

Fractals in Poetry Project
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ENG 302 Intermediate Creative Writing Class

Overview

The theory of fractals was developed by the mathematician Benoit Mandelbrot who was intrigued by chaotic phenomena such as earthquakes, patterns of vegetation in a swamp, and the way neurons fire when humans search through memory. The theory has been appropriated into poetry. Fractals are often formed by what is called an iterative process. In fractal poetics one poem triggers another through the repetition of certain linguistic elements or patterns. Procedural poetics resemble fractals. Fractal theory wants to help readers see deep form in the seemingly free, to remind readers to take free verse seriously.

Fractal project Outcomes:

Learning about fractals and their appropriation into poetry

Recognizing patterns

Graphing data

MAIN ACTIVITY

After having introduced students to fractals and fractal poetry, I will ask students to find the examples of fractals in poetry. We will practice pattern recognition on the example of John Taggard's poem "Slow Song for Mark Rothko." Lyn Hejinian's My Life will serve as the main text for our analysis. Students will be asked to recognize patterns within this seemingly random and chaotic text. They will study in groups the frequency and patterns of alliterations, repetitions, number of sentences in each paragraph and number of paragraphs. They will present their results on graphs and spreadsheets. We will see how and if this poem can be a fractal poem.

After having practiced pattern recognition, students will be asked to write/generate their own fractal poetry with a hidden pattern in it.

Fractal Poetics

301 Creative Writing

4week project

1. Introduction to fractals

The theory of fractals developed by the mathematician Benoit Mandelbrot who was intrigued by chaotic phenomena such as earthquakes, patterns of vegetation in a swamp, and the way neurons fire when humans search through memory. Mandelbrot discovered that these chaotic structures contained deep logic or patterns, which is precisely why he called them fractal forms (*fractus* from Latin: broken or fragmented). Mandelbrot observed that “each fractal form replicates the form of the entire structure” (190). Similarly, in Across the Frontiers—a book about the theory of elementary particles—Werner Heisenberg notes, the alteration of one leaf will affect the structure of the whole tree. In Feeling as a Foreign Language Alice Fulton writes:

the communication between roots and leaves; the oscillations of cotton futures; the movement of spiraling funnel galaxies; the branching of arteries and veins; and the curved, nonlinear structure of space-time itself are examples of chaotic phenomena found to contain fractal designs ” (63).

Preliminary exercises

1. Pre-test ideas (attached)

2. Power point (attached)

3. Students find examples in nature

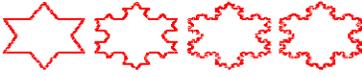
4. Applications of fractals in art, architecture, etc

--students come up with the examples

5. Appropriation of fractals into poetry

Fractals are often formed by what is called an iterative process. In fractal poetics one poem triggers another through the repetition of certain linguistic elements or patterns. Procedural poetics resemble fractals. Fractals are based on self-similarity. To make a fractal, we have to operate on a familiar geometric figure (a triangle or line segment, for example) and repeat its pattern at different scales. Romanesco broccoli serves as an

example of a very fine natural fractal. Fractals can achieve infinite detail through an endless repetition of patterns. A Koch snowflake is the result of infinite additions of triangles to the perimeter of the starting triangle. With every addition of triangles, the perimeter gets longer—it grows to infinity, although the enclosed surface does not and

remains finite. 

As Michael Theune acutely observes, “a fractal which replaces the paradigm of a musical score with the paradigm of a loop could be embodied in masterworks such as Paul Celan’s ‘Deathfugue’ and John Taggart’s ‘Slow Song for Mark Rothko,’ each poem growing by slow, repetitive accretion” (5).

Alice Fulton situates fractal poetics, “on the ground between set forms and aimlessness...” (Feeling as a Foreign Language 65). Such a poetics “could describe and make visible a third space: the nonbinary in-between [...]; a ground between chaos and Euclidean order” (Feeling 63). Fulton proposes to “call the poetry of irregular forms fractal verse,”

The bark patterns on oak, mud cracks in a dry riverbed, a broccoli spear—these are examples of fractal forms: irregular structures containing just enough regularity so that they can be described. Such forms are, at least to my perception, quite pleasing. Like free verse, they zig and zag, spurt and dawdle, while retaining an infinite complexity of detail. The fascination of these intricate forms (“the fascination of what’s difficult,” you might say) indicates that we don’t need an obvious or regular pattern to satisfy our aesthetic or psychological needs. Nonobjective art, which often reflects the fractal pattern of nature, makes the same point. In fact, asymmetric or turbulent composition may be the essence of twentieth-century aesthetics. (191)

Fulton herself claims to have written fractal poems, although it seems her poems are more meta-fractal poems than those truly resembling the structure of fractals. In “The Fractal Lines,” Fulton addresses the poetics of a cascade which “contains nesting of design within design” (189). In “Fractal Lines” she writes,

It’s good to know there are infinite
Exponents within the arrays we’ve made, that our laws block less
Visible more spectral evidence. Maybe a little
Equity – currently scarved in subterfuge – some
Linchpin – circumspect, magnetic – is yet to be
Opened and made cogent. Practice makes
Pattern. Repeat a thing till the *again*
Sculpts presence. It’s some world when
The power leavening each cell’s so variously
Hushed that we can’t see or hear it. (187)

Fulton insists on a careful examination of poems, since they might have hidden patterns, as in the case of the above acrostic poem. Fulton claims that we tend to

disregard or overlook hidden patterns, as is the case with this poem where readers usually remain oblivious to the acrostic dimension. As Theune states, “fractal poetry doesn’t encourage revolution so much as asks for analysis. Fractal theory wants to help readers see deep form in the seemingly free, to remind readers to take free verse seriously” (6). Fulton proposes, for example, that “digression, interruption, fragmentation, and lack of continuity be regarded as formal functions rather than lapses into formlessness” (64). She claims that fractal poetics is not a voice-based aesthetics, but rather a made thing, an artifice. Fractal poetics is neither elitist nor populist: “it exists on a third ground between “high” or “low” terrains, resistant to those classifications. Cole Swensen claims that in literature fractal form offers an opening between the unstructured and structured:

It creates this space between extremes by creating a pattern along which a mediation can be articulated. This new form is neither a third pole, nor a compromise between (combination of rearrangement of elements) the two original poles; rather, it is something new that breaks up a binary entrenchment by stepping outside its terms. (632)

Like the components of complex systems, “the poems’ inclusions neither lock into position nor dissolve into turbulence” (72). Fractal poetry is, however, much more turbulent than organic verse. A fractal poem might start as an iambic pentameter and break then and disrupt it, allowing other forms to emerge. To be fractal a poem must be situated between dimensions which can be achieved through shifting linguistic densities. Fractal poetry is three-dimensional. For Fulton, “Dickinson—with her broken syntax and maximal dashes—is a fractal forebear” (81).

Fractal poetics is also stochastic (from the Greek "stochos" or "goal," meaning random), which implies that it is non-deterministic, generated while written. An example of the stochastic process is a random walk. In mathematics and physics a random walk is a formalization of the intuitive idea of taking successive steps, each in a random direction. A random walk is sometimes called a drunkard's walk. A simple random walk has a starting point and a point of destination, but the direction from one point in the path to the next is chosen at random, and no direction is more probable than another. When a drunkard walks around in the city and at every corner chooses one of the four possible routes (including the one he came from) with equal probability, his will be a random walk. The drunkard will eventually get home. This won’t hold, however, for a three-dimensional walk in the air. In other words, a drunkard bird might wander forever without finding its nest. The three-dimensional random walk will be fractal. In brain research, random walks are used to model cascades of neuron firing in the brain (Wikipedia).

A random three dimensional walk can be transposed into fractal poetics. A. R. Ammons’ poetic field of multiple possibilities and infinite meandering serves as an example here of a three-dimensional walk. In “Corson Inlet” Ammons writes,

The walk liberating, I was released from forms,
From the perpendiculars,
 Straight lines, blocks, boxes, binds
Of thought

Into the hues, shadings, rises, flowing bends and blends
Of sight:
(148)

5. Examples of fractals in poetry

Lucy Pollard-Gott

Example

In Wallace Stevens' poem "The Sail of Ulysses (Canto I)" Pollard-Gott took **know** as the root. Here are the occurrences of **know** in the poem.

The Sail of Ulysses (Canto I)

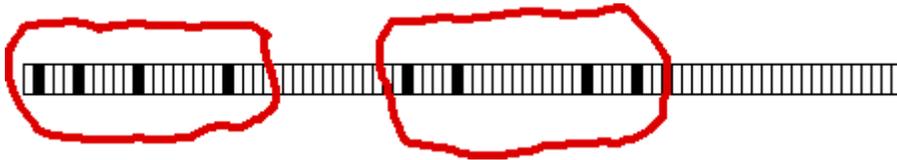
If **knowledge** and thing **known** are one
So that to **know** a man is to be
That man, to **know** a place is to be
That place, and it seems to come to that;
And if to **know** one man is to **know** all
And if one's sense of a single spot
Is what one **knows** of the universe,
Then **knowledge** is the only life,
The only sun of the only day,

The only access to true ease,
The deep comfort of the world and fate.

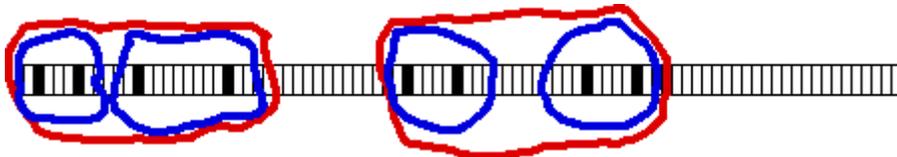
Lucy Pollard-Gott

Interpretation

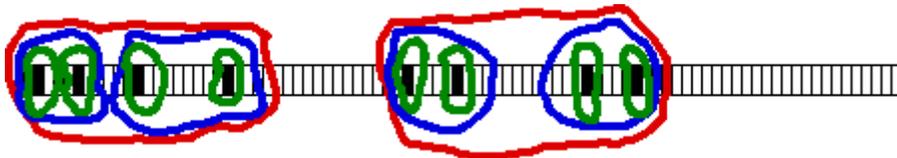
Note the occurrences of **know** organize themselves into hierarchical clusters, that is, clusters within clusters



There are two clusters,



each made of two clusters (the left is less clear than the right),



each made of two occurrences.

6. John Taggard's poem

John Taggard's "Slow Song for Mark Rothko" will serve as a practice for finding patterns in poetry and using excel to do it (see attached John Taggard Slow Song. doc.)

1. Read the poem and identify 5 words that reoccur frequently. Count how many times they occur in each stanza and the whole poem. Put your results into an excel spreadsheet and draw a graph of your results
2. Now use excel to count the occurrence of the words. The poem has been put into excel and you can use the "countif" function.
3. Graph the results and see if you can figure out a pattern of repetition.

--students analyze the poem and find out its pattern and regularities

(see attached document : fractal spreadsheet 2.xlsx)

Students will count in Excel the words that repeat and will see whether there is any pattern that emerges. They will present their findings in the graphs and spreadsheets.

7. A final project Lyn Hejinain MY LIFE

Lyn Hejinian's My Life will serve as the main text for our analysis. Students will be asked to recognize patterns within this seemingly random and chaotic text. They will study in groups the frequency and patterns of alliterations, repetitions, number of sentences in each paragraph and number of paragraphs.

1. Due to the length of this book, we will use the Word Document tool: find
2. Students find out how many sentences and paragraphs there are in the whole text
3. We check for the repetitions of particular words and phrases such as "a pause a rose something on a paper"
4. Is this text a fractal poem?

Vide attached scanned text of My Life

Results:

We have found out that there are 45 sentences in each paragraph and there are 45 paragraphs and that the author was 45 when she wrote it.

Hence, Lyn Hejinian's My Life may be regarded as a three-dimensional stroll or a swirl, a fractal poem which, in Robert Creeley's words, represents "a world that's constantly coming into being" (Baker 74). My Life reveals deep pattern amidst seemingly chaotic and free form. It oscillates between set forms and aimlessness; chaos and Euclidean order; closure and non-closure, and as such inhabits the third space. The fractal effect in Hejinian's My Life is achieved by repetition of certain sentences. A tagline in the left corner opens the book: "A Pause, a rose, something on paper" (7). This line reappears in the text eighteen times, sometimes unchanged and sometimes with added words, such as: "A pause, a rose, something on a paper—an example of parascription" (ML 88).

However, the repeated sentences are never the same in the new context. Constant reconfiguration and re-patterning of sentences serves as a means to reject clarity tantamount with closure. “Imagine: never to be unintelligible!” says Hejinian (ML 66). “What is the meaning hung from that depend” (ML 20). The meaning is always created within context; a new reconfiguration; a repetition in a different moment of perception. Each perception becomes the act of creation. The meaning is in “permanent constructedness;” never intelligible, never complete, always deferred. After all, “it is impossible to return to the stage of mind in which these sentences originated” (40). Hejinian achieves the effect of this permanent constructedness through repetition. Herrnstein-Smith states that repetition functions as one of the principal closural devices in a poem. Hejinian, on the contrary, utilizes repetition to disrupt the initial apparent meaning scheme and thus challenges reader’s inclination to identify the text. Through a recontextualization of certain phrases, “the initial reading is adjusted; meaning is set in motion, emended and extended, and the constant revision postpones completion of the thought indefinitely” (The Language of Inquiry 44). As Gertrude Stein observes in Portraits and Repetitions: “A thing that seems to be exactly the same thing may seem to be a repetition but is it...[sic] Is there repetition or is there insistence [sic], I am inclined to believe there is no such a thing as repetition” (“Rejection of Closure” 32). If we insist, even if we insist the same thing, the emphasis of insistence almost always changes. Lyn Hejinian puts this anti-closural theory of repetition into practice in My Life where in each repetition insists on the ceaseless process of composing without closure. Repetition becomes a procedural device. A replaced leitmotif always generates a new meaning. Thus, repetitions contribute to the fractal structure of My Life. Constantly re-patterned sentences, fractal-like, “fissure infinitely” in Swensen’s term (632).

7. Creative Writing Project

After having practiced pattern recognition, students will be asked to write/generate their own fractal poetry with a hidden pattern in it.

The workshop itself has a fractal form, as students after bringing their fractal poem give it to another student who “fractalizes” them further. They write on palimpsests of each other poems