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Fractal fuzzy logic using Kelly plots

Lógica difusa de fractales utilizando parcelas de Kelly

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Abstract

Strictly defined, the concept of self-similarity or self-similarity applies only to mathematical fractals - which arise from the iteration of simple formulae but lead to very complex structures, Cantor Dust, Peano Curve, Koch Snowflake, whereas in natural or physical fractals - those found in nature, such as a fern leaf, an arborisation, capillaries - the concept of self-similarity applies, since their fractality is only statistical and they possess, consequently, an anisotropic scaling,(not having the same properties in all dimensions of analysis), which does not allow an amplified part of a figure to maintain exactly the characteristics of the figure as a whole, is where we find Kelly plots.

Fuzzy logic, Fractal, Kelly plots

Resumen

En estricto rigor, el concepto de autosemejanza o autosimilitud se aplica sólo en fractales matemáticos - que surgen de la iteración de fórmulas sencillas pero que llevan a estructuras muy complejas, Polvo de Cantor, Curva de Peano, Copo de Nieve de Koch, mientras que en los fractales naturales o físicos - aquellos que se encuentran en la naturaleza: una hoja de helecho, una arborización , capilares y se aplica el concepto de autoafinidad, ya que su fractalidad es solamente estadística y poseen, en consecuencia, un escalamiento anisotrópico (que no tiene las mismas propiedades en todas dimensiones de análisis), lo que no permite que una parte amplificada de una figura mantenga exactamente las características de la figura como un todo, es donde encontramos las parcelas de Kelly.

Lógica difusa, Fractal, Parcelas de Kelly

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Introduction

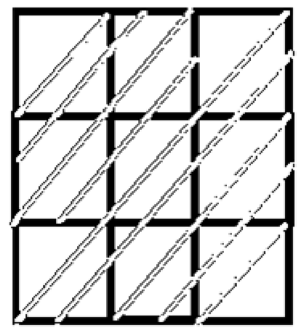
It is interesting to note that the irregularity of fractal objects becomes a particular characteristic of the object and accounts for the similarity of its parts with respect to the whole, regardless of the scale of analysis used.

There are mathematical fractals that arise thanks to the iteration of their mathematical formulae, as well as natural fractals or those that are found spontaneously in nature. Several scientific disciplines have had a progressive approach to fractal geometry, linked to its mathematical, scientific and technological applicability, which stimulates the dedication to the observation and study of fractal structures. Fractals seem to be a suitable tool for the deep mathematical study of, for example, the quantitative analysis of singularities that naturally appear in dynamical systems.

The contribution of fractals to the understanding of the world results in a kind of natural philosophy, an integrated view of the world, an organising element. However, it is recognised that fractal models are currently descriptive rather than explanatory, which in no way reduces their usefulness and potency for use in science. Mandelbrot explains that all the natural objects alluded to in the fractal geometry of nature are "systems", in the sense that they are made up of many different parts articulated among themselves, and the fractal dimension would describe this rule of articulation. Indeed, it would seem that fractal geometry would be, in a sense, the geometry of complex systems.

A fractal object has a fractal dimension expressed by a decimal number that exceeds its original topological dimension, which allows us to think that, depending on the irregularity of the shape, it becomes more complex and occupies a progressively larger place in space. In this way, we are faced with a tool that describes the shape or pattern (quality) in a complex system through a mathematical formalisation. The fractal dimension, in this understanding, accounts for the dialogue between quantity and quality in an object of nature with fractal characteristics.

Let's start with the negative diffusion in ¾= is the fractal mean.



$$DN = \frac{1}{2}\pi \cdot \left[\frac{lim}{ln}\right]^{\frac{3}{4}}$$

$$lI(DN) = \left[\frac{\partial\left[\frac{1}{2}\right]}{\partial\pi} \cdot \frac{dlim}{dln(\alpha)}\right]^{\frac{3}{4}}$$

π = It is the diffusion factor (α)

$$lI(D)^{N,p,b} \int_{Pd\to Pcc}^{Pi\to Pcr} \left[\frac{log\frac{1}{2}}{ln\pi} \cdot \frac{\frac{1}{\alpha}lim}{\frac{1}{\alpha}ln(\alpha)}\right]^{\frac{3}{4}} + \left[\frac{log\frac{1}{2}}{ln\left(\frac{\pi}{d}\right)} \cdot \frac{\frac{1}{\alpha}lim}{\frac{1}{\alpha}ln\left(-\frac{1}{\alpha}\right)}\right]^{\frac{3}{4}} + \left[\frac{log\frac{1}{2}\cdot\frac{1}{2}}{ln\left[\frac{1}{\pi}\right]^{\frac{1}{3}}}\right] \cdot \left[\frac{\frac{1}{\alpha}lim}{ln\frac{1}{3}}\right] \cdot lim(-4) + \left[\frac{\frac{1}{\alpha}}{ln\left(\frac{3}{4}\right)}\right] \cdot \left[\frac{log\pi}{ln(-1)}\right] + \left[\frac{\frac{1}{\alpha}}{ln\frac{1}{3}}\right] \cdot \left[\frac{\frac{1}{\alpha}}{ln\frac{1}{3}}\right] + lim(-4) + \left\{\left[\frac{\frac{1}{\alpha}}{ln\frac{3}{4}}\right] \cdot \left[\frac{log3}{ln4}\right] . lim\left(\frac{1}{\alpha}\right)\right\} \quad (1)$$

$$lI(D)^{N,p,b}_{\dots} \int_{Pd/_{-Pcr}}^{Pi/_{Pcc}} = \left[\frac{log\frac{1}{2}d^{IV}}{ln(\pi)} \cdot \frac{\frac{1}{\propto}^{IX}}{-\frac{1}{\propto}^{II}}\right]^{\left[\frac{d(3)\propto}{d(4)-\propto}\right]^{II}} + lim\left\{\left[\frac{log(\alpha)^{III}}{ln(-\alpha)}\right] - lim\left[\frac{\partial log(-\alpha)}{\partial ln(\propto)^{III}}\right]\right\}^{\left[-\frac{1}{4}+\frac{3}{(-4)}\right]} \quad (2)$$

An ensemble that has a fine structure, i.e., that has detail at whatever scale it is observed:

$$lI(D)^{N,p,b}_{\dots} \int_{Pd/_{Pcr}}^{Pi/_{Pcc}} = \left[\frac{log\frac{1}{2}}{ln\pi}\right]^{d-IV} \cdot \left[\frac{1}{\alpha}\right]^{VII\ d(-1)^{II}} + lim(\alpha^n) - lim(log - \alpha + ln\alpha)^{II} \quad (3)$$

$$lI(D)^{N,p,b}_{\dots} \int_{Pcc}^{Pi} + \int_{-Pcr}^{Pd} = \frac{antilog(2)}{d^{IV}} + \left[\frac{1}{\alpha}\right]^{VII} + lim\left[-\frac{1}{\alpha}\right]\alpha$$

$$lI(D)^{N,p,b}_{\dots} \int_{Pcc}^{Pi} + \int_{-Pcr}^{Pd} = \frac{\frac{1}{\alpha}\left(\frac{1}{2}\right)}{4} + \frac{\frac{1}{\alpha}}{7}lim\left[-\frac{1}{\alpha}\right]\alpha$$

$$lI(D)^{N,p,b}_{\dots} \int \frac{Pi-Pcr}{Pcr+pd} = \frac{1(2\alpha)}{4} + \frac{7}{\alpha} + lim\left[-\frac{1}{(2\alpha)}\right]$$

$$lI(D) = \frac{N\to P}{b} \dots \int \frac{P^{II}(1,c,r)}{P^{II}(d)} = \frac{2\alpha}{4} + \alpha - 7 + \frac{1}{\alpha} - 2\alpha$$

The fractal dimension (defined in some way) is larger than its topological dimension, and does not have to be integer:

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$$lI(D) = \frac{N \to P}{b} \ldots \int^{IV} \begin{Bmatrix} 1(2\alpha) \\ c(-7\alpha) \\ -d(\alpha) \end{Bmatrix} .2\alpha \tag{4}$$

$$lI(D) = \frac{N \to P}{b} \ldots \int \frac{P}{\frac{1}{4}} \begin{Bmatrix} \frac{1+c}{r-d} \\ \frac{-4}{\alpha} \end{Bmatrix} \Big/ \frac{1}{2}\alpha$$

$$lI(D) = (N+b)^{-P} \ldots \int^{\frac{P}{4}} \left(\frac{r \to c}{\frac{d}{\left[\frac{1}{-4}\right]}} \right) 0.5\alpha$$

$$lI(D) = \frac{(N+b)}{P} \left(\frac{P}{-4} \right) + \left(\frac{r+c}{\frac{d}{-4}} \right) 0.5\alpha$$

$$lI(D) = \frac{(N+b)}{(r-c)} 0.5\alpha$$

$$lI(D) = \frac{0.5}{(N+b)+(r-c)} - \alpha \tag{5}$$

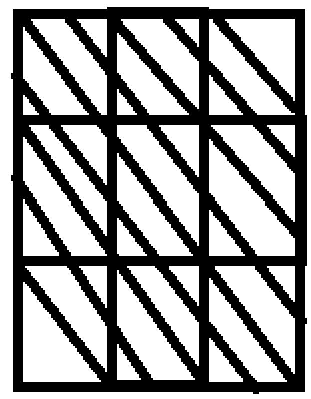
An L-system is basically a set of rules that are applied sequentially to an initial sentence. Starting from a string of symbols, successively longer and longer strings are generated.

$$lI(D) = \left[\frac{(N+b)}{(r-c)} \right] - \alpha$$

The interpretation is that reality is non-mechanical and non-linear, or in other words, the inability of man and science to predict and control reality, and that there is an order to seemingly random events.

$$DP = \left[\frac{1}{2}\right]^{\pi} \cdot \left[\frac{limI^{\frac{3}{4}}}{\frac{1}{ln}} \right]$$

$$lI(DP) = \frac{\partial \left[\frac{1}{2}\right]}{\frac{\partial \pi}{\partial d}} \cdot \left[\frac{[dlim]}{dln\left[\frac{1}{\propto}\right]} \right]^{\frac{3}{4}}$$



In this plot we can see the positive margins in the fractal elasticity. We are also interested in periodic points, or states of the system that are repeated over and over again. Periodic points can also be attractors. Sarkovskii's theorem describes the number of periodic points in a one-dimensional discrete dynamical system. Any deterministic system that is sensitive to the initial conditions is called chaotic:

I_F = Iteration finite

C= Call

P = Put

L_I = Itto´s Lemma

L= Lagragian

H_r= Recursive heteroscedasticity

H_R= Recursive homoscedasticity

$$\text{If} = \int_{n\alpha_l}^{C_a} \int_{n\alpha_{ll}}^{C_m} \int_{n\alpha_{lll}}^{C_\beta} \left[\frac{(C_a+C_m+C_\beta)^{\frac{3}{4}}}{\left(\left[\frac{n}{\alpha_l}\right]+\left[\frac{n}{\alpha_{ll}}\right]+\left[\frac{n}{\alpha_{lll}}\right]\right)^{\frac{1}{2}}} \right]^2 + \frac{(C_a+C_m+C_\beta)}{\frac{\frac{n}{\alpha_l} \to + \lambda_0 \to + \lambda_l \to}{\frac{\lambda_0 \Rightarrow}{\frac{\lambda_0}{\lambda_l}} + \frac{\frac{n}{\alpha_{ll}} \Longrightarrow}{\frac{\lambda_l}{\lambda_0}} + \frac{\frac{\lambda_0}{\lambda_l} \Longrightarrow}{\frac{n}{\alpha_{lll}}}}} \tag{6}$$

$$C = \frac{\frac{dM_3+dM_4}{d\lambda_l \to d\lambda_{ll}}}{\frac{dM_1+dM_2}{\lambda_{lll} \to \lambda_{lV}}} \tag{7}$$

$$P = \frac{M_1(M_4)}{M_3(M_2)} \int_{M_3}^{M_1} + 1 \frac{d(M_4)}{d\lambda_l} + \frac{d(M_2)}{d\lambda_{ll}} + \alpha \to \int_{M_3\left[\frac{d(M_2)}{d\lambda_{ll}}\right]^{\frac{1}{2}}}^{M_1\left[\frac{d(M_4)}{d\lambda_l}\right]^{\frac{3}{4}}} + \alpha \tag{8}$$

Its definition is very simple: take a segment of a certain length (for example, the interval [M1; M4] of the real line) and divide it into three sub-segments of equal length, remove the central segment and repeat the process with the two new segments.

$$\mathrm{L_I} = \left[\frac{d(\pi)^{\frac{1}{2}}+ d(\pi)^2}{1+\frac{1}{2}} + \frac{d\lambda_l}{d\lambda_{ll}}\right]^2 \cdot \left[\frac{d(\pi)^{\frac{1}{2}}}{d(\pi)^2}\right]^1 + \frac{d\lambda_l}{d\lambda_{ll}} \left[\frac{d(\pi)^{\frac{1}{2}}+ d\lambda_{ll}}{d(T.C)^2+ d\lambda_1}\right]^{\frac{3}{4}-\frac{1}{2}}$$

$$L = \int_{[T.C]}^{(\pi)^{\frac{1}{2}}} + 1 \frac{d(\pi)}{d\lambda_l} + \frac{d(T.C)^2}{d\lambda_{ll}} + \alpha$$

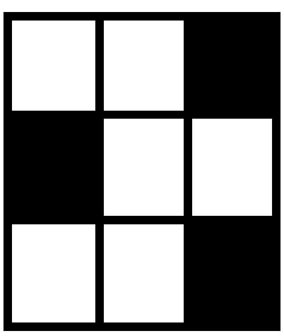
$$\mathrm{H_r} = \left[\frac{(C_a+C_m+C_\beta)^{\frac{3}{4}}}{\left(\left[\frac{n}{\alpha_l}\right]+\left|\frac{n}{\alpha_{ll}}\right|+\left[\frac{n}{\alpha_{lll}}\right]\right)^{\frac{1}{2}}}\right]^2$$

$$\mathrm{H_R} = \frac{(C_a + C_m + C_\beta)}{\begin{matrix} \overset{\frac{n}{\alpha_l}}{\rightarrow} + \overset{\lambda_0}{\rightarrow} + \overset{\lambda_l}{\rightarrow} \\ \underset{\frac{\lambda_0}{\lambda_l}}{\overset{\lambda_0}{\Rightarrow}} + \underset{\frac{\lambda_l}{\lambda_0}}{\overset{\frac{n}{\alpha_{ll}}}{\Longrightarrow}} + \underset{\frac{n}{\alpha_{lll}}}{\overset{\frac{\lambda_0}{\lambda_l}}{\Longrightarrow}} \end{matrix}} \qquad (9)$$

We determine the Brownian diffusion:

$$DB = \left[\frac{1}{2}\right]^\pi \cdot \left[\frac{lim}{\frac{1-4}{ln3}}\right]$$

$$lI(DB) = \frac{\partial \left[\frac{1}{2}\right]}{\frac{\partial \pi}{\partial d}} \cdot \left[\frac{dlim}{\frac{dlog1}{dlog4}}\right]^3$$



Structural equations:

Short-term: RC = [(π+T.C.)/(1/2)]

$$\mathrm{M_1} = \left[\frac{M+\pi}{\frac{1}{2}}\right]^{3/4}$$

Long-term: RL = [(π-T.C.+ 〖(π)〗^2)/(1/2+1)]

$$\mathrm{M_2} = \left[\frac{M1 + M2}{\pi + \frac{1}{2}}\right]^{3/4}$$

$$\mathrm{M_3} = \left[\frac{M1 + M2 + M3}{\pi + \frac{1}{2}}\right]^{3/4}$$

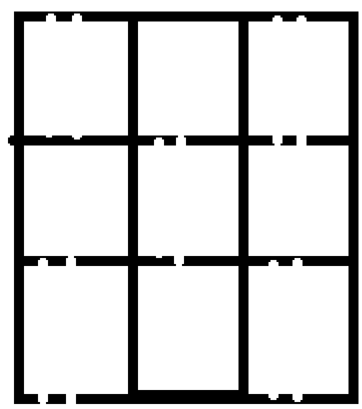
Medium-term: RM = [(π + T.C.)/(1/2-1)]^2

$$\mathrm{M_4} = \left[\frac{(M1+M2)^{1/2}}{(M3+M4)^{3/4}}\right]^\pi$$

We determine the diffusion with inelastic plot for the entire >1

$$DPi = \left[\frac{1}{2}\right] \cdot \left[\frac{\pi}{\frac{1}{3}}\right]^{lim-4}$$

$$lI(DPi) = \left[\frac{\partial \frac{1}{2}}{\frac{\partial \pi}{\partial \frac{1}{3}}}\right] \cdot \left[\frac{lim}{4}\right]$$



However, the set is small when its length is considered: the initial interval [0,1] measures 1, and at each step, one third is taken away, which makes its length multiply by 2/3 and in the geometric sequence a = (2/3)n tends towards zero.

$$\int \left[\frac{d\ (2.48)}{\frac{d(2.50)}{x}}\right]^{\frac{1}{2}} = \left(\frac{2.48}{2.50}\right)^{\frac{1}{2}}$$

Integral with fractional numbers.

$$\int\left[\frac{\frac{d\ (8)}{sin}}{\frac{d(14)}{cos}}\right]^{1/2} = \frac{\sin(14)}{\cos(8)}$$

Integral with entire numbers.

$$\int\left[\frac{d\ (7)}{\frac{d(2.48)}{x}}\right]^{3/4} = (7)^{3/4} - \ (2.48)^{3/4}$$

Integral with entire number and fractional numbers

We determine the fractal iteration:

$$\int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.42) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.40) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} +$$

$$\int\left[\begin{matrix} d & (2.38) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.40) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} +$$

$$\int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.48) \\ \hline \frac{d\quad(2.48)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.48)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} +$$

$$\int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.48) \\ \hline \frac{d\quad(2.48)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.40) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} +$$

$$\int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} +$$

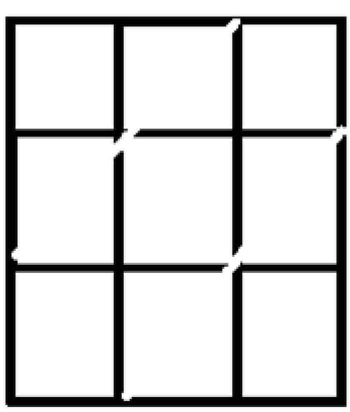
$$\int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} +$$

$$\int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2} + \int\left[\begin{matrix} d & (2.47) \\ \hline \frac{d\quad(2.47)}{x} \end{matrix}\right]^{1/2}$$

We determine the diffusion with increasing plot for all =1

$$DPcr = \frac{\left[\frac{1}{2}\right] \cdot \left[\frac{3}{4}\right]}{\pi - lim}$$

$$lI(DPcr) = \left[\frac{\partial\,\frac{1}{2}}{\partial\,\frac{3}{4}}\right] \cdot \left[\frac{log\pi}{ln\,\frac{1}{lim}}\right]$$



We adjust the value of each equivalent iterated dimension:

$$\left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.42}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.40}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.38}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} +$$

$$\left(\frac{2.40}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.48}{2.48}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.48}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} +$$

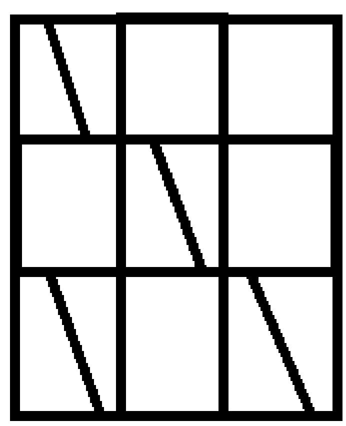
$$\left(\frac{2.40}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} +$$

$$\left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} + \left(\frac{2.47}{2.47}\right)^{\frac{1}{2}} =$$

We determine the diffusion with decreasing plot for all <1

$$DPd = \left[\frac{1}{2}\right] \cdot \left[\frac{\pi}{\frac{1}{3}}\right]^{lim4}$$

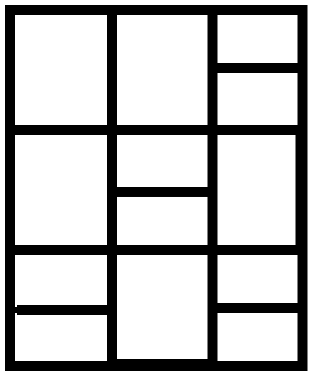
$$lI(DPd) = \left[\frac{\partial\left[\frac{1}{2}\right]}{\partial\left[\frac{1}{3}\right]}\right] \cdot \left[\frac{d\pi}{d\left[\frac{1}{3}\right]}\right] \cdot \left[\frac{lim}{4}\right]$$



Finally, we represent the diffusion with constant plot = 0

$$DPcc = \left[\frac{1}{2}\right] - lim\left[\frac{3}{4}\right]^{\pi}$$

$$lI(DPcc) = \left\{\frac{\partial\left[\frac{1}{2}\right]}{\partial\left[\frac{3}{4}\right]}\right\} \cdot \left[\frac{log3}{ln4}\right]^{lim\pi}$$



Conclusions

The more times the formula is iterated, the larger the complex number should become, but this is not always the case. The parameter that determines its growth is the modulus of the complex. If the modulus (which is not imaginary, but real) is 2 or greater, it is proven that it will continue to grow infinitely. However, there are complexes that, no matter how much we square them, will never give us a complex number whose modulus is greater than 2.

Under this new form of analysis, initially described by Hausdorff, it is possible to calculate the dimension of those "monstrous structures", for example, the number of parts can be expressed as a function of the scale factor according to the law a = sD.

By subtracting D we obtain: D = log a / log s. It can be seen that, for example, the Koch curve can be constructed by putting together four equal portions, the total curve being three times larger than each of the individual parts.

Thus, it is seen that some mathematical objects and probably many natural objects often lie in a non-integer dimension in space, i.e., their dimension is one decimal number larger than the topological dimension of origin (integer) of the same.

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