Unifying Classical Economics and the Standard (ΛCDM and QM) Model - through the Fractal.

PHYSICS AND SOCIAL NETWORK DYNAMICS OF THE MARKET
Stockholm June 1st 2016

I have created a simple experimental – a model: I have isolated the (quantitative/ fundamental) Koch snowflake fractal to measure (by means of 'applied mathematics') what an observer would expect to see outside and inside – or within – an iterating fractal.

As a geometry, the 'classical' view of the fractal demonstrates classical economics 'supply(MC) and demand(MU)' (figures 2 and 3). Figure 3 show the Lorenz Curves as derived by the growing/developing fractal. Quantum Mechanics: figure 5 shows spiralling propagation of discrete bits (triangles) 'wave/particle' sinusoidal propagation, and superposition. The (inverted) fractal matches observations made by astronomers, and I conclude these observed properties of the universe are inextricably linked by the geometry of the fractal. My model demonstrates: a (singularity) beginning; area/space expansion – Hubble's law (fig. 9); and expansion at an accelerating rate (fig. 10). The main equation I derived from my model is consistent (as far as I can tell) with the de Sitter description of the universe, and complements not only the early universe rapid inflationary epoch expansion, but also the – slower – current 'dark energy' 'Lambda' accelerating expansion.

In a second 'paper' I have also shown this fractal expansion explains the observed hierarchical clustering of galaxies with distance (time). i.e. the galaxy distribution transition from rough, to smooth, with distance (or looking back in time). Figures 11 and 12.

I have published/posted on academia.edu.

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1 Economics

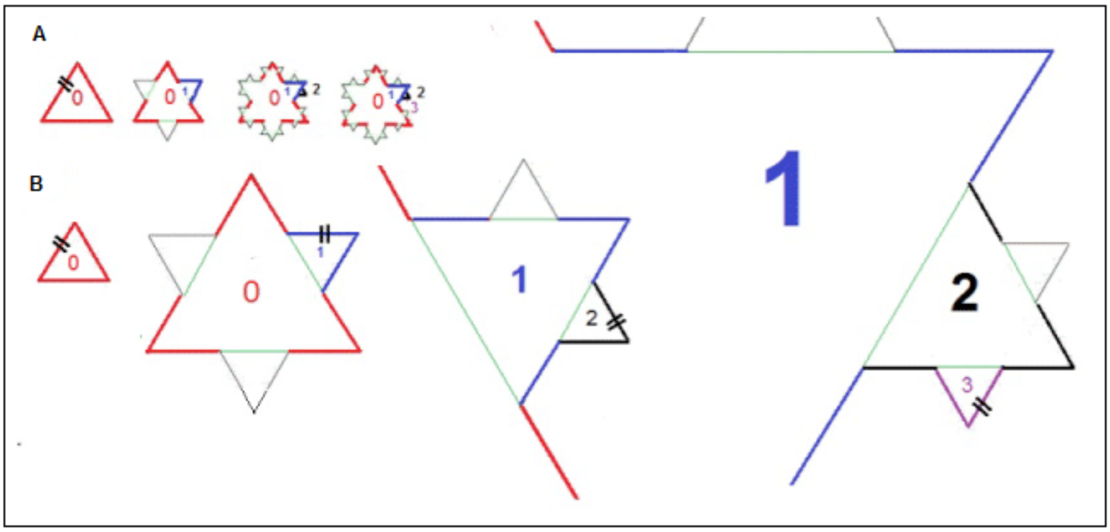


Figure 1. Expansion of the inverted Koch Snowflake fractal (fractspansion): The schematics above demonstrate fractal development by (A) the classical snowflake perspective, where the standard sized thatched (iteration '0') is the focus, and the following triangles diminish in size from colour red iteration 0 to colour purple iteration 3; and (B) the inverted, **fractspanding** perspective where the new (thatched) triangle is the focus and held at standard size while the original red iteration 0 triangle expands in area – as the fractal iterates.

'Demand' Consumption

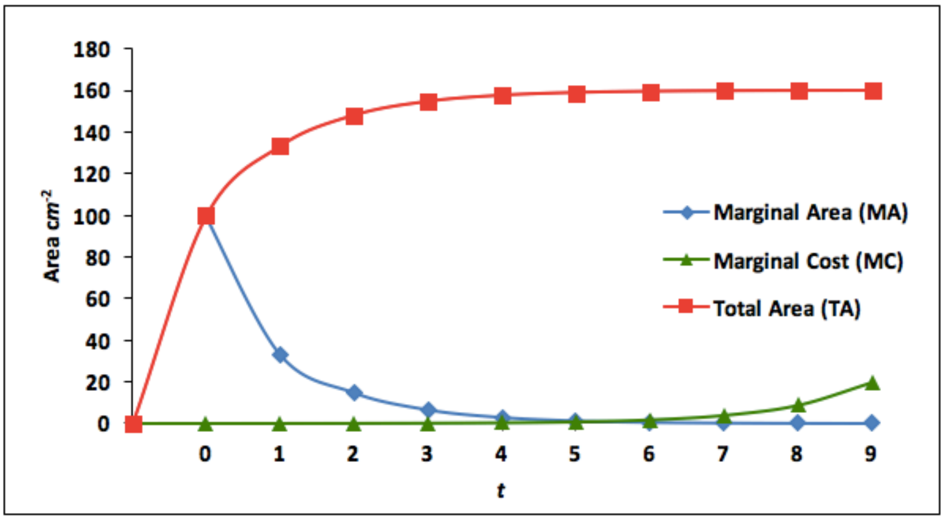


Figure 4. Fractal Equilibrium with TA, MA and Marginal Cost. As the (Koch Snowflake) fractal iterates: the total area increased from an arbitrary value of 100 to a limit approximating 160; and the 'marginal' area decreased (was convergent) from an arbitrary value of 100 towards – but never reaching – 0. The cost of product increased by the reciprocal of the Area. The shape equilibrium of the fractal was reached where the MC was equal to the MA – at around iteration-time (*t*) 5. ***cm*** = centimetres.

Figure 2

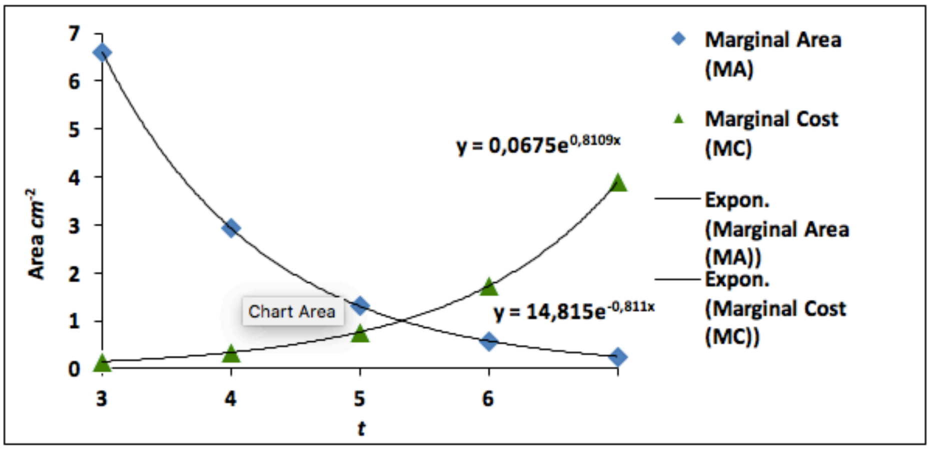


Figure 5 Fractal Equilibrium – close-up. As the (Koch Snowflake) fractal iterates shape equilibrium is reached where the MC is equal to the MA, at iteration 5. ***t*** = iteration time; ***cm*** = centimetres.

Figure 3

'Supply' Production

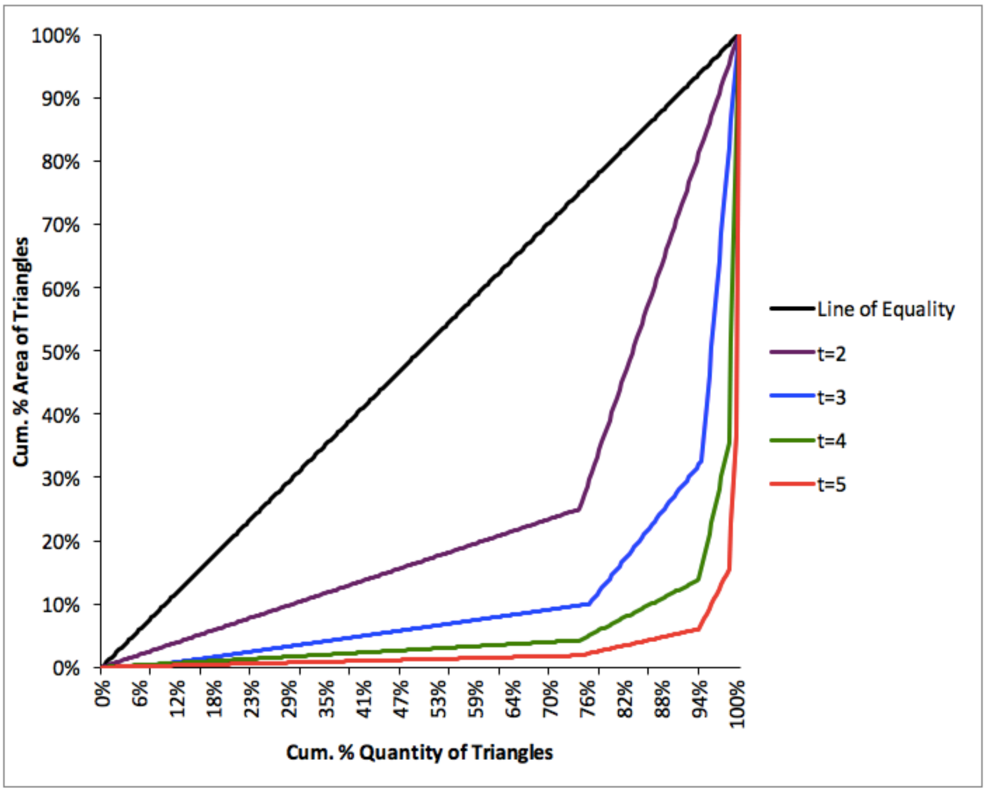


Figure 3. Fractal (Koch Snowflake) Lorenz Curves Expansion. As the (Koch Snowflake) fractal grows – and/or develops – with iteration time (*t*) the distribution of area – shown by the Lorenz Curves t=2 to t=5 – expands. At iteration-time 1 – the line of equality – distribution is homogenous. With growth the second iteration time (t=2) shows 25% of the area is found in 75% of the triangles; and conversely the remaining 75% of the area is found in the remaining 25% of the triangles. At iteration-time 5 (***t***=5) this distribution has expanded and shows only a small percentage of the triangles account for some 99% of the area.

Figure 4

2 Physics

QM

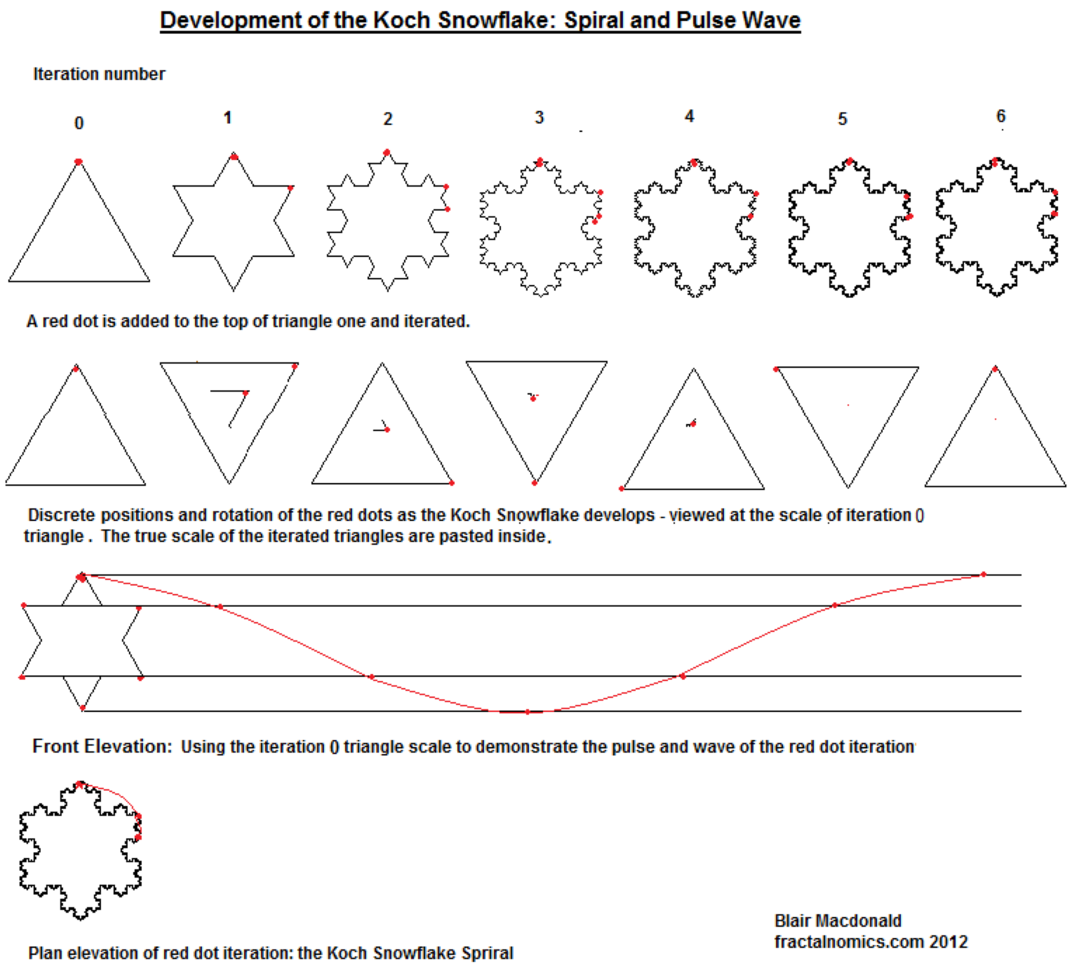


Figure 5

Cosmology

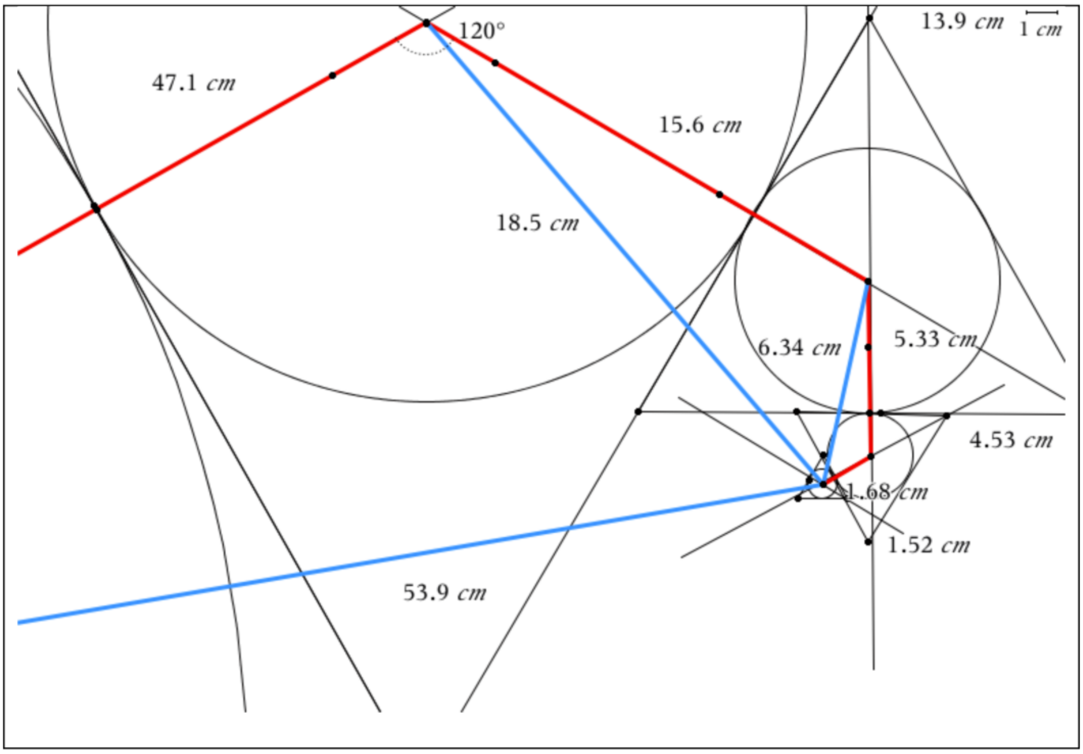


Figure 6. Displacement measurements from radii on the iterating Koch Snowflake created with TI-Nspire ™ software. Displacement is measured between (discrete) triangle centres and used in the calculation of the fractal/Hubble constant. The red line traces the circumference (the distance) of the fractal spiral, and the blue line the displacement of the fractal spiral from an arbitrary centre of observation. cm = centimetres.

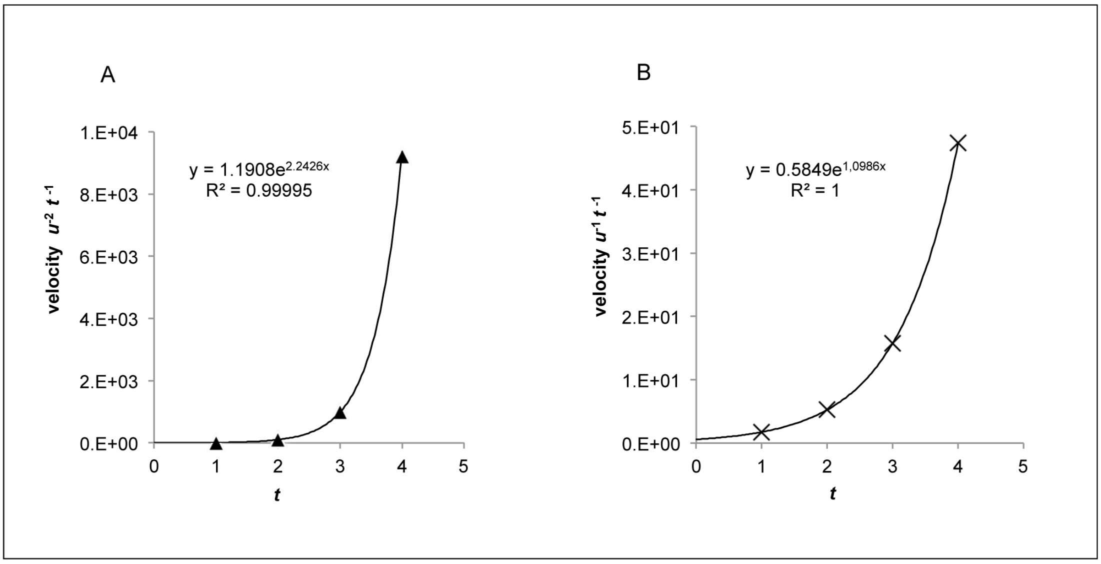


Figure 7. Inverted Koch Snowflake fractal (expansion) velocity. Expansion velocity of the inverted fractal at each corresponding iteration time (t): (A) expansion of total area, and (B) distance between points. u = arbitrary length.

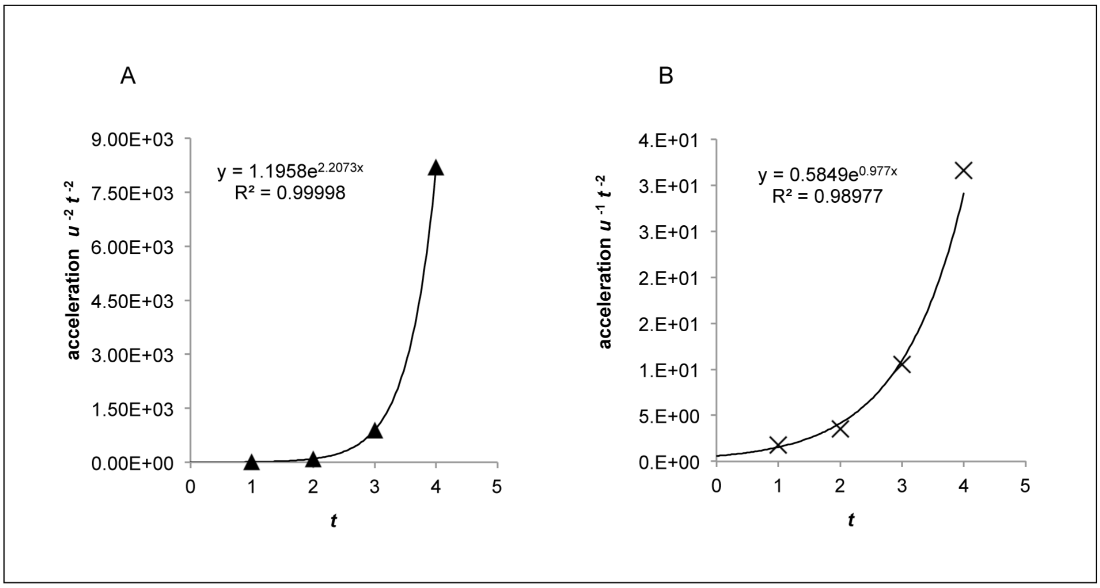
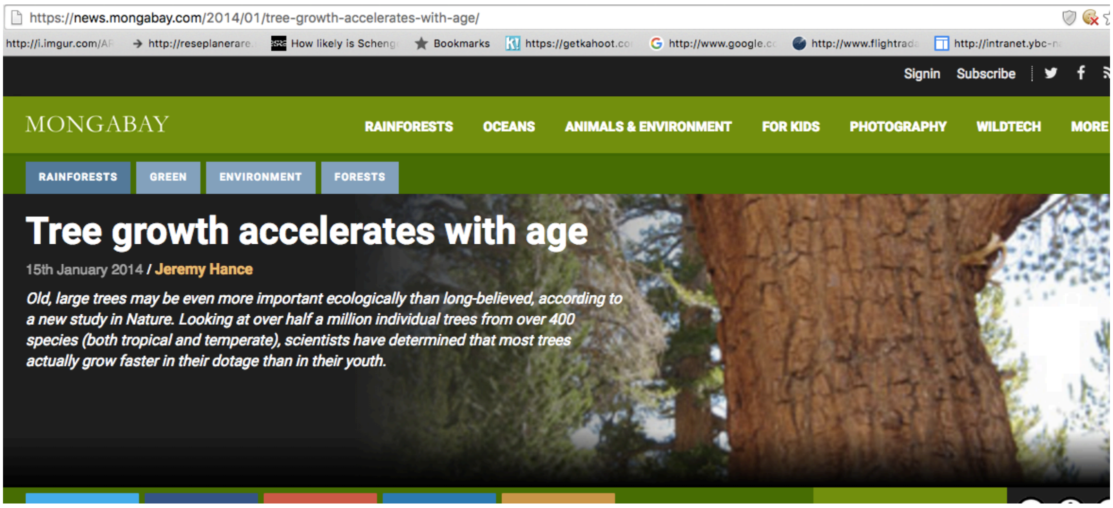


Figure 8. Inverted Koch Snowflake fractal (expansion) acceleration. Acceleration of the inverted fractal at each corresponding iteration time (t): (A) expansion of total area, and (B) distance between points. u = arbitrary length.



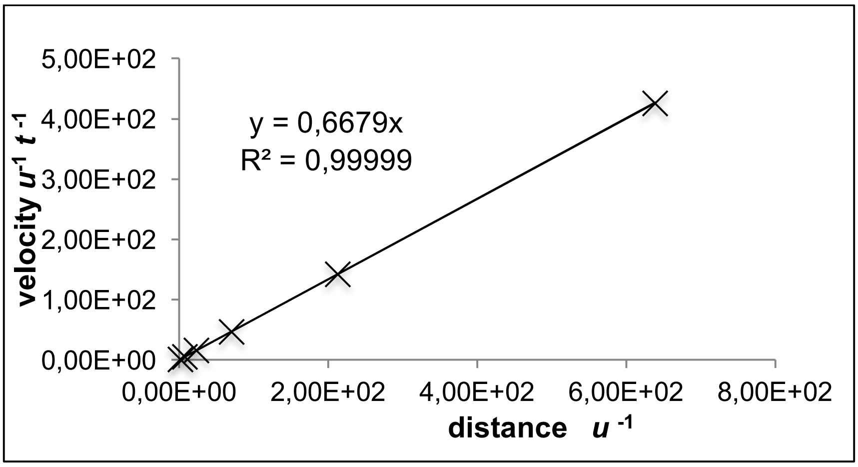


Figure 9. The Fractal Hubble diagram. As distance between triangle geometric centres increases with iteration, the recession velocity of the points increases. *u* = arbitrary length unit.

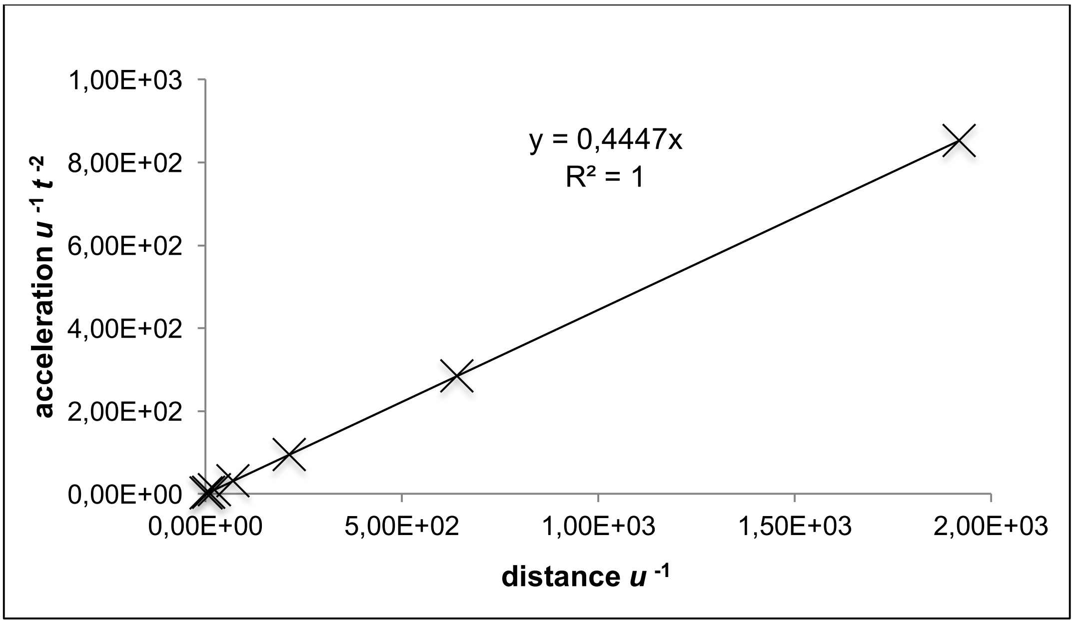


Figure 10. Recessional acceleration vs. distance on the inverted Koch Snowflake fractal.

As distance between triangle geometric centres increases with iteration, the recession acceleration of the points increases. *u* = arbitrary length unit.

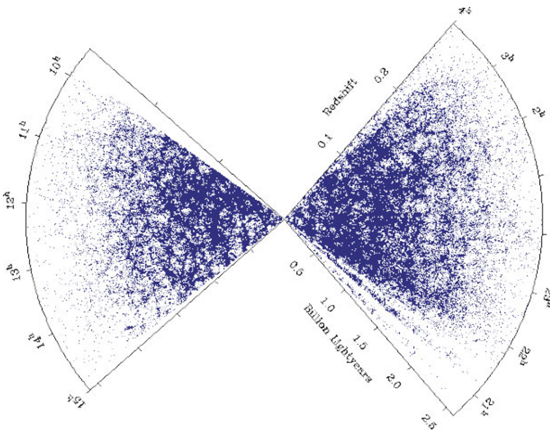
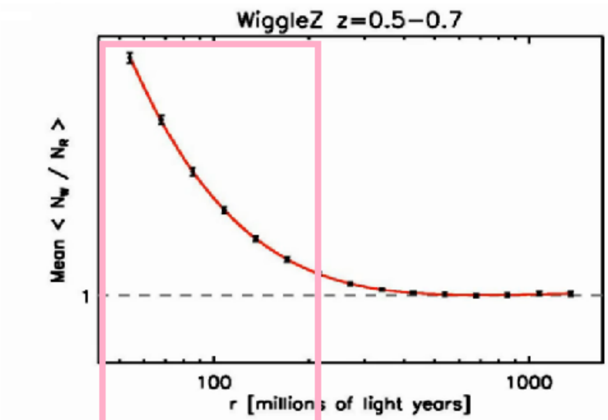
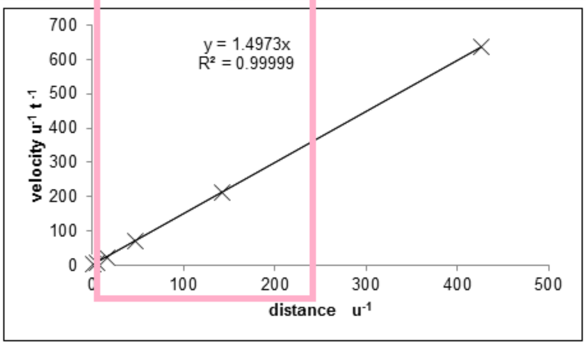


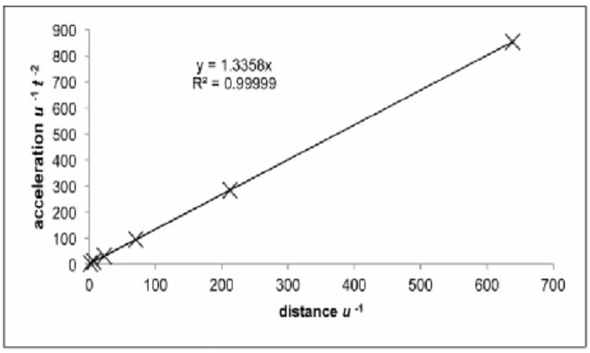
Figure 11. 2dF Galaxy Redshift Survey [15]



https://www.youtube.com/watch?v=tVk4XRKbvqo



Fractal Hubble Diagram (figure 7. Macdonald 2014)



Fractal Acceleration Diagram (figure 9, Macdonald 2014)

Figure 12. WiggleZ Dark Energy Survey figure 13, page 16. Revealing changing galaxy distributions from small-scale to large-scale; with fractal Hubble and Acceleration.

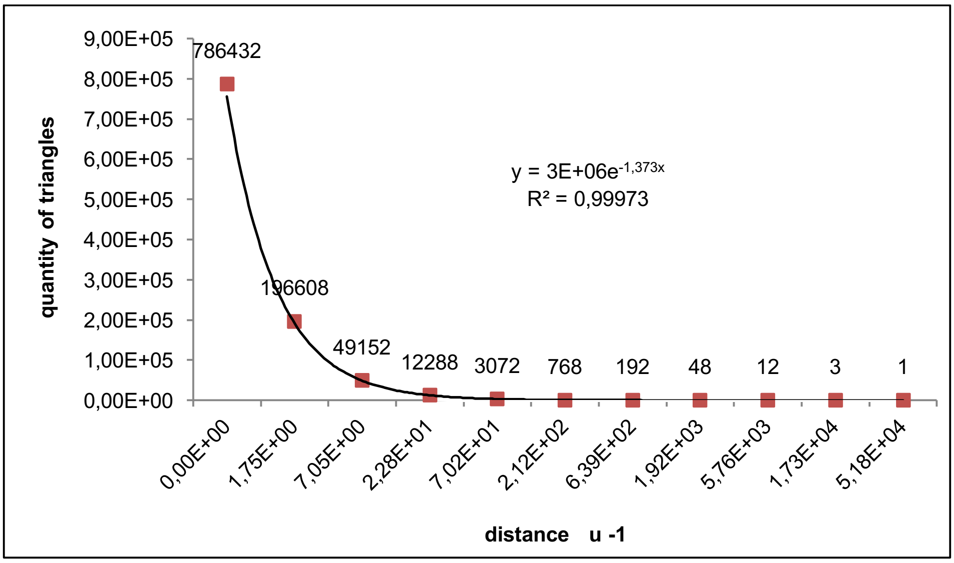


Figure 13. Quantity of triangles at each distance (point) from the observer on the inverted Koch Snowflake fractal. As the distance between triangle geometric centres increases (exponentially) with iteration, and so increasing the distance from the observer, the quantity of triangles per iteration decreases exponentially to a quantity of one – at time 0. *u* = arbitrary length unit.

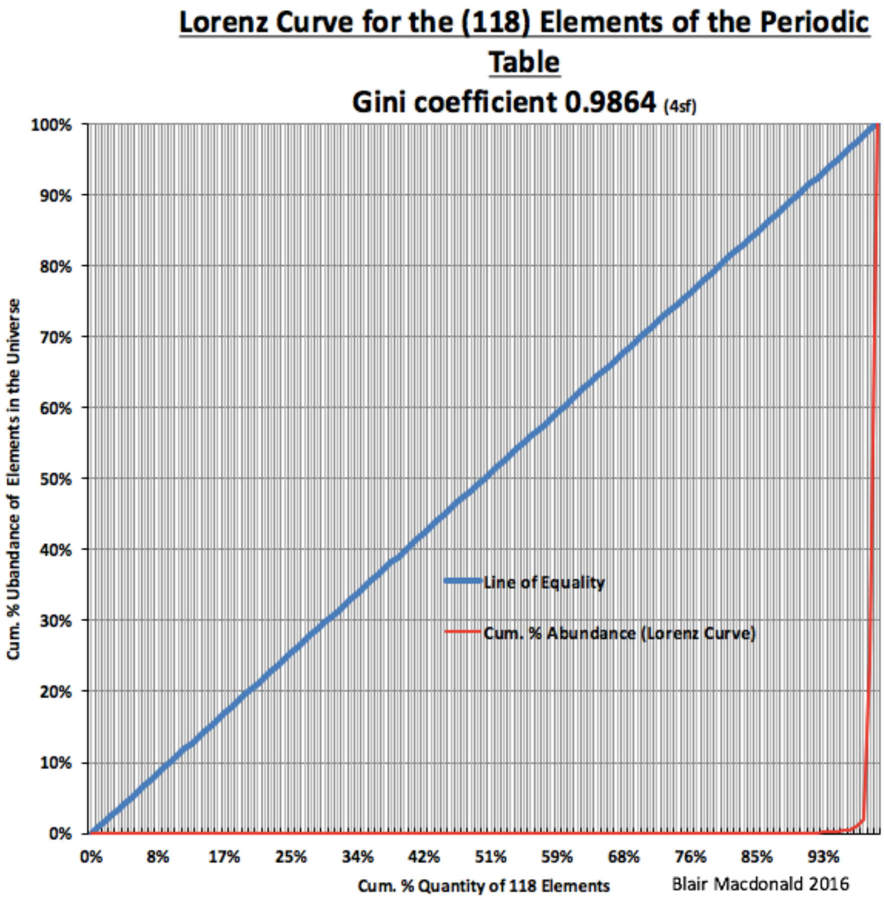


Figure 14