No.42

Producing Class Materials with KETCindy

・ Programming Styles, Creating Portal Site and the Evaluation -

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Purpose of my talk

We shall produce a class material with figures on the standard form of the parabola as follows:

A parabola has the focus $F(p, 0)$ and the directrix $l : x = -p$. The standard form of the parabola satisfies the equation

$$y^2 = 4px.$$
Contents of my talk

- What is \textit{K\textsc{ET}Cindy}?
- \LaTeX{} for class materials
- Making figures using \textit{K\textsc{ET}Cindy}
- Conclusion
What is KETCindy?
Many collegiate mathematics teachers use printed materials in their class.

Almost all of them use \texttt{LATeX} in order to produce their class materials.

\texttt{LATeX} can make beautiful formulas.

However, \texttt{LATeX} itself is somewhat hard to dealing with graphics.
Since 2006, KDG (KETpic Development Group) has developed KETpic as a tool to generate LaTeX codes for figures in class materials.

KETpic uses a mathematical software such as Maple, Mathematica initially, and recently, Scilab, R.
In 2010, \texttt{KETpic for Scilab} has been equipped with all functionalities.

Using \LaTeX\ and \texttt{KETpic}, teachers were able to produce printed materials with figures easily and on a daily basis.
**Flow chart of KEtpic system**

KEtpic uses Scilab at the left side and \LaTeX at the right side.
Desire for GUI of KEtpic

- It was hard for teachers to read the KEtpic program made by the other teachers because they wrote it in their own way.

- In 2013, KDG has established with KEtpic programming style in order to write readable KEtpic scripts.
Desire for GUI of \texttt{K\textsc{E}Tpic}

- However, when teachers use \texttt{K\textsc{E}Tpic}, they must write all scripts in the editor before confirming on the screen that the figure is desirable.
- Many teachers have desired a GUI (Graphic User Interface) for use with \texttt{K\textsc{E}Tpic}. 
What is Cinderella?

- **Cinderella** is a DGS (Dynamic Geometry System) package developed by Gebert and Kortenkamp.
- **Cinderella** has two screens; one is the main screen and the other is CindyScript editor.
- **CindyScript** is the programming language of Cinderella.
Birth of KETCindy

- KDG had been exploring the possibility of using Cinderella as a GUI of KETpic.

- KETCindy is a collaboration of KETpic and Cinderella. It is a macro package of CindyScript.

- The first version of KETCindy was released on September 5 in 2014.
Birth of KETCindy

- The main screen of KETCindy works as a GUI of KETCindy, and CindyScript editor as an editor of KETCindy.

- KETCindy can be downloaded from the following web page:
  - http://www65.atwiki.jp/ketcindy (for Japanese)
  - http://www65.atwiki.jp/ketcindy-eng (for English, incomplete)
Flow chart of KETCindy system

KETCindy uses only Cinderella.
KETCindy can do

<table>
<thead>
<tr>
<th></th>
<th>Geometric Figure</th>
<th>s8</th>
<th>Calling R</th>
</tr>
</thead>
<tbody>
<tr>
<td>s1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>s2</td>
<td>Graph of Function</td>
<td>s9</td>
<td>Surface</td>
</tr>
<tr>
<td>s3</td>
<td>Making Table</td>
<td>s10</td>
<td>Calling Maxima</td>
</tr>
<tr>
<td>s4</td>
<td>Bézier Curve</td>
<td>s11</td>
<td>Calling Asir</td>
</tr>
<tr>
<td>s5</td>
<td>3D Figure</td>
<td>s12</td>
<td>Calling Fricas</td>
</tr>
<tr>
<td>s6</td>
<td>Animation</td>
<td>s13</td>
<td>Calling Mesthab</td>
</tr>
<tr>
<td>s7</td>
<td>Slide for Presentation</td>
<td>kepic,ketlayer,ketslide</td>
<td></td>
</tr>
</tbody>
</table>

KETCindy has the above 13 sample folders.
\LaTeX for class materials
Simplified version of \LaTeX

- When \texttt{K\textsc{et}Cindy} is installed, simplified version of \LaTeX is also installed in the folder “kettex”.

- Class materials should be produced by using basic packages because there is a package that affects the other.
Basic packages of \LaTeX are the followings:

- amsmath.sty, amssymb.sty
- graphicx.sty, color.sty

In order to use KETCindy, “ketpic.sty” is needed.

To layout figures, the followings are needed:

- wrapfig.sty, ketlayer.sty
An example of a class material

\documentclass{article}
\usepackage{amsmath,amssymb}
\usepackage{graphicx,color,wrapfig}
\usepackage{ketpic,ketlayer}
\setmargin{20}{20}{20}{20}
\begin{document}
  < the main text >
\end{document}
An example of a class material

Open the \texttt{\LaTeX} main file.
Layer environment

- The layout is important for printed class materials.

- Usual \LaTeX{} also lacks to put various components appropriately.

- KDG has developed ketlayer.sty which includes layer environment.
Layer environment

- In \LaTeX{} main file, scripts are:
  \begin{layer}{xrange}{yrange}
  \putnote{xpos}{ypos}{\input{...}}
  \end{layer}

- Other components doesn’t change the positions.

- Grids are disappeared if yrange\(=\) 0.
An example of a class material

Open the \LaTeX{} main file.
Making figures using KETCindy
Header table using \texttt{K\textsc{ET}Cindy}

We shall produce a \LaTeX\ file “\texttt{headertb.tex}” for the header table using \texttt{K\textsc{ET}Cindy}.

<table>
<thead>
<tr>
<th>Applied Mathematics A</th>
<th>1. Definition of Fourier Series</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Class</td>
<td>No.</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Header table using KETCindy

Open to the cinderella file “headertb.cdy”.
We shall produce a \LaTeX file “parabola.tex” for the figure using K\ETCindy.
The KETCindy web page for Japanese version is

http://www65.atwiki.jp/ketcindy

and the web page for English version is

http://www65.atwiki.jp/ketcindy-eng
Conclusions

- Printed materials are often used in math classes at collegiate level.
- When teachers install KETCindy, they can use LaTeX in order to produce class materials.
- KETCindy makes it easy to make figures and tables inserted into class material.
Thank you for your attention