

MCS 320 Project Three : Plotting Koch Curves

The goal of this project is to use MATLAB or Octave and gnuplot to make plots of Koch curves.

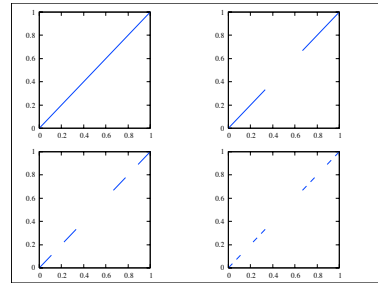
1. Cantor Sets

The Cantor ternary set is obtained by repeatedly deleting the middle third of a line segment.

The picture at right was obtained by the calls to the script `cantor`.

The arguments of `cantor` are two points – the end points of the line segment – and the level of deletions.

The plots are the result of the calls `cantor([0 0],[1 1],0)`, `cantor([0 0],[1 1],1)`, `cantor([0 0],[1 1],2)`, and `cantor([0 0],[1 1],3)`.



Assignment One. Give an implementation of the script `cantor`. Use function `cantor(A,B,k)` as prototype. The line segment has endpoints A and B. The level of recursion equals k.

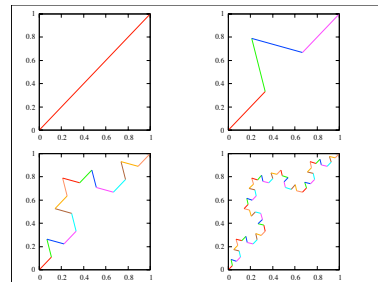
2. Koch Curves

With a Koch curve, the deleted line segment is replaced by a peak of height $\sqrt{3}/6$ times the length of the segment.

The picture at right was obtained by the calls to the script `koch`.

The arguments of `koch` are two points – the end points of the line segment – and the level of deletions.

The plots are the result of the calls `koch([0 0],[1 1],0)`, `koch([0 0],[1 1],1)`, `koch([0 0],[1 1],2)`, and `koch([0 0],[1 1],3)`.



Assignment Two. Give an implementation of the script `koch`. Use function `koch(A,B,k)` as prototype. The line segment has endpoints A and B. The level of recursion equals k.

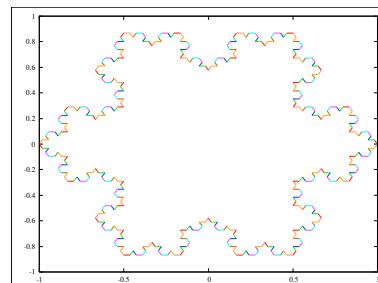
3. Koch Flakes

A bit like a snowflake, we may now define a Koch flake.

The picture at the right was obtained by the calls to the script `koch`.

The end points of the line segments given to `koch` lie at a circle of radius one. The end points of the line segments define a regular 6-gon.

For the plot at the right, the level of recursion in `koch` equals three.



Assignment Three. Use the script `koch` to make a Koch flake. In case there would be problems with the creation of `koch`, you may use the `cantor` function instead.

The deadline is Wednesday 2 May 2007 at 10AM

Bring *your* solution to the project to class. The *your* is emphasized to stress that your solution is the result of an *individual* effort. Collaborations are **not** permitted.

The solution to this project consists in two parts:

1. A print out of the scripts that you bring to class.
2. The plots produced by the scripts.

If you have questions or difficulties with the assignments, feel free to come to my office for help.