	0.13
Паллада	$2.3 \cdot 10^5$	$1.8 \cdot 10^{20}$	3.42	0.16
Юнона	$1.1 \cdot 10^5$	$2.0 \cdot 10^{19}$	3.35	0.23
Веста	$1.9 \cdot 10^5$	$1.0 \cdot 10^{20}$	2.57	0.18
Давида	$1.3 \cdot 10^5$	$3.0 \cdot 10^{19}$	3.75	0.22

[К2] Таблицы физических величин. Справочник под ред. акад. И.К. Кикоина. «Атомиздат», М., 1976.

Necessary things for OpenType fonts

1. PostScript header file `texcid.pro`
2. LaTeX package `luafonts`
3. The font name map consisting of triples:
   ⟨*tfm name*⟩␣⟨*ps name*⟩␣><⟨*file name*⟩
4. A character maps generated by `luafonts`:
   ⟨*tex char code*⟩, ⟨*OT font glyph index*⟩, ⟨*unicode equiv*⟩

```
59964,707,00AF
59965,708,00AF
59966,709,00200331
59967,710,0304
59968,711,02DA
59969,712,0020030A0301
59970,713,0020030A0301
59971,714,030A
59972,715,02DC
```

Examples of ⟨*tfm name*⟩

```
FandolFang-Regular
FandolFang-Regular:mode=node;script=latn;language=DFLT;+tlig;
TeXGyreAdventor
TeXGyreAdventor/B
TeXGyreAdventor/BI
TeXGyreAdventor/I
TeXGyreAdventor:mode=node;script=latn;language=DFLT;+pnum;+onum;
[lmroman10-bold]:+tlig;
[lmroman10-italic]:+tlig;
[lmroman10-regular]:+tlig;
```

Examples of ⟨*ps name*⟩


```
FandolFang-Regular
TeXGyreAdventor-Regular
TeXGyreAdventor-Bold
TeXGyreAdventor-BoldItalic
TeXGyreAdventor-Italic
TeXGyreAdventor-Regular
LMRoman10-Bold
LMRoman10-Italic
LMRoman10-Regular
```

Examples of ⟨*file name*⟩

```
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/fandol/FandolFang-
Regular.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/tex-
gyre/texgyreadventor-regular.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/tex-
gyre/texgyreadventor-bold.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/tex-
gyre/texgyreadventor-bolditalic.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/tex-
gyre/texgyreadventor-italic.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/tex-
gyre/texgyreadventor-regular.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/lm/lmroman10-
bold.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/lm/lmroman10-
italic.otf
>$SELFAUTOPARENT/texmf-dist/fonts/opentype/public/lm/lmroman10-
regular.otf
```

Compilation step 1

`dvilualatex` ⟨*article*⟩`.tex`

Input: ⟨*article*⟩`.tex`
`tex/luatex/luafonts/luafonts.sty`
`tex/luatex/luafonts/luafonts.lua`
`...`

Output: ⟨*article*⟩`.dvi`
`.xdvipsk/`⟨*ps name*⟩`.encodings.map`
`...`
`.xdvipsk/`⟨*article*⟩`.opentype.map`

Compilation step 2

`xdvipsk` ⟨*article*⟩`.dvi`:

Input: ⟨*article*⟩`.dvi`
`.xdvipsk/`⟨*ps name*⟩`.encodings.map`
`...`
`.xdvipsk/`⟨*article*⟩`.opentype.map`
`texmf-dist/dvips/base/texcid.pro`
`...`

Output: ⟨*article*⟩`.ps`
`...`
`.xdvipsk/`⟨*article*⟩`-cid`⟨*num*⟩`.tounicode`
`...`

where ⟨*num*⟩ is a font index in the DVI file

Compilation step 3

Call GhostScript or Acrobat
Input: ⟨*article*⟩`.ps`
Output: ⟨*article*⟩`.pdf`

Compilation step 4

Call `make2unc`

Input: ⟨*article*⟩`.pdf`
`...`
`.xdvipsk/`⟨*article*⟩`-cid`⟨*num*⟩`.tounicode`
`...`

Output: ⟨*article*⟩`.pdf` (searchable)

The end

???