Homework # 5
Due Oct. 23 at the beginning of class

T4.2

T4.3

Comp. Exp. 4.1 Modify my 1D code cantorifs.m to make your code. You do not need to hand in the plot. This should be easy. Then replace the map given by what you deduce in T4.3. Hand in your code and plot of Sierpinski gasket for the equilateral triangle.

4.2 a,b,c,e

4.4 See hint in the back of book.

A. Prove that for the map $P_c(z) = z^2 + c$ with $|c| < 2$, if z_n ever leaves the disc of radius 2 about the origin, the iteration will go to infinity. [Be sure to exclude any finite limits. Hint: use the triangle inequality $|a + b| \leq |a| + |b|$ for $a,\ b \in \mathbb{C}$, but you need to get a lower bound on $|z_{n+1}|$].

B. (easy) Write a Matlab code to iterate the map $P_c(z) = z^2 + c$ for $z \in \mathbb{C}$ starting from $z = 0$. When $c = -0.470 + 0.587i$, find the period to which the orbit is asymptotic. (You may enjoy reading the link on the Resources page to Devaney's explanation of Mandelbrot bulb periods.) Print out a plot of the attractor in the *complex plane* to which the orbit settles for this c. Use the definition given on p. 167 to answer the following question: Is this value of c in the Mandelbrot set?