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1

I begin by thanking APOLa International, especially the Board of Directors; also the members and adherents; those present, Julian: thank you. This research work integrates the one presented last November 21 (also in APOLa International). I will talk about Lacan's theory from his mathematics, trying to dissipate a little the philosophical and experiential fog that surrounds the psychoanalysis of mathematics; I will do it in a rudimentary way to put into play the articulations it presents, which is not only philosophical or products of inferential methods (such as deduction, induction, abduction and analogy), but refers from its structure and as such, to the most elementary and fundamental structure of physics, as well as to the emergent structure of the same discipline.

For the most anxious, in the horizon of subjectivity of this encounter as much as of the epoch, we can place Maldacena's conjecture, as much as the operativity of Lacan's paternal metaphor.

2

3

Menu: An **introduction** to highlight the conception of the word as a mathematical object, examined through the concepts of function and field; a **methodology** linked to the research process we are supposed to exercise for, also, these presentations; a **material basis** where the mathematical function of the word and language is deployed, establishing a simile with the articulation of classical mechanics with quantum mechanics; a specific **method** for our psychoanalytic technique; a **psychoanalytic clinic**, differentiated from the methodology of thought and derived from the psychoanalytic method as practice in the consulting room, that is: clinic of the mathematicians;

and, finally, by way of anticipation for those who wish to follow directly or indirectly what I propose from the mathematics, a specific **mechanics of the word** as a mathematical conjecture for the psychoanalytic field-not directly attributable to Lacan, but emerging from his theory-a proposal that constitutes my personal approach to a mechanics of the word.

4 Introduction

> "I beg you to consider that consciousness is something that is produced whenever we have - and this happens in the most unexpected and most distant places from each other - a surface such that it can produce what we call *an image*." Seminar 2, *The Ego in Freud's Theory*, p. 80, December 8, 1954, Paidós.
>
> "Who but us will ever again call into question the objective status of that "I" ["je" in Rimbaud's phrase], which a historical evolution peculiar to our culture tends to confuse with the subject?" Lacan, Jacques. Writings, "Aggressiveness in Psychoanalysis", p. 110, Paidós.

5

I am trying to make evident the mathematical function that operates in the phenomena of consciousness: we speak through words that point to meanings, meanings that are, in turn, words; consequently, words relate to each other: words to words, I emphasize. The point of departure is the imaginary register, from which words are uttered with a point of arrival at the symbolic register which, likewise, are words. With a fundamental precision: sovereignty does not reside in the particular saying of each one, but the saying of

each one constitutes an image of the words that pre-exist in the symbolic register for such expressiveness.

The diagram illustrates the functional relationship between domains and images by means of two pairs of sets. In the first pair, depicted on the left, a set labeled "0" constituting the domain is connected by a function to another set labeled "1" representing the image. In the second pair, on the right, this relationship is reversed: the set labeled "0" now functions as the image while the set labeled "A" operates as the domain. Both sets of the second pair contain "words", connected by a bidirectional function represented by a red arrow, evidencing the reciprocity in the relationship between these elements.

The symbols 0 and 1 have a fundamental significance (see Möebius band) in both classical information theory and quantum information. In classical information, they form the basis of the binary system, where each bit can assume only one of these two values, allowing the encoding of all digital information. In quantum information, these same symbols acquire an additional dimension by representing the base states of a qubit, but with the particularity of being able to exist simultaneously in superpositions of both states, transcending classical binary logic.

6

"The unconscious completely **escapes the circle of certainties** through which man recognizes himself as **I (je)**. It is outside this field that something exists which has every right to express itself as *I (heh),* and which demonstrates this right in the circumstance of seeing the light by expressing itself as *I (heh).* What in analysis comes to be formulated as, properly speaking, the *I (heh),* is precisely what is most unknown to the field of the I." Seminar 2, p. 18.

Click on "I is another": the sentence is raised.

Click on "I is another": dissolves the quotation.

Click on the slide number: 6. Function appears.

We recover, then, the function "It is", determined by speaking from the "other", in principle, as similar; not to mention that it is only by immediacy, as it is a subset of the Other as battery which, in turn, is a subset of the Autre as treasure.
Can you see what I am saying? A book before one, an audience before one, is reflection and thought, of the other as similar, but as a subset of the Other as a battery and the latter as a subset of the Autre as treasure.
For this reason, Lacan very well maintains that we always... almost always talk to ourselves.

Click on the slide number: 6. Concave mirror appears.

Up to there, before the concave mirror "the unconscious escapes completely..." according to the recent quote.
I don't know if you notice that, although we are approaching mathematics, it is not without Lacan; in fact, a simple mathematical function is nothing other than the optical model. And, if you remember, in previous slides I played with the names of the sets, with 0 and 1, apparently to come up with a bijective interterritoriality (that is, not only us resorting to mathematics, but also appealing to the summons of mathematicians and physicists to help us unravel what they deal with, which Lacan uses in his theory), but also to situate on both sides of a single face, of the Möebius band, the 0 and the 1; starting point of the division that makes it possible to immediately situate the demand from the 1.

Click on the slide number: 6. Observer appears (eye).

It means, in many ways, that eye that, not only we speak alone, but what we see and say has to do with us: that is why we reflect. I use reflection instead of thought, to play with the reflection that mirrors make possible.

In addition, I am beginning to differentiate reading from writing, for the first time since mathematics (I'm in charge).
To reduce confusion, given that we have in front of the eye, our saying, in this case, "I is another", let's go on to utter it: placing in it, a mouth.

Click on the slide number: 6. The talker (mouth) appears.

A mouth that, besides reflecting, has the property of counting; it is true that it narrates, but it also counts. Accounts that count with greater scope than what is possible to see, as much as what is possible to think or reflect: it enables the operations of calculations.
And if it is a question of calculating, it is possible to situate the very hidden virtual subject (SV) of Lacan's optical model.

So, with the mouth and with the VS, we solve a problem of thinking: given the early development of the visual system (cranial pair), the ability to see becomes more important than motor skills (operations). It means that, before we can manipulate or master an object, we already form a mental image of it. This image, created by vision, becomes our main reference. Over time, this identifying image ends up dominating our perception of the object, i.e., our understanding of the world is based more on what we see and think, rather than on what it is possible to estimate, calculate.

This image, created by sight, becomes our main guide. Over time, this image ends up being more important than the object itself, because we become "hooked" to it: our way of understanding the world is then based more on what we see.

7 We have here, the original function and the inversion of the function, with the names referred to, for the Möebius band, 0 and 1, as well as for the model

optic, although the 0 would occupy in several ways the that formalizes the division required for there to be two: a domain and a function.

In addition, by holding 0 and 1, we can better appreciate why 2 "rejoices". of being odd", for occupying a third place, although all three are determined by the fourth, which starts from the indeterminations of the SV.

8 Read slide.

9 Where the SV (virtual subject) begins, the drama of the limit begins: drama, for establishing a limit to the inferential methods of thought in order to transit its necessary continuity, but also drama for reaching the discrete in the key of surprise.

Read slide.

And add: (after reading the table of the infinite geometric series), and in the sequence on the right, no term is zero although the values tend to zero, target, goal and approximation value. Note that when it tends to very large numbers, the function approaches zero; and, when it tends to zero, when the numbers are very small, it tends to infinity.

Here I mention, as if in passing, the curves of Lacan's Scheme I: on the left, almost an exponential curve and on the right of the identity function, a logarithmic curve. That is to say: thought by continuous and infinite, at most reaches 1 (in neurosis, infinite in psychosis) and on the other side of the identity function, or on the side of the Other, the function is logarithmic, something that produces the possibility of learning with minimum efforts when one approaches new subjects but, upon reaching the limit, with maximum efforts very little is achieved in terms of knowledge. That is why Planck, on October 9, 1900, staged the limit of the continuum with his crossed out h.

10 By way of digression, before ending the Introduction, a point to bear in mind that arose in Flavia Dutrá's presentation on theory and technique. It is very dense slide but as a contribution to settle something that is often recurrent. Read slide.

I can say that they have an inseparable coexistence.

1. **When solving**: When I clear x in y = 2x to obtain x = y/2, I apply technique (algebraic procedure) guided by theory (properties of equalities).
2. **When plotting**: When I plot the function on a Cartesian plane, the technique (plotting points) materializes the theory (linear behavior).
3. **When interpreting**: Slope 2 is a theoretical concept that translates technically into "for every unit we advance in x, we go up 2 in y".

Theory provides the "why" (the function is linear because it satisfies f(x+y) = f(x)+f(y)), while technique provides the "how" (to graph it, I calculate points and connect them). Both dimensions, although distinct, operate simultaneously in mathematical work. That is why Lacan proposed his mathematics: it not only has theoretical rigor but accompanies it with technical rigor.

It is essential to take into account, in order to be at the height of the horizon of subjectivity, that Lacan's signifier not only does not signify anything, but also does not signify anything, always: until it is observed. This is Lacan's way of introducing a variable that takes into account the indeterminacies demanded by Heisenberg's formulations since 1927.

11 briefly, Kafka's fifth postulate to sketch a possible articulation at the limit, with the defense.

One more element, because this limit point allows us to differentiate something discussed in previous presentations: when Alfredo mentions "configuration" without a material basis, he is referring (we will see) to the concept of classical entropy, the

elements that reach almost to the limit, that which in the geometric series makes it possible to reach, when adding them, the 1. One interlocutor stated very well that the base is infrastructural for Marx's terms, where the economy determines the structure.

Now, if we take into account the limit (it is after Marx, 1900, when Marx published his first volume of Capital in 1867), it is necessary to take from the limit (where Lacan places, beyond, his signifier) the macroeconomic variables to take note of the political notions: liberalism, Marxism and Peronism, discuss labor organizing their theoretical bodies from macroeconomics, (as an example) the international interest rate and the international inflation rate. The Austrian school with its two strands, social democracy and neoliberalism, being globalist, is disinterested in macroeconomics. Taking into account that left, right, its ultras, do not reach to describe the current changes, which are reorganizing the world from work, as nationalism (no longer as globalism).

12 **Methodology**

13 Read slide.

14 Read slide.

15 read slide.

16 this "diagram of components of the research process" schematizes the differentiation of the scientific research process. We have

three major components: Object or Product, which refers to what is investigated as a starting point and what is obtained as a result, including theories, hypotheses in charge of explaining facts, etc. In this element the specific is the scientific explanation that implies providing knowledge about the functioning of the object of study. Course of action or method, refers to the actions oriented to achieve the previous element (Object or Product). And finally, the means or conditions of realization: technical means and institutional contexts. Three inseparable dimensions that refer to science conceived as a process.

17 Comment on whether I worked on theory and technique or take advantage to work on the distinction in this slide: Politics is economics; it happens that people still confuse economics with microeconomics (the one they have at hand or in their pockets; politics is macroeconomics: it makes it possible to define the limits between liberalism, Marxism, Peronism, anarcho-capitalism. And fundamentally, what is happening today: a nationalist paradigm began against the perished globalism whose legality was the free market and now it is protectionist, because nationalist and industrialist.

18 in this element I want to highlight the limit of scientific thought that is based on natural language with philosophical foundations without mathematics. For the first element, the sub-elements theory and facts, he expresses that there is an irreducibility and inseparability between theoretical language and the language of sensory data; it is a coming and going between experience and theory (here the limit is clear, because theory, we shall see, coincides with technique and precedes experience from mathematics). Regarding the second element, it presents a structural duality: procedures to produce new knowledge but also procedures that demonstrate the validity of established knowledge. Regarding the third element, it establishes a mutual determination between technical conditions and institutional conditions.

19 Read slide.

20 Read slide.

21 Read slide.

22 Read slide.

23 Read slide.

24 Base material

25 Read slide.

26 Read slide.

27 Read slide.

28 Read slide.

29 Read slide.

"It is fundamental law (invariant transformation principle) that dictates how mass and energy are exchanged without altering the total amount of a property called 'energy-momentum' (relativistic invariant). The 'total value' is conserved in all reference frames (special relativity). Mass can become kinetic energy, photons, heat... and vice versa. In a nuclear reactor, the mass lost in fission does not disappear: it is transformed into thermal energy (and the total balance satisfies Eantes = Edespués).

A profound observation: physical 'nothingness' is the quantum vacuum, a dynamic field where virtual particles constantly appear and disappear (e.g. Casimir effect). Fundamental fields (electromagnetic, Higgs) allow the 'nothing' to lend energy to create. A high energy photon (γ) can become an electron-positron pair (e-, e+) near an atomic nucleus (which absorbs recoil to conserve momentum). Creation out of nothing? No: The photon energy pre-existed, and the nucleus 'guarantees' that momentum is conserved.

The 'nothingness' of common sense (total absence of everything, static, passive) contrasts with quantum 'nothingness' (vacuum): state of minimum energy, but full of fluctuating quantum fields and virtual particle-antiparticle pairs."

30 Read slide.

31 Read slide.

32 Read slide.

33 Read slide.

34 Read slide.

35 Read slide.

36 Read slide.

37 **method**

38 Read slide.

39 **clinic**

40 In the context of psychoanalysis (of mathematics), the term "clinic" refers to the set of theoretical and practical devices that make it possible to read, intervene and produce subject effects based on the word as a mathematical object.

Lacan provides a precise distinction if we apply the concepts of mathematical model and (mathematical) conjecture.

what would a mathematical model be in the clinic?

A formalization that proves to be operational and coherent and is expressed in a language like that of mathematics: it has definitions, operators and structural prediction.

Like the formulas for hysteria and obsessional neurosis, which I will discuss in future presentations, after a period of time so that they can work on the

notions so far poured by me; they have a clinical use of diagnosis, orientation and position of the psychoanalyst.

Briefly, the model of hysteria situates its letters a and A in a certain uncertainty with its desire that is located at the level of the Other, which regulates the center of gravity of a, so that the Other is not law but desire, so as not to give place to the signifier of the law to organize desire, operating desire on the imaginary plane from the a of the formula of the phantasm. Or in the model of obsessional neurosis, trying to annul the desire of the Other by denial of such desire (relating to something like a forbidden desire); unlike the hysterical discourse that finds the point of support of its desire in the identification with the imaginary other (that is why it would be a dialogue between "a" and "a"), in the obsessional discourse it tries to reduce the A (capital letters) of the Other to lowercase "a".

what would be a mathematical conjecture in the clinic?

A formal proposition that has not yet been fully demonstrated, nor deployed in all its effects, although technically effective: like the paternal metaphor, for us; it has as a clinical use to measure the effectiveness of interpretation (alienation and separation) as a theoretical exploration.

41 for this, the previous slides, trying to highlight the differentiation of the material basis as information and, in coming up with such a notion, to distinguish between classical information (Shannon) with the notion of indeterminate or quantum information (Von Neumann and others).

See if you have time to read this:

1. Bit as data vs. Bit as information

- Bit as data: It is the basic storage unit in classical systems, represented as 0 or 1. It is static and has no meaning by itself.
- Bit as information: It is the meaning or semantic value associated with the bit. It depends on the context and how it is processed or interpreted.

2. Classical Information Theory (Shannon)

- Bit as data: It focuses on the transmission and storage of bits, without considering their meaning.
- Bit as information: Information is measured in terms of uncertainty reduction (entropy). Uncertainty is probabilistic (example: flipping a coin).
- Relation to uncertainty: Uncertainty is quantifiable and is reduced by receiving information.

4. Quantum Information Theory

- Bit as data: It is generalized to the qubit, which can be in superposition of states (0 and 1 simultaneously).
- Bit as information: Quantum information includes properties such as entanglement and superposition, allowing information to be processed more powerfully than in classical systems.
-Relationship with uncertainty: Uncertainty is inherent to quantum measurement (Heisenberg's uncertainty principle). It is not only probabilistic, but also depends on the observer and the (quantum) state.

42 mechanics of the word

43 With a certain humility, I am gradually deciphering Lacan's arguments according to the relations that arise from physics and not the arguments that are obtained from the authors of thought, nor from philosophy. It is then possible to measure with the theory of mathematics, to measure the limit reached by the authors referred to by Lacan (for not having counted on the signifier he proposed, to take note of the indeterminacies that they operationalize from the discourse, the structure, when speaking.

44 Naming the horizon of subjectivity by showing the slide.

45 read slide.

46 thank you.