Mathematical Modeling of a Proposed Way of Looking at Cerebral Transmission of Information Part II

Luis A Pando-Orellana*

Department of Clinical Research, CPALC, Mexico

*Corresponding Author: Luis A Pando-Orellana, Department of Clinical Research, CPALC, Mexico.

Abstract

The idea of developing mathematical models [1] or its basic principles and proposition of a mathematical language of superior brain functions and its connections, expresses the need of transdisciplinary research in health sciences particularly physical concepts and laws and its mathematical presumptions.

Furthermore, the possibility of integrating superior brain functions within mathematical models that might predict comparative neuropsychiatric tendencies.

The question is how does several theories apply to the brain, such as the laws of thermodynamics, the relativity theory and Space, time and structure revision, applied to the brain.

As such vectorial fields, tetradimensional conception of neurons and its vectorial and counter- vectorial forces. This is an introductory thesis that follows a first approach [1].

There is very little bibliography and it is referred to neural networks with the application of logical mathematics and lineal Algebra to the subject and of course a complex one.

This models have been applied to the economical field with success for example in the game theory [2].

Keywords: Higher Cortical Functions; Mathematical Model; Neurons; Space-Time-Structure; Vectors; TENSORS

Introduction

Mathematical models of brain functions [1-14] serve the purpose of being able to conceive reality based on neurophysiological and neurochemical and neuroelctrophysical concepts in order to determine the feasibility of imagination through inter-discipline, particularly in the context of physics (space, time and structure) [4] and mathematics (derivation, partial derivates and numerical integration) applied to medicine and biology (Figure 5). Macrocosmos has been revolutionized by means of relativity theory: microcosmos has also found a way to apply such concepts and has "trapped the soul" through the understanding and partially solving of the transference of energy within the context of brain synapsis and integration of information as it is stated in the present article. Three main premises are sustained in this proposition of theoretical medicine:

1. The principle of convergence/divergence flow of information through the brain [1-4] (Figure 3).

2. The proposition of the existence of proteins (Figure 9) that specifically modify permeability of membranes in front of stimuli; determining a net of associated thresholds that create through geodesic structures and holographic images for any kind of cortical functions including affection (Figure 1-9).

3. Transformation by means of a flow of energy through affinity and parallel shift of tensor (electromagnetical) fields in a tetradimensional cortex and the application of first thermodynamical law [1-6].

Mathematical premises

We contemplate a 64-dimensional continuum in which the transference of information has to reach adjacent structures we will name (I, II, III... within a function that tends to $\to\infty$).

We will represent Xk as continuous and differential functions with k as a constant and X that represents numbers or group of numbers that have meaning in the process of uniting elements.

We have to save the individuality of each linkage in the conduction of information but a property must remain stable: this property must be referred as quantic information (packs of energy or energy (thermodynamical law of conservation of energy). packs that will be expressed through a number and will be addressed as invariant or scalar.

So, we are talking about a field of invariability in continuous transformation expressed as (Pi)(Xk).

dPi/dXk/Pi meaning any set or system gives us the increment of (Pi), when proceeding from one stage to another.

This partial derivatives give a gradient to Pi and its given by a group of numbers called covariant vectorial field with a counterpart represented by Bk.

dXk: Based on Pi.

X = 3.14, 3.1416, 3.141618, ->n...F-> ∞ or (geodesical that opens the vectorial field in a circle around polygonal axonal structures).

Figure 1: Various patterns neurons and axons, tending to form the circle in various polygonal shapes.

K = E = mc^2 or per neuron total energy (E)^2 = [(1.00794u)H(1800 cm^3)(3.3 x 10^{10} cm/seg^2)]^2 = ...

With a momentum (p) = mv; p = [(1.00794)(1850 cm^3) or(value of post-synaptic excitatory or inhibitory in μv)^2 = ...

X = Variable

K = Constant value

P = Moment of the object (neuron)

E = Energy

E^2 = Total energy of the object (neuron)

H = Hydrogen proton

V = Volume

U = Mass (which in a proton is equivalent to its atomical weight)

m = mass cerebral

∞ or = Infinite.

Bk develops in the same manner but in a negative sense both fluctuating as the hypercube (Figure 2) does in this quantic energy fields.

Tensors can be added or subtracted in the 64 tensors, with a continuum given by the above X and K values for each set of numbers of Pi. as it travels within each value of Pi within a circle around polygonal distribution of axons. They can be added, subtracted or even disappear but respecting the values of conservation of energy that are seen in cerebral mapping. And we can even recognize a tensor cero.

There can be association of vectors in parallel displacement represented by Tau letter that are displaced in any given tensor density of the same gender, signifying that x values may variate and include specific similar or extended values of Pi.

The question of integrability

It is the result of transferring Xk from status Q to status R. If the conexion has affinity (Considering the Game theory (2)), it will be integrable or not in a certain region depending on the extinction of a tensor of curvature denominated curvature tensor of Riemann-Christoffer [1-14].

So, in a neuron we have 64 vectorial fields or tensors charged electromagnetically within 4 dimensions in which we would have to calculate the T variable.

Within each step from dXK in the stage P to the P´ we have to consider the law of conservation of energy (Thermodynamical laws applied) (Figure 6).

With this approach it is obtained a polygonal structure within the limits of true infinitesimal values that can be considered also in negative values (-dXk) (Figure 6).

If we transfer a counter variant vector indicating the direction of the curve within any given point we will obtain the vector direction from P to P" [1] (Figure 1-6).

Our construction offers a standard of comparison with each step of the way in the different sections of the curve (from polygonal, tending to be a circle).

Such curve is organized from ∞64 sides of the hypercube that we reduce to 6 for didactic purposes. For Function tending to infinite in ∞4 dimensions. That covers a neighboring finite area starting from a specific point with only one curve connecting P to P´ [1-6] (Figure 1-9).

So, using a vision model, with emotional components (Figure 1-8) and magnifying the process through geodesical formations (Figure 1-9) in 4D (Figure 2).
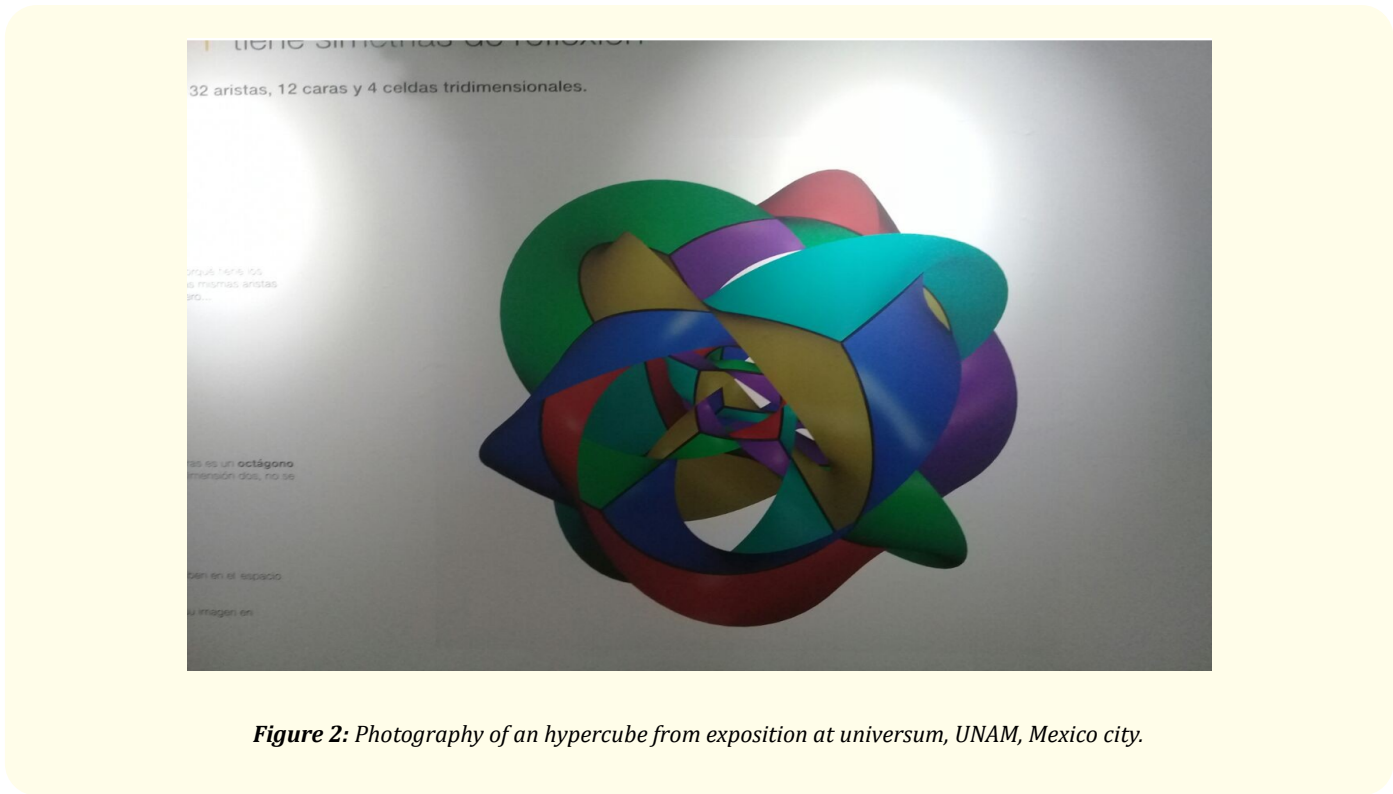

Figure 2: Photography of an hypercube from exposition at universum, UNAM, Mexico city.

In this manner we obtain a polygonal limit of the true infinitesimals that can be followed inversely (-Bk or Bk).

All this happens through microtubules with signals detected from the outside and the inside of light reflected in objects and persons and low energy radiation from the nuclei [6].

Reflected likewise to other neurons, recluted by means of neuroregulatory [1-6] (Figure 4-10) form networks in the fourth dimension In A Convergent-Divergent (Figure 3).

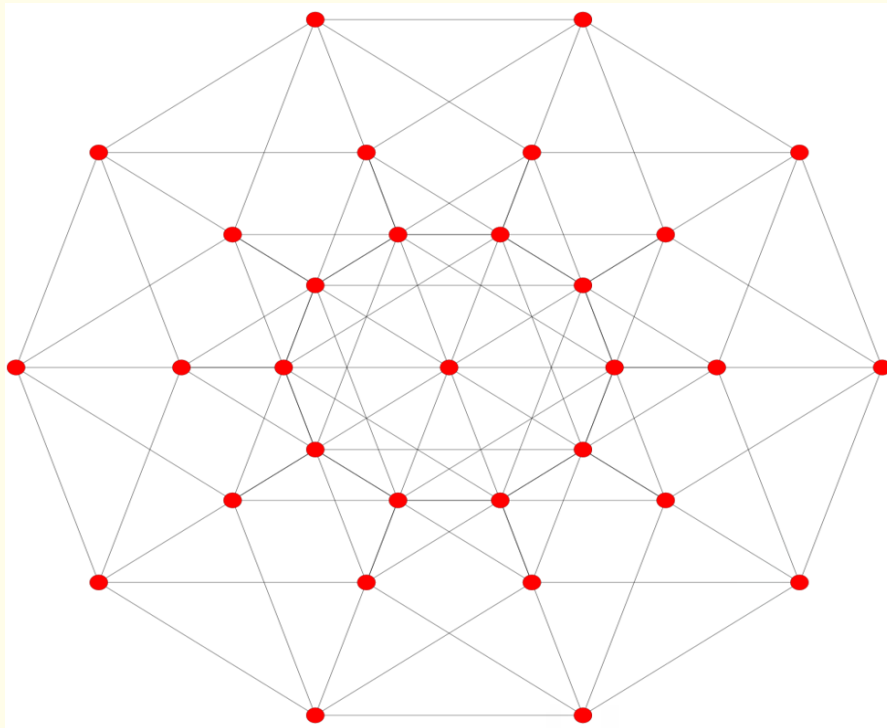***Figure 3:*** *Disposition of pyramidal neurons in a convergence divergence patterns (Courtesy of Pando., et al. Lab).*

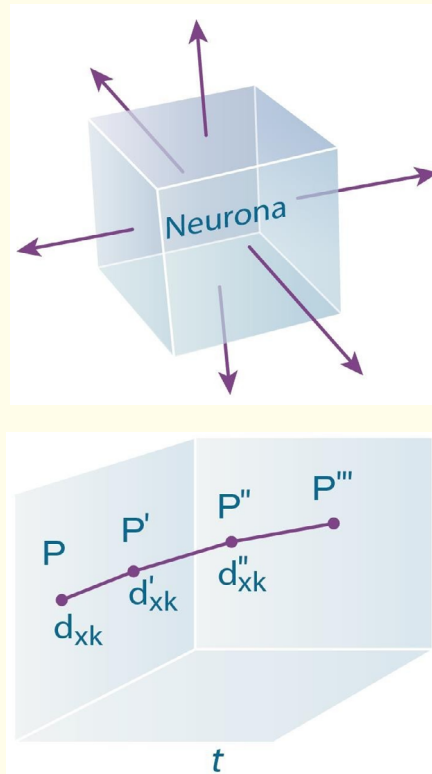***Figure 4:*** *Geodesical disposition of connections.*

Figure 5: *Derivatives, packs of energy. Derivatives within time Derivation of packs of information from one point P to P´ For didactic purposes we work with a cube.*
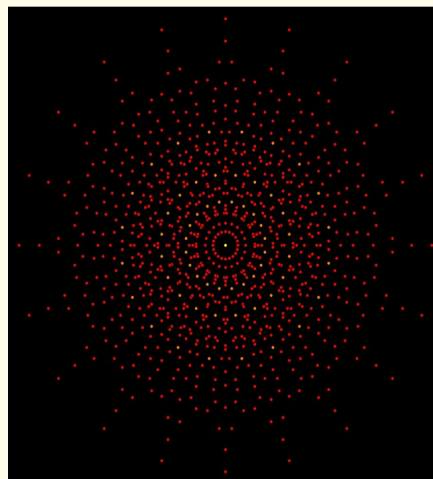

Figure 6: *A more advanced stage of polygonal movement tending to be a dynamic circle). Public. Structure connections and the process of holograms.*
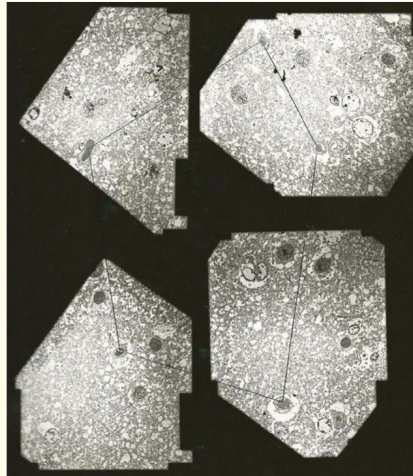
Figure 7: Electron microscopic image of polygonal disposition of axons (Pando., et al.).
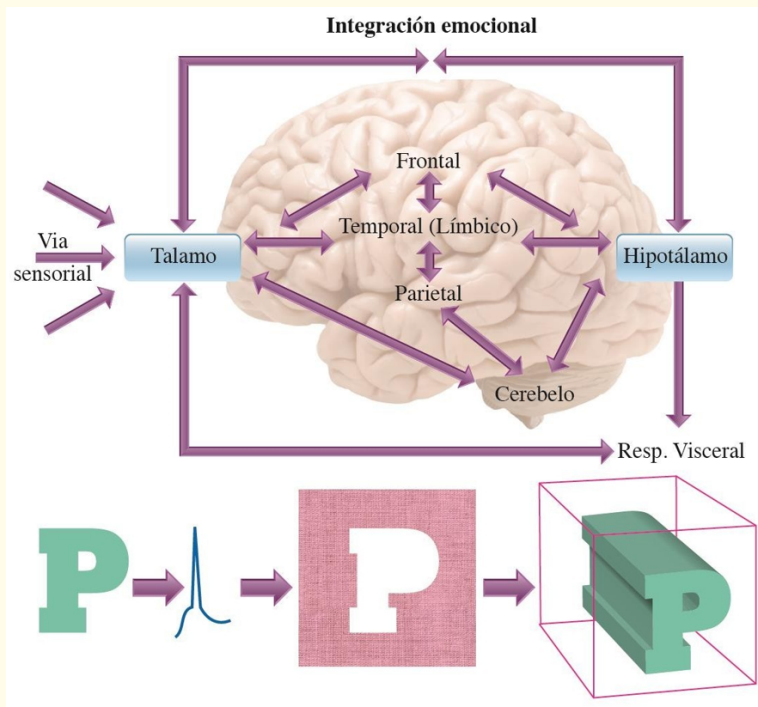

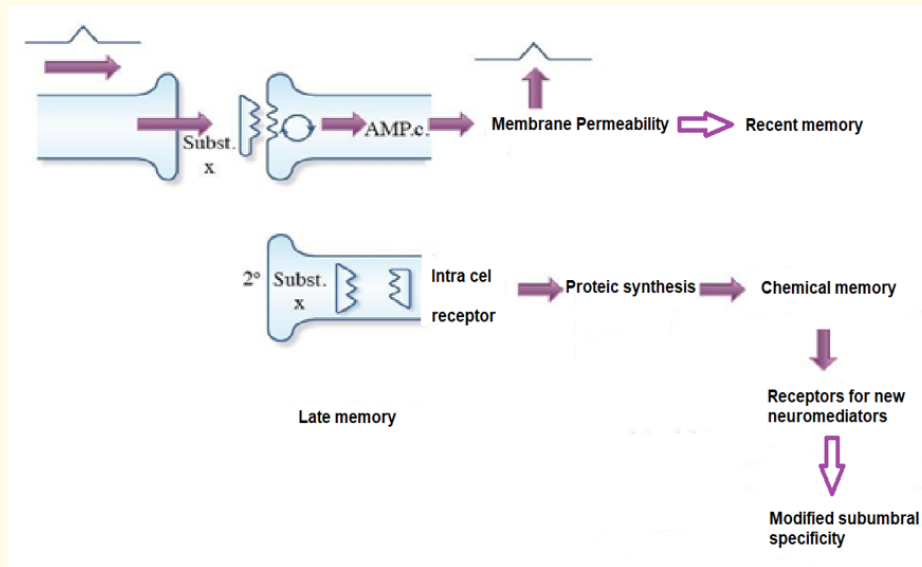*Figure 8: Algorithm from cell to hologram.*

Figure 9: *Biochemical amplification, suppression, memories.*

Conclusion

This is a second step in the approach to integrability based on mathematical expressions [1-6], that try to understand not only the question of integrability in the process. The signaling of cells that have a structural, geometrical, biophysical, space and time considerations, that give way to new hypothesis of how complex interactions are, from the intracell neurofilaments, to geometrical disposition of neural layers and recruitment from outer and inner signaling in different frecuencies [6] that very much refer to the clinical bands we study in neurophysiological discipline.

The modeling of such hypothesis must and can be made in computers for each instance and then try to unite them to obtain an integral view of how information travels and structure itself in human brain cortex (Figure 1-9).

Bibliography

1. Pando L., et al. "Modelo matemático de la relación functional neuronal basado en microestructura". *Revista Mexicana de Neurociencia* 17.3 (2016): 3-16.

2. Pando L. "Teoría del Juego". *Revista Mexicana de Neurociencia* 18.2 (2017): 137-140.

3. Wada J. "Kindling". Raven Press (1976): 1-39.

4. Schroedinger E. Space, time and Structure.

5. Gilbert CH. "Mechanisms of processing in primary visual cortex". In: E. Martínez-Uriegas (Ed.), The Cuernavaca workshop on vision. UNAM, Cuernavaca (1987): 3-4.

6. Popp F-A., et al. "Electromagnetic bioinformation". Proceedings of Marburg symposium, Germany (1979): 55-107.

7. Klein S. "Sillabus for Cuernavaca Workshop on vision". In: E. Martínez-Uriegas (Ed.), The Cuernavaca workshop on vision. UNAM, Cuernavaca (1987): 23-24.

8. Livingstone M. "Segregation of form, color, movement and depth processing: Anatomy, physiology, psychophysics, art and illusion". In: E. Cuernavaca (1987): 11-13.

9. Schiller PH. "The on and off channels of the visual system". In: E. Martínez-Uriegas (Ed.), The Cuernavaca workshop on vision. UNAM, Cuernavaca (1987): 26.

10. Babloyantz A. "Self-organization phenomena resulting from cell-cell contact". *Journal of Theoretical Biology* 68 (1977): 551-561.

11. Bergen JR. "Early extraction of motion and texture information in human and machine vision". In: E. Martínez-Uriegas (Ed.), The Cuernavaca workshop on vision. UNAM, Cuernavaca (1987): 38-39.

12. Fischer H. "Photons as transmitter for intra-and intercellular biological and biochemical communication. The construction of a Hypothesis". In: F. A. Popp, G. Becker, H. Konig y W. Peschka (Eds.), Electromagnetic bio-information. Urgan & Schawarzenberg, Munich, Viena, Baltimo (1979): 175-180.

13. Marroquin JL. "A probabilistic approach to computational vision". In: E. Martínez-Uriegas (Ed.), The Cuernavaca workshop on vision. UNAM, Cuernavaca (1987): 25.

14. Pentland AP. "Recovering 3-D description of snape using massively parallel networks". In: E. Martínez-Uriegas (Ed.), The Cuernavaca workshop on vision. UNAM, Cuernavaca (1987): 10.