Contributions to the Langlands Program

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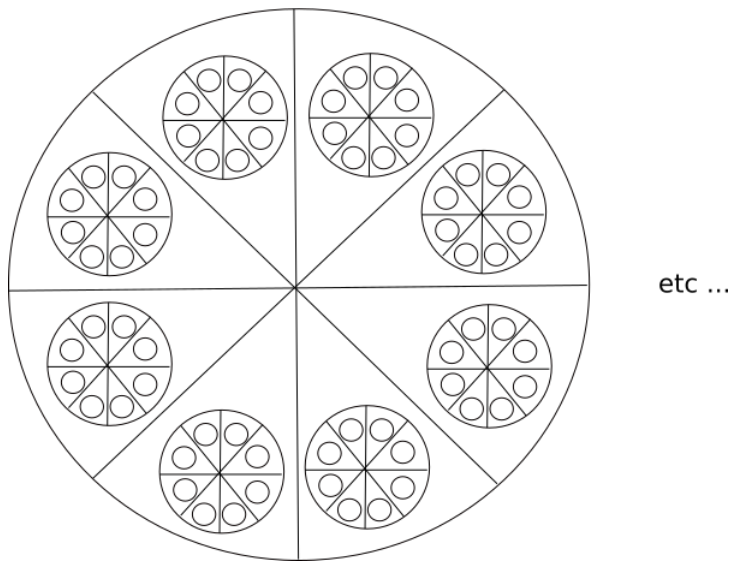March 2024

Abstract

This article is a contribution to the Langlands Program.

First step :

Construction of the **universe** with a **shape** feature.

<u>**Tool**</u> : We consider a **compass fractal** as :

Diagram : Compass fractal

etc ...

Remark : We can consider the number of trajectories for one compass as tending to infinity.

So a compass contains compasses, and each of these ones contains compasses etc...

With this process, we get a **n-dimensional universe**.
Since we want a **finite** universe (in the sense of defined, stable), the compass fractal has to be **finite** (has to stop).
But any interruption of the fractal, no matter how deep the fractal is, **biases** the model.

For a correct model, we add therefore what I call a **universal door** :
It is an object which is roughly a **total** and **attractive emptiness**, **localized**
but **without edges**.
The attraction induced by the universal door is a **consequence** of the
interruption of the fractal process (quantities to be **preserved**).

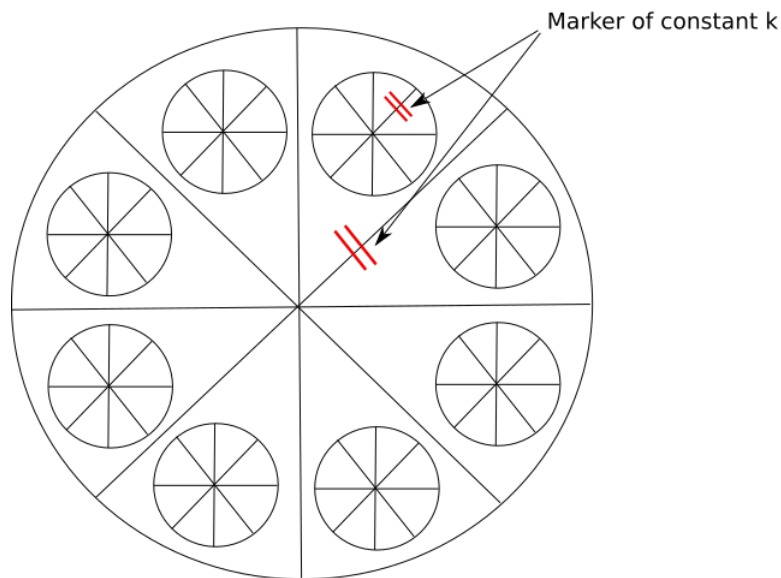The universe as described is going to be **specified** :
If we come back to the very beginning (before the run of the compass fractal),
We apply now a **constant k** that will be :
⇒ At the **junction** of a (unique) trajectory (**always the same** through
fractal), we add a **Marker**.

Remark : A constant (**value**) is good because it is the **simplest** and basic
thing.

Diagram : constant k

Marker of constant k

If we run/process with the constant k,
we now can delimit a **sub-space of the universe**.

Remark : We consider the sub-space as a **j-dimensional ink
shape/bubble** in a n-dimensional universe (fractal) with $j \prec n$.
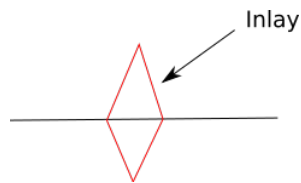It is good to see this sub-space with a **color** different from the rest of the
universe (better for what comes after).
(Like an **ink veil in water**).

Second step :

At the step 2, we **plunge** an **object** in the universe.
The object is there a **support**, and as explained before, it will be **attracted** toward the universal door.

The main idea is the concept of **Inlay**.
Roughly an Inlay can be see like :

The Inlay is a kind of **anchor**. In our model/universe, to go against the attraction of the universal door ⇒ The object has to have an Inlay (**of equal quantity with the one of attraction**).

Diagram : Universe
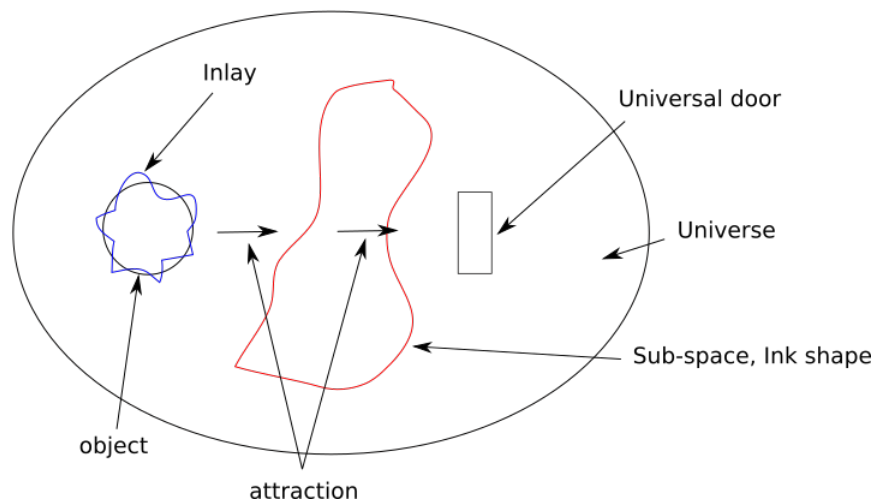
Third step :

At the step 3, it will be the step of the Inlaying of the object.
How? : Our compass had been "**unwound**",
Now we **rewind it** ≡ It will be the compass fractal **reversed**.

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Analogy : If the "**normal**" compass fractal runs pi starting from 3 and going to all its other digits,
The **reversed** compass fractal do the **opposite**
≡ (pi) from its last digits (pi is indeed well reproduced thanks to the universal door as a **balance**) toward 3.

The compass, with reversed fractal process, is getting more and more **roughness**/**rough spots** (analogy of an abstract phenomenon) ≡ We have more and more **distance** between the possibles trajectories.
At a point, the change of trajectory will reach a **threshold** corresponding to the **Inlaying**.

Remark : We can associate the object with the compass (≡ **See the object as the compass**) since we are **centered** on the object.

If the initial state is that : from object to door, there is a **negative** field (attraction);
Then the rewind of the compass corresponds to an **operation** + with this + having **a higher and higher value**.

During the rewind, object and universal door are getting closer until they **overlap** ≡ from [(compass), (door)]
to the **tuple** [(compass, door)]
With/Then the Inlaying.

Second to last + ≡ Second to last variation of trajectory ≡ total/**full overlap**
Last + ≡ Last variation of trajectory ≡ **Inlaying**

The **final object** is : object + its inlaying.

Fourth step :

Now we have to understand *what is inlaid*.
During the rewind of compass (reversed fractal),
There is formation of what I call **laces pattern**.
What happens in the last +, is no more no less than **the Inlaying of the laces pattern**.

The **laces pattern is** the **folding** of the **sub-space** Ink bubble coming from the **constant k** during the **process reversed compass fractal** until **Inlaying**.
The laces pattern is (created by) the **iterative process** of reversed compass fractal.

(**Note** : The Inlaid laces pattern is probably **closed** (because the object was **completely** plunged into the universe).)

Remark/Thought : The reversed compass fractal is a kind of **continuity breaking** (Inlaying) by/using a process that is **almost continuous** (variation of trajectories **tending to infinity**).

The Inlaying according to this model gives a structure no more spacial but **numerical**.

Remark : I want to insist on the role of universal door as **stabilizing** element.

Fifth step :

Now, we are going to go further for one thing, namely this door :
The **door** can also be **Inlaid**. It is allowed because its function/role of attractive emptiness stabilizing our universe is **preserved**.

A Not Inlaid door can be seen as an **Uncountable infinity**.
A Inlaid door can be seen as a **Countable infinity**.
The infinity is preserved in **both** $\Rightarrow$ Inlaid door allowed.

Condition : The door has to be **already** Inlaid (or not) in the universe
$\equiv$ **No** personal/**unique Inlaying** of the door.
Why? Because the Inlaying of an object such the door implies to give it edges, which imply the spending/**consumption** of the **whole space** $\equiv$ If we make the Inlaying off the door alone, there would be **no more space** but the Inlaid door **alone** (with edges).

So we have **2 types** of laces pattern (But one type has **plenty of forms**) :

Simple type : Inlaid door; **few iterations** of reversed compass fractal.
Inlaying $\equiv$ Door already inlaid, object Inlaid

AND

Complex type : Not Inlaid door $\Rightarrow$ The Inlaying is **mixed** : object and the door; **lots of iterations**.
Inlaying $\equiv$ Door **AND** object **at the same time**.

End :

If the constant k is an **integer**, and the Universe and its door is **exclusively** a **real number** (pi for instance),
I think to understand that by going back as I have explained on the object (Inlaying), we go back in a way to **integer-like values** (sorry for the vague) $\equiv$ We **force** the system to give a traduction of the real (number) concept on a plane **mapped** by a $\approx$ algebraic pattern (laces pattern).
Also, I say real but with my concept of Inlaid door (Countable infinity), I can also make the **Rationals appear**.

Maybe can we see the final object as mapped by **tiles** with **possibles** and **finites states** (it would be the **degree of freedom** of these tiles) given by the **value** (**form**) of the laces pattern (via (maybe again) a **simple decomposition** of the laces pattern ≡ its **characteristic**).

As said, I have tried to associate a geometry (spatial) with an algebraic expression (≡ final laces pattern on the object).

I am sorry being unable to work more on the quantitative and qualitative analysis part.
But I hope to have clarify some things.
This study wasn't led with a specific problem in mind,
but only with the aim to make geometry and arithmetic closer.
In this sense, I would say this article is close to the Langlands Program.