

# Chaos, Complexity & Christianity

## ***6. $Y = X$ : the narrow gate and the only way to the Father***

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# Summary

- *Reviews the logistic map and its amazing dynamics.*
- *Reintroduces the Feigenbaum tree and its universal properties.*
- *Shows intertwined roads that lead to distinct destinations in the summit of chaos.*
- *Illustrates an improbable escape from the most infernal chaos.*
- *Relates the Feigenbaum tree with biblical fig trees and argues that “abandonment” is key for us to enter the Kingdom of Heaven.*
- *Concludes that Jesus,  $Y = X$ , is the narrow gate and the only way that takes us to God the Father, the Origin.*

# **The logistic dynamics**

*(Puente, 2019a)*

# The logistic model

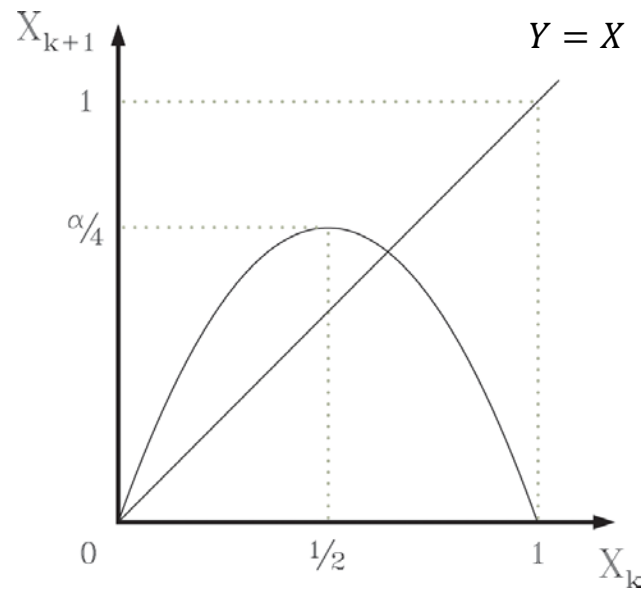
$$X_{k+1} = \alpha X_k (1 - X_k), \quad \alpha \in [0,4]$$

...a population of “*rabbits*” as a function of time

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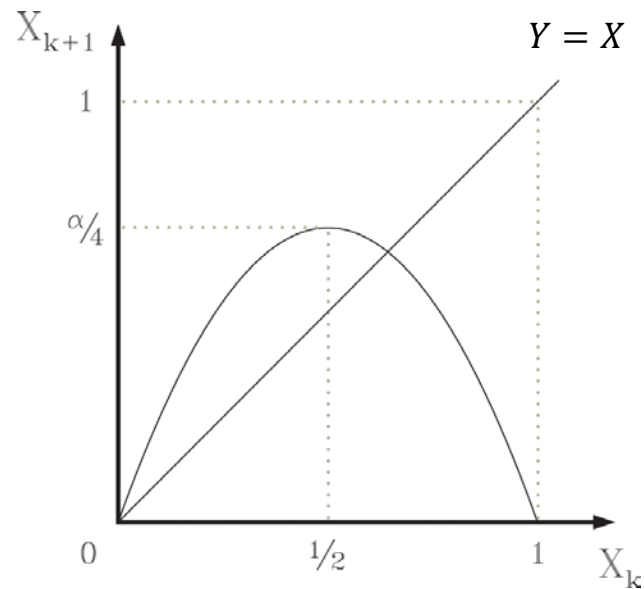
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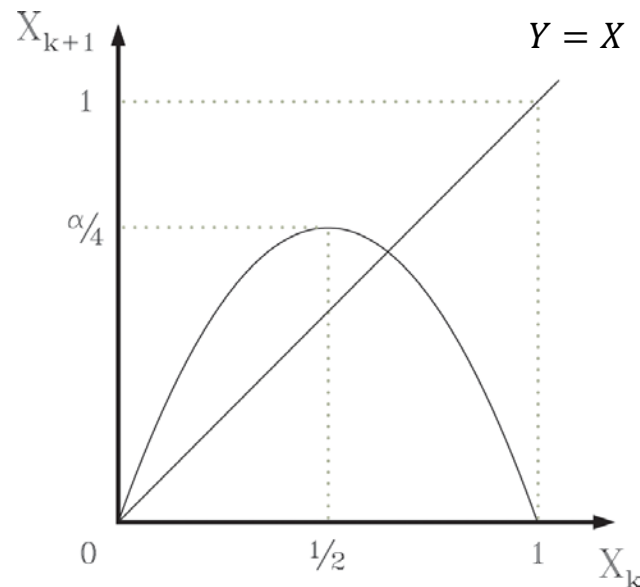
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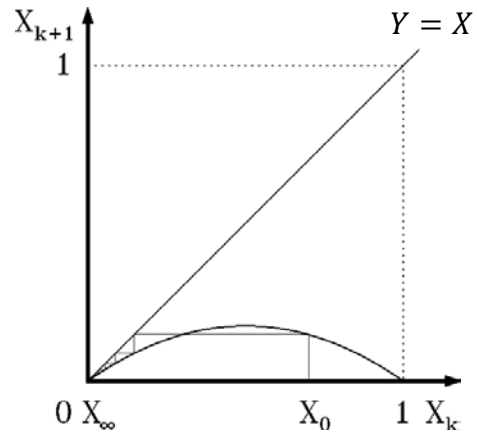


different cases depending on the parameter  $\alpha$ :

# The logistic dynamics

$$0 < \alpha \leq 1$$

$$X_\infty = 0$$

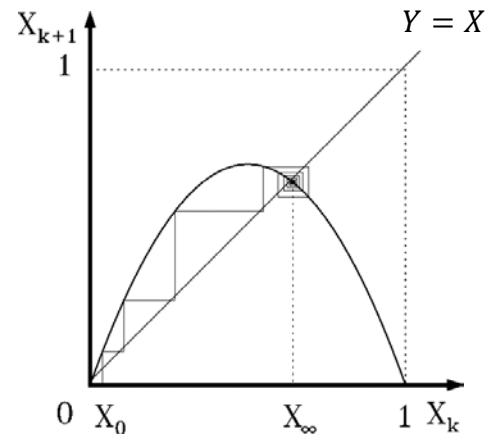
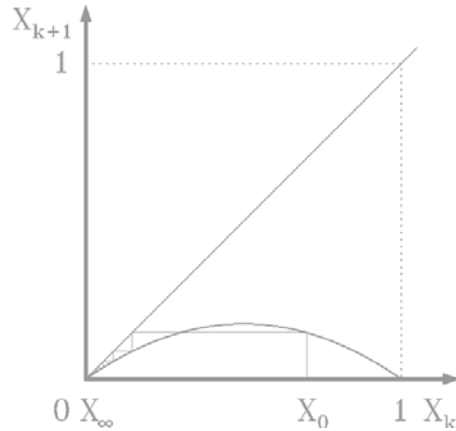




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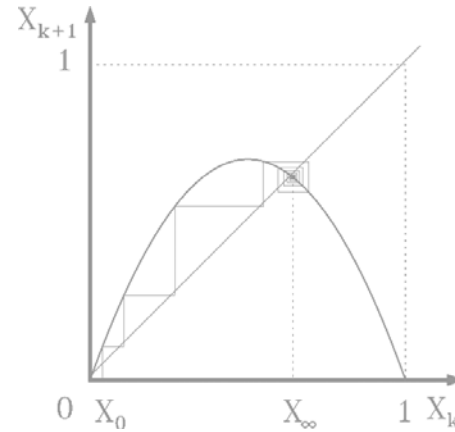
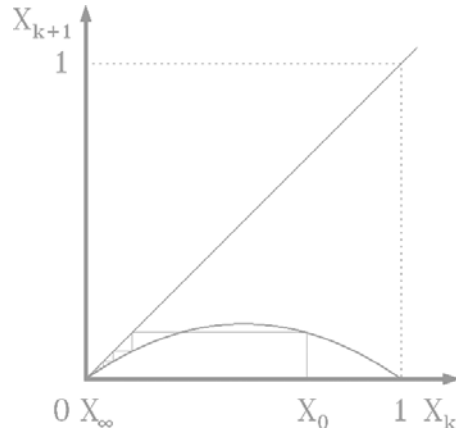
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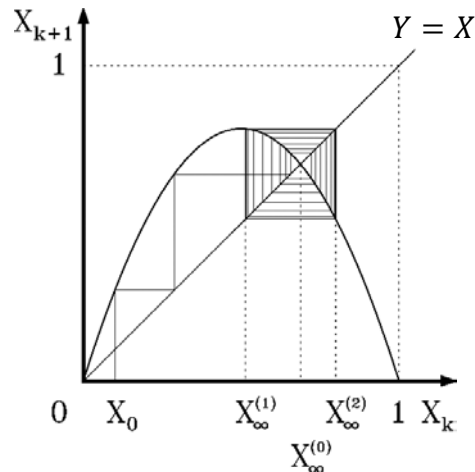


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$$\alpha = 3.2$$

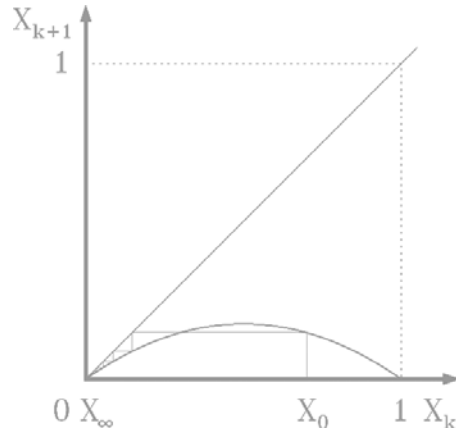
period 2



# The logistic dynamics

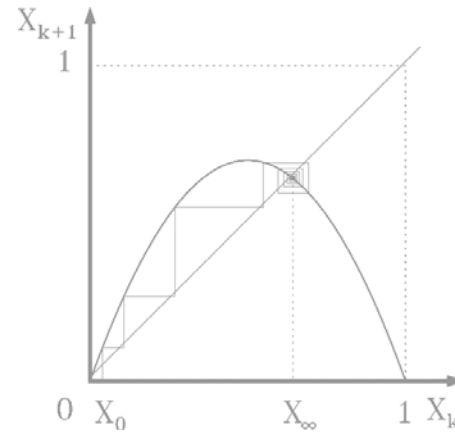
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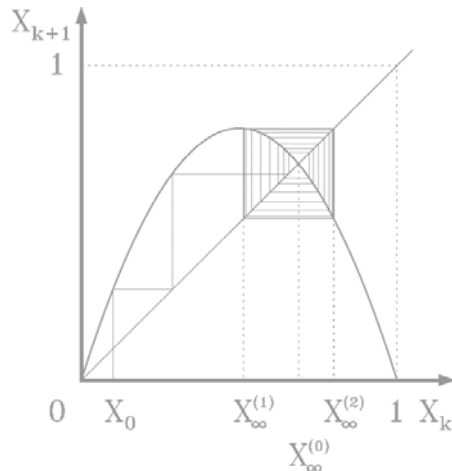
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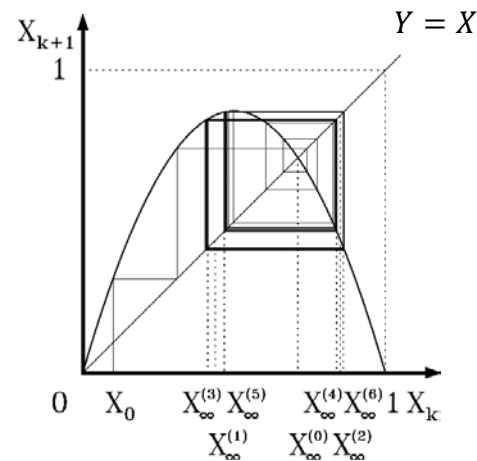
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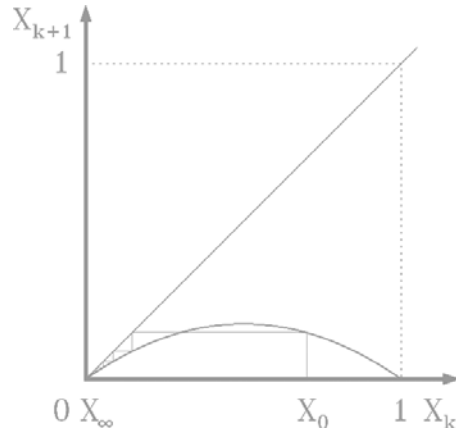
period 4



# The logistic dynamics

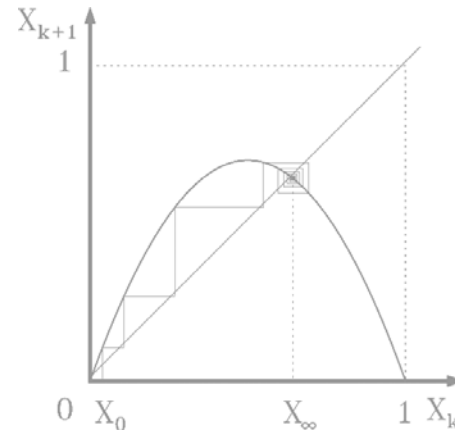
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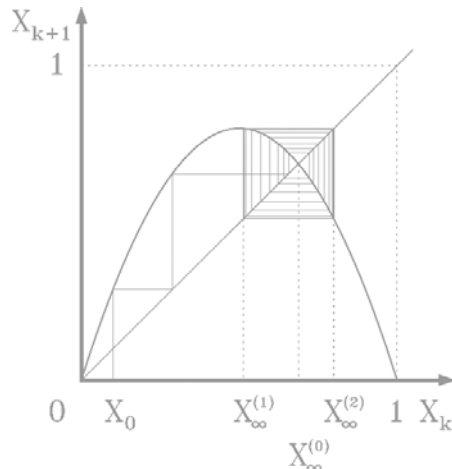
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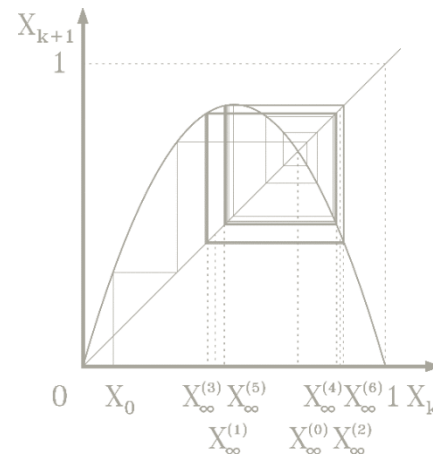
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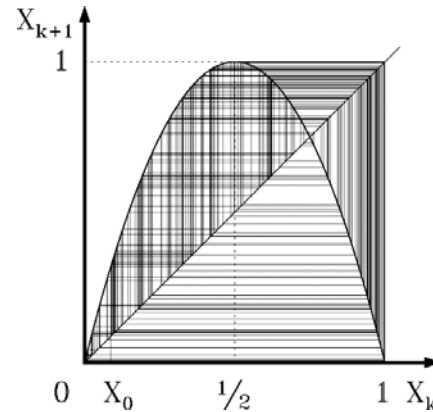
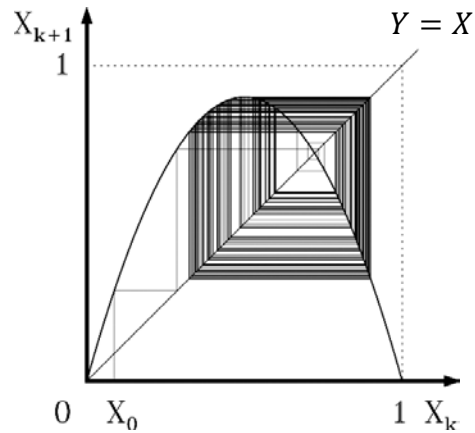


$$\dots \alpha_\infty \approx 3.5699$$

period  $2^n$

# The logistic dynamics

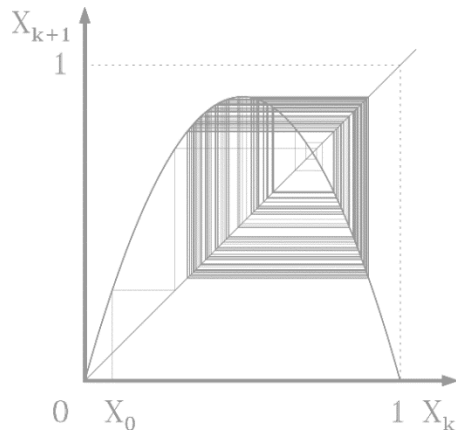
$\alpha = 3.6$   
aperiodic  
strange



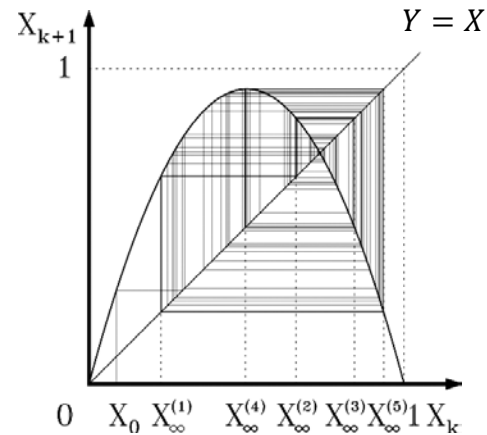
$\alpha = 4$   
aperiodic  
chaos

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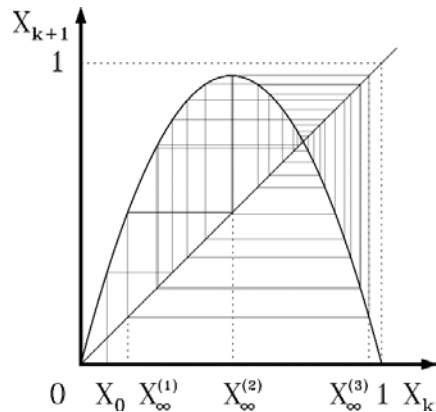
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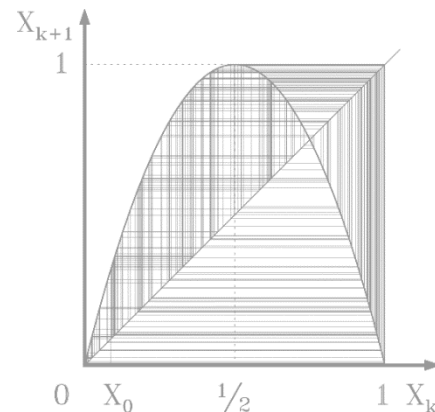
$\alpha = 3.74$   
period 5



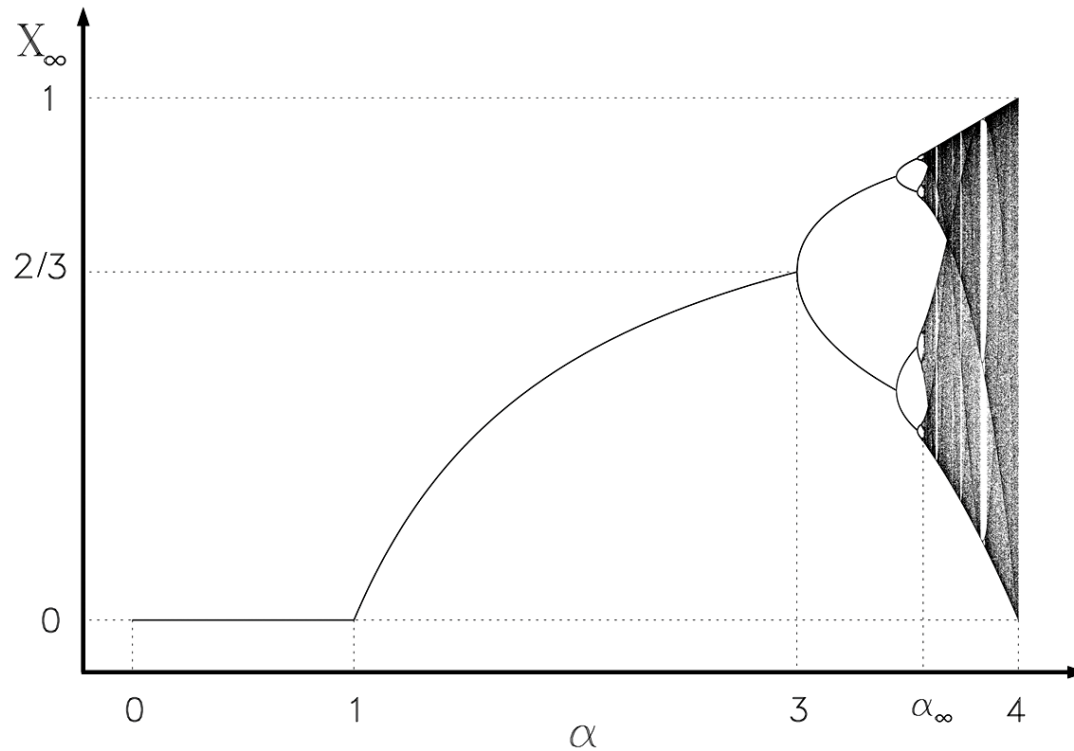
$\alpha = 3.83$   
period 3



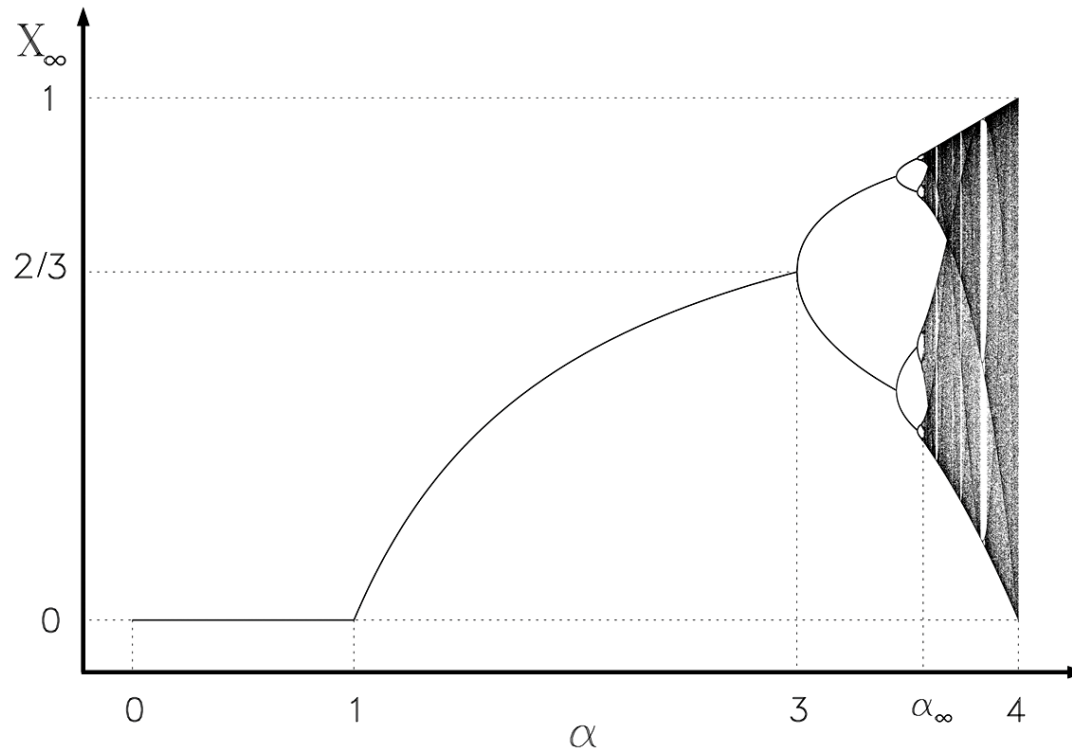
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# The diagram of bifurcations



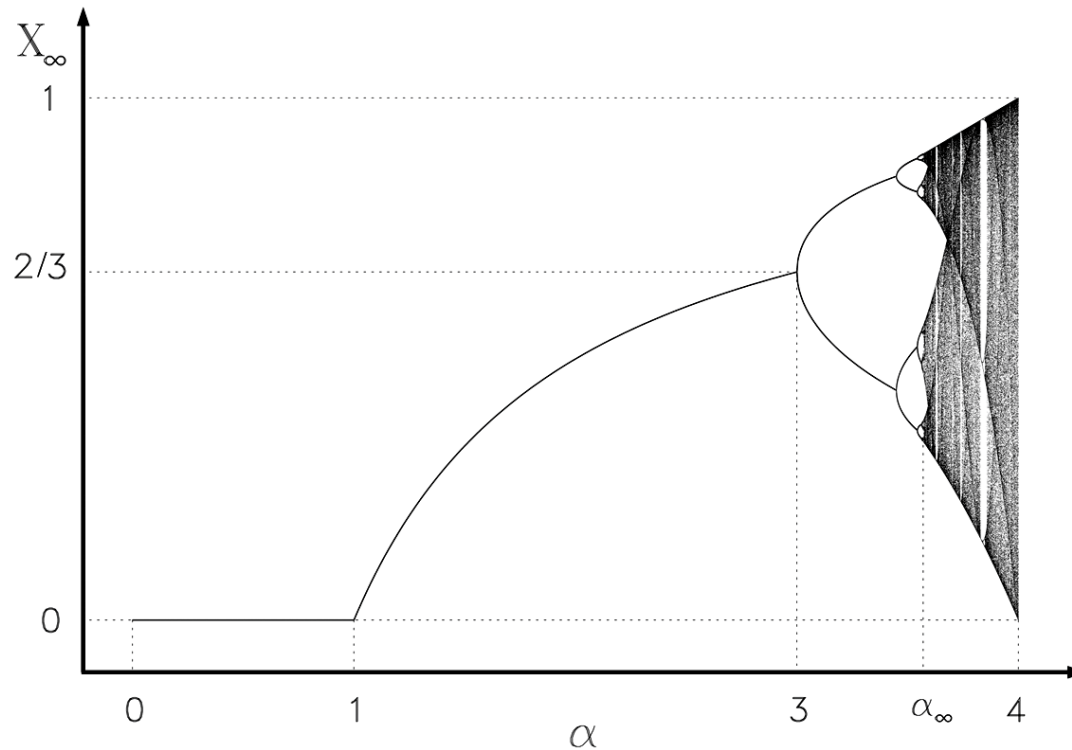
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the **periodic** and **chaotic** intertwine (!)



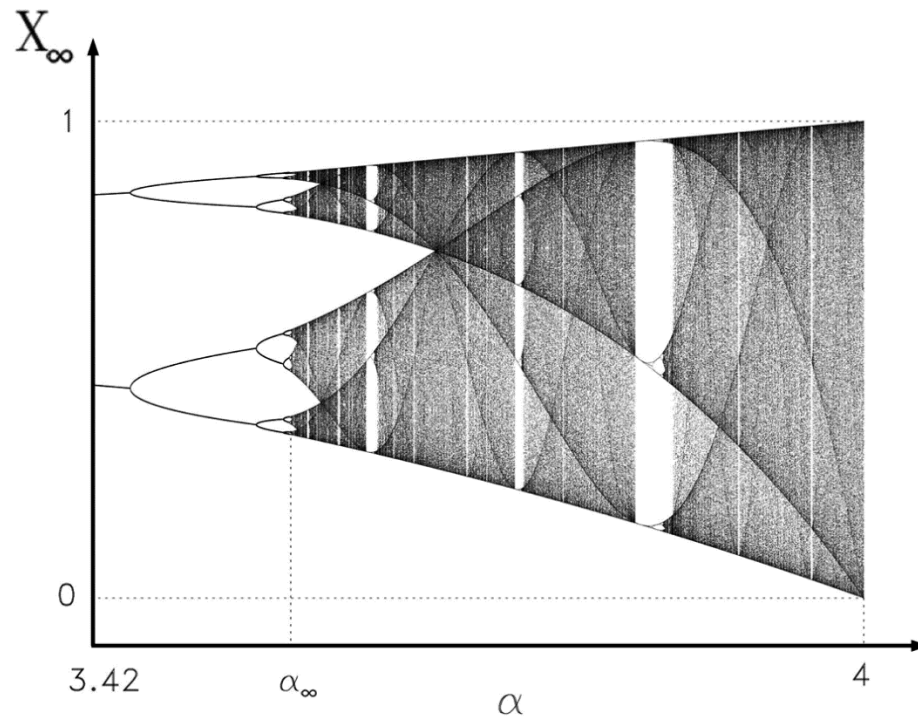
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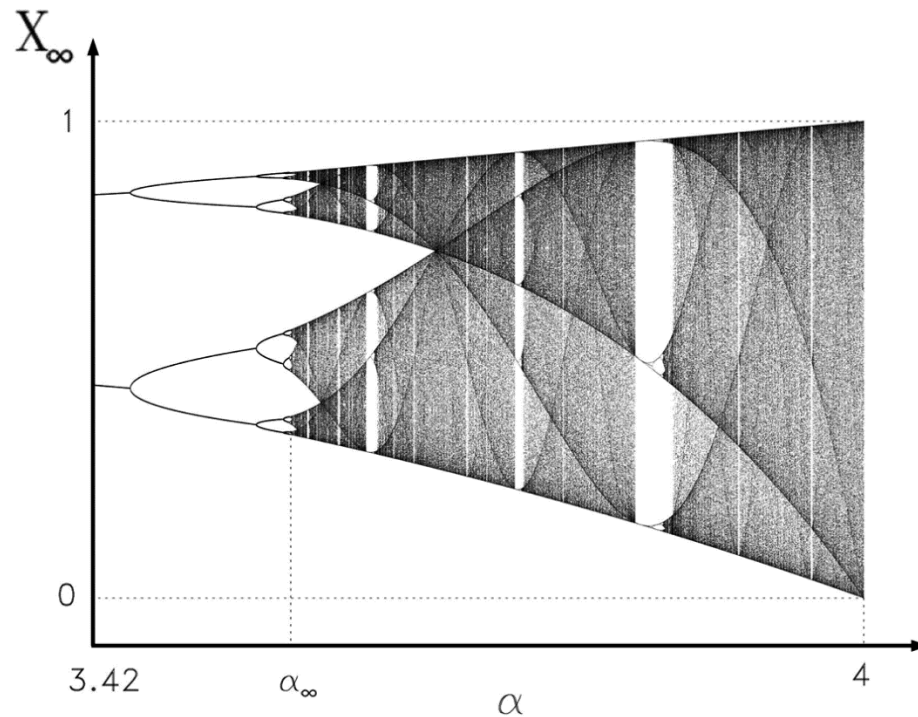
the **periodic** and **chaotic** intertwine (!)

the **tree** contains **all natural** numbers... (!)

# The diagram of bifurcations

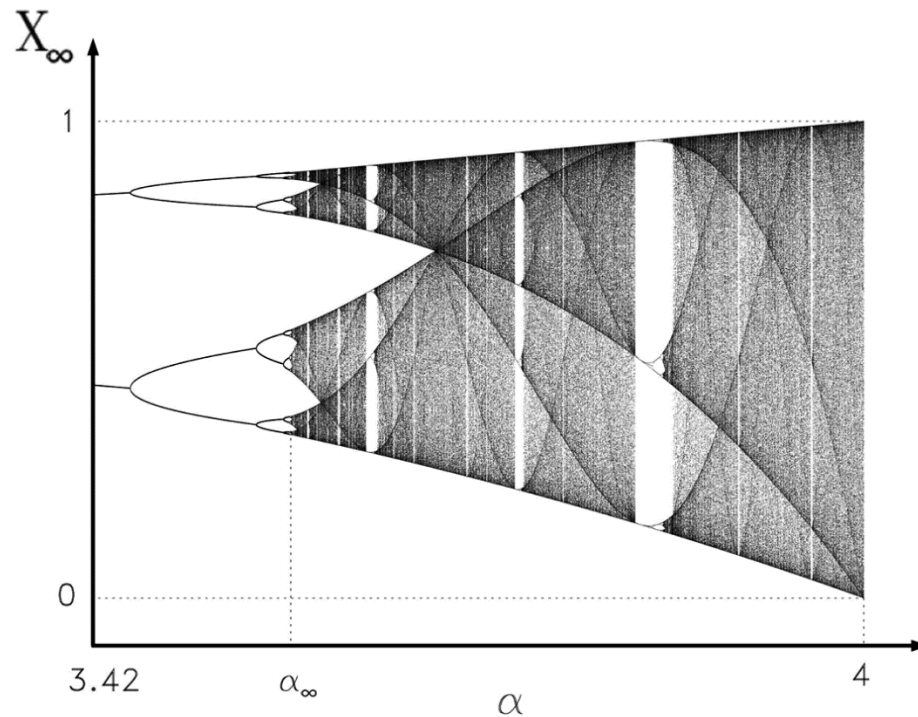


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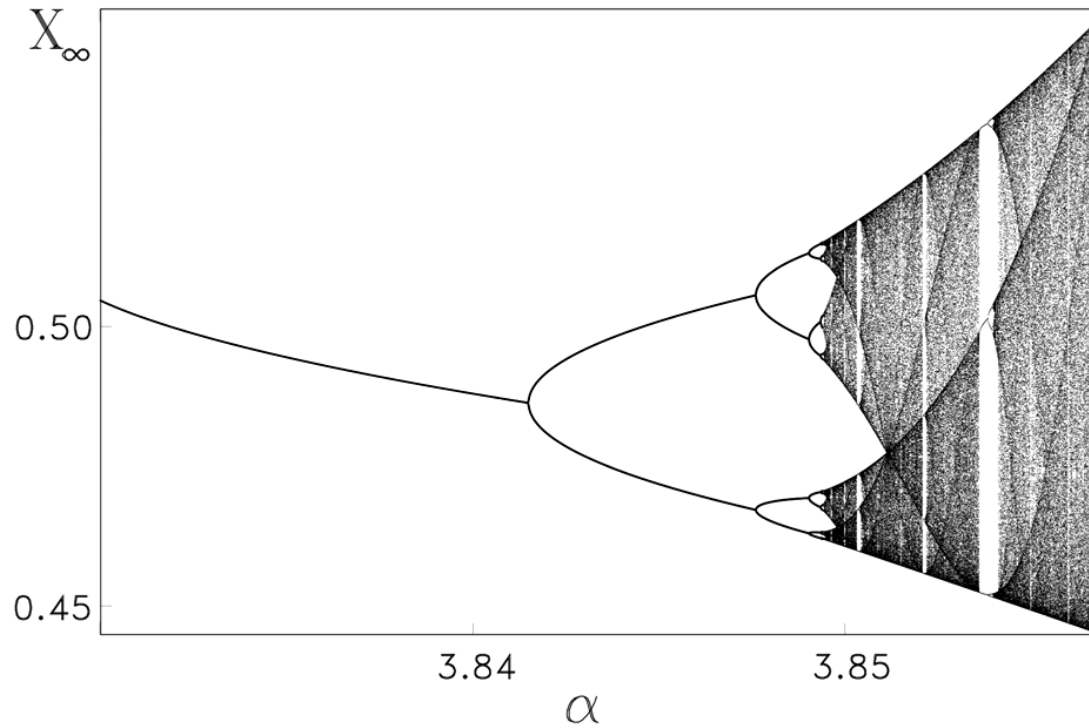
the “shoot” includes many **dusty strange attractors**

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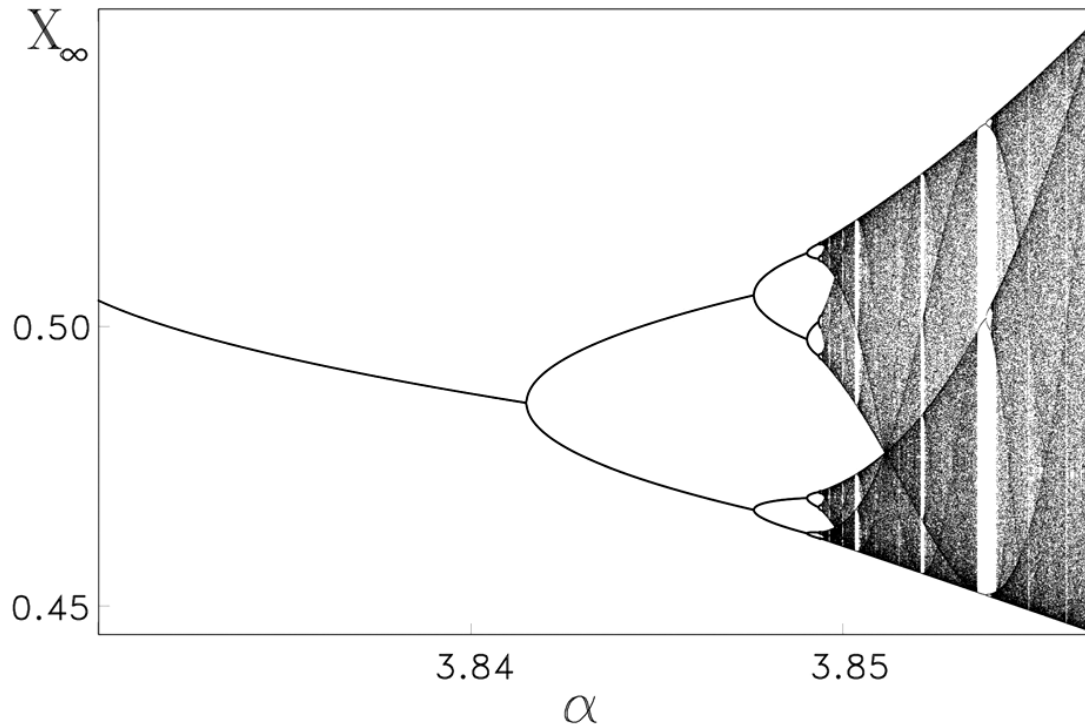


the “shoot” includes many **dusty** strange attractors  
there are periodic “**buds**” in the **white bands**

# A bud from period 3

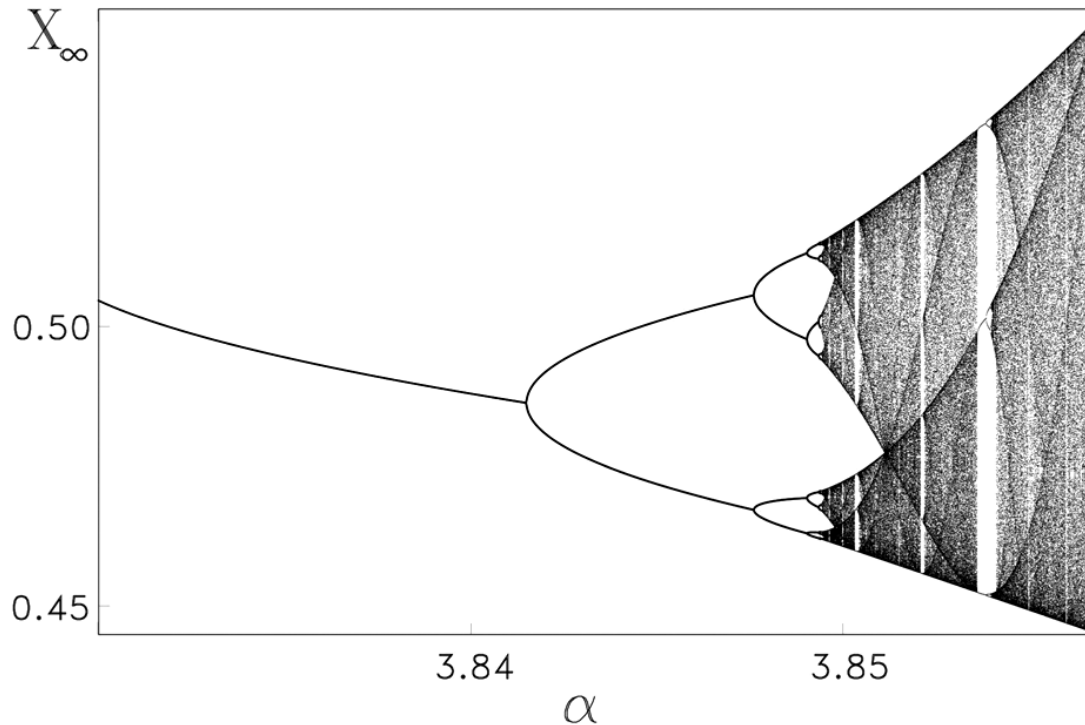


# A bud from period 3



a reduced copy of the **shoot** of the **tree**, without the **root** (!)

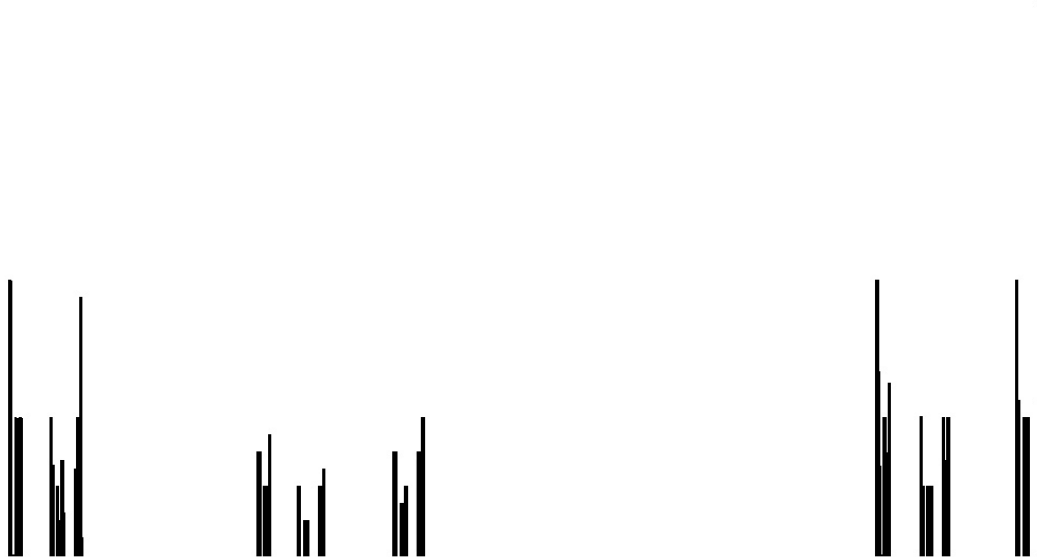
# A bud from period 3



a reduced copy of the **shoot** of the **tree**, without the **root** (!)  
...exquisite **self-similarity** *ad infinitum*

# A thorny tree

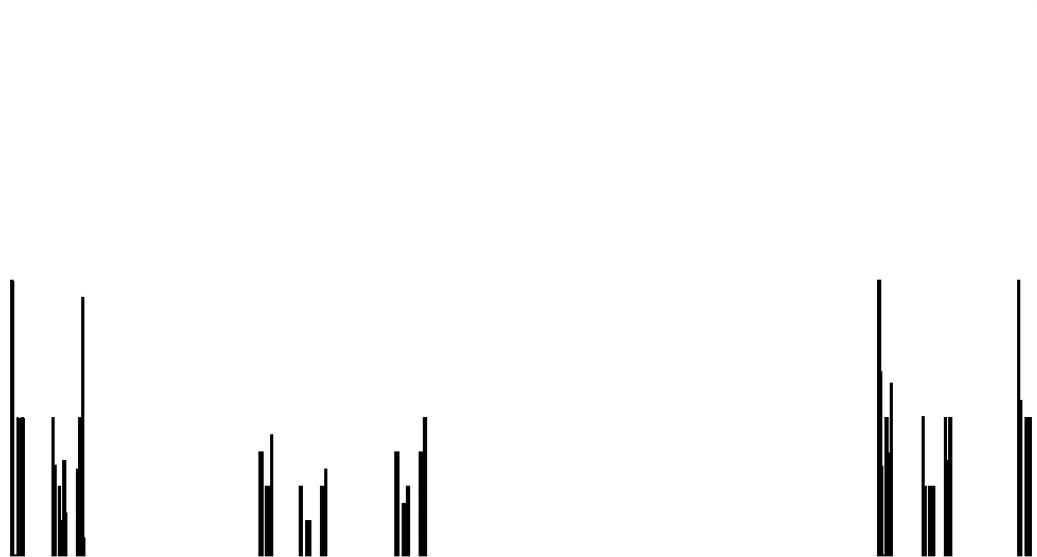
the chaotic tree contains many **multi-fractal thorns**  
that combine **imbalances** and **holes**, as in  $\alpha_\infty$ :





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that combine **imbalances** and **holes**, as in  $\alpha_\infty$ :



...there are **infinitely** many by the end of the infinite **buds**

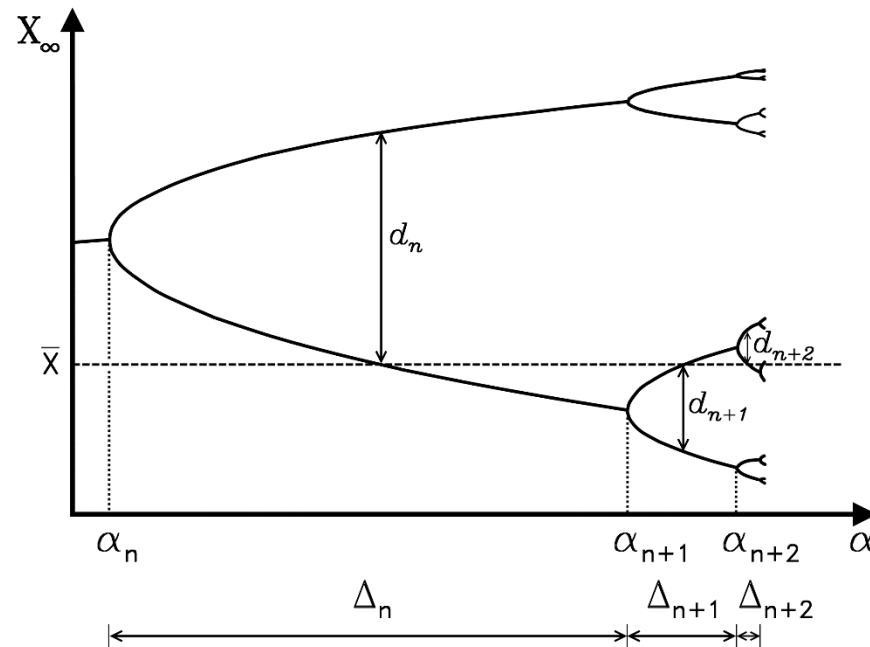
# Universality in the “fig tree”

*(Feigenbaum, 1978)*

in the **tree**, bifurcations happen in an **orderly** fashion:

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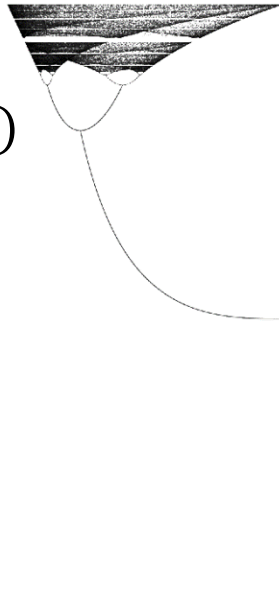
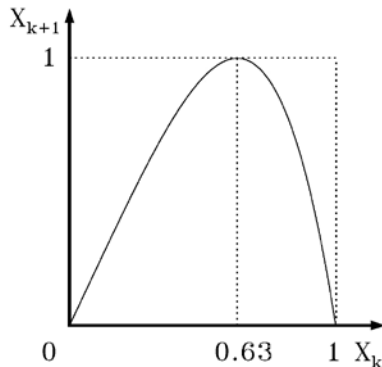
$$d_n/d_{n+1} \rightarrow \mathcal{F}_1 = -2.50 \dots \quad \Delta_n/\Delta_{n+1} \rightarrow \mathcal{F}_2 = 4.66 \dots$$

**openings**
**durations**

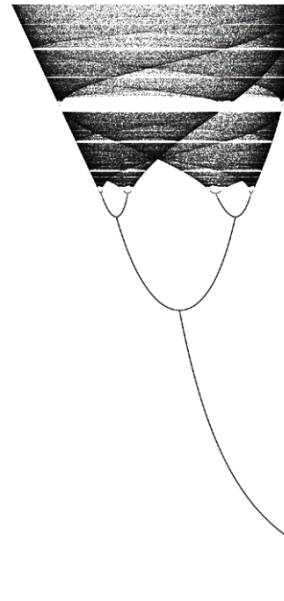
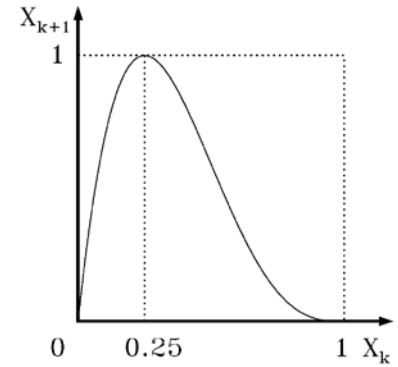
# Universality in other trees

*straight root, tender branch, branches, dust or fig leaves*

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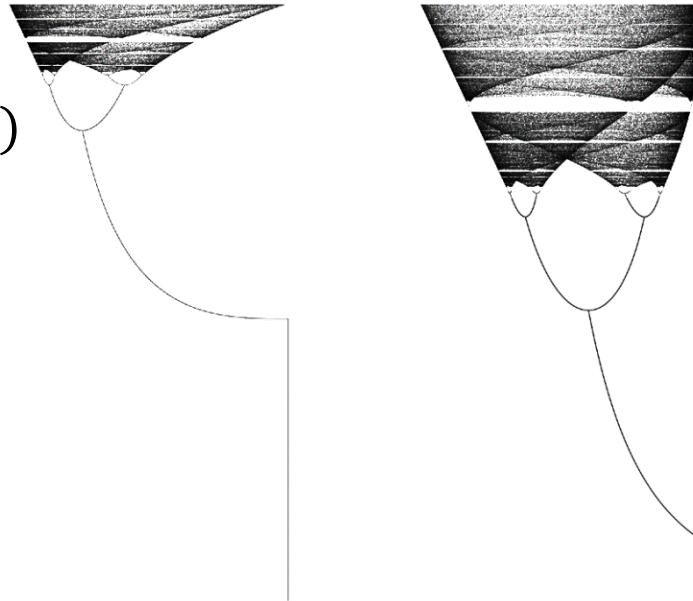
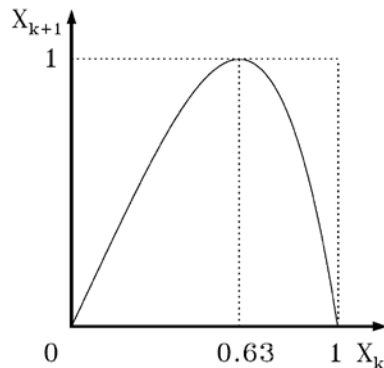
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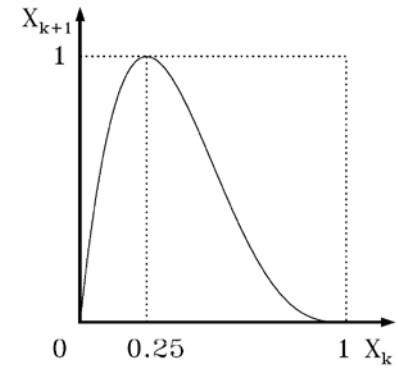
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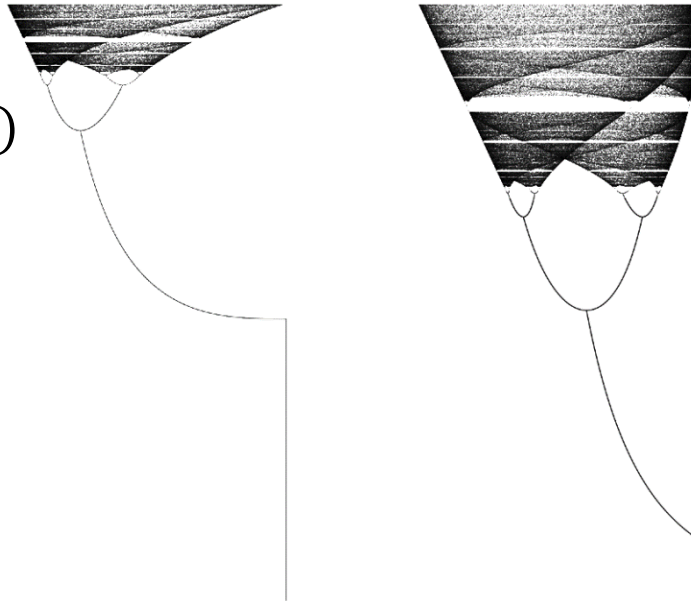
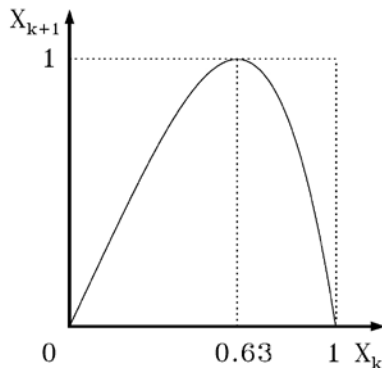
useful in biology, ecology, chemistry, physics, economics, hydrology...

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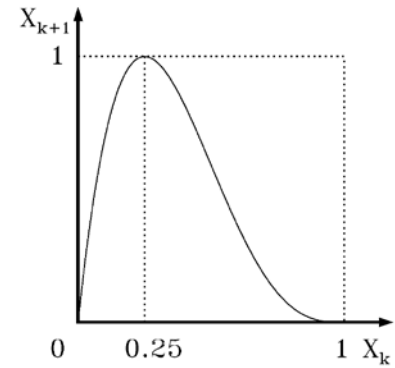
(Maurer and Libchaber, 1979)

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useful in biology, ecology, chemistry, physics, economics, hydrology...

the dynamics of **convection** are reproduced if  $\alpha$  is **heat**

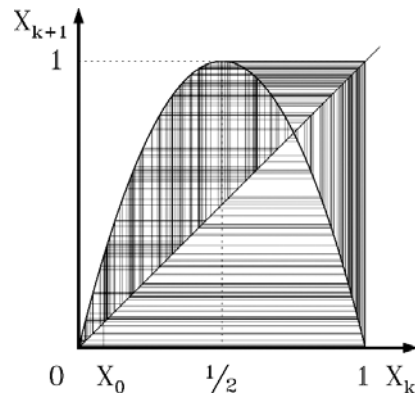
# **In the blistering summit of chaos**

*(Puente, 2019b)*

# In the summit of chaos

$$X_{k+1} = 4X_k(1 - X_k)$$

all appears to wander forever in a **strange attractor** when  $\alpha = 4$ :

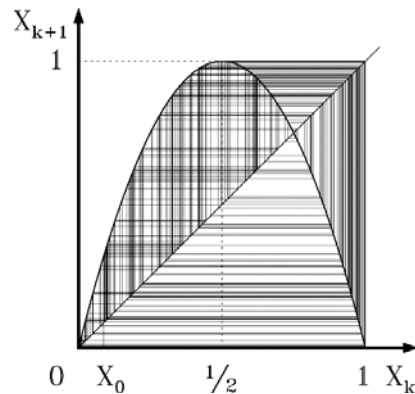




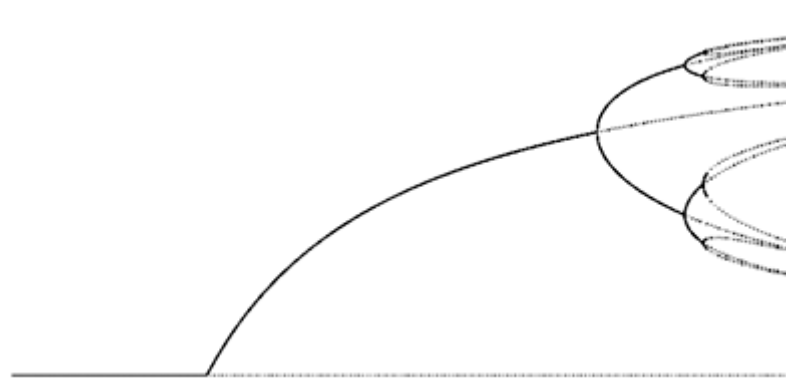
# In the summit of chaos

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all appears to wander forever in a **strange attractor** when  $\alpha = 4$ :



however, **unstable extensions** of the tree ought to be excluded



# In the summit of chaos

$$X_{k+1} = 4X_k(1 - X_k)$$

the **tip** of the **main branch**,  $\frac{3}{4}$ , is not in the attractor:  $\frac{3}{4} \rightarrow \frac{3}{4}$

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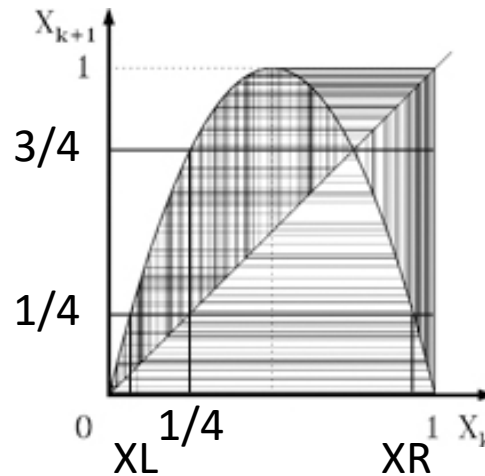
$\frac{1}{4}$  is not in the attractor either:  $\frac{1}{4} \rightarrow \frac{3}{4}$

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XR



$\frac{1}{4} \rightarrow \frac{3}{4} \rightarrow \frac{3}{4}$



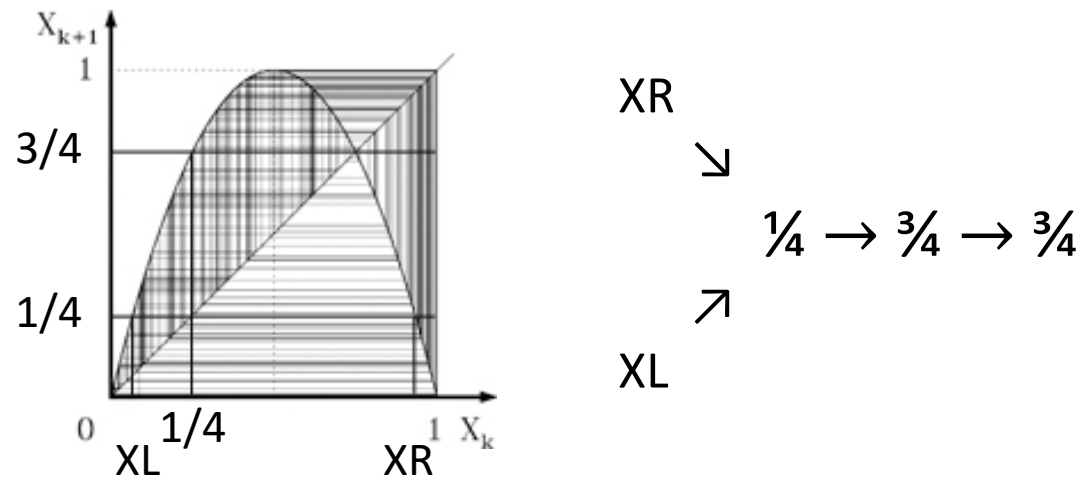
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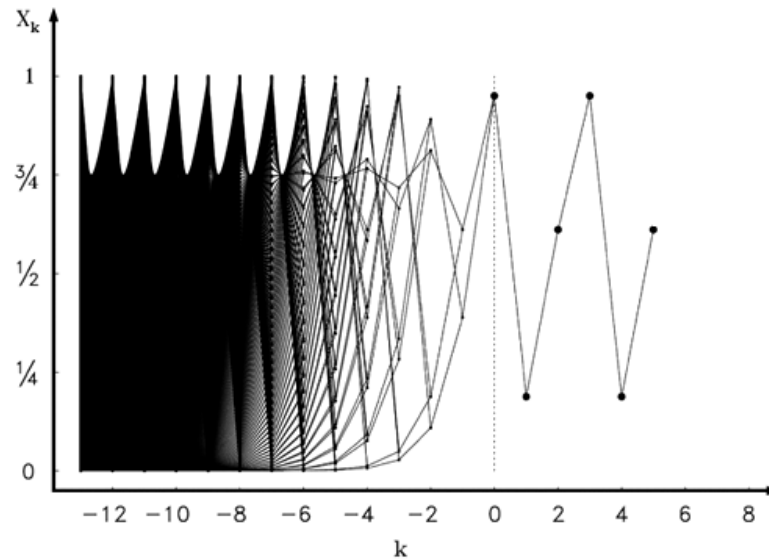
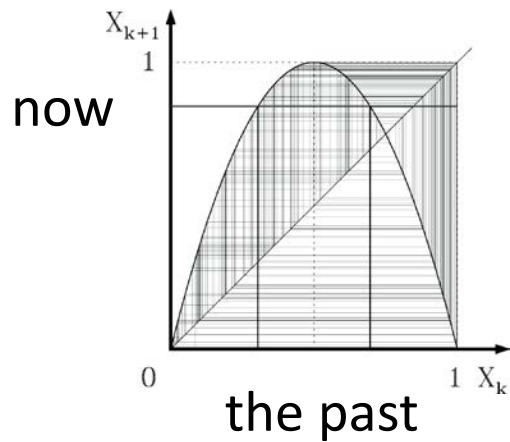
...the points in the **past**, in powers of 2, need to be excluded

# Jumps above the tree

the **past** of all periodic **orbits** is not in the attractor

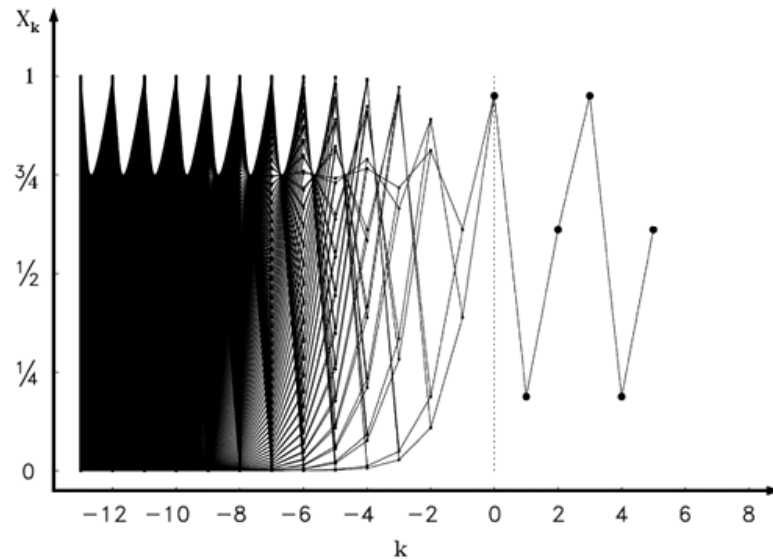
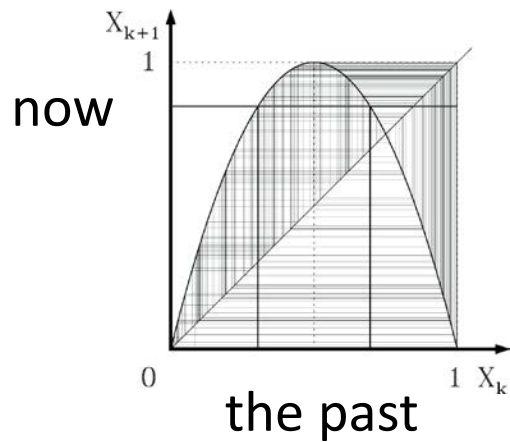
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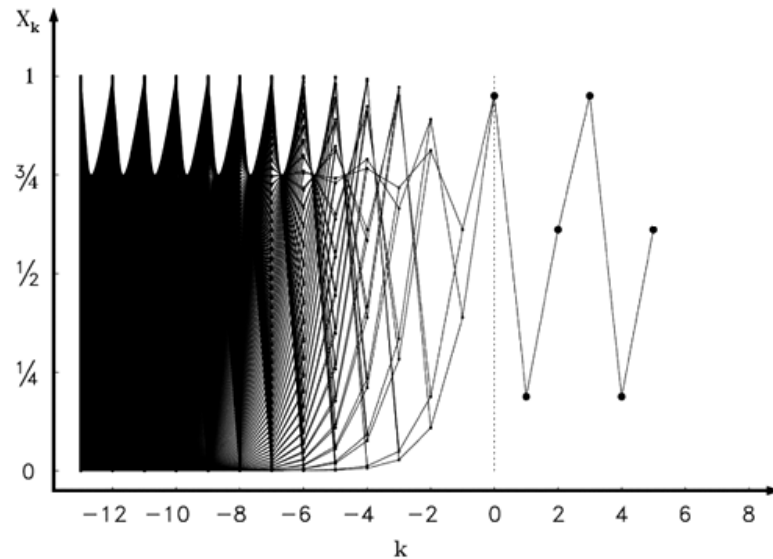
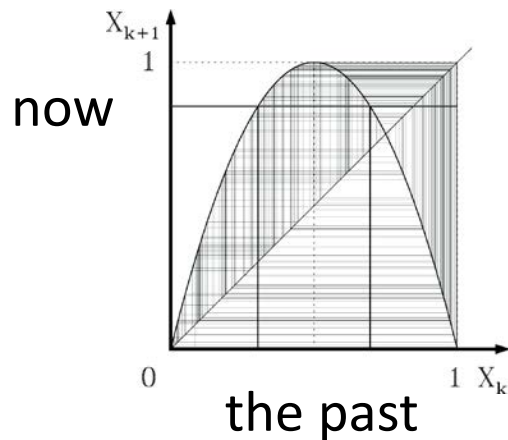


similar **dense** “**trees**” for every **period** need to be excluded (!)



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as those that end up repeating every **three** generations:



similar **dense "trees"** for every **period** need to be excluded (!)  
... the **HELLISH** strange attractor is **infinite uncountable dust** (!)

**A real purgatory**

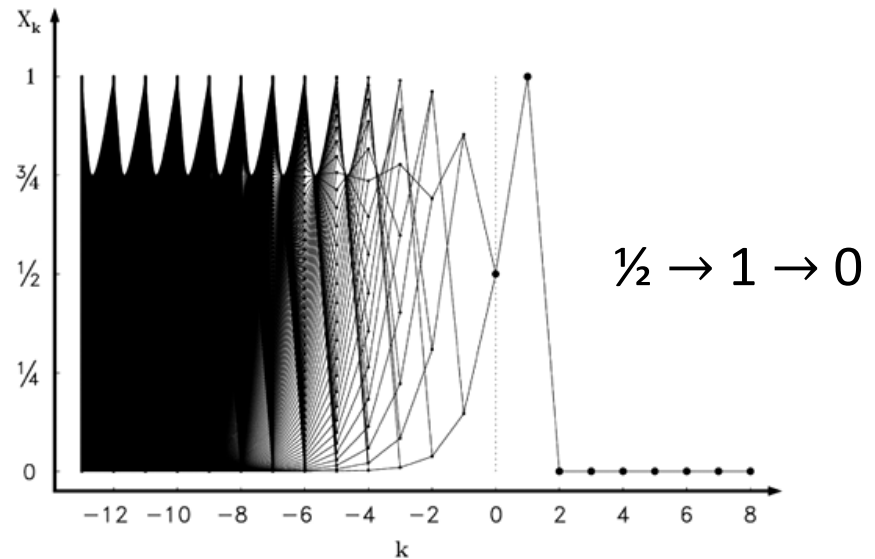
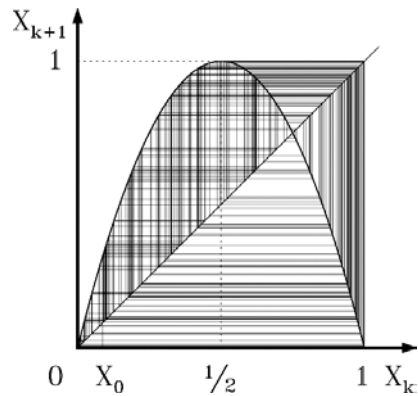
# From chaos to the root

$$X_{k+1} = 4X_k(1 - X_k)$$

there are points that *improbably* return to the **root** of the **tree**:

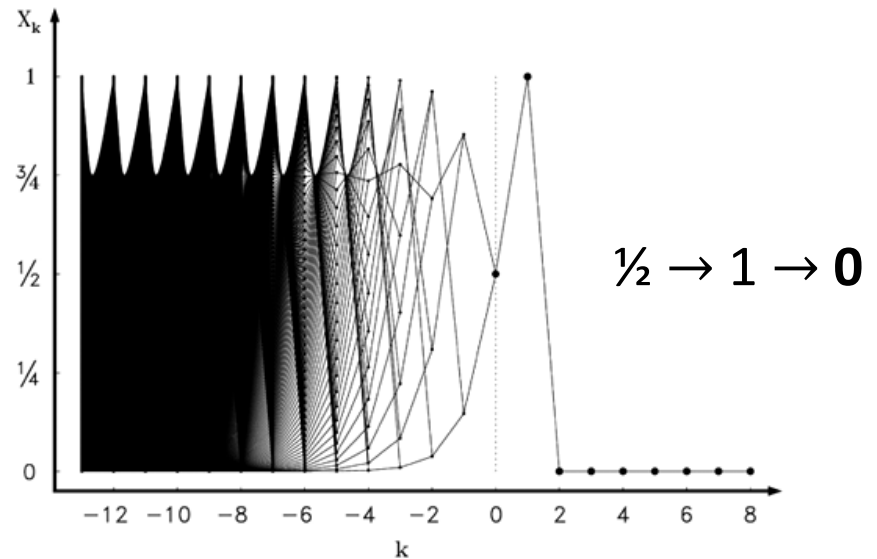
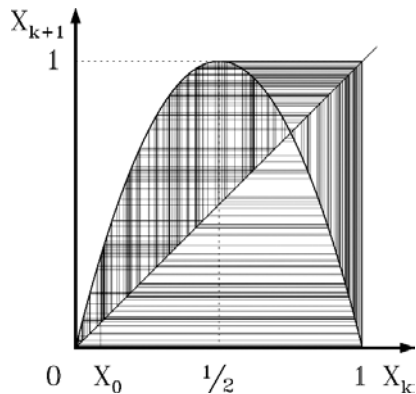
# From chaos to the root

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the **pre-images of zero** rest despite the highest **heat**



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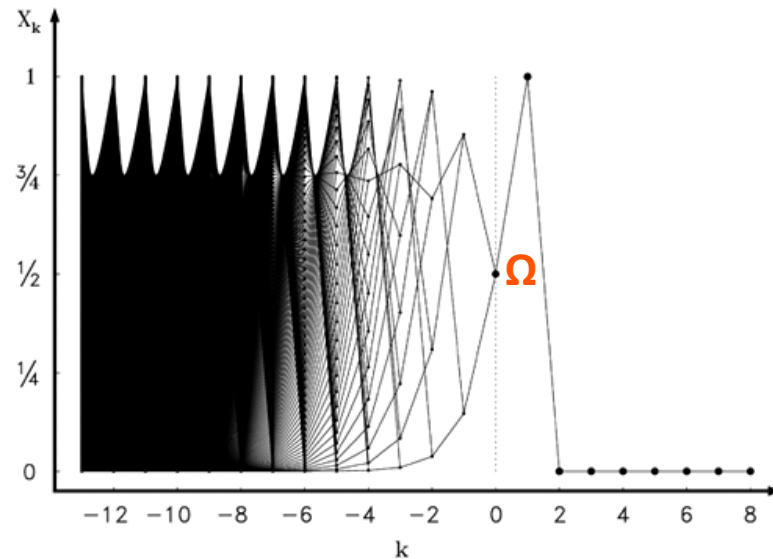
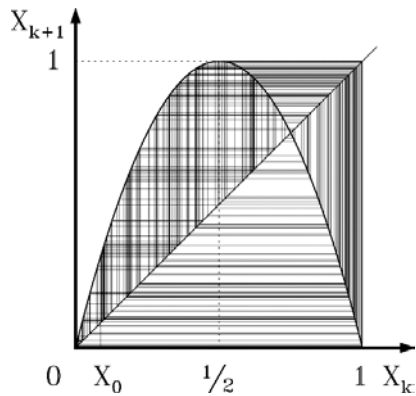
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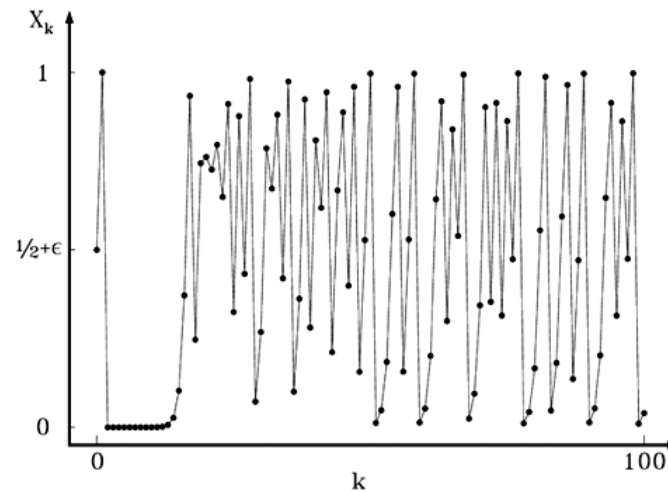
the arrival to the **origin** remind us of *Purgatory* (!)

the **victorious** dynamics paint a **square root** by an **Ω** point (!)

**Plain common sense**

# Plain common sense

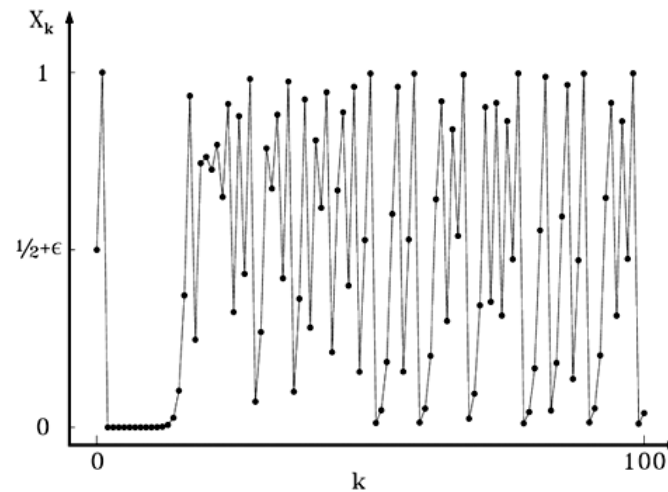
it is much better not to miss the middle point in the midst of **chaos**:





# Plain common sense

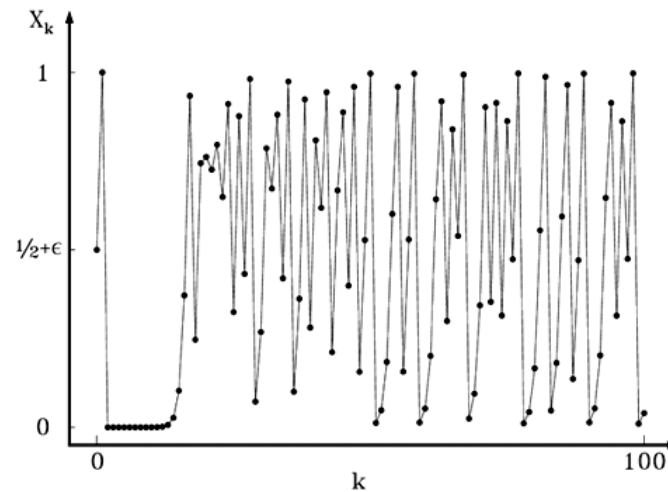
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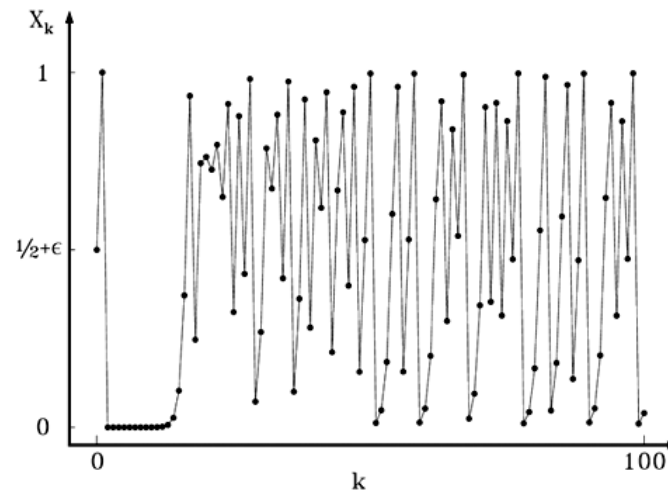


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for the *butterfly effect* gives rise to an eternal turbulence...

it is even better to enter the *narrow gate*,  $Y = X$ , to reach the Origin:

refraining from nonlinearities,  $\alpha > 1$ , to elude **thorns** and **dust**

and thus *coming down the tree* as *Zacchaeus* did (!)

# **Biblical and modern fig trees**

*(Puente, 2011, 2019c)*

# **The fig tree and Holy Scripture**

Adam and Eve cover themselves with fig leaves (Gn 3:7)

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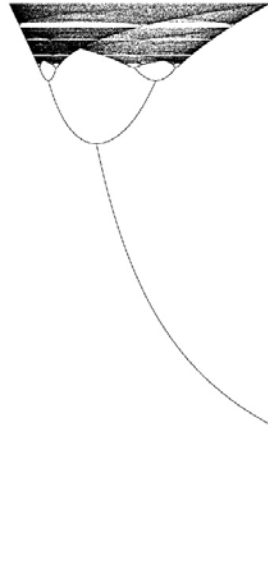
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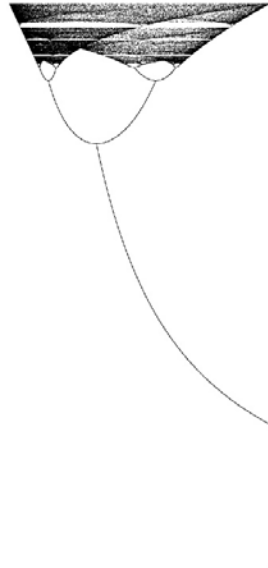
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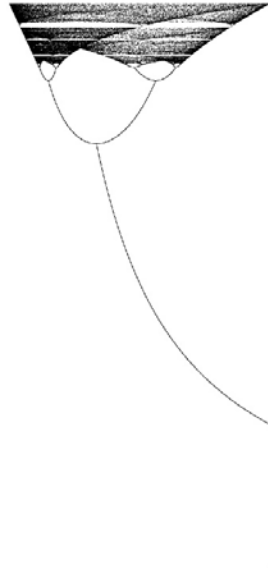


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an allegorical **fig tree** *without fruit*, consistently *cursed*

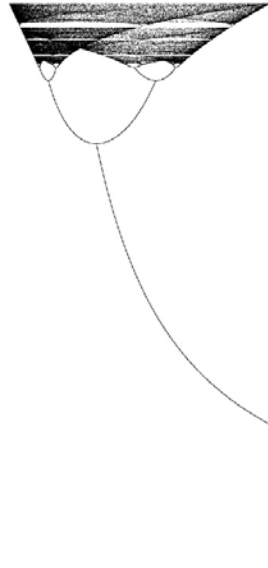
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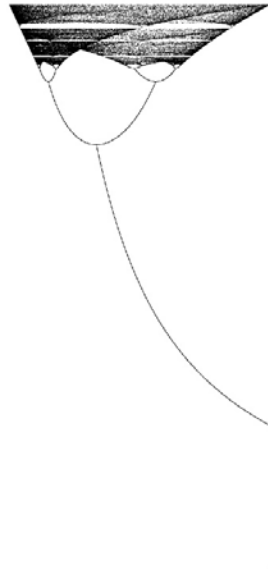


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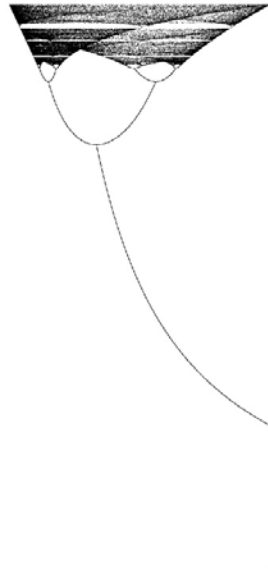
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**...I better prepare myself, and you?**

# A stone cries out!

*(Soons, 2006a,b)*



עֲנֵנִי

*under the chin at Shroud of Turin*

# **Our options**

*(Puente, 2011)*

# Our options

*order*

*simplicity*

*serenity*

*peace*



*disorder*

*complexity*

*turbulence*

*chaos*



# Our options

*order*

*simplicity*

*serenity*

*peace*

*decreasing*

*God's way*

*below  $Y = X$*

*abandonment*



*disorder*

*complexity*

*turbulence*

*chaos*

*increasing*

*our way*

*above  $Y = X$*

*selfishness*



# Our options



*order*  
*simplicity*  
*serenity*  
*peace*  
*decreasing*  
*God's way*  
*below  $Y = X$*   
*abandonment*  
*obedience*  
*blessing*  
*resting*  
**Heaven**

*disorder*  
*complexity*  
*turbulence*  
*chaos*  
*increasing*  
*our way*  
*above  $Y = X$*   
*selfishness*  
*rebelliousness*  
*curse*  
*wandering*  
**hell**



# **Feigenbaum's parabel**

*(Puente, 2011, 2019b)*

*In the confines of science  
majestically stands a tree,  
with all numerals in dance  
in emergent chaos to see.*

*In the instance of a trance  
a good day I drew a link,  
and here it is, at a glance,  
the wisdom that I received.*

Foliage of disorder  
trapped in empty dust,  
jumps astir forever  
enduring subtle thrust.



Crossing of the outset  
leaving faithful root,  
looming tender offset  
failing to yield fruit.

Cascade of bifurcations,  
increasing heat within,  
inescapable succession  
of branches bent by wind.

Sprouting of dynamics  
attracted to the strange,  
o infinity reminding  
at the origin: the flame.

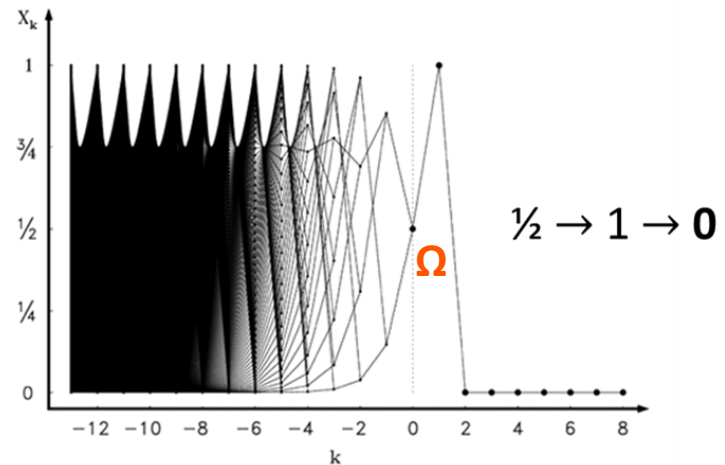


**In the midst of chaos**  
there is a small gate  
leading to fine rest.

**In the midst of chaos**  
there are loyal paths  
inviting to a dance.

**On top of the fig tree**  
there is a key point  
that runs to the core.

**On top of the fig tree**  
there is clear light  
that averts a fright.

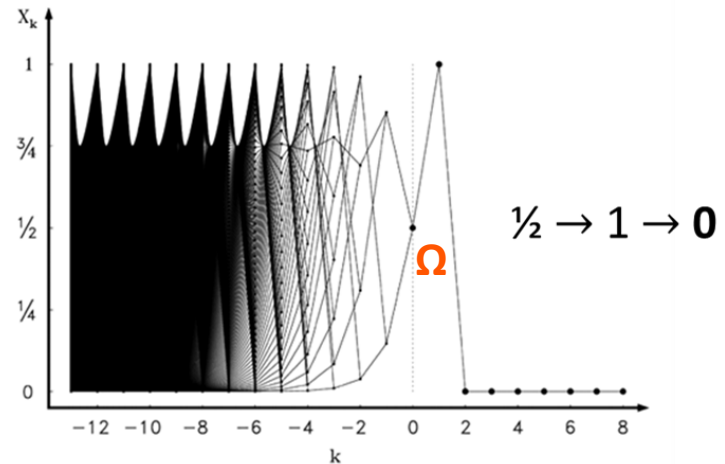


**In the midst of chaos**  
there is leaping game  
discerning the way.

**In the midst of chaos**  
there is a fine well  
watering the brain.

**On top of the fig tree**  
there is a clean frame  
that cancels the blame.

**On top of the fig tree**  
there is mighty help  
that shelters from hell.



**In the midst of chaos**

look it is there,

**in the midst of chaos**

logistics in truth,

**In the midst of chaos**

a clear faithful route,

**in the midst of chaos**

leading to the root.

**On top of the fig tree**

this is no delusion,

**on top of the fig tree**

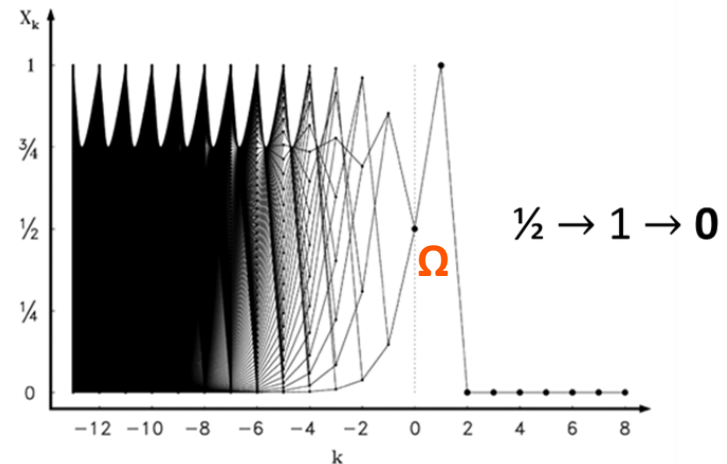
a sought needle's eye,

**on top of the fig tree**

the goodness of wheat,

**on top of the fig tree**

oh heavenly treat.

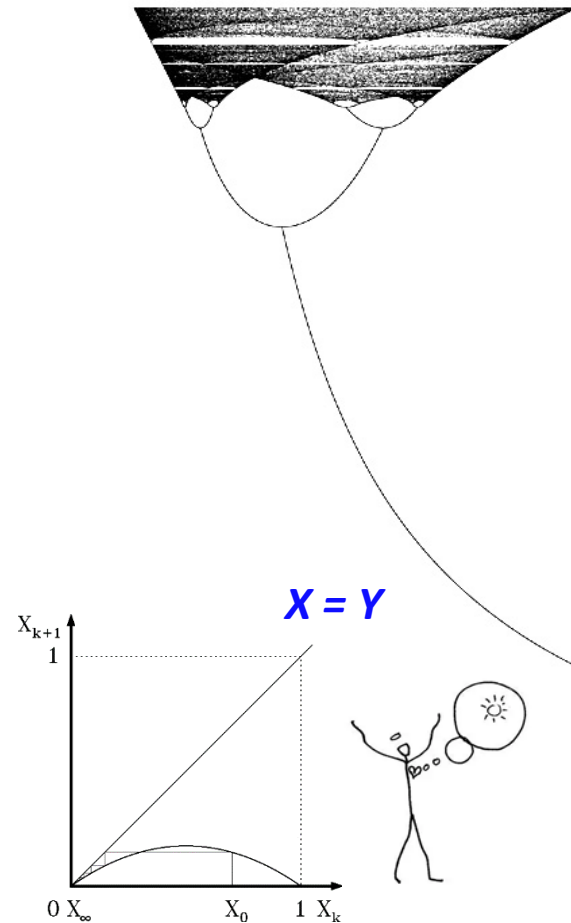


*Could it be, o my friends,  
that science provides a rhyme?,  
for a rotten tree foretells  
the very advent of time.*

*Could it be, o how plain,  
that nature extends a call?,  
for old parable proclaims  
the crux in growing small.*

*I do not know about you,  
but I choose to come down...*

*(February 2000/June 2002)*



**Other coincidences**

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the *four states* in the parable of the sower: **fruit** in the **root**

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“though 1,000 fall at your side, 10,000 at your right ...”

“can you bury the haughty in the **dust** together?”

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the power of **sanctity** is visualized **geometrically**:  $0+0=00$

the escape point from **chaos** to **purgatory** is a real “**Ω point**”

*...Well, here you continue realizing that the coincidences from science to faith are numerous and that they point to Jesus and only to Him.*

*In our next encounter we shall explain in more detail that all that has been shared here is consonant with what Holy Scripture says.*

*Until next time...*

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