8. A geometric model of the Most Holy Trinity

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Summary

- *Reviews the construction of fractal "mountains" and "clouds".*

- *Shows that the "shadows" of such objects constitute a Platonic model of natural complexity.*

- *Explains how the limiting cases give rise to Gaussian bell curves.*

- *Relates the limiting case yielding a "cloud" with the Holy Spirit and introduces a geometric model of the Most Holy Trinity.*

- *Explains how such concepts are useful to talk about Jesus Christ as our Savior and to consider other matters of faith.*

- *Generalizes the ideas to more dimensions yielding limiting bells over two-dimensions.*

- *Exhibits exotic kaleidoscopes inside the circular bell that include ice crystals and the rosette of life's DNA.*

Fractal functions

(Barnsley, 1988; Puente, 2020a,e)

Fractal functions

iterating simple maps

$$w_1(x, y) = \left(\frac{x}{2}, x + d_1 \cdot y \right), \ w_2(x, y) = \left(\frac{x}{2} + \frac{1}{2}, 1 - x + d_2 \cdot y \right)$$

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$x \in [0, 1]$

w_1 operates to the **left** and w_2 to the **right**

Fractal functions
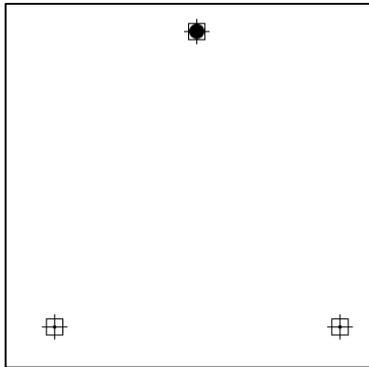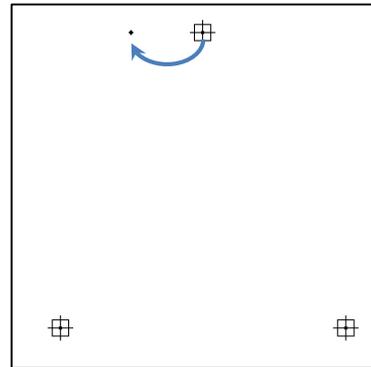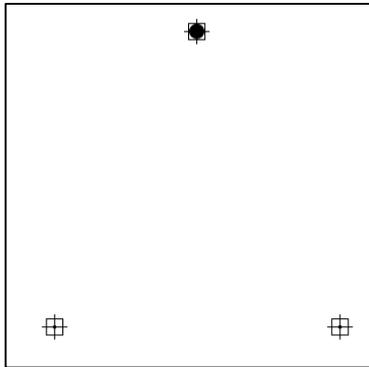
$$d_1 = -d_2 = z = 0.5$$

Fractal functions

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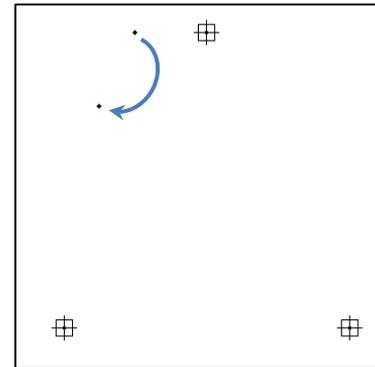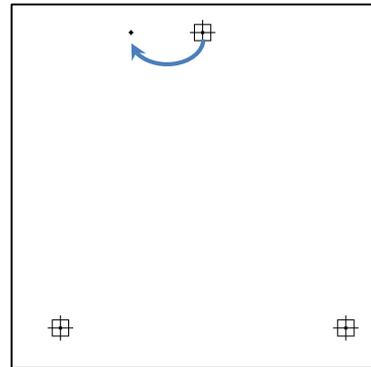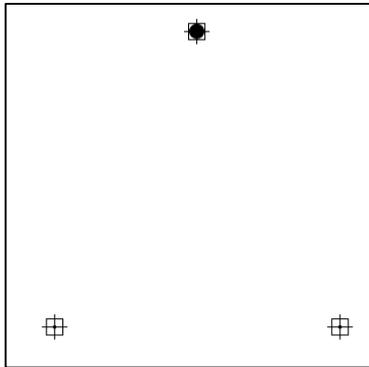
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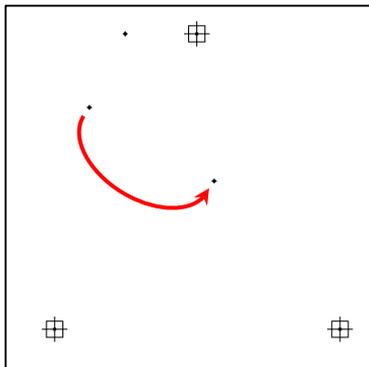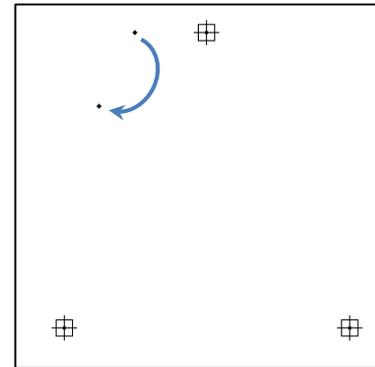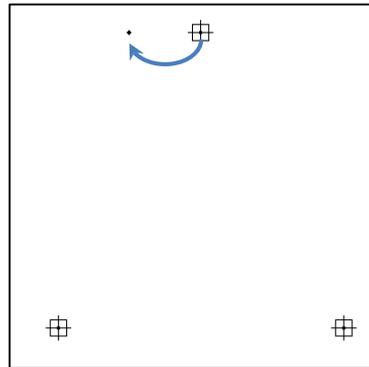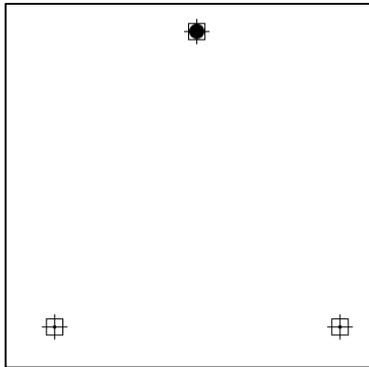
# Fractal functions

$$d_1 = -d_2 = z = 0.5$$

Fractal functions
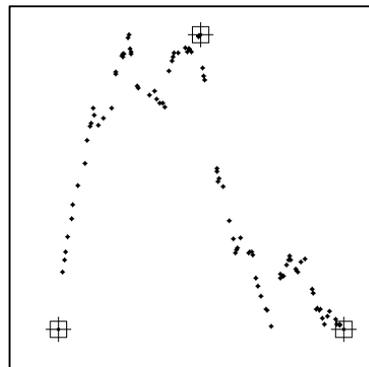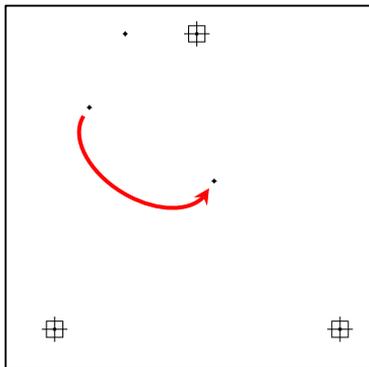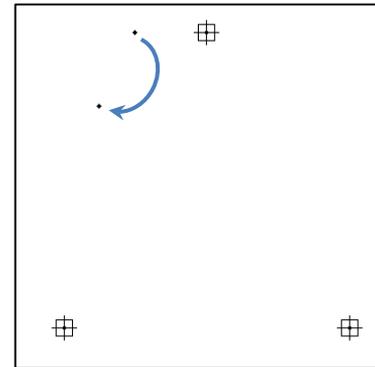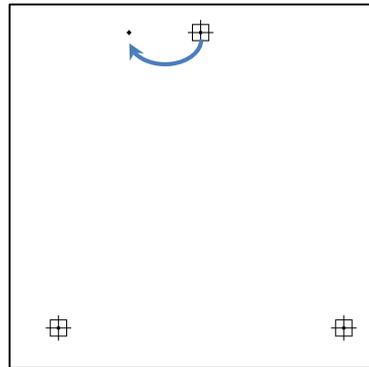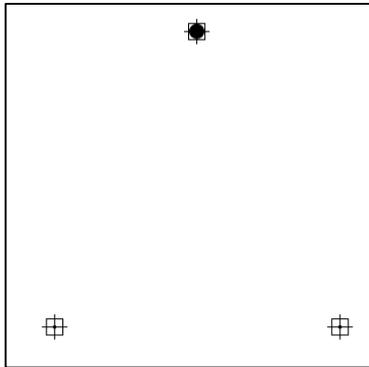
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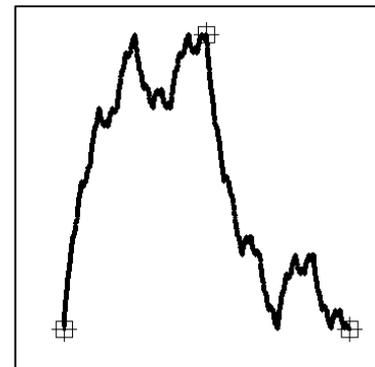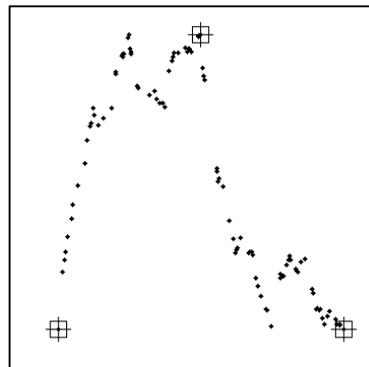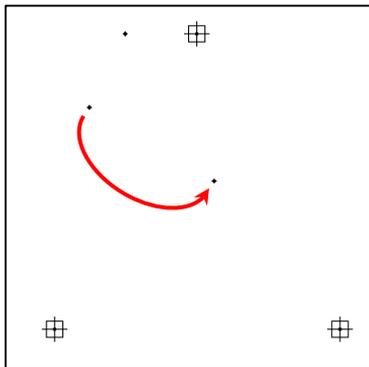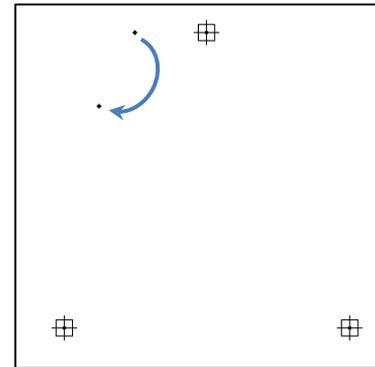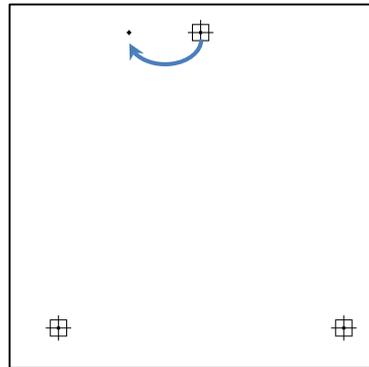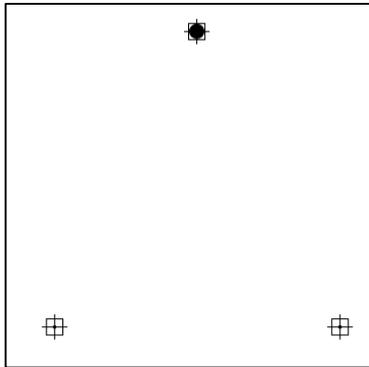
fractal *mountain*

Fractal functions

a matter of signs
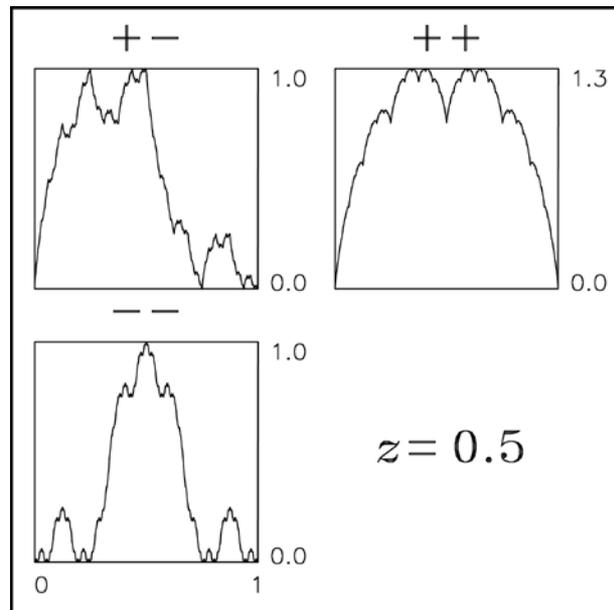
$$|d_1| = |d_2| = z$$

Fractal functions

a matter of signs
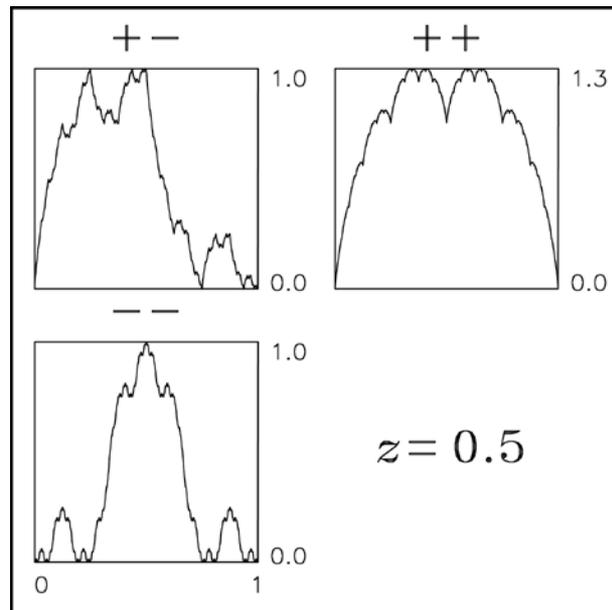
$$|d_1| = |d_2| = z$$

case **+ -** is the *mountain*

case **- -** gives another *mountain*

case **+ +** produces instead a *cloud* **(!)**

Fractal functions
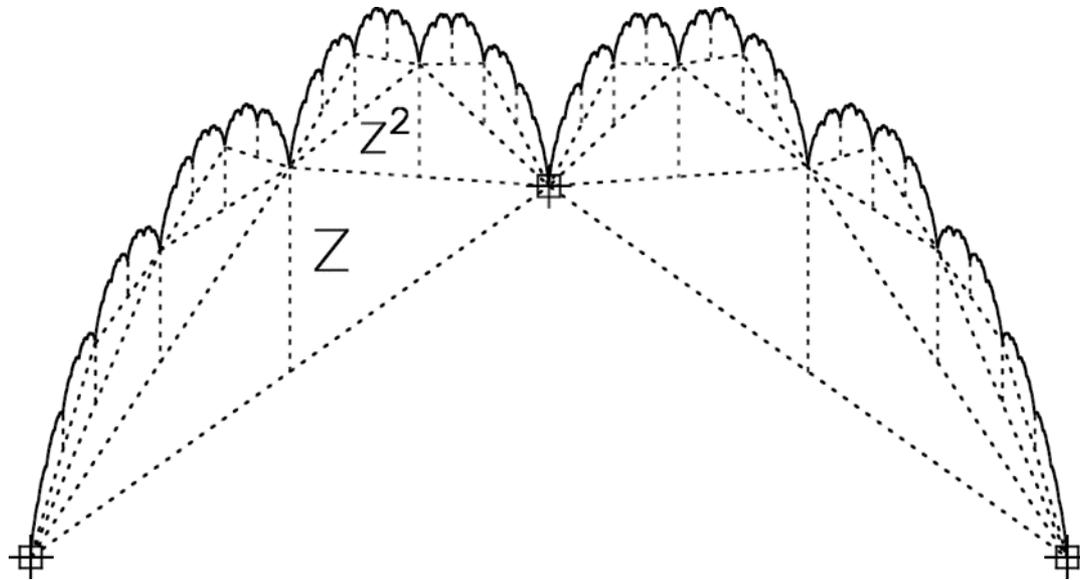
a matter of precision

$$d_1 = d_2 = z$$

Fractal functions

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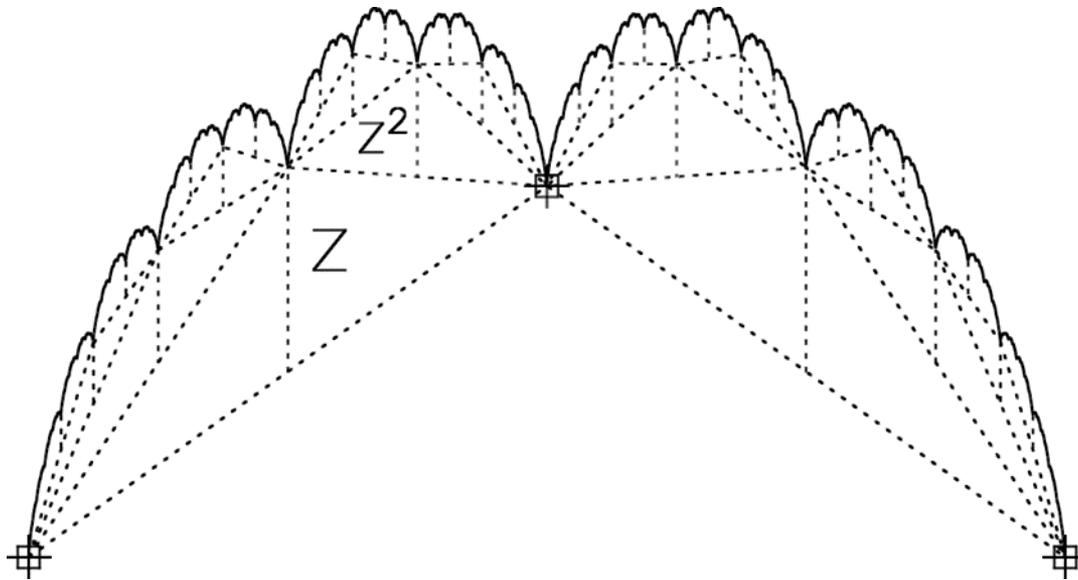
$$d_1 = d_2 = z$$

case + +: positive additions by the middle in powers of z

Fractal functions

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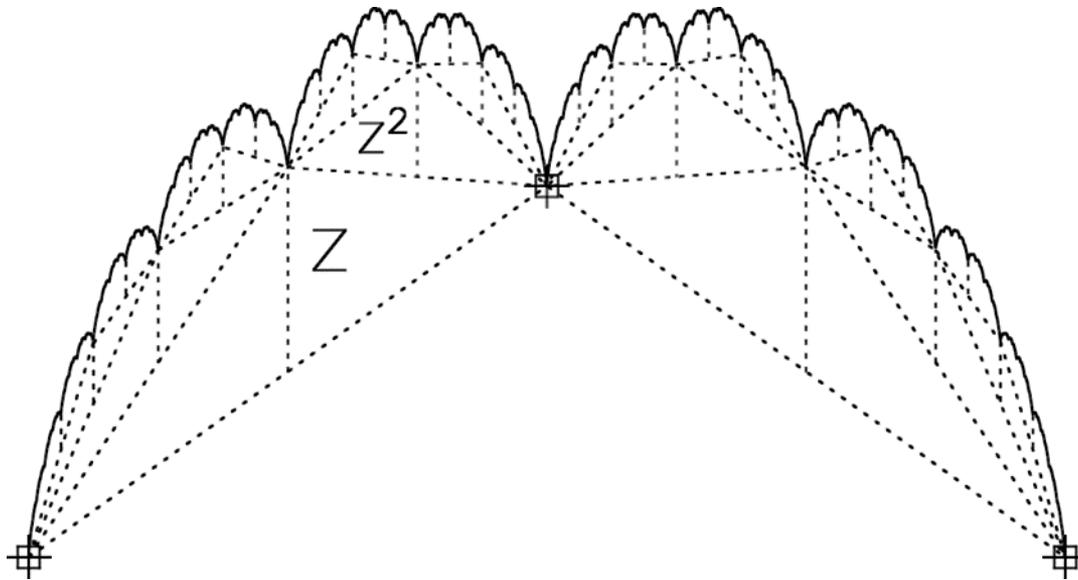
$$d_1 = d_2 = z$$

case + +: positive additions by the middle in powers of z

the points always land in the *cloud* irrespective of *chance*

Fractal functions

a matter of dimension
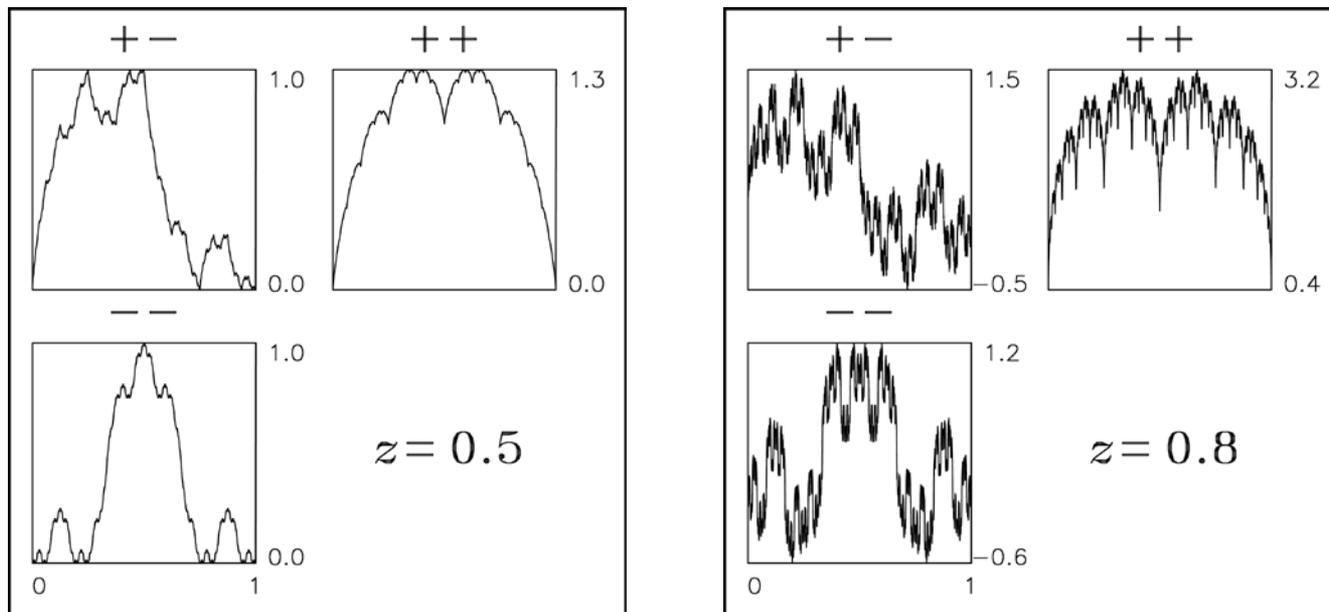
$$|d_1| = |d_2| = z$$

if z increases, the "**wires**" *fill more space* and become *infinite*

Fractal functions

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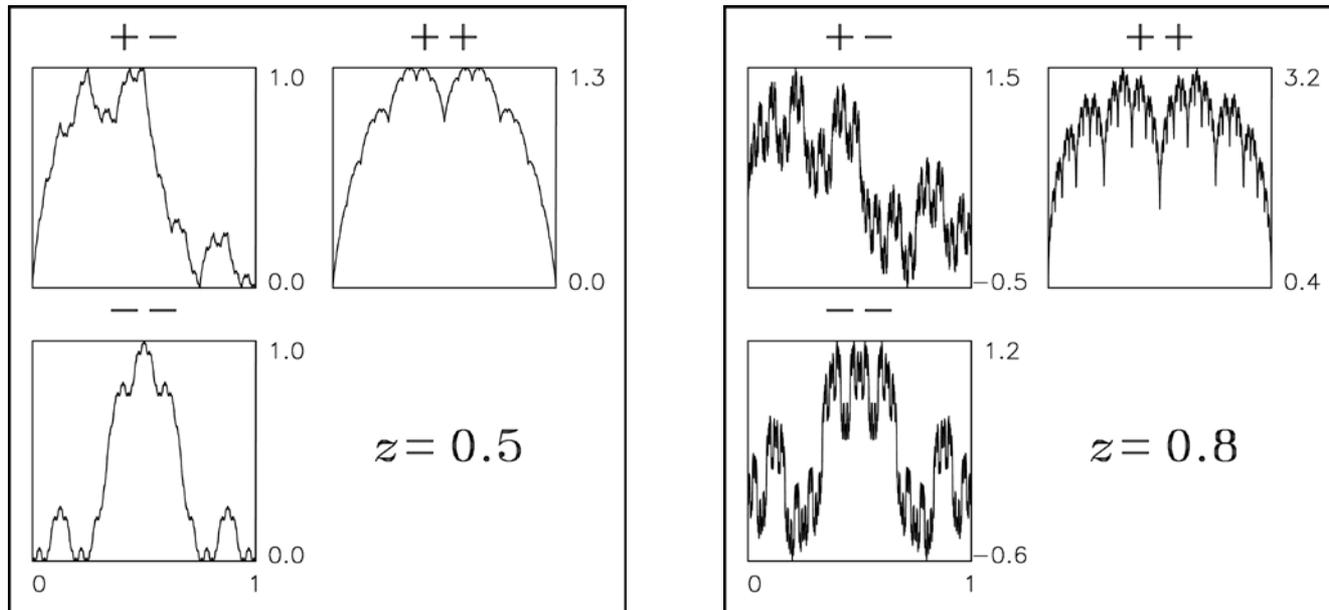
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as z tends to 1, their **fractal dimensions** tend to 2

Fractal functions

a matter of bias

50-50

70-30
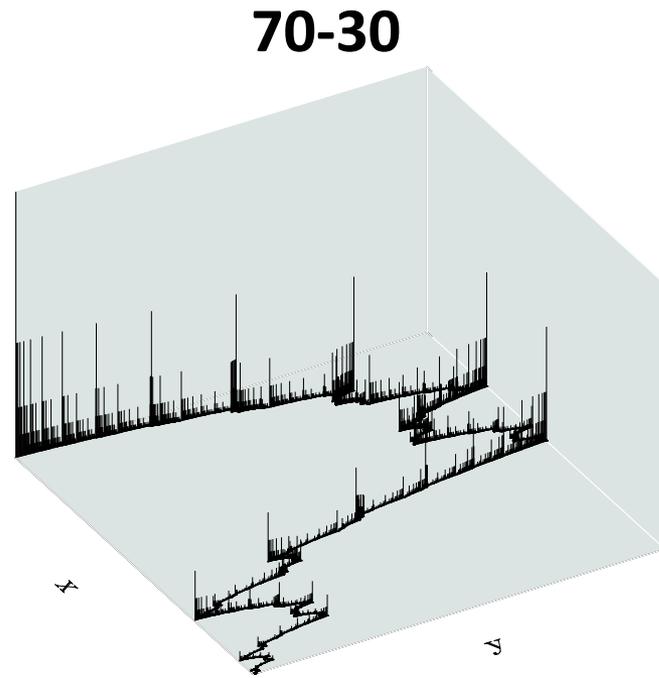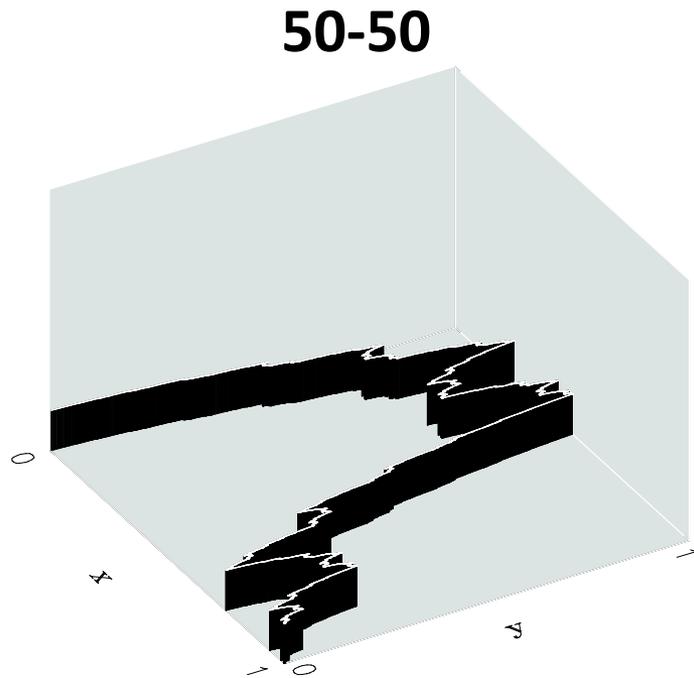
different **textures** over the same *wire* (Elton, 1987)

Fractal functions

a matter of bias

50-50   **70-30**
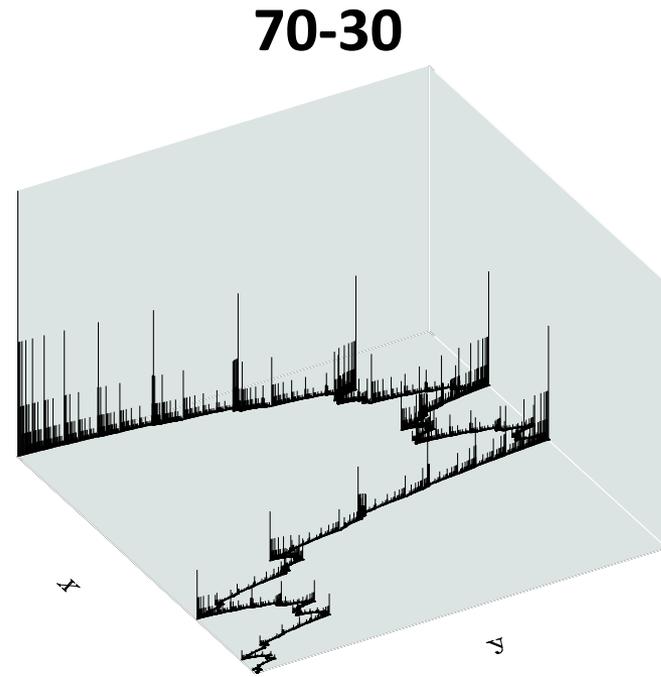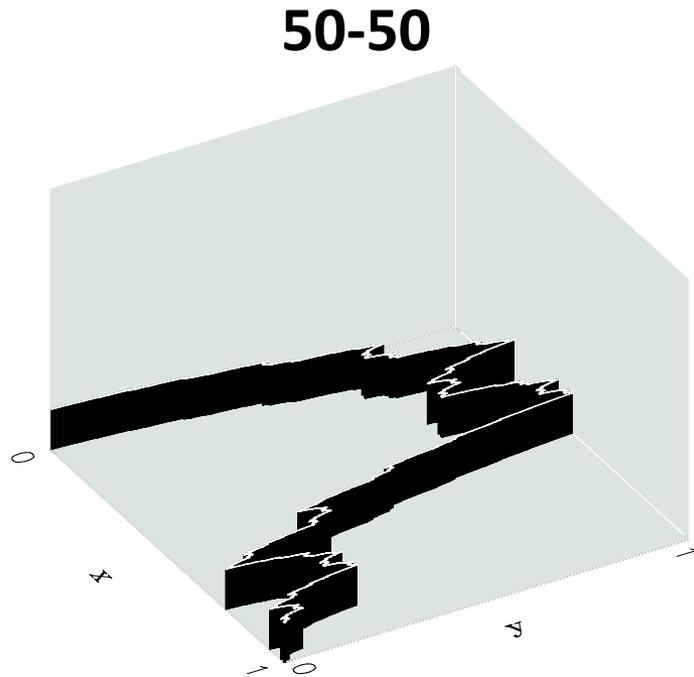
different **textures** over the same ***wire*** (Elton, 1987)

they produce diverse ***projections*** over x and y

Interesting projections

(Puente, 2020e)

The projection over x
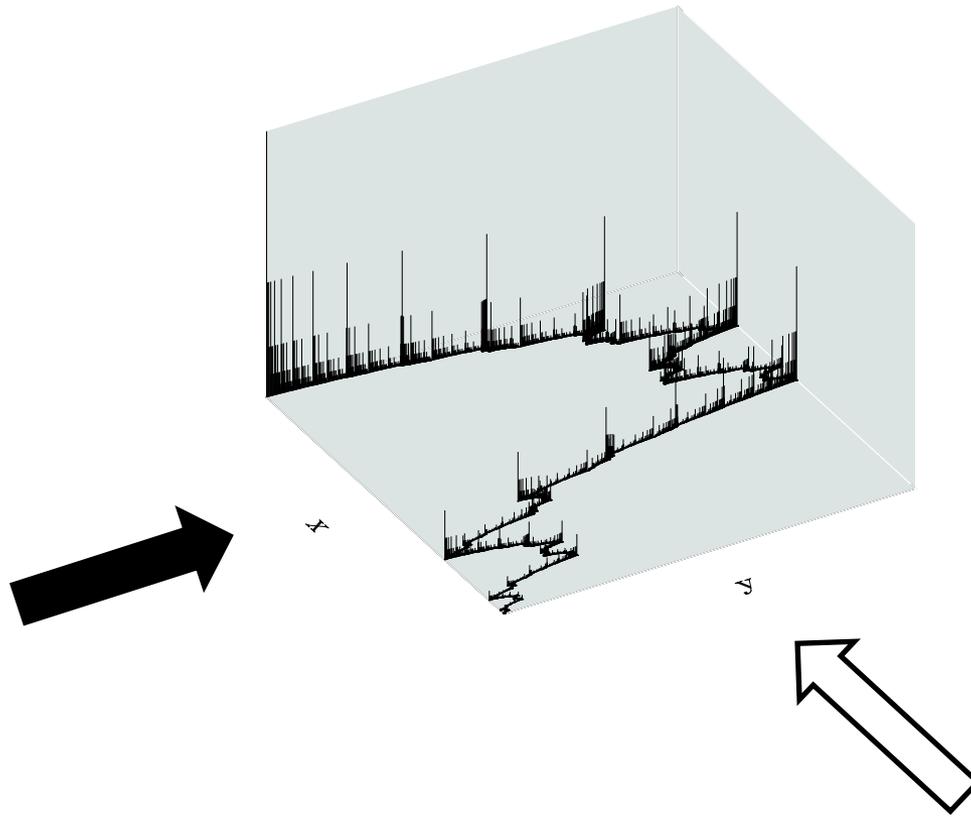
Turbulence and multifractals

(Meneveau and Sreenivasan, 1987)

70%   30%
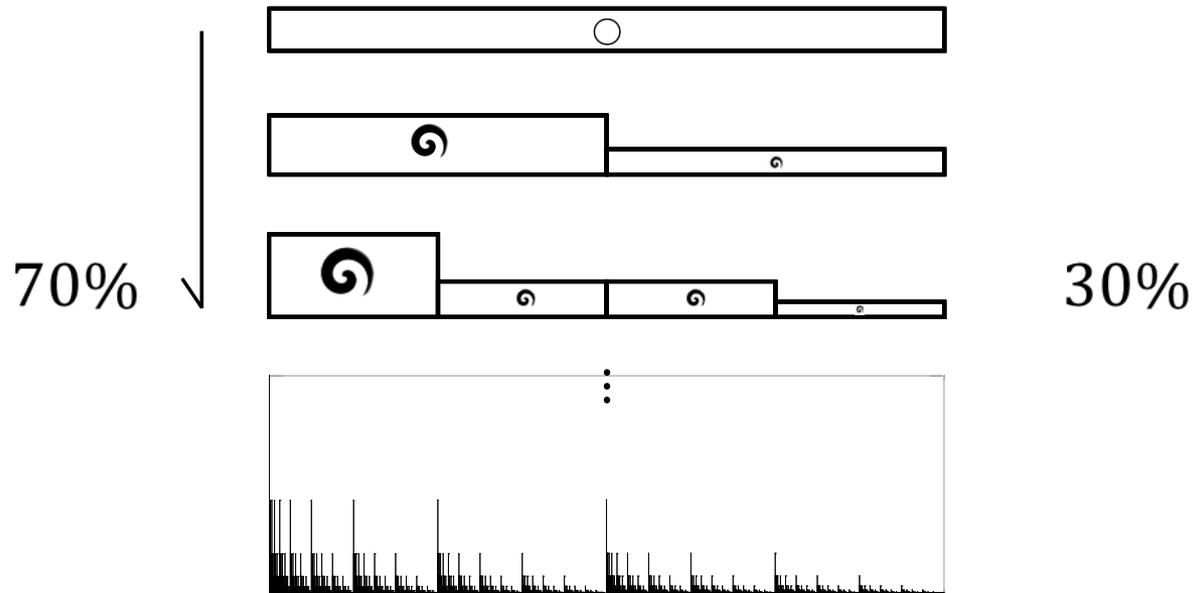
a cascade of **eddies** generating intermittent **violence**

Turbulence and multifractals
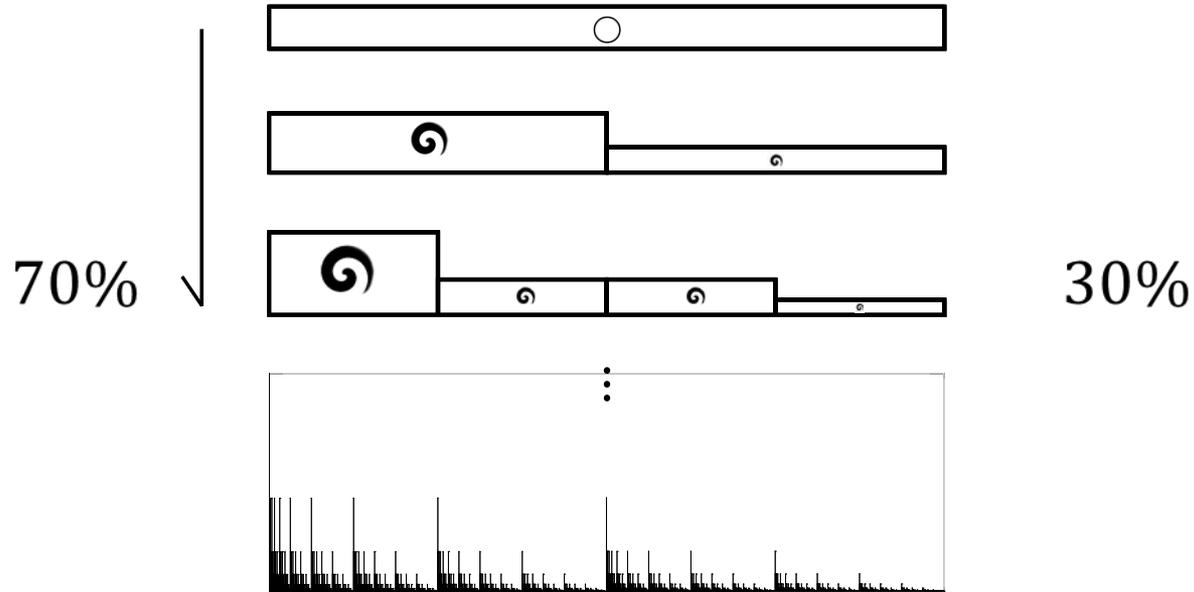
70%   30%

a cascade of **eddies** generating intermittent **violence**

multiple **fragmentation** yielding **thorns** and **dust**

Turbulence and multifractals

(Puente, 2006)
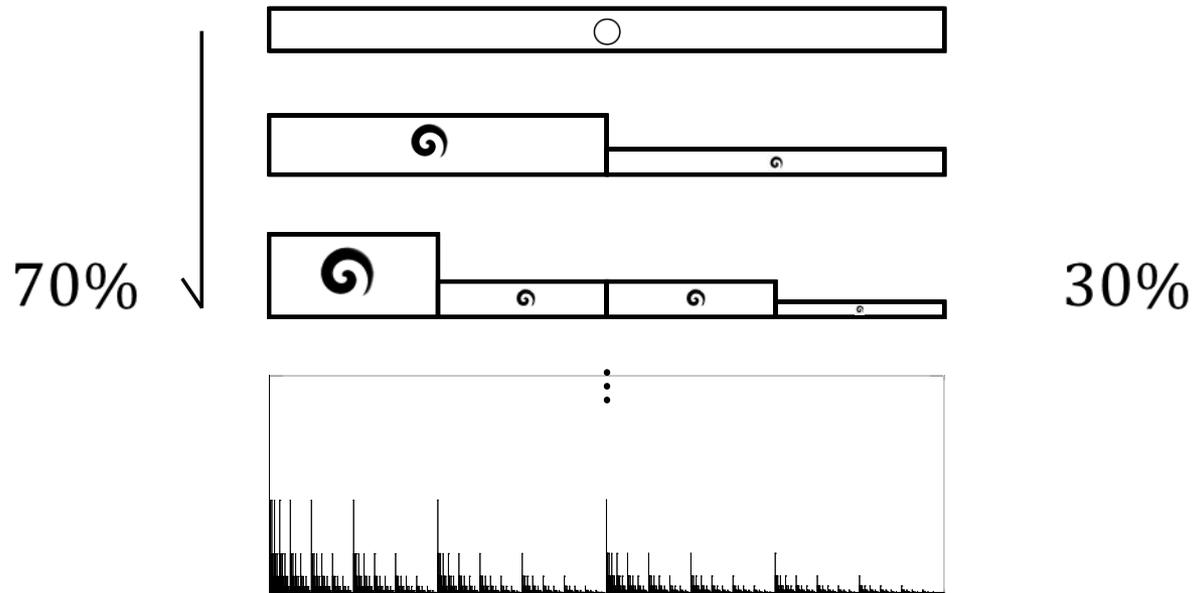
70% ↓   30%

a cascade of **eddies** generating intermittent **violence**

multiple **fragmentation** yielding **thorns** and **dust**

a **dissipative** process, also in economic **inequalities**…

The projection over y
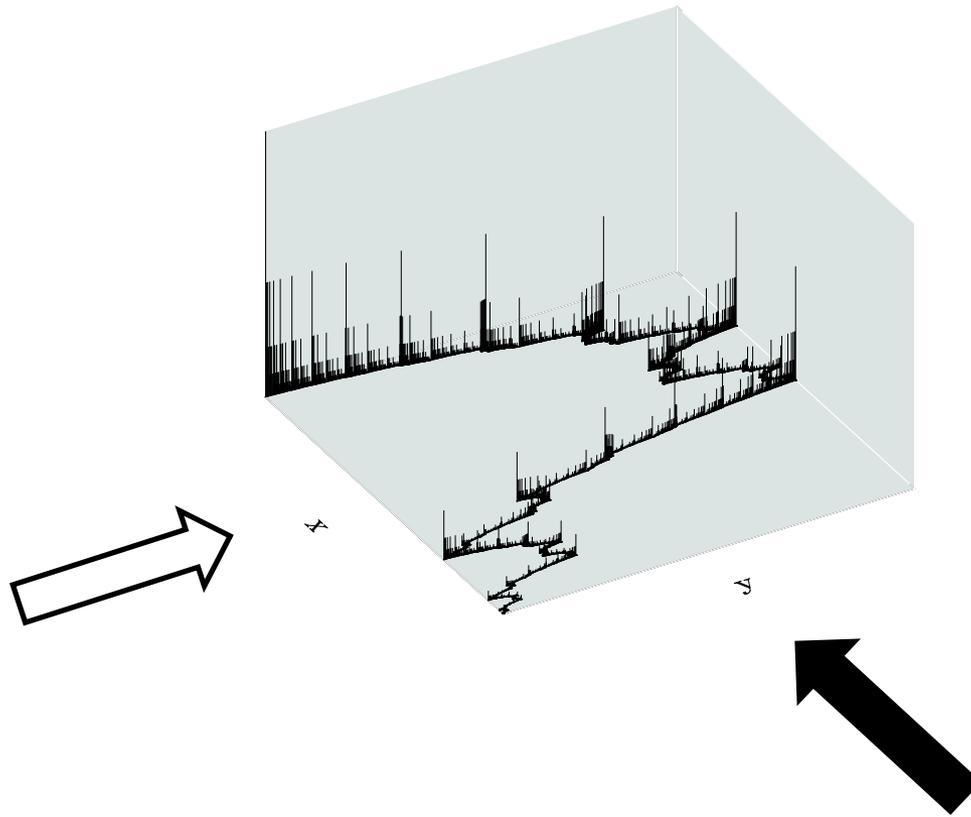
Plato was right!

(Puente, 1992, 1996)

system

input

output
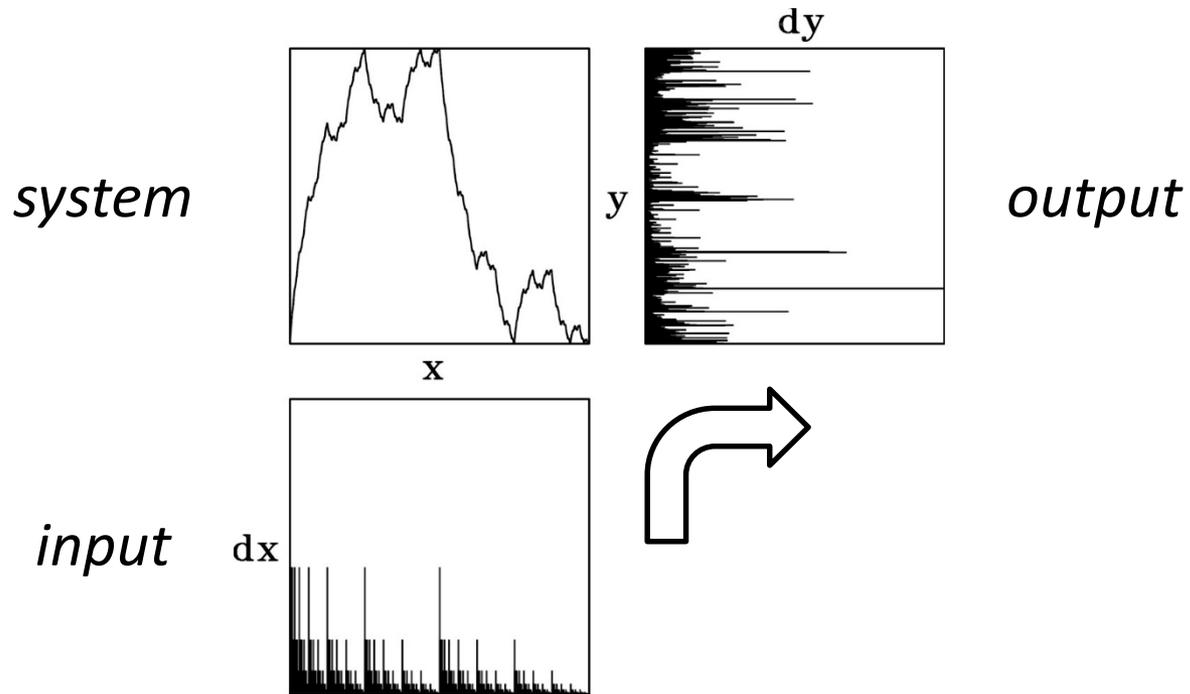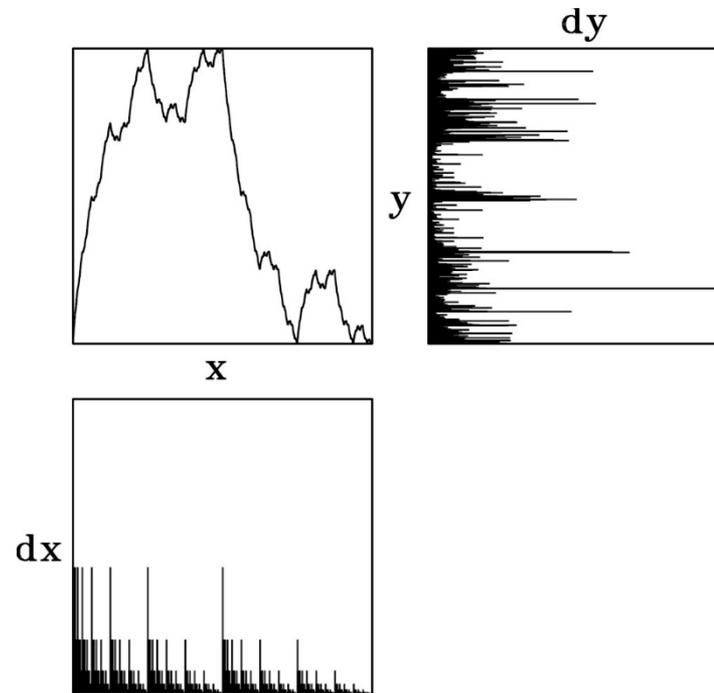
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dx "*illuminates*" the wire and dy is its "*shadow*"

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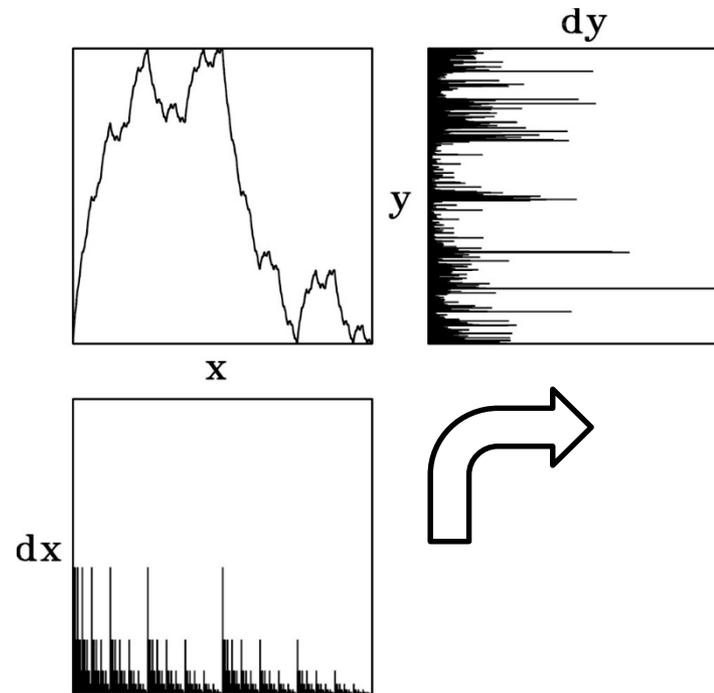
dx "***illuminates***" the wire and dy is its *"**shadow**"*

dy is a **transformation** of **turbulence**

Plato was right!
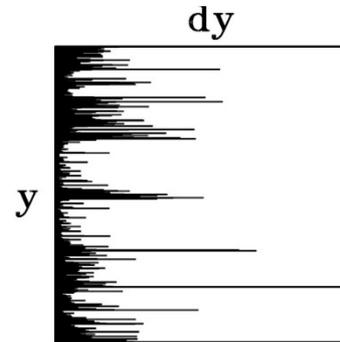
dx "*illuminates*" the wire and dy is its *"shadow"*

dy is a **transformation** of **turbulence**

the projection dy appears *random*, but it is not **(!)**

Shadows and no more!
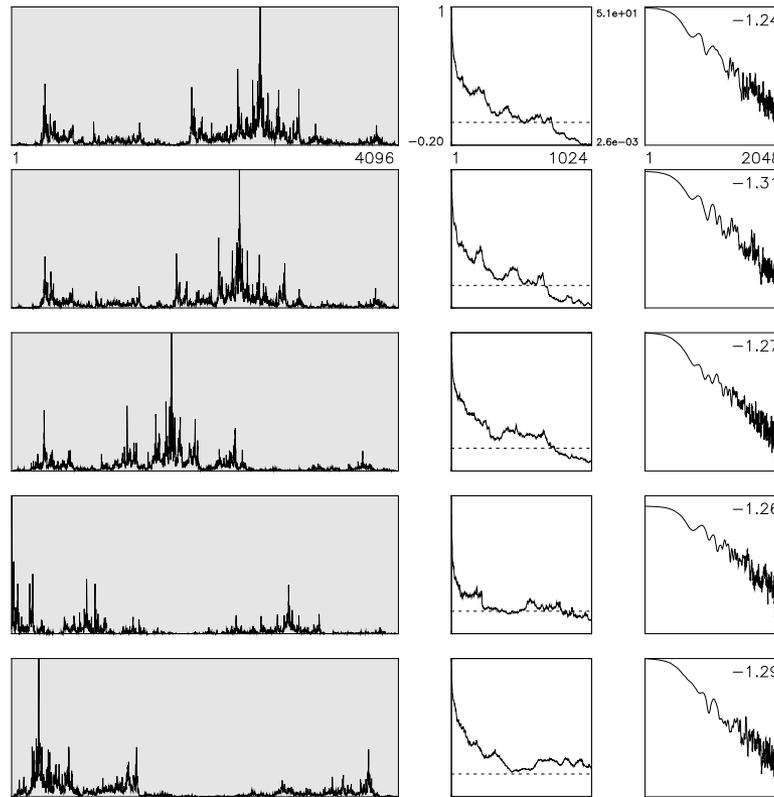
varying the parameters of the construction (and generalizations)

produces shapes and statistics similar to **natural** data **(!)**

Limiting projections

(Puente, 2020e)

Case $+-$, $z \rightarrow 1$
(Puente et al., 1996)
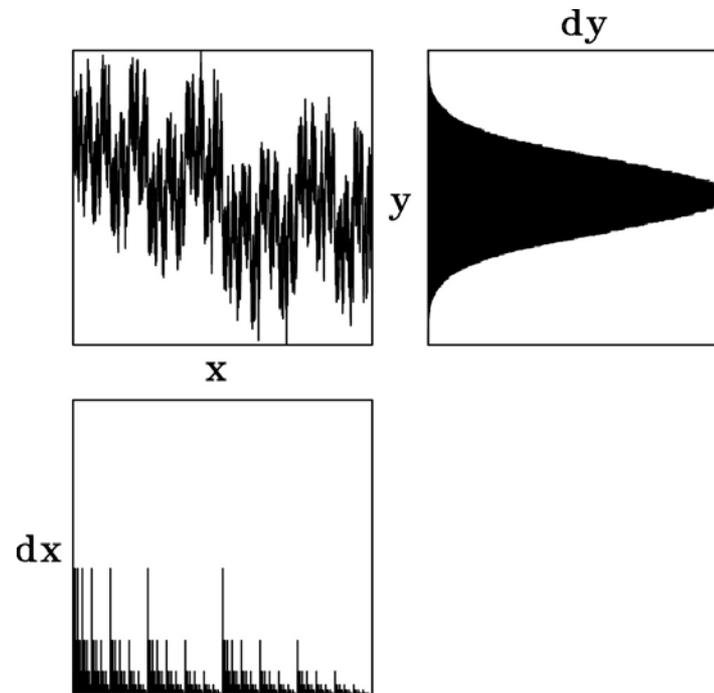
Case + −, $z \to 1$
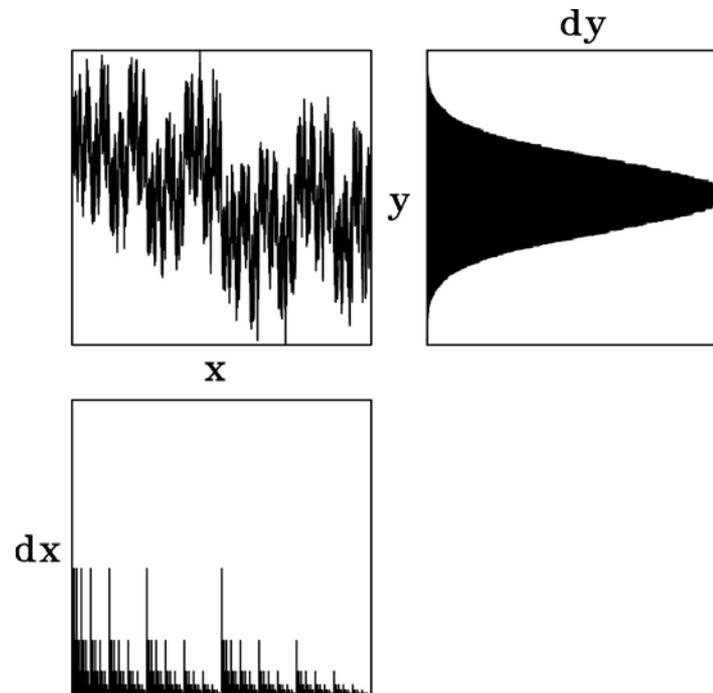
dy is a ***Gaussian bell curve*** for **any** **non-discrete** dx **(!)**

Case + −, $z \to 1$
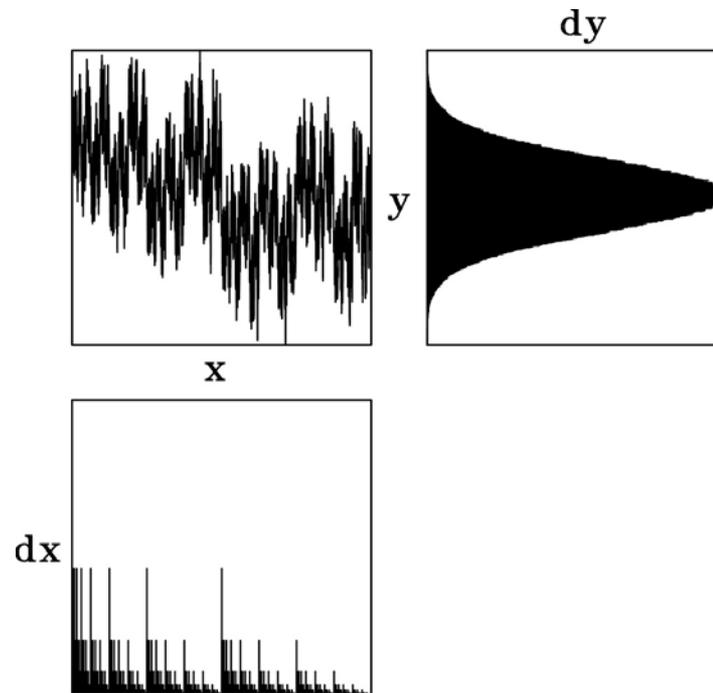
dy is a **_Gaussian bell curve_** for **any non-discrete** dx (!)

a surprising **_BRIDGE_** from **dissipation** to **conduction** **(!)**

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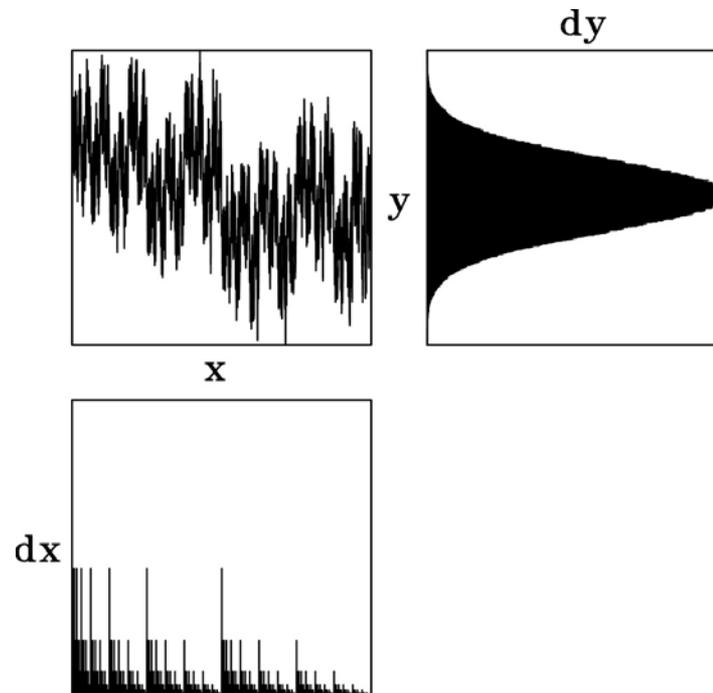
dy is a ***Gaussian bell curve*** for **any non-discrete** dx (!)

a surprising ***BRIDGE*** from **dissipation** to **conduction** (!)

case - - produces **oscillations** between two bells

Case + +, $z \rightarrow 1$

(Puente, 2011)
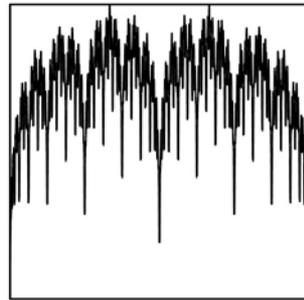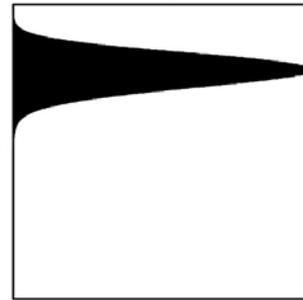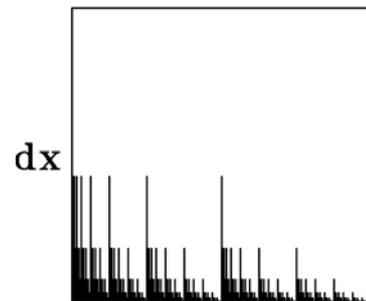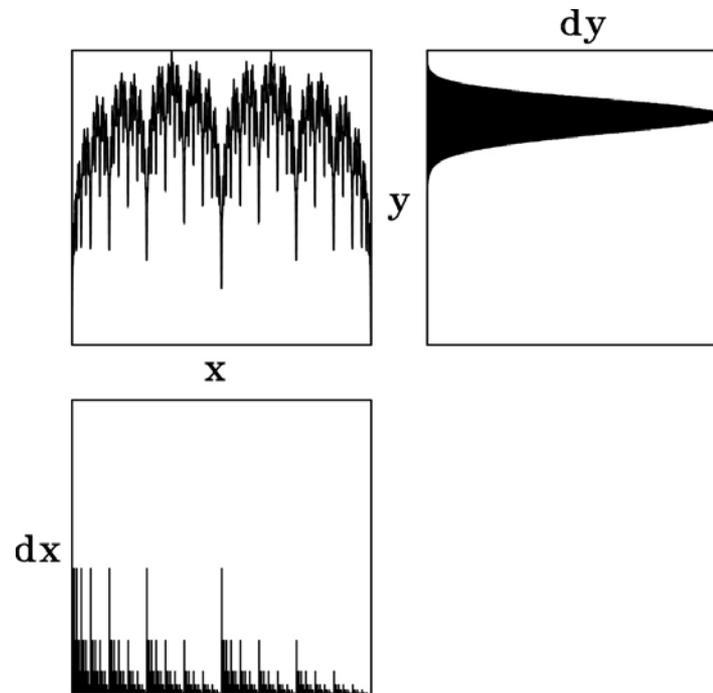
Case + +, $z \rightarrow 1$

a *luminous* and *singular* bell *concentrated* at **infinity** **(!)**

Case + +, $z \to 1$
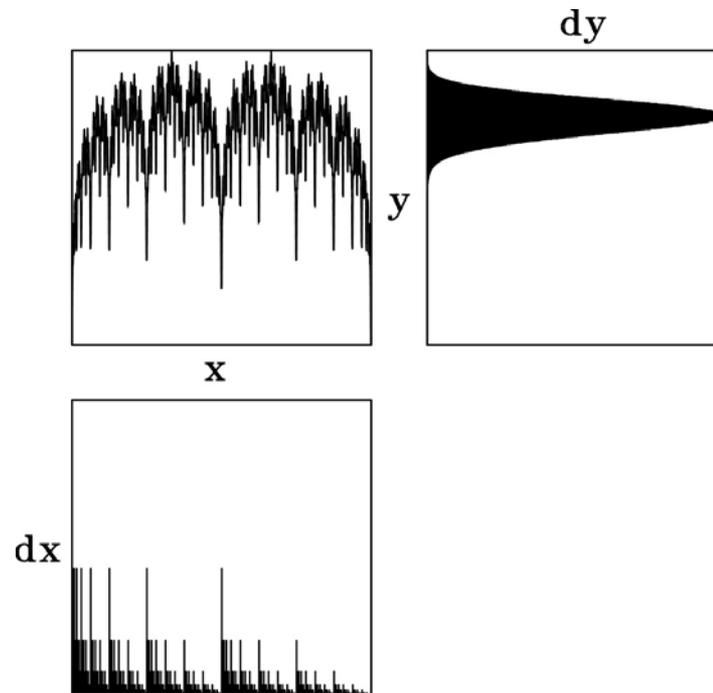
a *luminous* and *singular* bell *concentrated* at **infinity** (!)

the most **positive wire** filters *almost any* **disorder** **(!)**

Case + +, $z \rightarrow 1$
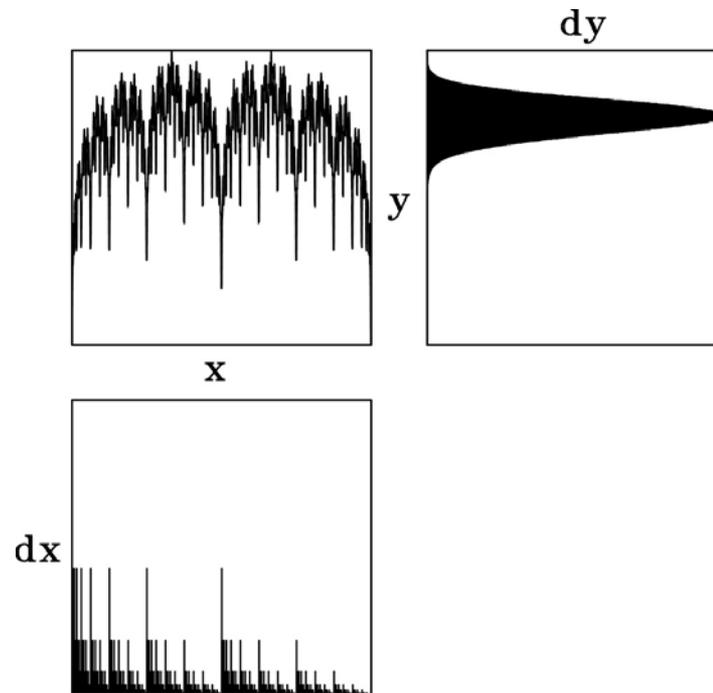
a *luminous* and *singular* bell *concentrated* at **infinity** (!)

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Is it LOVE? Where, O death, is your victory?

The best combination

(Puente, 2020c)

*"Every **valley** shall be **lifted up**, every **mountain and hill made low**; the **rugged land** shall be a **plain**, the **rough country**, a **broad valley**. Then **the glory of the LORD** shall be revealed, and **all flesh shall see it together**"* (Is 40:4-5).

*"Every **valley** shall be **filled** and every **mountain and hill** shall be **made low**. The **winding** roads shall be made **straight**, and the **rough ways** made **smooth**, and **all flesh shall see the salvation of God**"* (Lk 3:5-6).

*Of course, this is **Jesus Christ**, the **uniform**, the **rock**...*

Case + +, dx uniform, z → 1
(Puente, 2020c)
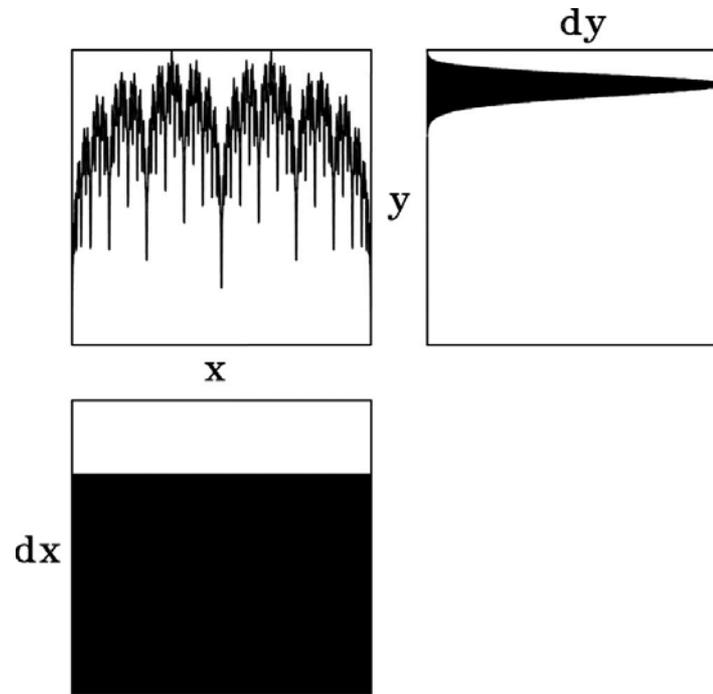
The Most Holy Trinity
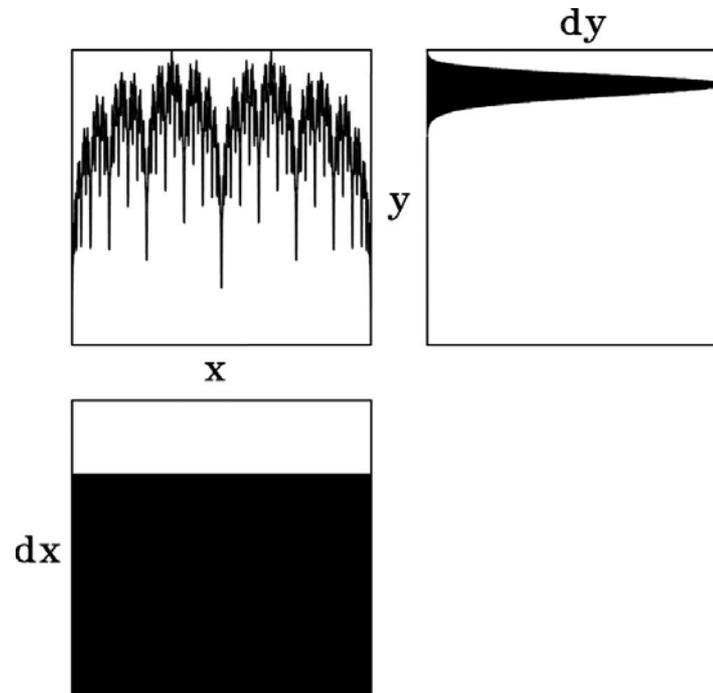
the *Father powerful* in *heaven*

the *Son* always *perfect* and *positive*

and the *Holy Spirit* that *proceeds from them*

The Most Holy Trinity

the perfection of 0, 1 and ∞
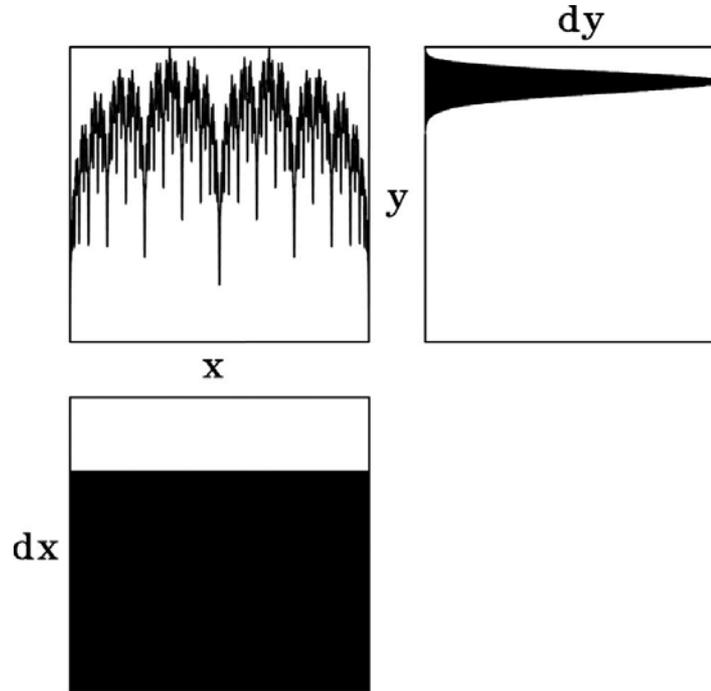
the ***Father powerful*** in ***heaven***

the ***Son*** always ***perfect*** and ***positive***

and the ***Holy Spirit*** that ***proceeds from them***

The Most Holy Trinity
(Eph 2:20 – 22)
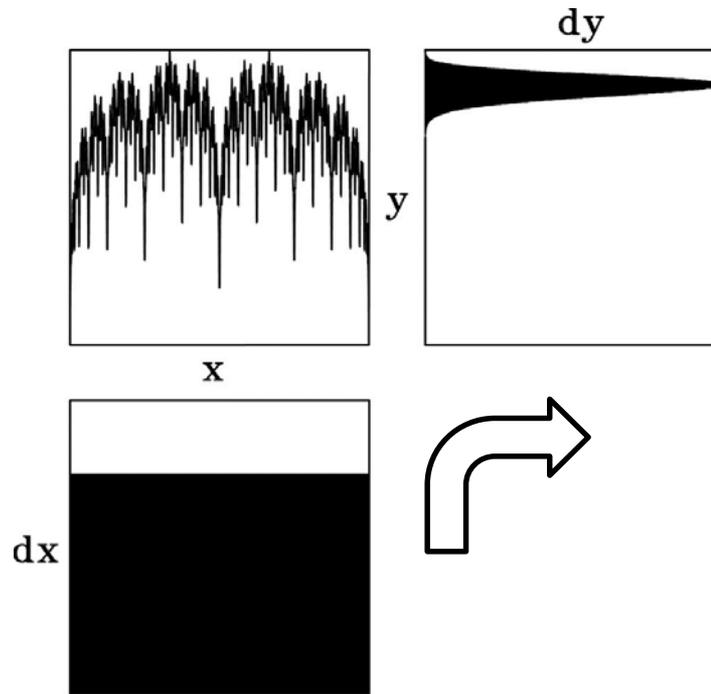
"…with **Christ Jesus** himself as the ***capstone***, through him the whole ***structure*** is held together and grows into a ***temple sacred*** in **the Lord**;

in him you are also being ***built***, into a dwelling place of **God** in **the Spirit**", our **Savior (!)**

The power of the Holy Spirit
(Puente, 2019a,d, 2020b)

The power of the Holy Spirit

$$z \rightarrow 1$$

The power of the Holy Spirit

$$z \to 1$$
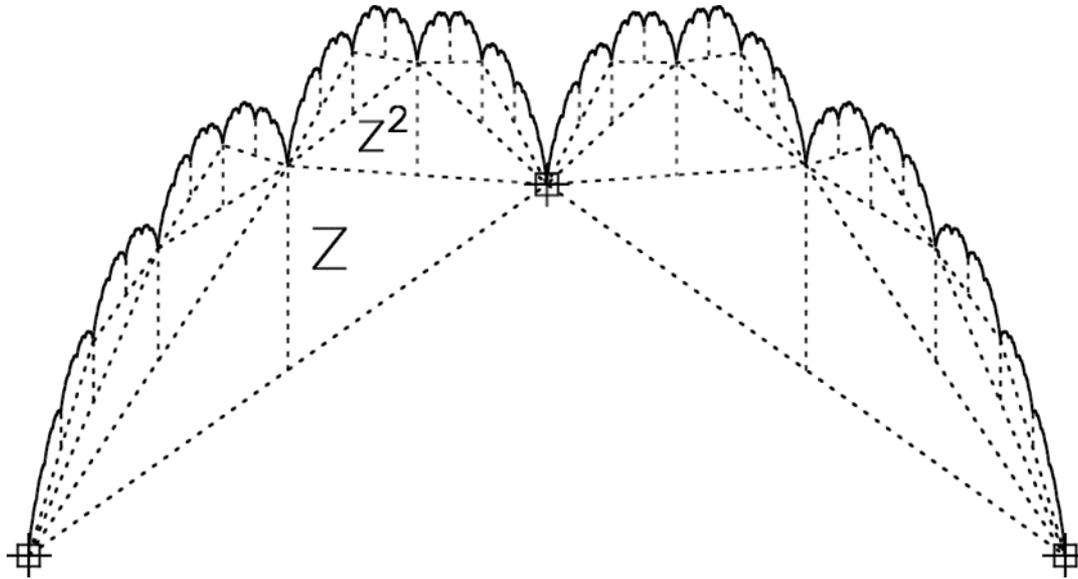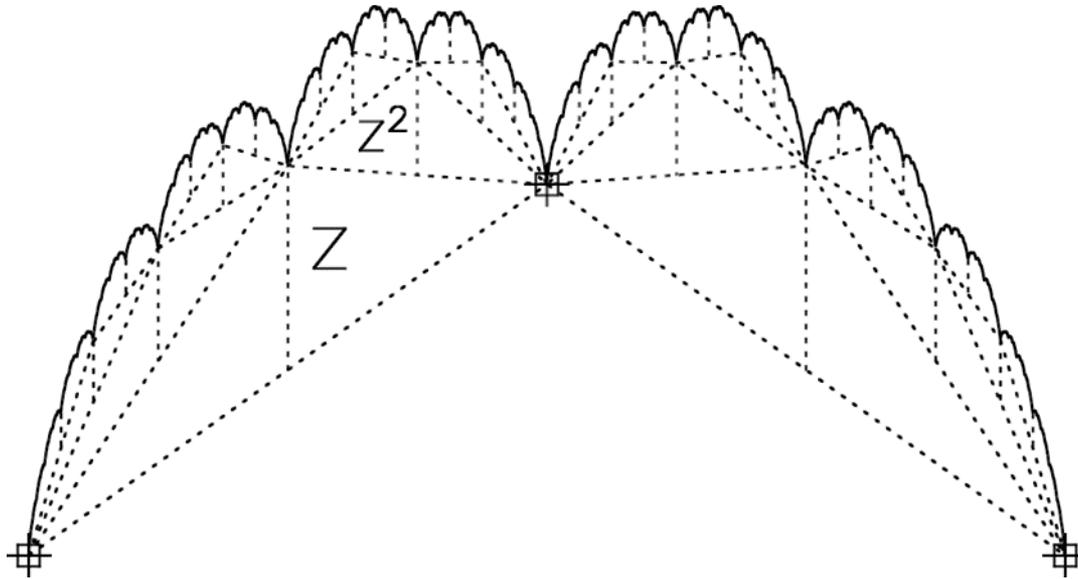
the **angelical** diagram contains **infinite unity** **(!)**

The power of the Holy Spirit
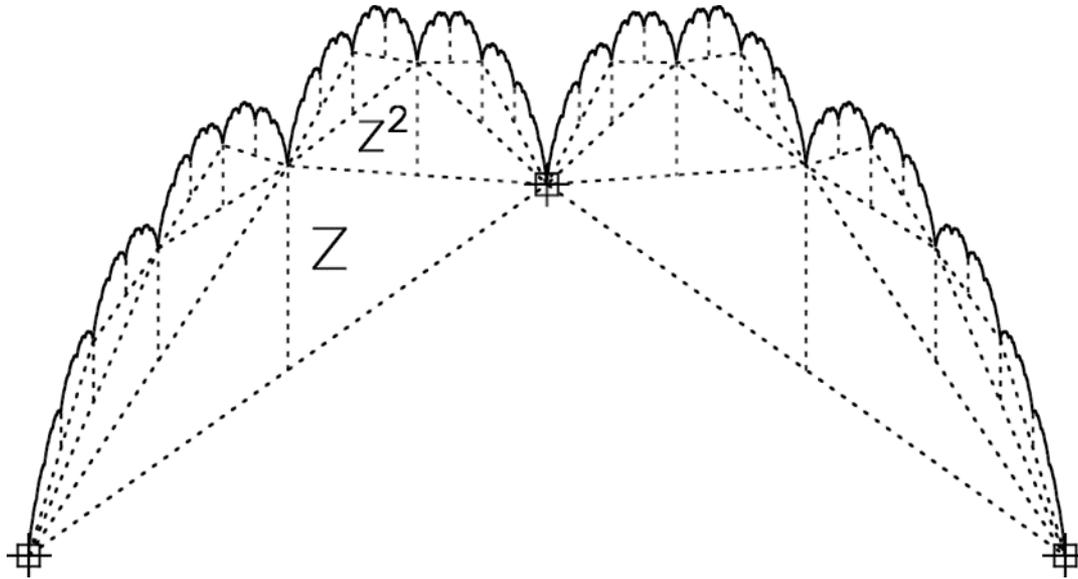
$$z \to 1$$

the **angelical** diagram contains **infinite unity** (!)

such reflects "the **unity** of the **Holy Spirit**" and its capacity to **unite** **(!)**

The power of the Holy Spirit
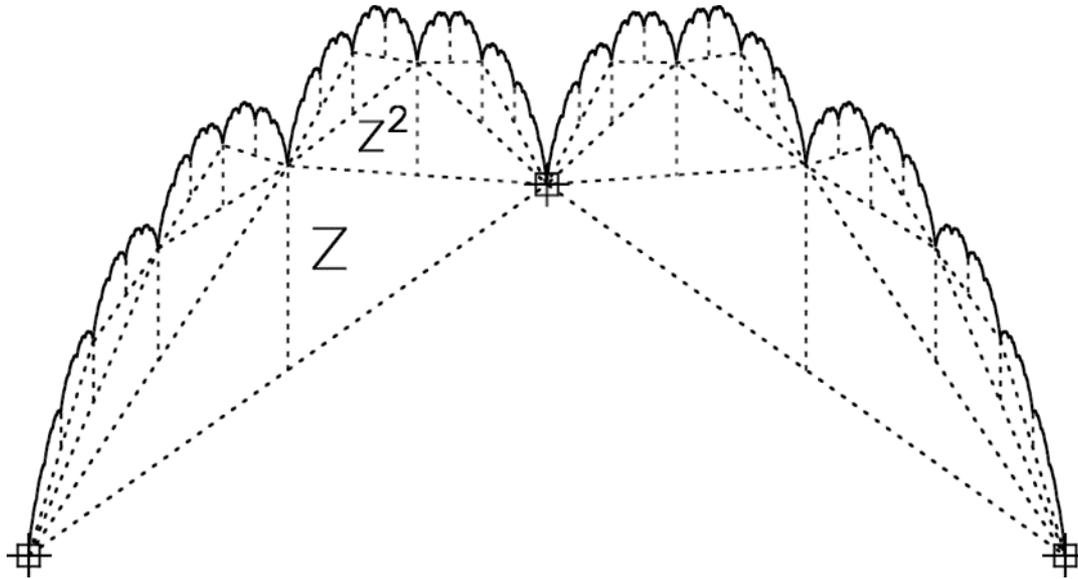
the **angelical** diagram contains **infinite unity** (!)

such reflects "the **unity** of the **Holy Spirit**" and its capacity to **unite** (!)

the **Spirit** also reflects the **loving** spiral of **9** in **1 = 0.999…** **(!)**

The power of the Holy Spirit
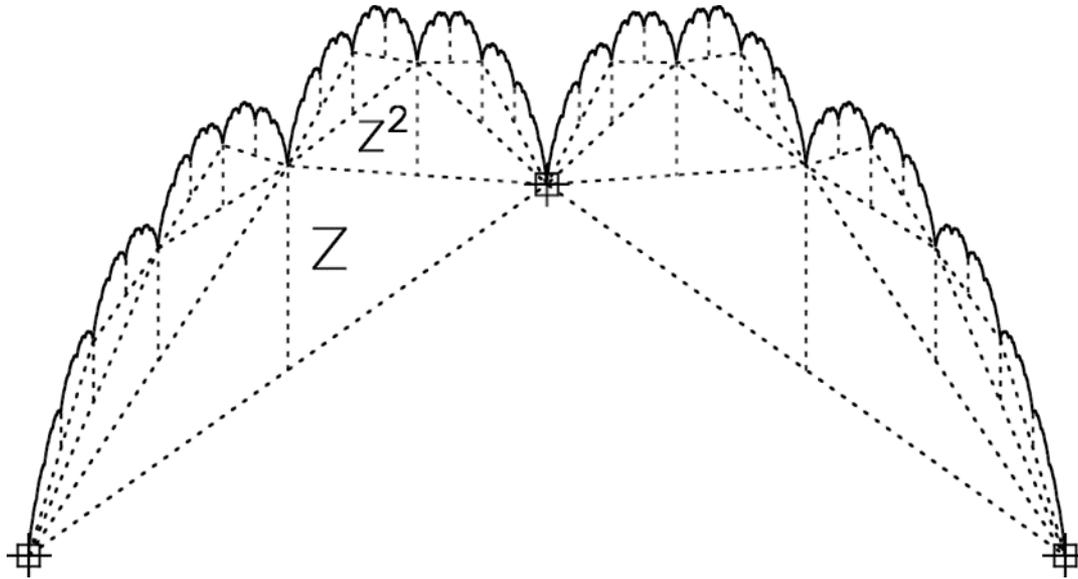
the **angelical** diagram contains **infinite unity** (!)

such reflects "the **unity** of the **Holy Spirit**" and its capacity to **unite** (!)

the **Spirit** also reflects the **loving** spiral of **9** in **1 = 0.999…** (!)

the *transformation* is a symphony of **love**, **unity** and the **positive cross +**

Other relevant citations

About Jesus Christ and more...
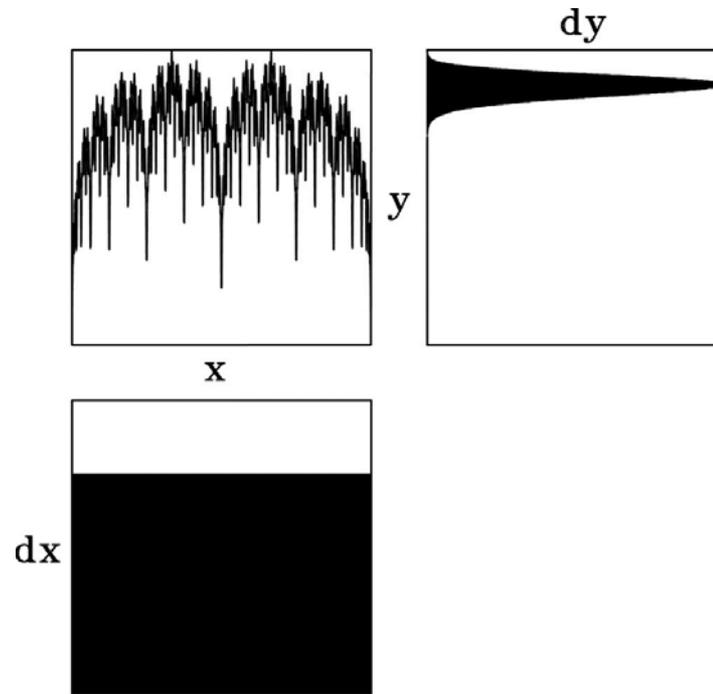
About Jesus Christ and more…

(Puente, 2019b,c)
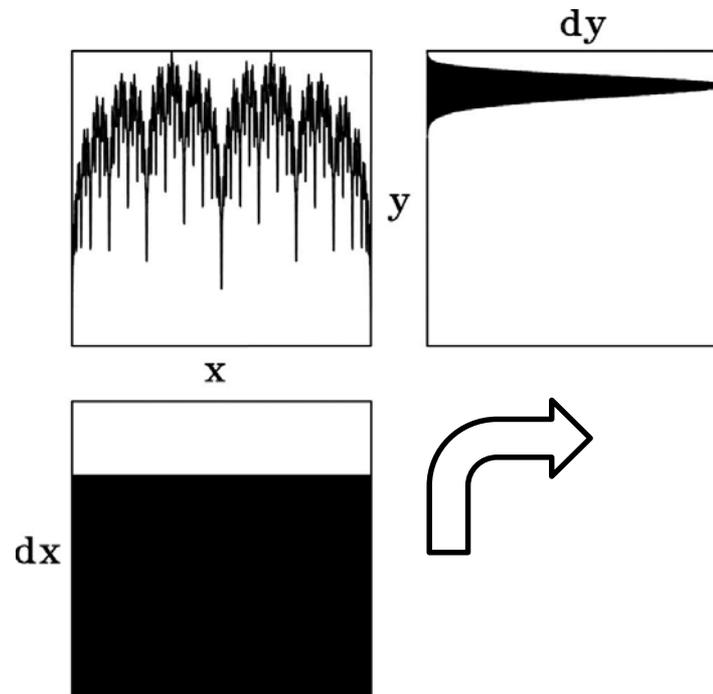
birth, **transfiguration**, **resurrection**, **ascension**

About Jesus Christ and more...

(Puente, 2018, 2020d)
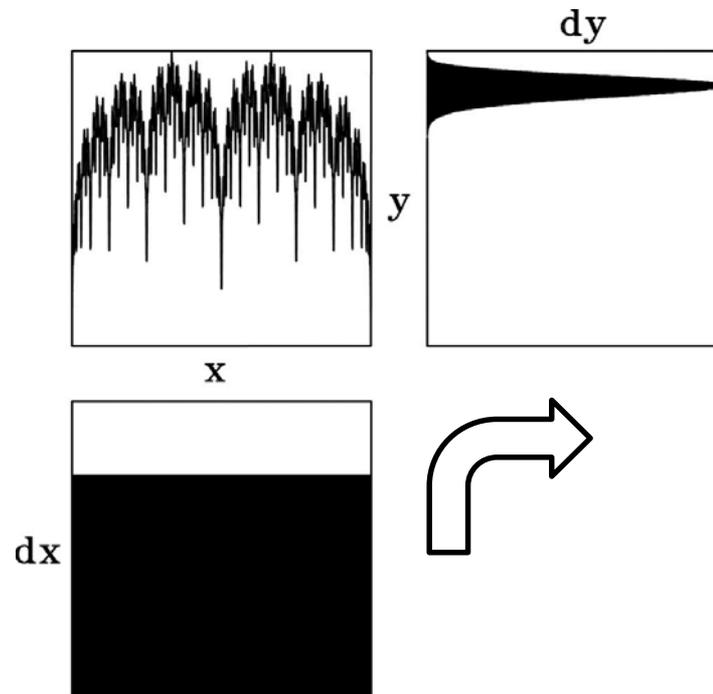
birth, **transfiguration**, **resurrection**, **ascension**

baptism, **Eucharist** in "*a little piece of the system*"

About Jesus Christ and more…
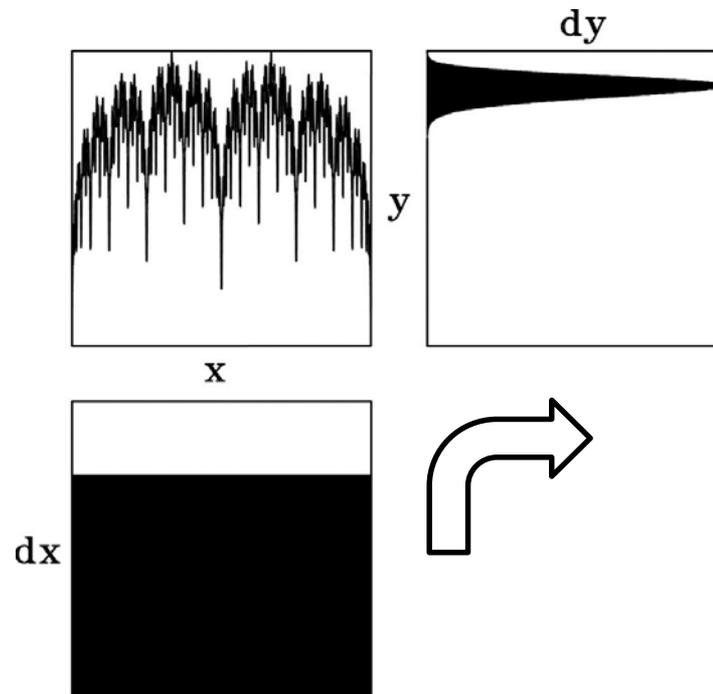
birth, **transfiguration**, **resurrection**, **ascension**

baptism, **Eucharist** in "*a little piece of the system*"

assumption of **Mary** and "**rapture**" of the **Church**, *St. Augustine*

Other matters of faith
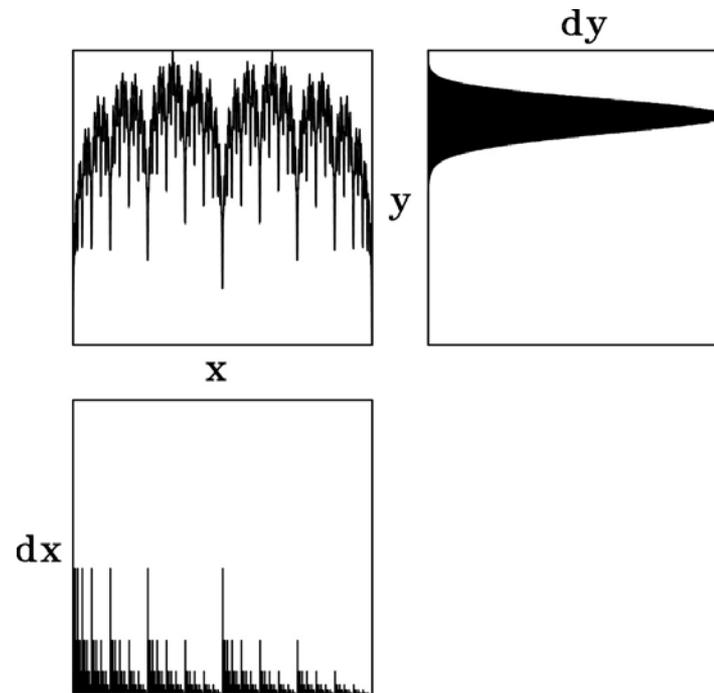
Other matters of faith
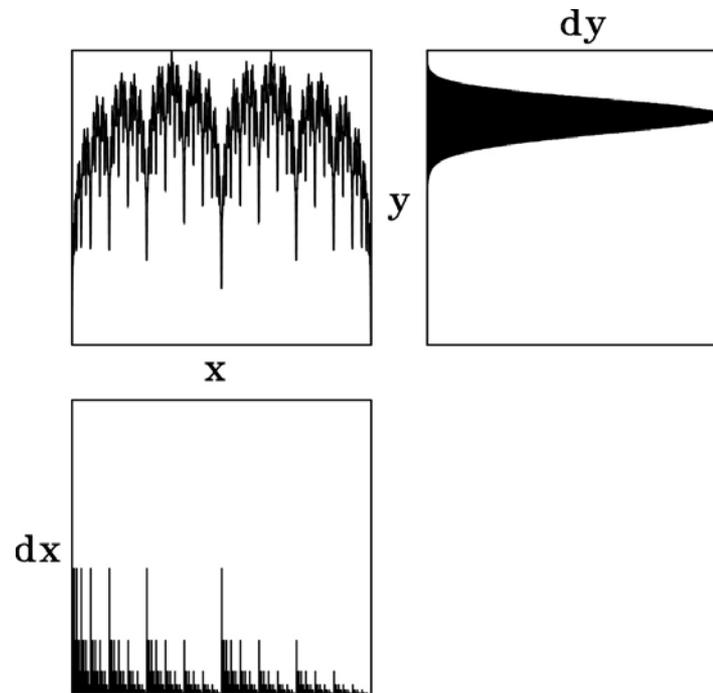
look not on our **sins**, but on the **faith** of your **Church**

Other matters of faith
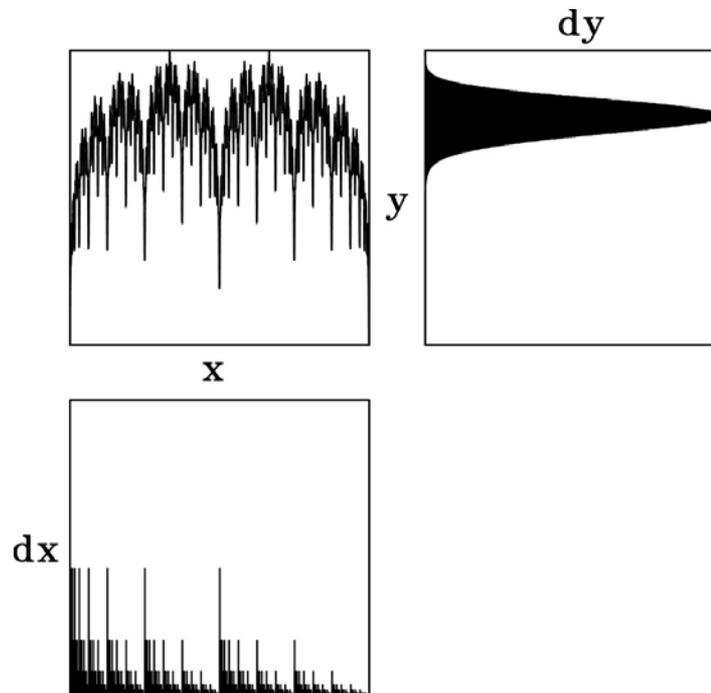
look not on our **sins**, but on the **faith** of your **Church**

the **flesh** produces **death**, but the **Spirit life**

Other matters of faith
(Puente, 2020f)
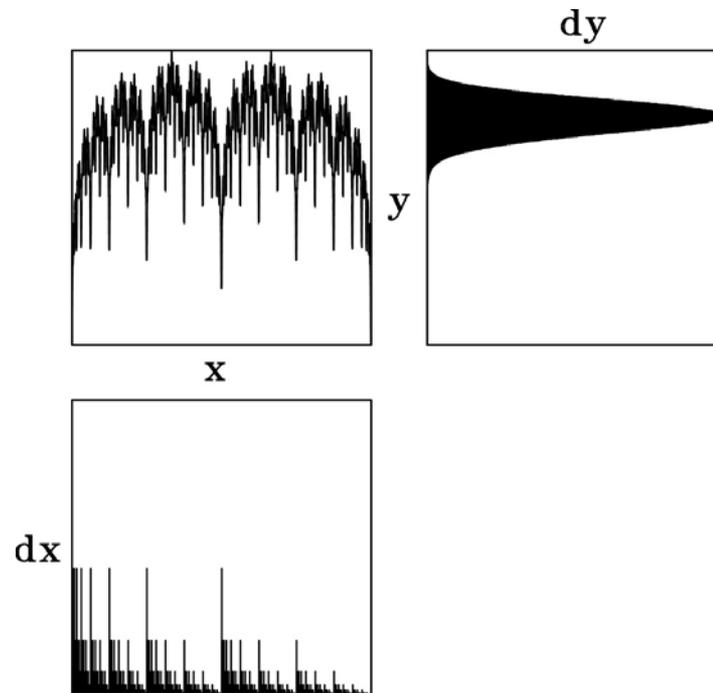
look not on our **sins**, but on the **faith** of your **Church**

the **flesh** produces **death**, but the **Spirit life**

everlasting sin in ***blasphemy*** against the **Holy Spirit** **(!)**

Other matters of faith
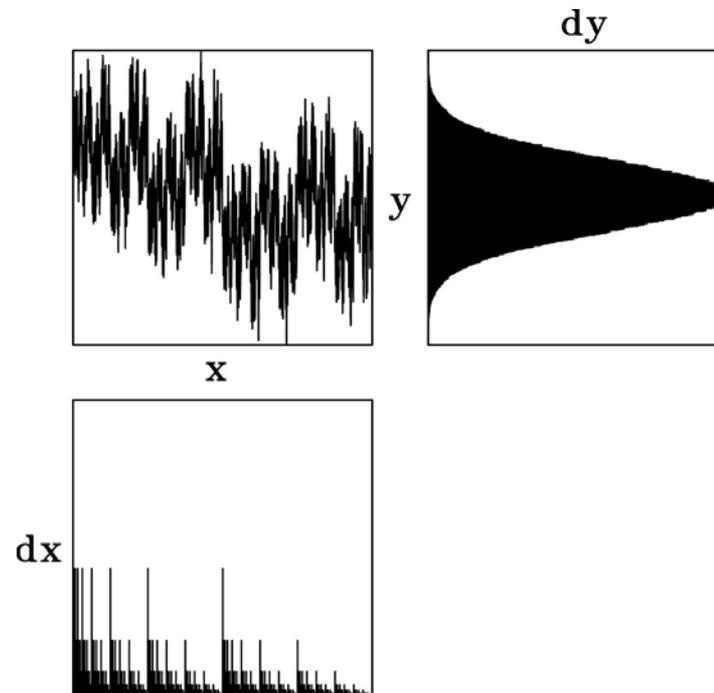
Other matters of faith
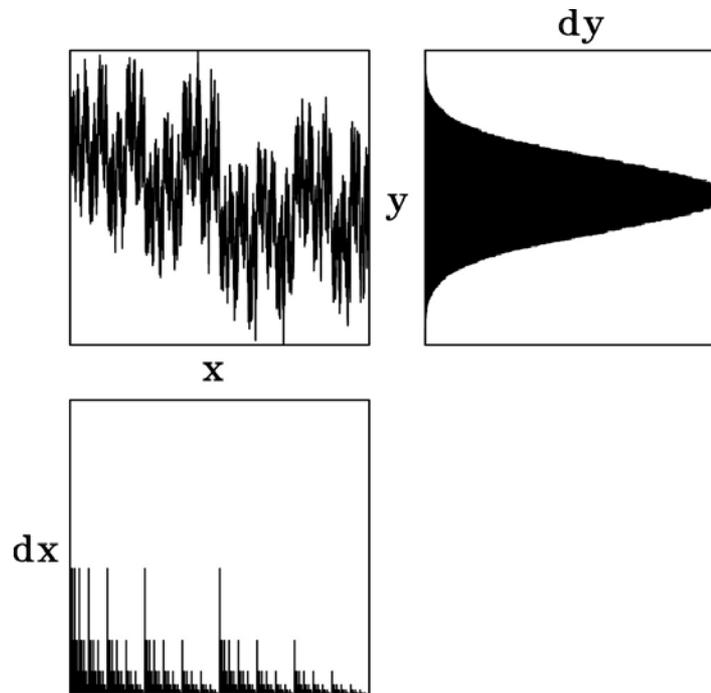
the other sign combinations do *not go up* and their dy's are **finite**

Other matters of faith
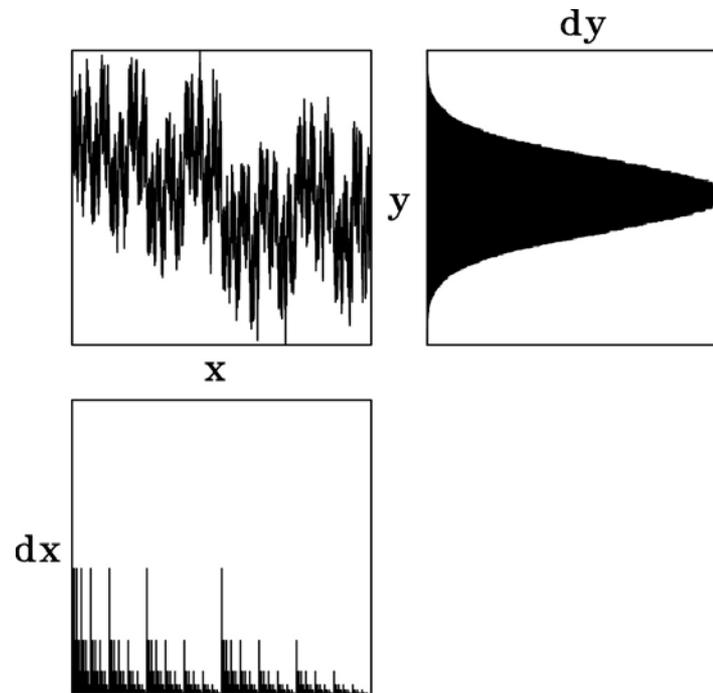
the other sign combinations do ***not go up*** and their dy's are **finite**

a bad *imitation* of the faithful + + process that indeed takes to **infinity**

Other matters of faith
(Puente, 2020f)
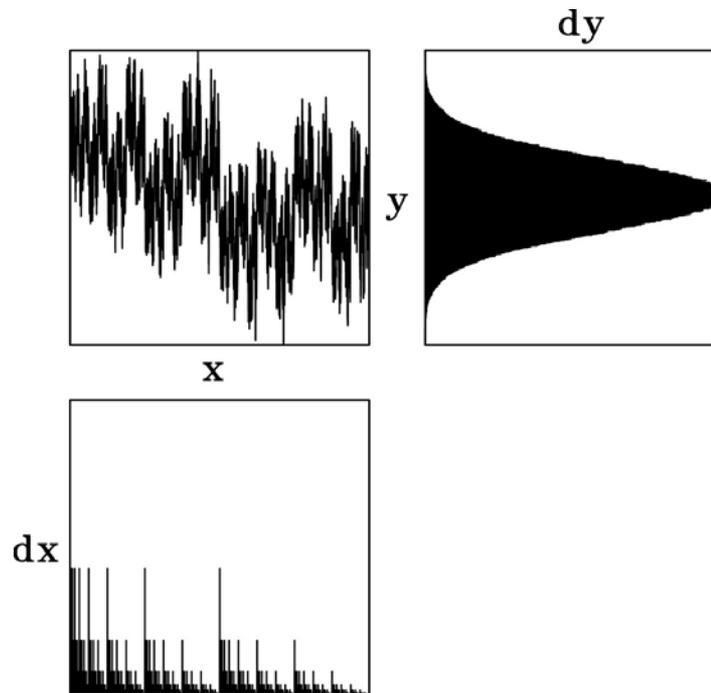
the other sign combinations do ***not go up*** and their dy's are **finite**

a bad ***imitation*** of the faithful + + process that indeed takes to **infinity**

choosing the **negative** represents another ***silly blasphemy*** **(!)**

The antidote

(Puente, 2011)

X → Y

From X into Y
as unnatural flow,
mapping immensity
leaving dust below.

From X into Y
inspiring all awe,
o plus of liberty
forever aglow.

From X into Y
only a tiny piece,
wired to totality
o normal release.

From X into Y
o infinite fleece,
by packing vitality
no thorns but peace.

From X into Y
singular the dough,
symphony of unity
breeding single row.

From X into Y
by breaking a spell,
amazing simplicity
o refuge from hell.

From X into Y
from holy plateau,
perennial immunity
o Spirit on the go.

From X into Y
triune is the cell,
omnipotent divinity
o sacred God's bell.

(March 2011)

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(March 2011)

Designs in more dimensions

Extensions to higher dimensions

more variables, x uncoupled:

$$w_n \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} a_n & 0 & 0 \\ c_n & d_n & h_n \\ k_n & l_n & m_n \end{pmatrix} \cdot \begin{pmatrix} x \\ y \\ z \end{pmatrix} + \begin{pmatrix} e_n \\ f_n \\ g_n \end{pmatrix}$$

Extensions to higher dimensions

more variables, x uncoupled:

$$w_n \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} a_n & 0 & 0 \\ c_n & d_n & h_n \\ k_n & l_n & m_n \end{pmatrix} \cdot \begin{pmatrix} x \\ y \\ z \end{pmatrix} + \begin{pmatrix} e_n \\ f_n \\ g_n \end{pmatrix}$$

polar coordinates, parameters **radial** and **angular**:

$$D_n = \begin{pmatrix} d_n & h_n \\ l_n & m_n \end{pmatrix} = \begin{pmatrix} r_n^{(1)} \cdot cos\theta_n^{(1)} & -r_n^{(2)} \cdot sin\theta_n^{(2)} \\ r_n^{(1)} \cdot sin\theta_n^{(1)} & r_n^{(2)} \cdot cos\theta_n^{(2)} \end{pmatrix}$$

Extensions to higher dimensions

more variables, x uncoupled:

$$w_n \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} a_n & 0 & 0 \\ c_n & d_n & h_n \\ k_n & l_n & m_n \end{pmatrix} \cdot \begin{pmatrix} x \\ y \\ z \end{pmatrix} + \begin{pmatrix} e_n \\ f_n \\ g_n \end{pmatrix}$$

polar coordinates, parameters **radial** and **angular**:

$$D_n = \begin{pmatrix} d_n & h_n \\ l_n & m_n \end{pmatrix} = \begin{pmatrix} r_n^{(1)} \cdot cos\theta_n^{(1)} & -r_n^{(2)} \cdot sin\theta_n^{(2)} \\ r_n^{(1)} \cdot sin\theta_n^{(1)} & r_n^{(2)} \cdot cos\theta_n^{(2)} \end{pmatrix}$$

the iterations generate *wires* from x to (y, z)

with *fractal dimensions* between 1 and 3

More scientific discoveries
(Puente, 2004)
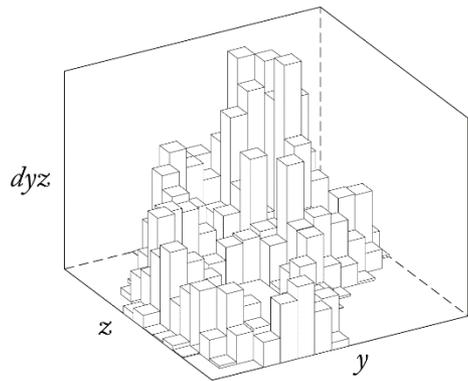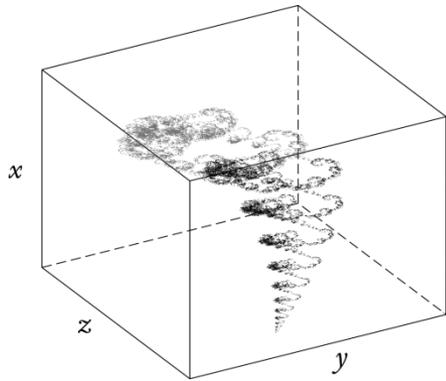
shadow over (y, z)
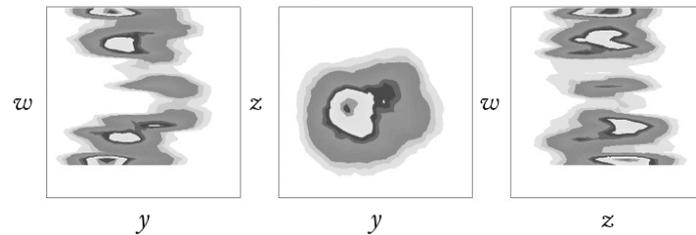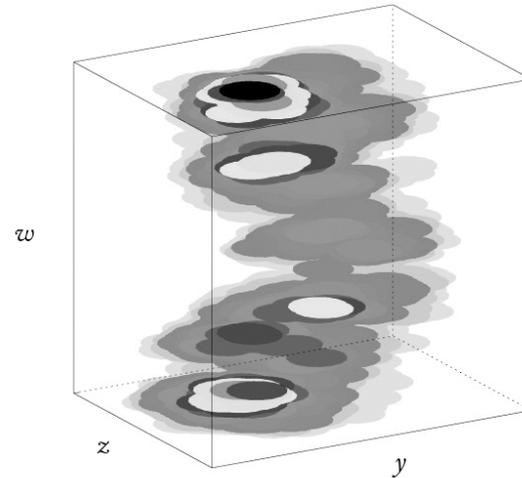
based on wire in 4D

pollution, rainfall and more…

Bells with finite centers
(Puente and Klebanoff, 1994)
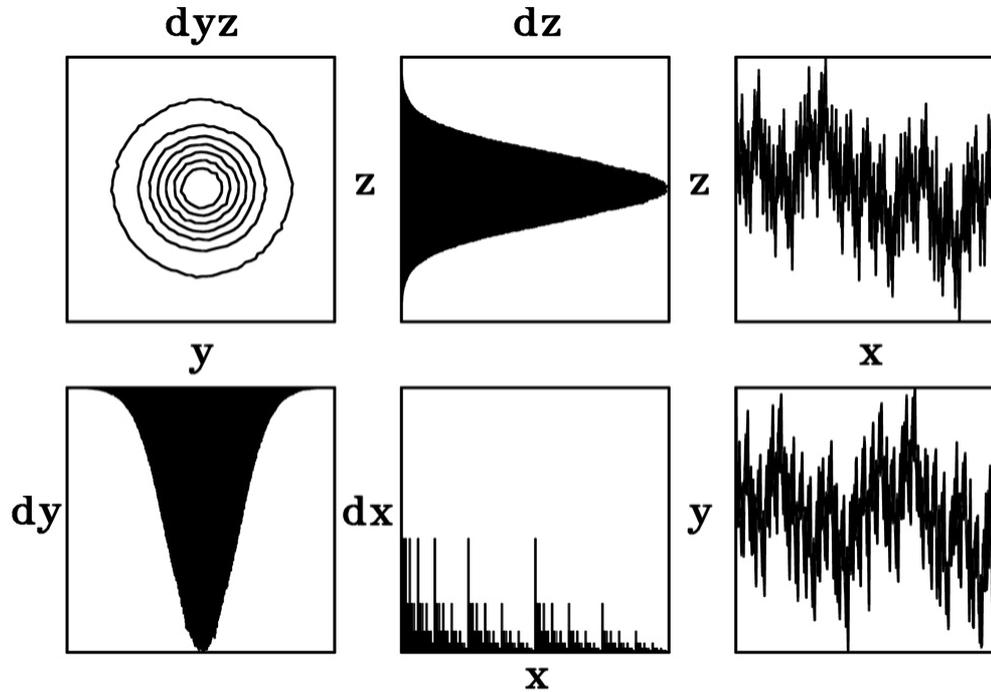
Bells with finite centers
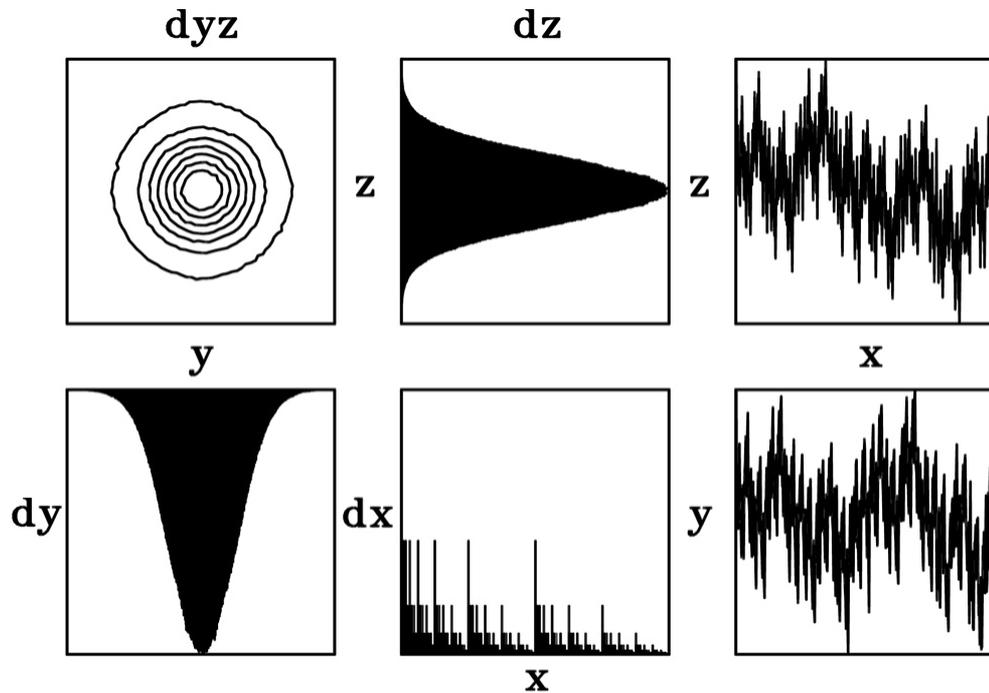
$|D_n| \to 1$, $D \to 3$, **circular**, but also **elliptical** and **oscillations**

Bells with finite centers
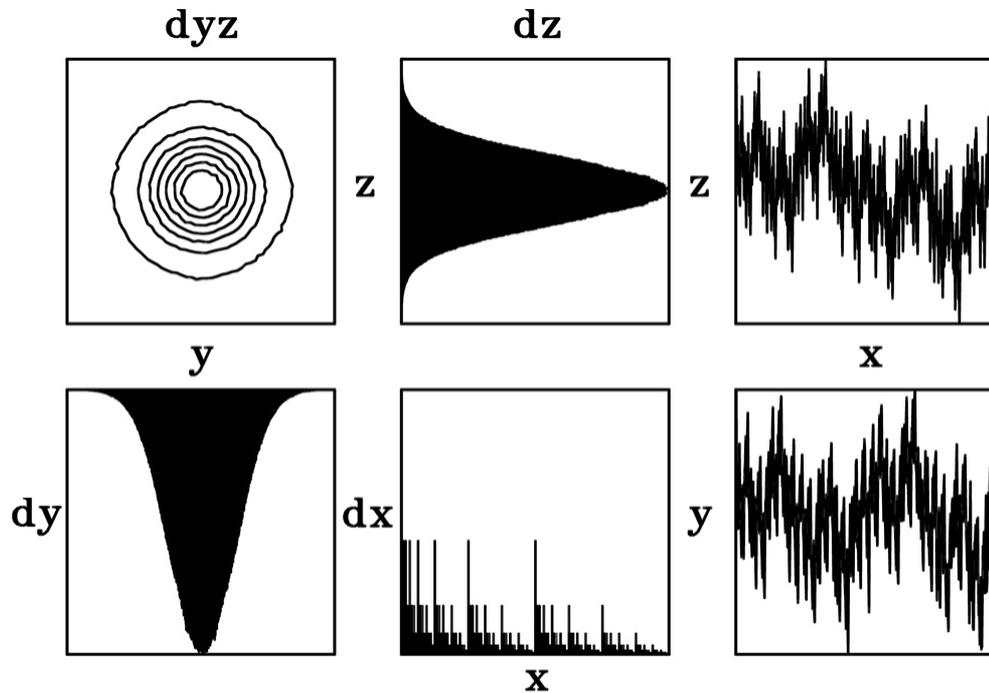
$|D_n| \rightarrow 1$, $D \rightarrow 3$, **circular**, but also **elliptical** and **oscillations**

portions of wires yield **bells**, *ad infinitum*

Bells with finite centers
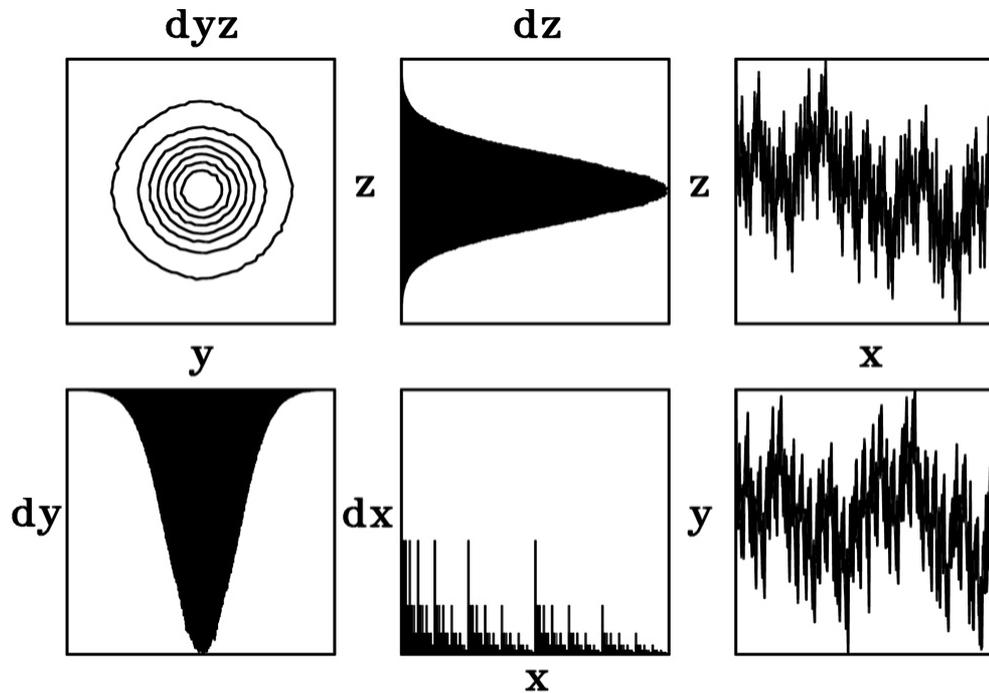
$|D_n| \to 1$, $D \to 3$, **circular**, but also **elliptical** and **oscillations**

portions of wires yield **bells**, *ad infinitum*

the proof of the multidimensional case is unknown…

Kaleidoscopes in the bell

geometry: (0,0,0) (0.5,1,1) (1,0,0)

parameters: **radial** (+ - + +) 0.9999, **angular** 60 60 60 60

every 10,000 points until 1'200,000 bits of π

Treasures inside the bell
(Puente, 2003)
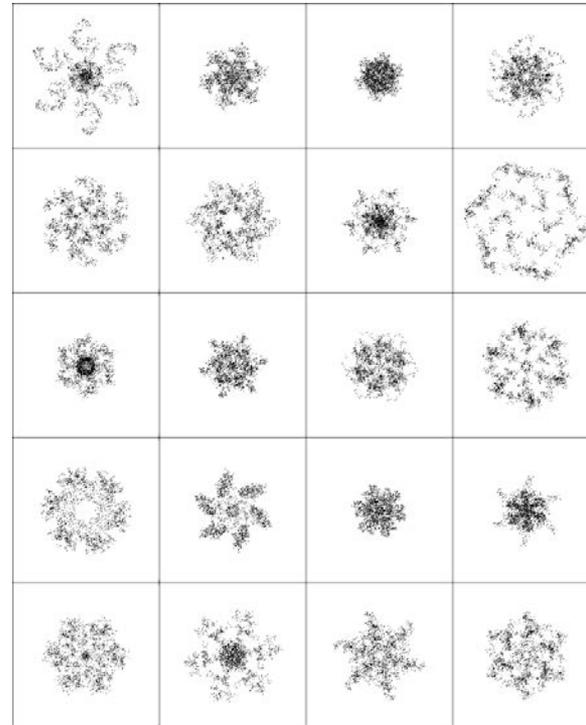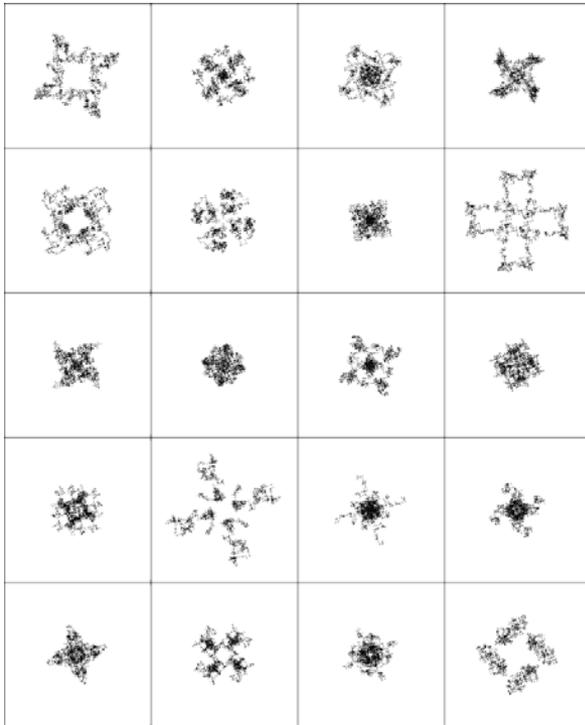
Treasures inside the bell
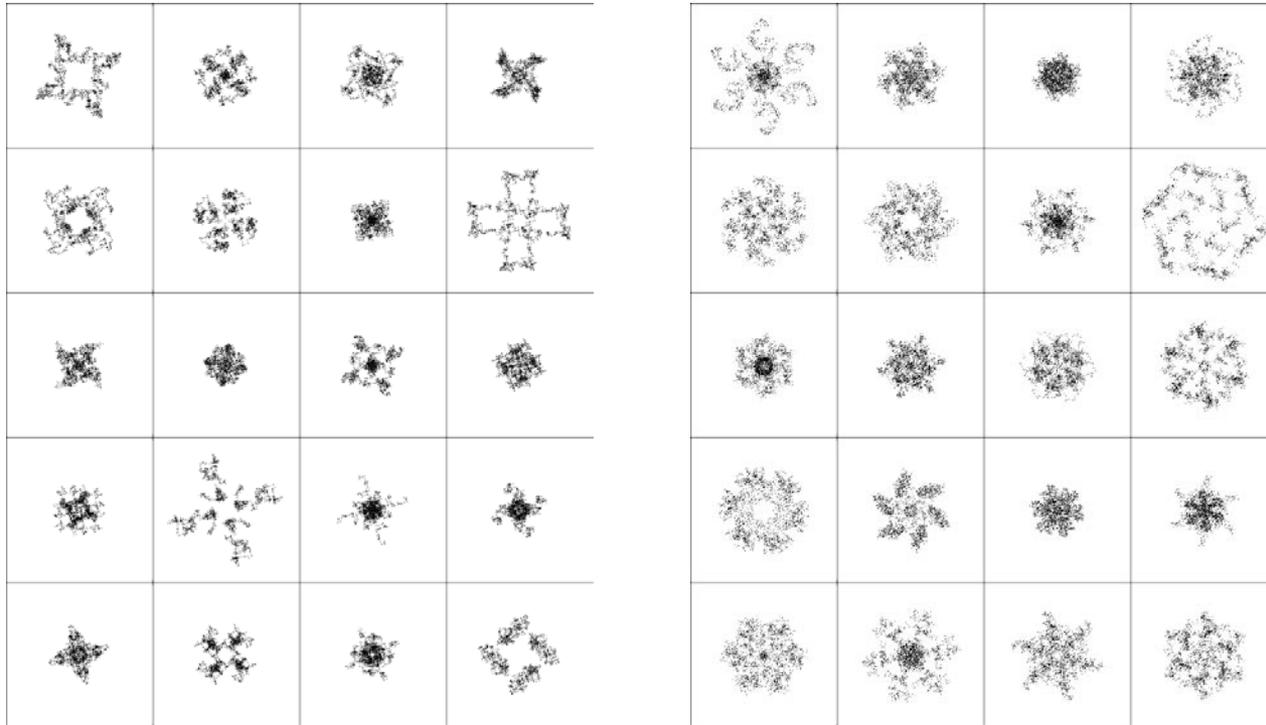
the *superposition* of rosettes produces **perfect** **circles** **(!)**

Treasures inside the bell
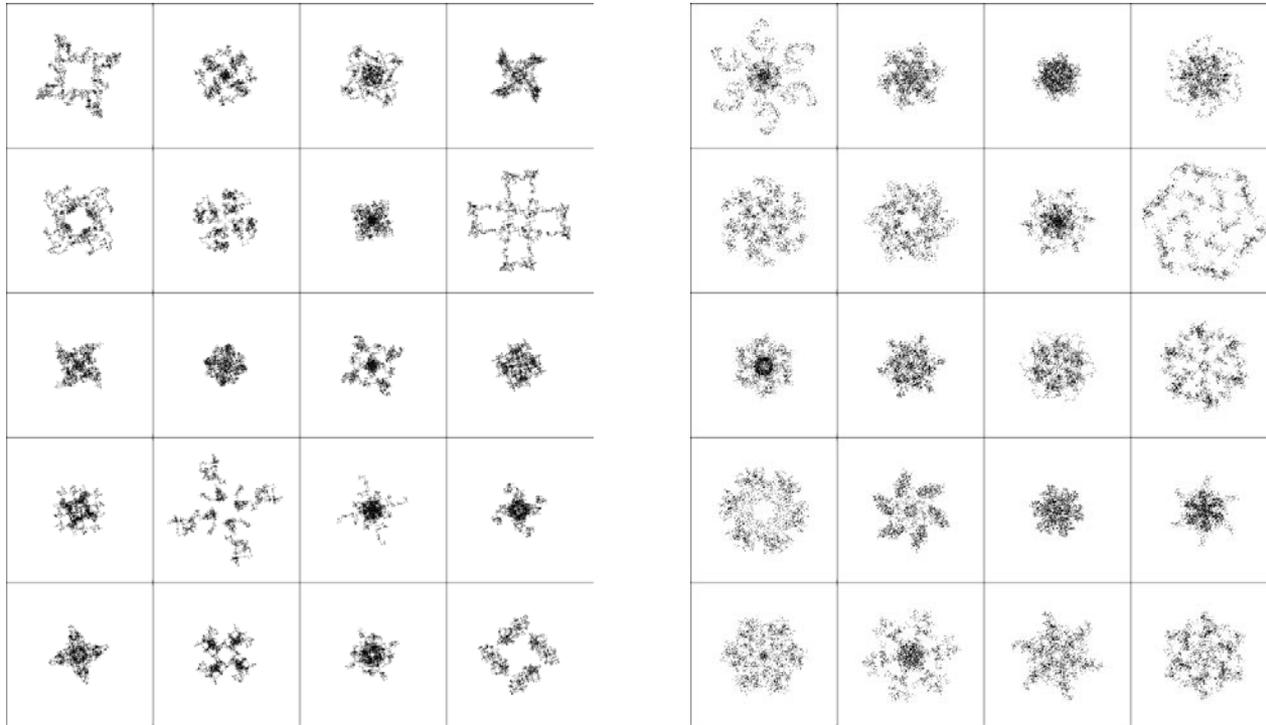
the *superposition* of rosettes produces **perfect circles** (!)

only in the limit that **fills space** there is a hidden **order** in **chance**

Designs in the bell
(Puente and Puente, 2004; Puente, 2000)
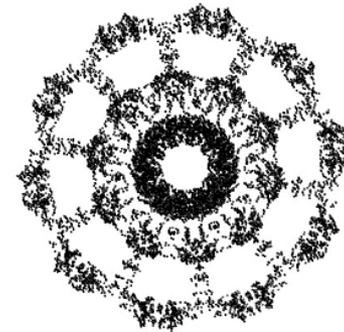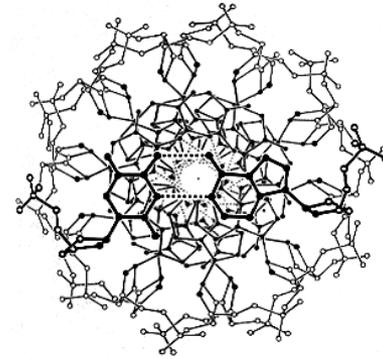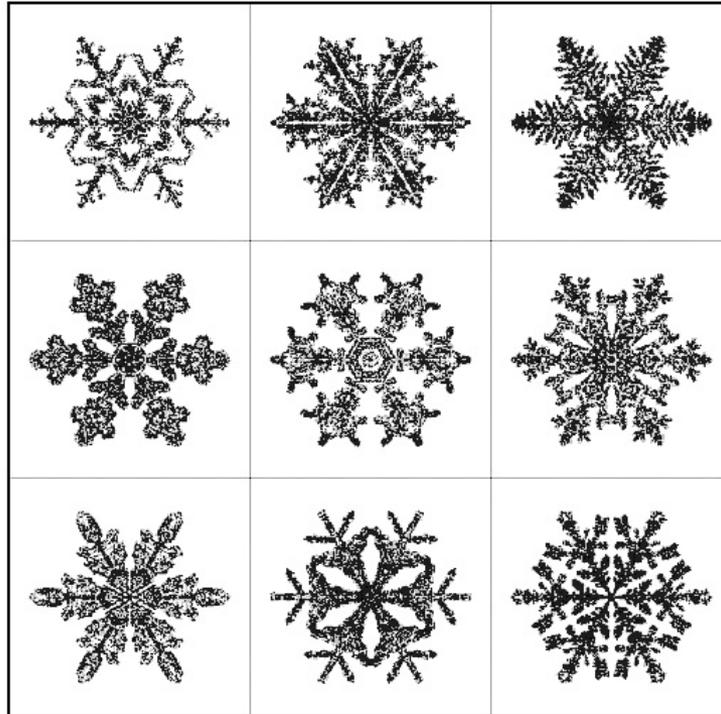
Designs in the bell
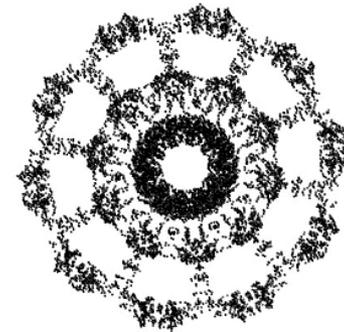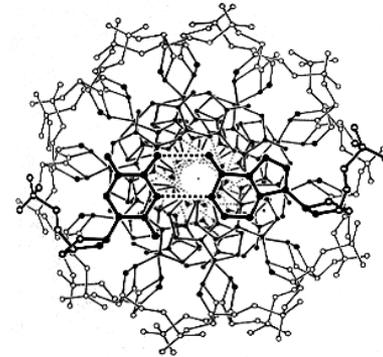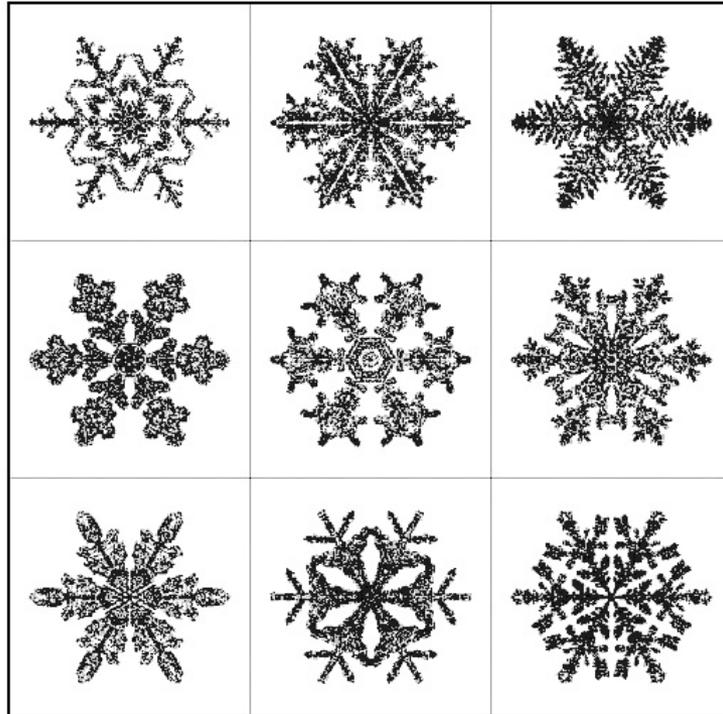
ice crystals in a Borgesian aleph **(!)**

Designs in the bell
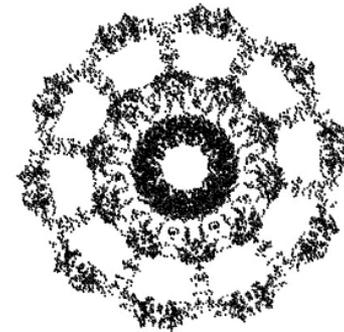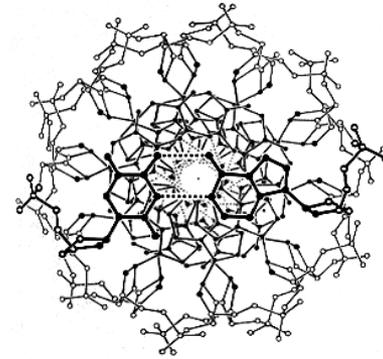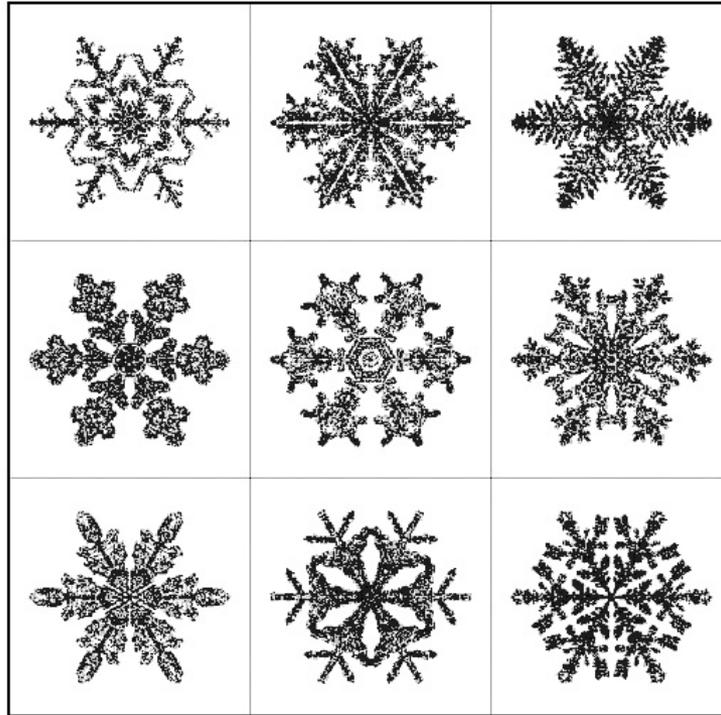
ice crystals in a Borgesian aleph (!)

the *DNA rosette* is coded by the binary expansion of π (!)

Beautiful perishable patterns
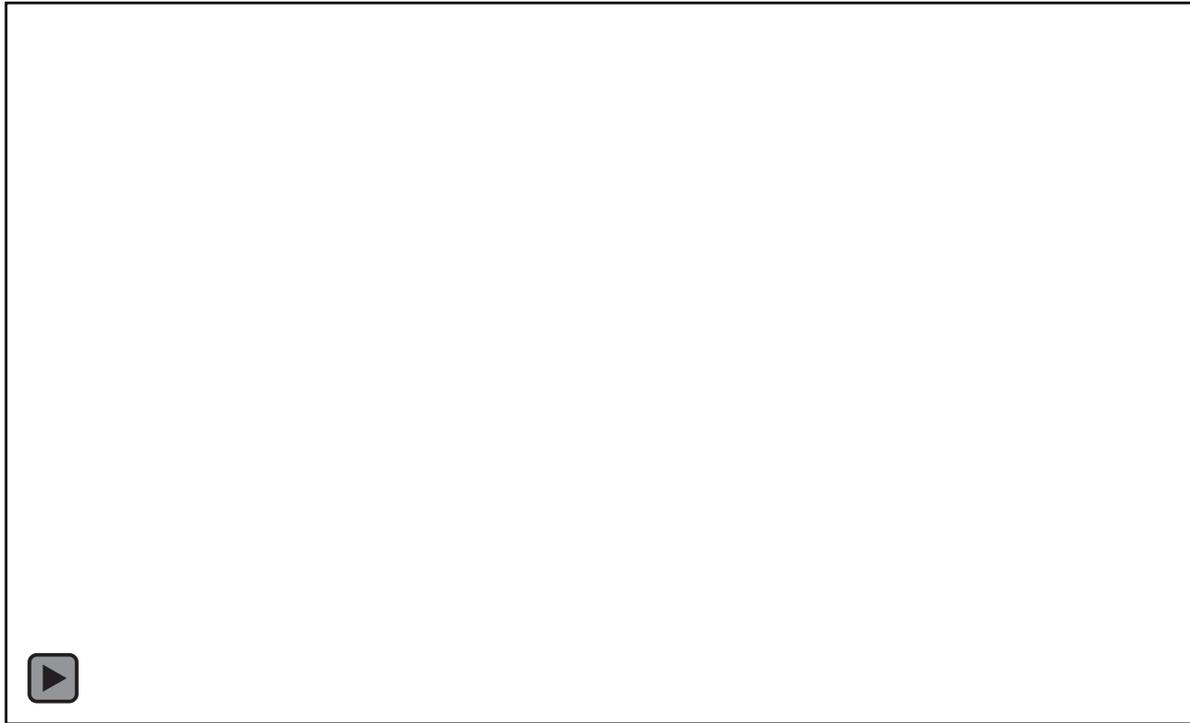
geometry: (0,0,0) (0.5,1,1) (1,3,0)

parameters: **radial** (- + + +) 0.99999999, **angular** 180 60 180 60

every 1,000 points until 100,000 bits of π

The amazing bell

(Puente, 2011)

By the mystery of science
graciously shines a state,
an all-embracing alliance
adding liberty a shape.

One day, as if by chance,
boldly there was such gem,
as the shadow off a wire
that fills completely space.

As the ideas hint above
enduring a lasting zest,
here is probable code
in the ever precious bell.

The bell peals silent, o o
reflecting its peace,
and inside it gathers
lovely masterpiece.

Symmetric pure beauty, o o
o mighty delight,
this limit in fullness
stores life's designs.

Such vessel contains, o o
alephs of all tastes,
diatoms and crystals
including DNA.

But there is a case, o o
reason to this song:
the forward selection
that raises it all.

There is clear choice
that rotates the 8,
**by loving sincerely
we surely converge.**

Notice this is cogent:
the bell's central theme,
**by living in freedom
one fulfills the dream.**

There is transformation
that kindles the heart,
**by loving in plenitude
we become smart.**

For love mends the spiky
and takes to the clouds,
**by living the present
one joins blessed crowd.**

O see, this is truthful:
the plus all the way,
by loving the enemy
we learn how to play.

Dimensional growth,
o essence of life,
by living in harmony
one nails normal plan.

O notice the symbols,
oh irrational might,
by loving simplicity
we experience the light.

O listen, you colleague,
let's go out the cave,
by living in unity
we shall all prevail.
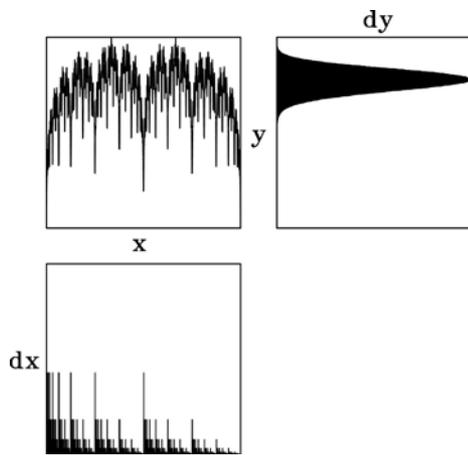
O notice, my friend,
the plea from a bell,
**by loving and loving
joy will have no end.**

**By loving and loving
joy will have no end...**

(September 2000/October 2003)
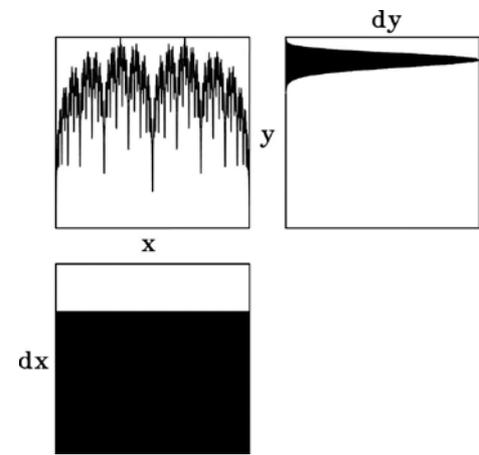
listen [here](#)

Our options

(Puente, 2011)

Our options

conduction   dissipation

infiniteness   finiteness

plenitude   solitude

trust   disbelief

Our options

conduction   dissipation

infiniteness   finiteness

plenitude   solitude

trust   disbelief

faith   *doubts*

freedom   *slavery*

one day at a time   *anxiety*

harmony   *intermittency*

Our options

conduction	dissipation
infiniteness	finiteness
plenitude	solitude
trust	disbelief
faith	doubts
freedom	slavery
one day at a time	anxiety
harmony	intermittency
light	darkness
heavenly	earthly
always +	a bit –
Love	else
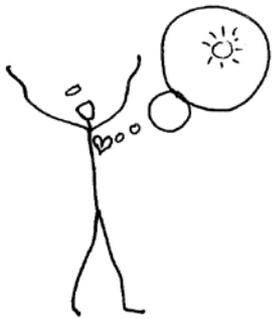
Other coincidences

Other coincidences

"**I am who am**"

"for **He** spoke, and it came to be, commanded, and it stood in place"

Other coincidences

"**I am who am**"

"for **He** spoke, and it came to be, commanded, and it stood in place"

"**God** sent his only **Son** so that we might have **life** through **him**"

"the glorious **freedom** of the **children of God**"

"all things work for **good** for those who **love God**"

Other coincidences

"**I am who am**"

"for **He** spoke, and it came to be, commanded, and it stood in place"

"**God** sent his only **Son** so that we might have **life** through **him**"

"the glorious **freedom** of the **children of God**"

"all things work for **good** for those who **love God**"

"there is no **salvation** through anyone else…"

"the dead in **Christ** will **rise** first … to meet the **Lord** in the air"

"if you do not believe that **I AM**, you will **die** on your **sins**"

Other coincidences

"**I am who am**"

"for **He** spoke, and it came to be, commanded, and it stood in place"

"**God** sent his only **Son** so that we might have **life** through **him**"

"the glorious **freedom** of the **children of God**"

"all things work for **good** for those who **love God**"

"there is no **salvation** through anyone else…"

"the dead in **Christ** will **rise** first … to meet the **Lord** in the air"

"if you do not believe that **I AM**, you will **die** on your **sins**"

"do not conform yourselves to this age but be **transformed**…"

"the **Lord** is the **Spirit**, and where the **Spirit** of the **Lord** is, there is **freedom**"

O **Lord**, "**increase our faith**"

…Well, here you continue realizing that the connections from science to faith are rather broad and very beautiful.

During our next encounter we shall go deeper into these notions by considering Holy Scripture.

Until next time…

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