

Fractals in the classroom with CAS and KeTCindy

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We present our project of using Computer Algebra Systems (CAS) and Dynamic Geometry Systems (DGS) in teaching introductory course on Fractals. In our examples we use Wolfram *Mathematica* and KeTCindy.

Mathematica is very powerful CAS, it is easy to use, program codes are clear and compact, it has good graphic capabilities. KeTCindy is a plug-in to DGS Cinderella that generates high-quality TeX graphics. Moreover, KeTCindy makes it possible to import the data calculated or simulated by using other systems (like Maxima, Scilab, and R) and combine them with the graphical data, so that extremely wide range of mathematical objects can be presented.

Classic fractals (Sierpinski gasket, Sierpinski carpet, Mandelbrot set, and others) are used for examples and demonstrations. Different approaches and paradigms are used to construct fractal sets: Game of chaos, Multiple Reduction Copy Machines, and others. We give examples of codes and workbooks making a special stress on using KeTCindy.

Depending on the situation and final goal, both *Mathematica* and KeTCindy can be used in the classroom, or preference could be given to one of the systems. As was mentioned earlier, *Mathematica* is easy to use, but it is expensive and, in a way, it is too easy to use, it doesn't expand horizon for the students. From the other side, KeTCindy is not as easy to start using, but it is free and encourages students (and faculty) to study/use R, Maxima, etc. In addition, some dynamical visualizations seem easier to do with KeTCindy than in *Mathematica*.

Keywords

Fractals, Dynamic Geometry Systems