

The reality of hell and purgatory

A translation of <https://campanitasdefe.com/2019/03/02/la-realidad-del-infierno/>

Summary. Using as a basis what was explained in the [previous](#) little bell regarding [chaos theory](#), this entry of the blog shows how such ideas allow us to define accurate models of [hell](#) and [purgatory](#). A fragment a capella of the song "[En medio del caos](#)" ([In the midst of chaos](#)) can be heard in Spanish [here](#). The fragment sung by me can also be heard by the end of the text.

The conference [Learn an urgent lesson from a chaotic fig tree!](#), in English, as I shared it at [Ateneo Pontificio Regina Apostolorum](#) in [Rome](#) in 2013, summarizes the theme of this little bell and also of the following ones: [here](#), [here](#), [here](#) and [here](#). The YouTube video of this talk can be accessed [here](#) and at the end of the text.

The blog [Presentation](#) provides information about the purpose of these little bells and the blog [Organization](#) shows how the entries are grouped by categories. This entry belongs to the categories "[Calls to conversion](#)," "[Hell](#)" and [Chaos and its fig tree](#)."

The material for this little bell is found in the second chapter of my book [The Fig Tree & The Bell](#).

In these modern times of the 21st century, talking about [hell](#) — and also [purgatory](#) — has become increasingly laborious. While some argue that life after death does not exist and therefore neither does the archaic and [hellish](#) place imagined by [Dante](#), others believe that it does exist but that there is no need to worry. After all, [God](#), in [His infinite mercy](#), would not send anyone there, let alone to the other destination of further [purification](#), and such is the opinion of those who do not even believe in [God's](#) existence. If [hell](#) exists, others say, it must be an [almost empty](#) place, populated by truly [malevolent](#) beings, only the [vilest](#) and no one else, allowing us, hence, to live in [peace](#) without any subsequent worry.

According to the [Sacred Scriptures](#), that is, the [Holy Bible](#), [Jesus, the Son of God](#), became [man](#) so that those who would embrace [His sacrifice on the cross](#) could have [eternal life](#) in [heaven](#), thus avoiding the [suffering](#) in the [dust](#) prescribed for our [sin](#). This premise is being questioned today, as many argue, even in places where it should not happen, that the [sacrifice](#) of [Christ](#), by virtue of [His universal love](#), is automatically extended to everyone without requiring the acceptance of the fact, that is, that [He](#) is [the way, the truth, and the](#)

life (Jn 14:6). Every path arrives, they confidently repeat with *ecumenical* assurance, but this is as incoherent as winning the lottery in this world without even buying a ticket.

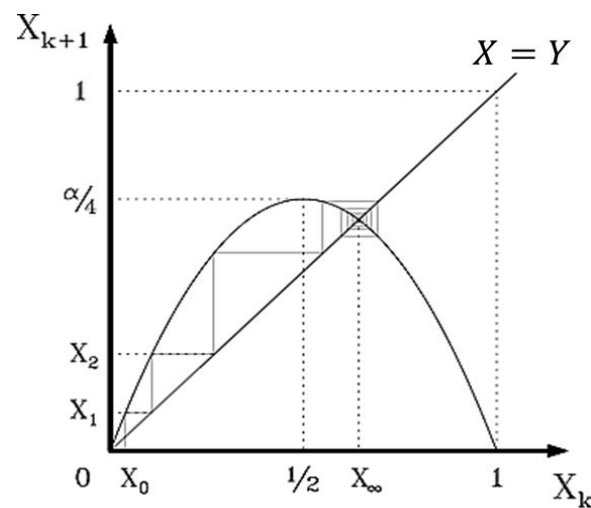
This little bell shows how *chaos theory*, already described in some detail in the *previous* entry, allows us to define, first, a model of **HELL** — one *eternal* and *very sad*, characterized by never reaching the *origin* while *wandering in dust* and *suffering in fire*, and, second, a representation of **PURGATORY** — a stay *finite* in *suffering* and ultimately *very happy*, defined by *improbable* and *merciful dynamics* arriving to the *origin* amid the most horrendous *chaos*.

As seen earlier, the formula used to describe the concept of *chaos* is the *logistic map*:

$$X_{k+1} = \alpha X_k (1 - X_k)$$

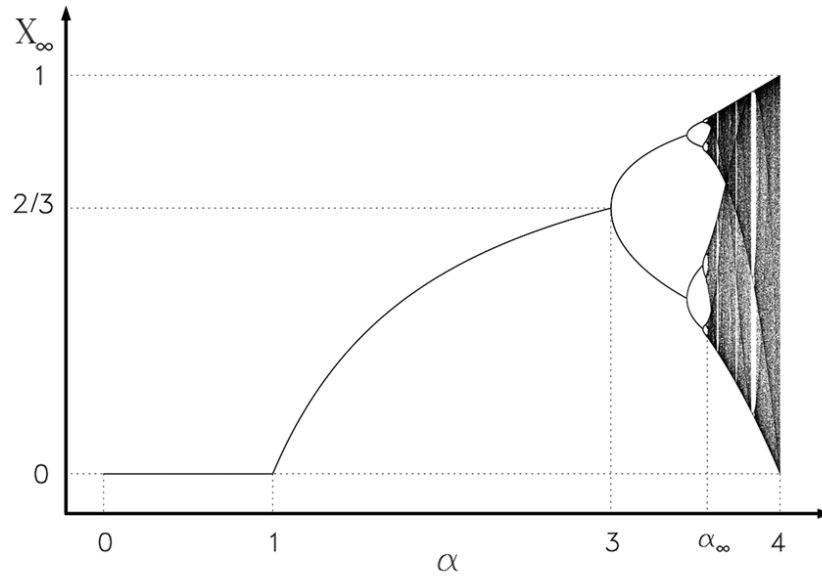
where X is the *size* of a normalized *population* of *rabbits* between 0 and 1, k and $k + 1$ are successive *generations*, and α is a *parameter* between 0 and 4.

By *reiterating* the *equation* over and over, it gives rise to various behaviors, such as those found for $\alpha = 2.8$:



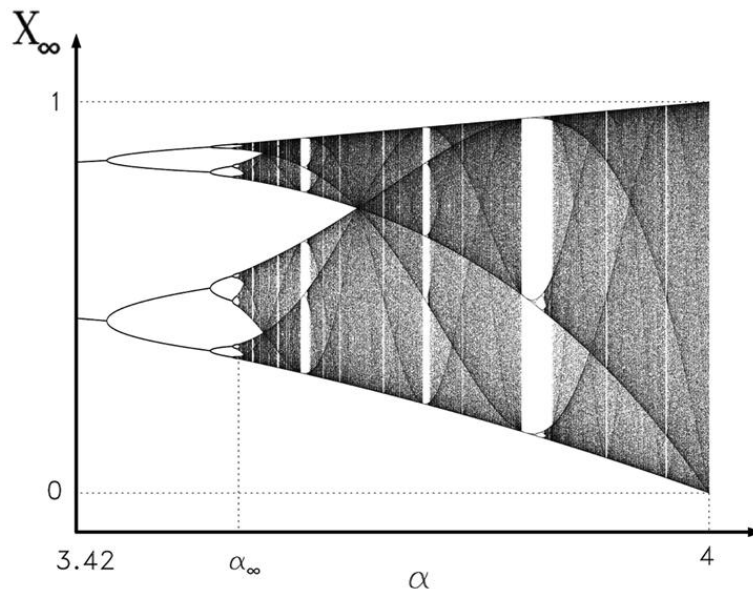
in which the *logistic parabola* produces, from one *generation* to the *next*, a sequence $X_0 \rightarrow X_1 \rightarrow X_2 \rightarrow \dots \rightarrow X_\infty$, outlined by the shown *vertical-horizontal lines*, in which the *population* of *rabbits stabilizes*.

However, as we studied, a simple succession towards **a single point** is not always found, and the **logistic equation**, depending on the **parameter** α , produces a great diversity of limits X_∞ , which is illustrated in the iconic **diagram of bifurcations**:



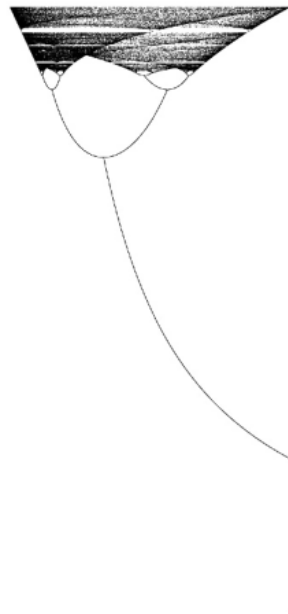
When α is between 0 and 1, the **dynamics converge** to the point $(0,0)$, the **origin**, and the **population** tends to **zero**. When the **parameter** α is between 1 and 3, the number of **rabbits** consolidates at a **single value** given by the **non-zero intersection** of the **parabola** and the **straight line** $X = Y$ – as illustrated in the previous figure. When α exceeds 3 and up to a value $\alpha_\infty \approx 3.5699$, the **rabbit population oscillates** in increasing **powers of two**, thus forming a **chain of bifurcations**.

When α surpasses α_∞ :



there are either *repetitive* or *periodic* behaviors, for every natural number that *is not a power of two*, or, more commonly, *infinite dusty attractors* that define the *wandering forever* of *chaos*.

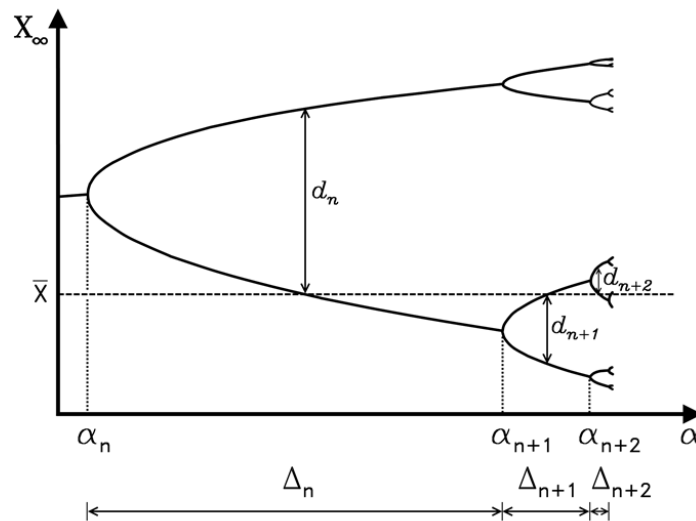
As explained in the *previous* little bell, this diagram, rotated 90 degrees counterclockwise, is also known as the *Feigenbaum tree*:



in honor of **Mitchell Feigenbaum**, who discovered and demonstrated *universal properties* about how the transition happens from *order* — *below* — to *disorder* — *above*.

Since these discoveries are relevant in order to approach the topic of **hell**, here I attempt to explain what such *genius* and professor at **Rockefeller University** found, even if the subject may be a bit difficult to understand. As in the previous little bell, I encourage the reader to press on *without becoming discouraged*, even if this time the topic pertains to a *terrifying* place.

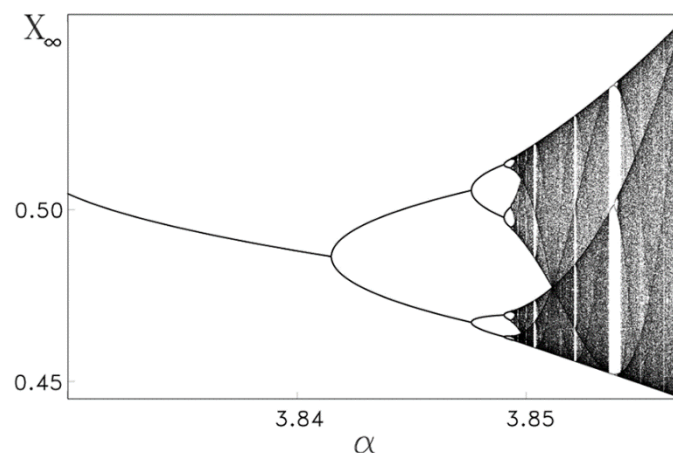
Feigenbaum studied how successive *thresholds* occur, when the *dynamics* vary in *powers of two*:



Here we observe several **bifurcations**, having increasingly **shorter durations**, $\Delta_n > \Delta_{n+1} > \Delta_{n+2}$, and we also see how the **branches** of the **bifurcations** **open less and less** when measured **up** and **down** and **up** from a **horizontal line** \bar{X} that encompasses the **dynamics**, $d_n > d_{n+1} > d_{n+2}$.

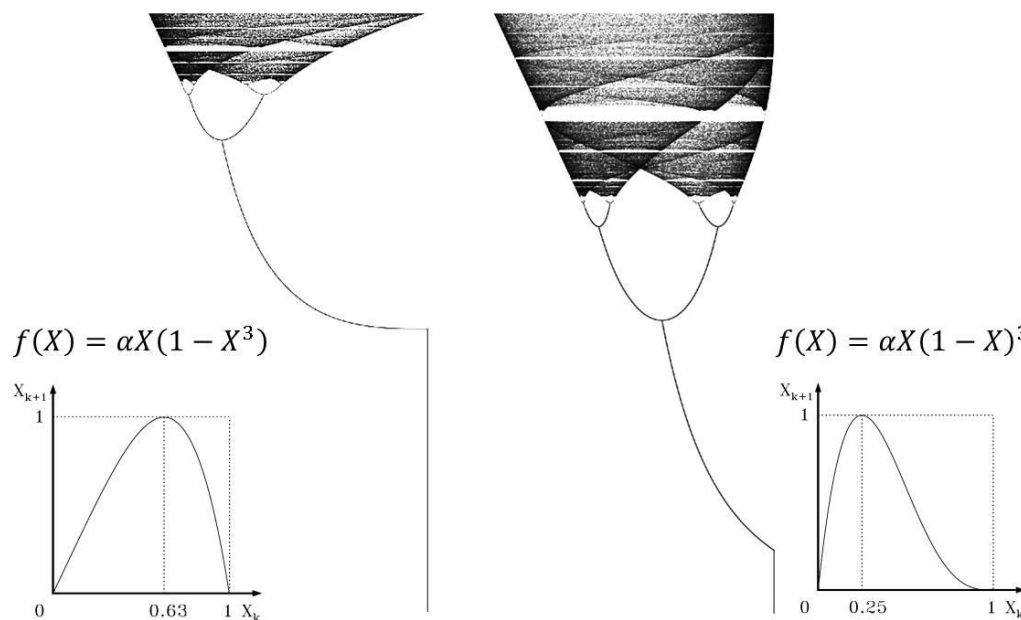
Feigenbaum demonstrated that the ratio of such distances, from one **bifurcation** to the **next**, follow a rather **precise order**, as these fractions do converge to two values, $d_n/d_{n+1} \rightarrow \mathcal{F}_1 \approx -2.50$ and $\Delta_n/\Delta_{n+1} \rightarrow \mathcal{F}_2 \approx 4.66$, now known as **Feigenbaum's universal constants**.

This designation is accurate because not only is the **first chain of bifurcations** in the **tree** governed by these **constants**, but also any similar sequence in **powers of two** found in the existing **buds** in the **white bands** of the **tree**, and for **infinite periods**, as it happens, for example, in the most prominent **bud** located in the middle of the widest **white band** of **period 3** — for values of α from 3.84 to 3.85, as it was shown in the **previous** little bell:

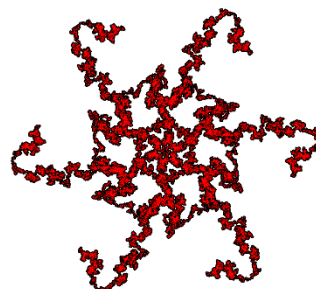


Although these discoveries do not imply that **chaos** itself *is ordered* — as is sometimes mistakenly claimed — they show that there is indeed an extraordinary *order* in the *route to chaos* through *bifurcations*, as the same type of *fragmentation* occurs, astonishingly, everywhere in the tail of the diagram, that is, in the *foliage* of the *tree*.

And if this infinite repetition were not enough to classify the *constants* as “*universal*,” **Feigenbaum** also demonstrated that the same ratios from *bifurcation* to *bifurcation*, \mathcal{F}_1 and \mathcal{F}_2 , also appear when using *any equation* other than the *logistic map*, provided that it has a *single peak*, which is illustrated next for two simple maps that generate *trees* with *chaotic foliage* when a *parameter* α is increased from a value of zero to a maximum value:



As observed, the *mathematical regularity* found is both unexpected and astonishing, and the *constants* \mathcal{F}_1 and \mathcal{F}_2 (with infinite expansions not yet known) are to *the route towards chaos through bifurcations* as what *π is to circles*. What a magnificent discovery by **Dr. Fig Tree**, for, as mentioned in the *previous* little bell, that is what **Feigenbaum** means in German! ...



... But there is even more, just after a pause with a bow inside the *circular Gaussian bell*. Beyond its unifying power in the *mathematics of chaos*, these results became even more relevant when the *universal constants* began to appear in a variety of fields of knowledge, especially \mathcal{F}_2 and particularly in the physical study of *convection*, that is, the *heating of fluids*.

In a manner consonant with what is carefully observed when making Colombian coffee in the morning, precise experiments conducted in the 1970s and 1980s by *Albert Libchaber* — another *genius* at *Rockefeller University* — led to discernible measurements of the behavior of a *fluid* when it is placed between two conductive *plates* and such that a *temperature differential* ΔT between them increases.

Here is a summary of what happens. When ΔT is very small, *the fluid does not even feel it* and its internal temperature remains stable. However, if ΔT increases, there comes a point when it exceeds a *threshold* ΔT_0 and the *fluid* begins to *conduct the heat, warming up* but *remaining still*. When ΔT continues to rise and surpasses another *critical temperature* ΔT_1 , that is, another *threshold*, the fluid not only *continues to heat up* but has *no way to stay still* — much like what sometimes happens to us — and it *breaks* into *cylindrical “convective rolls,”* which move the *excessive energy* from one *plate* to the *other* in a geometrically *stable* manner. These *rolls*, analogous to what occurs when *daily storms* form in *tropical areas*, *oscillate*, moving *the hotter* and *less dense fluid* toward the *colder plate* and the *cooler* and *heavier fluid* toward the *hotter plate*.

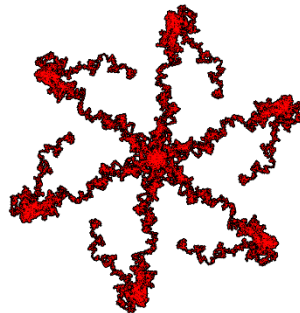
When ΔT rises even further, a second dynamic *threshold* ΔT_2 , is found where the *rolls* cease to be *cylindrical* and instead possess more complex geometries defined by *more than two basic temperatures*. As ΔT increases even further, additional *thresholds* appear that yield a diversity of *oscillatory* behaviors that happen in a curiously *ordered* manner. Eventually, when ΔT is large enough, great many *thresholds* are crossed, and the *fluid* becomes *turbulent* and *chaotic*, and it is best not to stick a finger in that *boiling* pot full of *tumultuous bubbles*.

Notably, and as reported by *Libchaber* and his collaborators, the precise locations of the temperature *thresholds* observed, when heating both *liquid helium* and *mercury* in the laboratory, closely approximate, in their *duration ratios*, the *constant* obtained by *Feigenbaum* regarding *bifurcations* in *powers of two*, that is, \mathcal{F}_2 . Although measuring more than *four bifurcations* is difficult due to precision limitations, these results and others

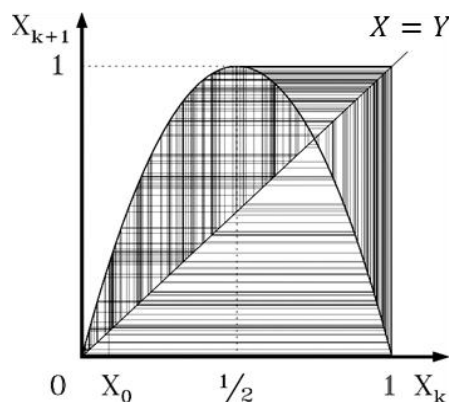
calculated later on for **water** imply that there is a discernible order in the way **heating** leads a **fluid** from **stillness** or **equilibrium** to an eventual **chaotic** and **turbulent** state.

Oh, what an admirable result found in **mathematics** and **physics** by **the two geniuses** at **Rockefeller University**: the **heating of fluids** is related to the **logistic map** when the **parameter** α represents the **heat** added to the **liquid**! What an **unprecedented simplicity** in such a **devilishly complexity**!

I don't know if you are finding the matter interesting or not, but amidst all the **mess** based on these “**simple**” results regarding **heating**, it becomes relevant to study, even if from a distance, the behavior of the **logistic map** when the **heat** is at its highest, that is, when the **parameter** α equals 4. As will be seen, this location, which exceeds **all infinite thresholds** in the **infinite sprouts** or **buds** of the **Feigenbaum tree** for **all repetitive** behaviors, certainly leads to a **stable chaotic** movement in a **strange attractor**, in which **wandering forever** in **dust** and **without repetition** at **the highest heat** represents a **terrifying** yet real image of the worst place we can visit to never return: **HELL** ...



... Here we observe, at first glance, what occurs at **the top** of the **Feigenbaum tree** when α equals 4 and the **peak of the parabola** has a value of 1:

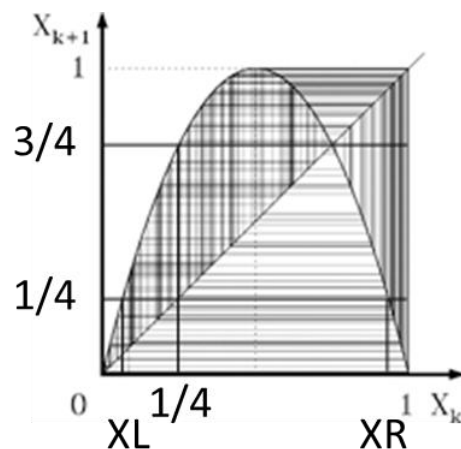


As seen, here appears a collection of **vertical-horizontal lines** starting from an initial value X_0 , and they, always linked with the **first threshold $X = Y$** , seem to visit all points from 0 to 1. It seems, indeed, that the **logistic dynamics** covers the entire interval, but it is also observed that the **infinite attractor** is **dusty** as it contains “**gaps**” (tiny and white), much like a cake made up of layers of dough.

Certainly, it is true that not every point in the interval $[0, 1]$ travels **forever without repetition** when α is equal to 4. For example, if X_0 corresponds to the **non-zero intersection** of the **parabola** with the **straight line**, that is, $(\alpha - 1)/\alpha = 3/4$, then $X_1 = \alpha \cdot X_0 \cdot (1 - X_0) = 4 \cdot 3/4 \cdot 1/4 = 3/4$, the same as X_0 , and from there onward the **population** remains forever at $3/4$.

Given the symmetry of the **parabola**, it is easy to notice that the value $1/4$ also does not belong to the **strange attractor**, since if $X_0 = 1/4$, then $X_1 = \alpha \cdot X_0 \cdot (1 - X_0) = 4 \cdot 1/4 \cdot 3/4 = 3/4$, which means that if the process begins exactly at $1/4$, the **dynamics** travel to $3/4$ and **remain there** forever, without **wandering without repetition**.

It turns out that $1/4$ and $3/4$ are not the only **gaps** in the **attractor**, as there are **two values** in the **past** of $1/4$ — obtained by reading the **parabola** backward — that also end up being **attracted** by $3/4$:

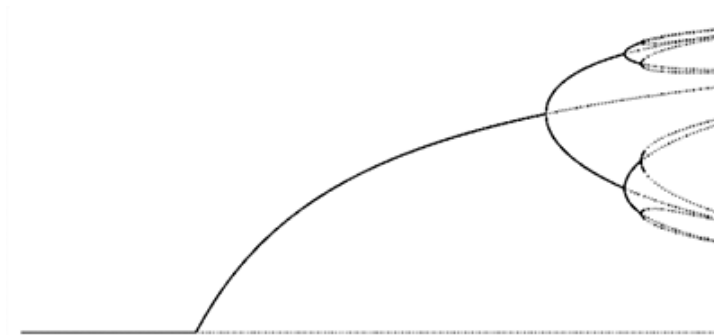


If one starts at these points, denoted as XL and XR , from there both go to $1/4$ and from there to $3/4$.

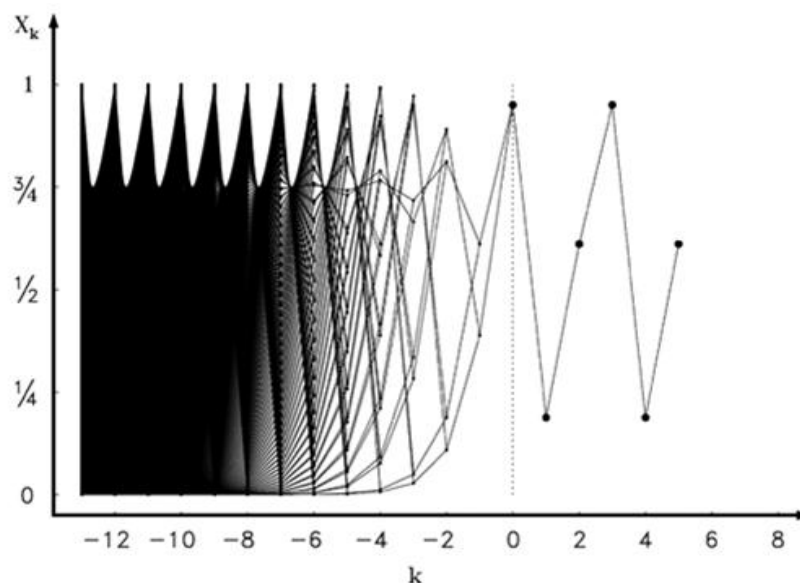
But the matter does not end there, as there are also values in the **past** of XL and XR , found by drawing **horizontal lines** at these values and reading the **parabola** backward at the **two intersections** — just as was done for XL and XR starting from $1/4$ — which, by construction,

also end up at $3/4$. Since this process can be carried out repeatedly into the *past*, it is observed that the *attractor* contains an *infinite number of gaps*, and thus the (black) “cake” is, in fact, *dispersed* and *empty* like *dust*.

It happens that the *attractor* does not contain the point $3/4$ nor its related values in the *past*, and it also does not include other sets of *infinite points* related to the *infinite branches* of the *tree* and its *root*, which ceased to *attract* and instead *repelled* upon crossing a *threshold*:



For example, the *attractor* excludes — although it has not been drawn above to avoid further confusion — the behavior that ends up repeating every *three generations*:



Here the *diagram* shows the paths in the *past* of the largest repeating value (close to 0.95), when k is the number of *generations* until the *oscillations* begin. For each value in a “*now*” (starting from $k = 0$), there are two in “*the past*” linked to it, and thus, the *diagram* is built step by step, resulting in an *infinite “binary tree”* that is not part of the *strange attractor*.

In addition to graphically reiterating that the **attractor** contains **infinite gaps**, like those found in relation to $3/4$, this curious **figure** shows that **the points that do not wander forever occur everywhere** in **the interval from zero to one**, as can be seen in a “**dense**” manner to the left, 13 generations in the **past**.

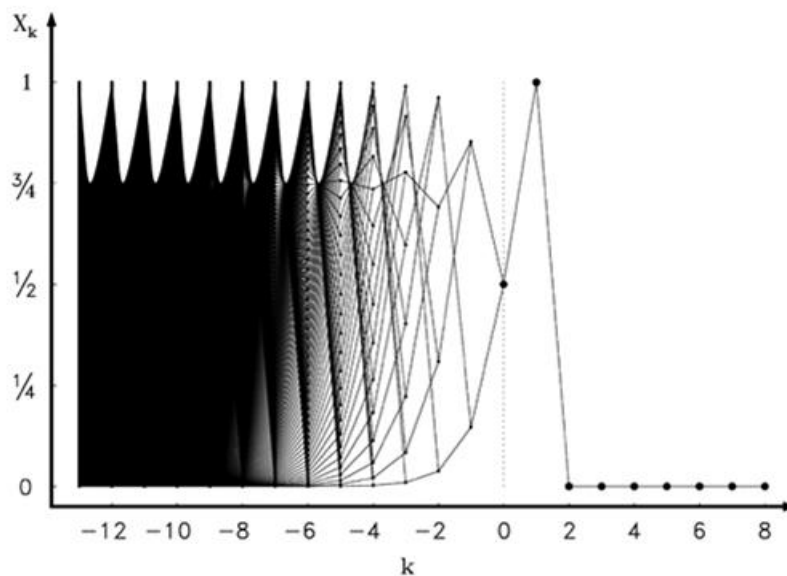
When the value of the **parameter** α is equal to 4, the **chaotic attractor**, although it truly contains an **infinite number of points** that **cannot be counted**, ends up being really **dusty**, as it is equal to the interval $[0, 1]$ (also an **uncountable infinite set**) minus an **infinity of infinite diagrams** — **infinite binary trees** that are **countable** — which are based on all the **infinite values** that end up **repeating**, that is, for any natural number reflected by the **branches** of the **tree**.

What a jumble defined by the **infinite thresholds** of the astonishing **Feigenbaum tree**! What a subtle object the **final attractor** is, so **devilishly fragmented** while **intertwined** with all **repetitive behaviors**! Who would have thought that such a “strange” description of **infinite dust** would be read here, all stemming from **beautiful little rabbits**!

All of this is madness when α is equal to 4, of course, and these (**countable**) **infinite binary diagrams** turn out to be, in fact, **arbitrarily close** to one another, **exquisitely intertwined** to one another, making it **impossible to predict** what will happen to a certain initial value, say 100 generations from the past. Will the **dynamics** reach $3/4$ from there, or end up **oscillating** every **two generations**, or every **three**, or perhaps **repeat** every **10,000 generations**? It is unknown, as the reality of **chaos** makes the **binary diagrams** look **identical in the past**, and because a **really tiny error** in any initial value likely causes the **dynamics** to end up **wandering** in the **infinite** and **uncountable attractor** of **chaos**.

The matter is undoubtedly very complex, but there is a bit more. Within this mess of **diverse** and **densely interwoven** paths that travel according to **disparate periodic behaviors**, there is also another **binary tree** that must be excluded from **wandering forever** in the **great heat**, and such is related to the **dynamics** associated with the **root** of the **Feigenbaum tree**, that is, with **converging** to the **origin**, extending the **straight root** upward, that is, toward $\alpha = 4$.

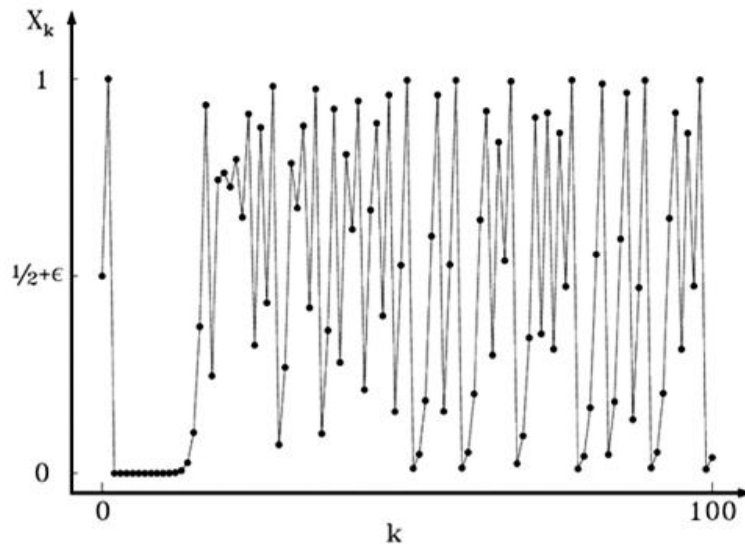
This precise behavior gives rise to the **diagram**:



which is very similar to the one shown earlier for period three — certainly starting at six generations to the past — but this one, by passing exactly through the *middle*, $1/2$, when $k = 0$, travels from there to *one* — the *peak of the parabola* — and then rests at *zero*, the *origin*, also drawing the inverted symbol (upside down) of a *square root*.

After so much *chaos* in this little bell, the existence of this *diagram* leading to the *holy abandonment* of *zero* turns out to be *hopeful*, for amid the *greatest heat* at the *top* of the *Feigenbaum tree* when $\alpha = 4$, and only there, in the *most extreme condition*, there is found — though *intertwined* with *chaos* and with *oscillating* or being *still* at $3/4$, that is, in a both boring and painful manner forever — an *escape to the essence*, like an extremely *merciful* and also dogmatic *purgatory* that avoids *eternal punishment*. What a *wonderful* and wholly *improbable dynamic*, for, in all probability, *chaos* creates its mess at *the top* of such a *fig tree* of science!

Chaos is, without a doubt, a *cumbersome* and *nefarious* process that is better avoided by us “*lowering*” the *heat of life*, obediently going toward the *straight root* of the *tree*, leaving behind all *lies*, just as explained in the *previous* little bell. It is true, and we can visualize it. Up there, at *the peak* of *chaos*, there is a *beautiful escape*, but it is uncertain, for if we fail to enter through the proverbial *midpoint*, even by a tiny $\epsilon = 0.0001$:



the **dynamics** fails to reach **unity**, leading to a succession of **populations** close to **zero** but **positive**, which succumb to the extreme sensitivity of **chaos** and to **divergent** movements guided as if by chance.

In the **diagram** is seen in action the **previously** mentioned **butterfly effect** — which reflects the “**lack of forgiveness**” of the **infernal** process that **attracts us** to where we do not want to go, taking us “**everywhere**” while passing “**close** to **home**,” but never entering **it**. What a sad situation this is, like that of a “**rich**” man who **wandered in pain without ever arriving**, even though he spoke with another **faithful** man named **Lazarus** who was going to **rest** and to whom he asked for a little water! (Lk 16:19–31). How unfortunate it is to be **burned tares** instead of **good wheat** stored in the **heavenly barn**! (Mt 13:24–30, 36–43). How real and consistent is the **punishment** received by the murdering **devil** in **hell** itself (Mt 25:41) and there eating **dust forever**! (Gn 3:14).

Without dismissing even an epsilon the improbable existence of a **finite purgatory** — let there be here an ode to the word **finite** — and much less the **souls** that pay for their **sins** there until they **owe no more** (Mt 5:26), it is indeed much better to **come down at once** from the **tree** to **the root**, as little **Zacchaeus** did at once (Lk 19:1–10), recognizing the precious **threshold** $X = Y$, who else but our savior **Jesus**, who satisfied the simplest **one-to-one** equation in a geometric way, extending **His arms** nailed to the **cross**.

I understand well that it may seem **strange** — using that terminology intentionally — that the **redeemer of the world** can be described by such a **childish** equation, but as explained in a **previous** little bell, such a **line** allows us to understand that **He** is indeed “**the way, the truth, and the life**” and that “**no one comes to the Father but through Him**” (Jn 14:6). And

it also happens that if we would not want to see **Him** there, we can also refer to **His** words when **He** said that the **stones** would speak if the **disciples** did not (Lk 19:40), for as has already been **explained**, recent studies of the image of the **Holy Shroud of Turin** reveal that beneath the chin of the crucified there was an oval **stone** (visible at its lower edge here) with an inscription of three letters:



IN Y

which serve as an **ancient** and truthful hint, I say, for **modern** explanations that express that **Jesus** satisfied **X = Y**.

“God is really great,” my grandmother **Fanny** would say at this moment, for, in addition, **God** can indeed trap the **wicked** in the **dust** and sink them there together, just as **He** told **Job** (Jb 40:12–13), and **He** can do it without them ever encountering themselves, trapped in the most horrifying **solitude**, that is, in a **dusty** and **infernal** attractor. And **He**, the **omnipotent**, can also do — I cannot understand how one could doubt **His infinite power** — what undoubtedly seems impossible: to bring out from the **dust** **His faithful chosen ones**, that is, those who accepted that **Jesus** was who **He** was, in order for **Him** to take them **home**.

How can we not remember the **young rich man** who asked **Jesus** what was required to **enter** the **kingdom of heaven**, the same one who did not do what he was told because he had many possessions? Do you remember that **generic** and **self-assured man** whose name we never knew? And how can we not link this **precise** and **implausible purgatory** — defined with zero probability — to the astonished reaction of the **disciples** when they understood that being

saved for them was “*impossible*,” to which **Jesus** replied that it was impossible for man but not for **God**? (Mt 19:16—30).

To conclude this long little bell, though *finite* in suffering, I include next a song that exalts the way to **heaven** through *purgatory*, something that is, I hope it is very clear, *muuuuuuuch better* than following the path to **hell** through *bifurcations* or any other way to **chaos**. If, when my day comes, I ought to take the improbable path of *vital purification*, well understood as a *clarification* or *dogma of faith*, it would be a *holy* and *infinite blessing*.

May this **Lent** that is beginning be very fruitful!

IN THE MIDST OF CHAOS

What a Purgatory!

In modern science
there is a catholic tree,
with an everlasting root
and a chaotic foliage.

This icon describes
the madness of the matter
and powerfully defines
the way out of the imbroglio.

Listen, friend, understand,
loyal warning from the fig tree:
if you think you are very brave,
you will cry your blindness.

Listen well, holy advice:
to be prepared is wise:
it is vital to stay awake
to outsmart death.

Shanti Setú...

And understand that...

In the midst of chaos

there is a way out
that leads to life.

In the midst of chaos

there is a refuge
that heals the wound.

At the top of the fig tree

there is a tiny path
that goes to infinity.

At the top of the fig tree

there is a small point
that connects it all.

In the midst of chaos

there is a hopscotch
to jump without shame.

In the midst of chaos

there is the Omega
that nourishes and frees.

At the top of the fig tree

there is a fine well
that waters destiny.

At the top of the fig tree

there is the friend
who gives the divine.

Bridge of peace...

In the midst of chaos
study and you will see,
in the midst of chaos
really all truth,
in the midst of chaos
a true open door,
in the midst of chaos
that leads to the essence,
in the midst of chaos
in all equilibrium,
in the midst of chaos
danger is avoided,
in the midst of chaos
oh walking straight,
in the midst of chaos
the truthful is found.

At the top of the fig tree
see it is no invention,
at the top of the fig tree
a very beautiful oasis,
at the top of the fig tree
there is a good wheat,
at the top of the fig tree
surrounded by weeds,
at the top of the fig tree
there is a needle's eye,
at the top of the fig tree
you go through and it heals,
at the top of the fig tree
you go down smiling,
at the top of the fig tree
and you reach the origin.

In the midst of chaos
with the holy glory,

at the top of the fig tree
you find your victory,
in the midst of chaos
written on your chest,
at the top of the fig tree
you find your dream,
in the midst of chaos
surrounded by death,
at the top of the fig tree
you discover great luck,
in the midst of chaos
with a clear soul,
at the top of the fig tree
nothing happens to you.

Shanti Setú...

In the midst of chaos
at the top of the fig tree
purgatory is seen,
at the top of the fig tree
in the midst of chaos
a notable escape.

Oh, due to so much chaos
at the top of the fig tree
I go down, my friend,
from the top of the fig tree
and avoiding all chaos
I choose now the **root**.

(June 2000/March 2022)



A fragment, a capella in Spanish can be heard [here](#)...

The video of my conference **Learn an urgent lesson from a chaotic fig tree!**, in English, which summarizes the theme of this little bell and also the one on the following entries: [here](#), [here](#), [here](#) and [here](#), may be heard [here](#).