

# MTH 337

Day 16 Thursday, March 4, 2008

## HW 6 on Newton basin boundaries

In addition to just generating the picture, describe it.

Look up the term “self-similar” and try to use it appropriately in your description.

## Polynomial interpolation

test code

arbitrary data

interpolating sampled functions

sin

Runge

perturbed linear data

effect of noise

## Abandoning the perfect fit: regression

least squares

finding the “best” straight line

## Lab exercises

1.
  - a Complete your Lagrange polynomial interpolant code.
  - b Test it on the Runge function with 13 equally spaced nodes in  $[-1, 1]$ .
  - c Test it on the Runge function with “Chebyshev” nodes:  
 $xdata := [\text{seq}((xmin+xmax)/2 + (xmax-xmin)/2 * \cos((2*i-1)*\text{Pi}/(2*n)), i=1..n)];$   
Comment on the difference between the results of b and c.
2.
  - a Write a procedure “lsqlin(x,y)” that takes in x,y data and returns “a,b”.  
Test the procedure on some examples where you know the answer.
  - b Apply it to the data from butterfly effect homework:  
find the exponential separation rate, and  
plot the best straight line on your log plot of the data.

Turn in your report on this as part of your HW 6 submission (9am Tues, Mar 18).