



Working group

COLLABORATIVE USE OF DGS AND K_ETpic

Setsuo Takato
Toho University

Masataka Kaneko
Toho University

Because of its remarkable publishing features and extensive facilities for automating most aspects of typesetting, TeX has become a major tool for editing printed teaching materials in collegiate mathematics education. So that, to improve the educational effect of such materials, it has become a crucial matter how to combine various necessary factors in higher mathematics education (such as high-quality graphics and flexible page layouts) with TeX capabilities mentioned above.

With respect to the graphics use, the typical methodology is to use graphical editor to generate our artwork and then invoke the resulting image files from TeX. Especially, in case when CAS or DGS are used to generate graphics, their graphical output is usually formatted into EPS or PDF style, and invoked from TeX. This method often causes incompatibilities because image files must comply with a limited set of prescribed format. Moreover, though the graphical output of CAS and DGS is obtained through extensive symbolic calculation and precise numerical calculation, the preciseness in shape and length of its graphical image cannot be guaranteed when they are generated on TeX documents. So that, some of these software have been equipped with the capability to export their graphical outputs into the source code of various graphical packages associated to TeX (such as PSTricks and TikZ). However, because of the indirect connection between each software and TeX graphics capabilities, some extra effort will be needed for flexibly manipulating the resulting image in accordance with teachers' intention.

KETpic has been developed for the purpose of enabling teachers to flexibly use graphics in their teaching materials (edited by TeX). It is a macro package designed for CASs (such as Mathematica, Maple, Matlab, and Scilab) to generate the graphical codes which is originally inherited to TeX (i.e. Tpic specials and pict2e codes). On the one hand, CAS use in KETpic scheme widens its applicable range due to programmability and computability. On the other hand, user friendliness like scrolling 3D-image by mouse dragging can hardly be expected.

With respect to the user friendliness as above, graphics capability of CAS and DGS has superiority. For instance, we can readily choose the appropriate view angle to see 3D shapes. Some DGS has been implemented with rich facilities so that (for example)

- complex shapes can be generated with a few mouse clicks
- its implementations are based on reliable mathematical theory
- high-level programming language is also equipped

These excellent features of DGS seem to match the characteristics of KETpic.

The aim of this working group is to pursue the possibility of collaborative use of DGS and KETpic in order to establish more flexible and handy environment for generating graphics in teaching materials edited by TeX. Besides technical advises, suggestions from educational experience will also be welcomed.



Fifth Central- and Eastern European Conference on
Computer Algebra- and Dynamic Geometry Systems
in Mathematics Education
26-29 September, 2014 Halle (Saale), Germany



KETpic GROUP MEMBERS

