Re: A functional measure of roughness

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The measure of roughness based on the Bezier
which is like a Lyapunov exponent average, but more sensative:
It turns out to be like a second derivative:
Measure[n]=Sum[Log[1+Abs[f''(x(i))]/4],{i,1,n}]/n
Limit[Measure[n],n−> Infinity]=rho
The roughness measure is relate to the Lyapunov exponent average by
k=Sum[Log[f'(x(i))],{i,1,n}]/n/Sum[Log[1+Abs[f''(x(i))]/4],{i,1,n}]/n
k is close to 2 for the primes.
So I have actually found two measures.

Roger Bagula wrote:
> *In thinking of a way to get a better than Lyapunov , Hausdorff or Kolmogorov*
> *measure of dimension , I thought of this:*
> *F(curve)=0 if smooth and continuous*
> *F(curve)<>0 if rough or discontinuous*
> *The best measure of dimensional roughness (Mandelbrot's way of*
> *expressing it) is the*
> *Lyapunov exponent (or maybe the Hurst exponent?).*
> *Box counting or capacity/ entropy dimension of the Kolmogorov type*
> *is too big most of the time*
> *while Hausdorff being very cut−off measure like*
> *is usually too small.*
> *The trouble with Lyapunov is that it depends on a derivative*
> *and unless you are talking about a fractional derivative,*
> *many fractal functions are of the Weierstrass fractal type*
> *where the classical derivative doesn't exist.*
>
> *I did some work on Bezier functions in IFS in the past*
> *and fractional partial derivatives of an angular sort as well.*
> *I came to realize that the three point Bezier function of an iterative*
> *sequence in n:*
> *Bezier[p,n]=p^2*f(n+2+2*p*(1−p)*f(n+1)+(1−p)^2*f(n)*
> *is such that if smooth and continuous:*
> *f(n+1)=Bezier[1/2,n]=f(n+2)/4+f(n+1)/2+f(n)/4*
> *So that the function :*
> *delta[n]=f(n+2)/4+f(n+1)/2+f(n)/4−f(n+1)*
> *is a measure of the roughness.*
> *Putting this measure in an Lyapunov average type function:*

> *Measure[n]=Sum[Log[1+delta[i]],{i,1,n}]/n*
> *I tried this out by comparing it to a known rough set, the primes*
> *and it's Lyapunov integer difference average.*
> *In this experiment the new Bezier roughness measure performs better than the*
> *Lyapunov equivalent over the same range in detecting roughness.*
> *Respectfully, Roger L. Bagula*
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