New Approach to Deep Miniaturization: A Way to Overcoming Moore's Law

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Abstract

The matter about some far-going consequences commencing from the replacement of one of the basic principles of the traditional physics that is the principle of locality, with the recently put forward principle of boundedness is considered. It is proven that the thermodynamic theory which is explicitly grounded on the principle of locality, suffers inherent contradiction which roots lay down to the principle of locality. The way to overcome it goes via the replacement of the principle of locality with the recently put forward by the author principle of boundedness. In turn, the latter gives rise not only to a fundamentally novel notion for a number of ideas but also it yields replacement of the proportionality between the software and hardware components with a new non-extensive approach to the matter. It is proven that the famous Moore's law stands in new reading both in its support and the way to overcome its limitations. Apart from its role for the technical applications, the present considerations stand also as a methodological example how the role of the basics of any theory affects practical rules such as the Moore's law.

1. Introduction

One of the greatest challenges to the general theory of artificial intelligence is establishing of general protocols for organization of the match between software and hardware for different types of intelligence. Up-to-now the only studied and developed type of intelligence is the algorithmic intelligence. In the line of the present considerations, one of its major properties is proportionality between the logical steps involved in software and the number of components involved in

the corresponding hardware. This result is justified by the use of Boolean logic for the software components and the "switches" between elementary components for the hardware. The common between the Boolean logic and the switches between components is that they both are executed locally so that the next step (switch) is free not to be physically correlated with either of the previous and/or the next one. Consequently, proportionality between the number of logical steps and the number of components commences.

Then, the meeting of ever-growing demands of the human mankind to devices of all kinds is focused mainly on further downsizing and doubling of components as well as on finding the most efficient algorithms for classes of problems. It is widely accepted that this route has its limits proclaimed by the famous Moore's law. So far, it is taken for granted that the limits to further downsizing are to be considered as formation of new phenomena such as, e.g., how many atoms are needed to be removed from a metallic system so that the latter to start exhibiting non-metallic properties. Thus, the Moore's law stands as limit which delineates the boundary between phenomena of different qualities (e.g. transition from a non-metal to a metal). Yet, now I will outline that the Moore's law is more than that.

Still the dominant view on our human intelligence is that it operates on the grounds of the same Boolean logic for the "software" executed by means of cleverly designed "hardware" consisting of components each and every of which operates locally, *i.e.* on the principle of "switches". This view commences from principle of locality of physical laws which is the very grounding principle of reductionist type of sciences to which the physics belongs. However, the theory built on that principle suffers fundamental contradictions. One of them, a consequence of the thermodynamic theory, is that there are no limits (both lower and upper) on the number of components of any circuit to operate steadily. Thus, it seems possible to build a circuit out of a single atom. Then, is the human brain so imperfect to need myriads of atoms and molecules for its functioning?

The fundamental flaw of the thermodynamic theory is that it considers only systems which are in general equilibrium and/or in a state that represents small deviations from it. The principle of locality, which assumes that the laws of Nature can be formulated at a single spatio-temporal point, e.g. a material point, and instantaneously acting forces concentrated in the center of mass, is here expressed by the assumption about Markovianity for the small deviations from the general equilibrium regardless to the origin of those deviations, *i.e.* whether they represent fluctuations or they come as a response to environmental impacts. Then, this setting renders the association/dissociation of species to be considered as a process unlimited in its number and as un-affecting the other properties of the corresponding system. Thus, not only the thermodynamic theory is not able to distinguish between a "bunch" of grains and a pile of sand, but it is not able to define a critical size for steady operation. Thus, a question arises, is it possible to

re-define the thermodynamic theory so that to overcome the above conundrum and what are the consequences.

It turns out that such re-definition is possible but at the expense of withdrawal from the principle of locality and its replacement with the principle of boundedness, recently introduced by the author in her book [1]. The far going consequences of that replacement read that there exists a "kinetic" (operational) threshold below which any given circuit cannot operate steadily. The threshold is specific for each and every circuit but its existence is universal. The existence of operational thresholds not only puts the Moore's law on formal grounds, but it delineates the major strategy for its overcoming: it is the use of new materials for further downsizing. Since the realm of new materials is vast, most promises hold on its exploration.

Yet, the story is not finished: the principle of boundedness renders the matter about doubling of components to develop under another strategy as well. In a nutshell this strategy withdraws from growth of the number of components and applies non-extensive view on the matter. It is considered in section 2.

The non-extensive approach to the matter about the match between software and hardware is an exclusive property of the naturally aroused in the frame of the theory of boundedness [1] semantic intelligence where the logic is not Boolean and is grounded on specific for each task highly non-trivial interplay between long- and short-distant logical correlations executed by a "hardware" which is driven by spontaneously executed specific natural physico-chemical processes. To recall the major property of the semantic intelligence is autonomous comprehension and creation of information [1]. To compare, the algorithmic intelligence is non-autonomous because both the design of software and hardware, and decoding of each and every output are subject to artificial intervention.

Summarizing, the establishing of a new general protocol for the match between software and hardware provides the new general strategy for overcoming the Moore's law which along with the prescribed use of new materials will be the next milestone on the way to constructing devices for exploration of hazardous events, distant outer space endeavors and study of events where information is incomplete and/or uncertain.

2. Kinetic (Operational) Threshold

The goal of the present section is to prove that the existence of an operational threshold over stable functioning of any device is a generic property of all circuits. In turn, the Moore's law gains another argument in its favor as well as providing the way of overcoming it. The reason for presenting it in a separate section is that the matter about existing of an operational threshold is highly non-trivial because it requires new setting for the notion of chemical potential.

At first, let me demonstrate why the traditional notion of chemical potential is inherently contradictive. Below I reproduce the derivation in the way it is pre-

sented in Chapter 8 of the book [1].

The traditional thermodynamics is grounded on the principle of locality which, among all, asserts that the basic characteristics of a system, (internal energy, entropy, chemical potential) are functions of the general equilibrium only and they do not depend on the path through which a system arrives at it. The most widespread definition of the chemical potential reads that it is the Gibbs energy necessary for associating/dissociating a species in/out a system in equilibrium. In order to meet the principle of locality, basic characteristics of a system, chemical potential included, are assumed to be intensive variables. Among all, the latter implies that the chemical potential must be independent from the number of species. However, next I will present a proof that the chemical equilibrium is not able to maintain this property of the chemical potential. Thus, it turns out that the traditional thermodynamics experiences a fundamental flaw.

Let us follow the traditional derivation of the necessary condition that a chemical reaction at fixed pressure and temperature should obey in order to reside in chemical equilibrium. It is demonstrated that it produces dependence of the chemical potential on the number of species of all sorts which in turn constitutes an immediate violation of the condition for separation of the variables to intensive and extensive ones.

In chemical equilibrium the amount of each of the reactants and products is constant and corresponds to the stoichiometric relation:

$$\sum_{i=1}^{S} \nu_i A_i = 0 \tag{1}$$

where ν_i is the stoichiometric coefficient of the $i-th$ sort, A_i is its amount and S is the number of the $i-th$ sort species.

Equation (1) is equivalent to the following relation:

$$\frac{\partial \Phi}{\partial N_i} + \frac{\partial \Phi}{\partial N_2}\frac{\partial N_2}{\partial N_1} + \cdots + \frac{\partial \Phi}{\partial N_i}\frac{\partial N_i}{\partial N_1} + \cdots + \frac{\partial \Phi}{\partial N_S}\frac{\partial N_S}{\partial N_1} = 0 \tag{2}$$

where Φ is the Gibbs energy, N_i is the number of species of the $i-th$ sort.

Let us now rewrite (2) in slightly different form:

$$\sum_{i=1}^{S} \frac{\partial \Phi}{\partial N_i}\frac{\nu_i}{\nu} = 0. \tag{3}$$

By definition:

$$\frac{\partial \Phi}{\partial N_i} = \mu_i \tag{4}$$

where μ_i is the chemical potential.

Thus, at equilibrium the following relation holds:

$$\sum_{i=1}^{S} \nu_i \mu_i = 0 \tag{5}$$

Further, since the Gibbs energy is thermodynamic potential in the linear do-

main around the equilibrium state, the condition for independence of the arrival at equilibrium from the path is provided by its smoothness:

$$\frac{\partial^2 \Phi}{\partial N_i \partial N_j} = \frac{\partial^2 \Phi}{\partial N_j \partial N_i} \tag{6}$$

which immediately leads to the following relation:

$$\frac{\partial \mu_i}{\partial N_j} = \frac{\partial \mu_j}{\partial N_i} \tag{7}$$

where μ_i, μ_j are the chemical potentials of the $i-th$ and $j-th$ sort species correspondingly. Let us now have a closer look on (7)—it turns out that (7) makes the chemical identity dependent on the number of the species! In addition, it is obvious that thereby the chemical potential turns a non-intensive variable so that it depends not only on the number of the species of its sort but on the number of species of all other sorts. However, this is in a sharp controversy with the idea of its meaning presented by Equation (4), that the chemical potential is predetermined by the chemical identity of the species of any given sort alone.

The way out from the above contradiction is to adopt a new definition for the notion of the chemical potential. It is well known that there exists another definition which derives it from the notion of Lagrangian. The inconvenience of that definition in the frame of the traditional thermodynamics, however, lies in the fact that the notion of Lagrangian is associated with extremal properties of a system such as minimum energy, maximum entropy etc.

Luckily, in the theory of boundedness the notion of stationarity of the action is associated with those trajectories where the boundedness of rates and amplitudes of exchanging energy/matter/information with the current environment is permanently maintained. Thus, stationarity of the action is not any longer to be associated with any form of extremization. A crucial test for the new definition of the chemical potential is whether it puts a ban over association/dissociation of arbitrary amount of species. This is very important for delineating a system from its environment in the process of its interaction with not apriori specified environment. Thus, if the exchange of species is not limited, a system could either enlarge to arbitrary size or deplete to extinction. This suggests straightforward relation of the new notion of chemical potential to the notion of stability of a system. The fundamental advantage of the definition of a chemical potential in the setting of boundedness (through non-extremizing Lagrangian) is that it renders the functional properties of the system to play an apparent role in the notion of the chemical potential. Thus it renders the chemical potential to depend on the spatio-temporal order of association/dissociation of species. In turn, the latter renders the option for the chemical potential to turn to zero during those processes which immediately implies collapse of the corresponding system.

That is why I define the chemical potential as follows:

$$\mu_i = -\Omega \frac{\delta L}{\delta n_i} \tag{8}$$

where Ω is the volume of the system; n_i is the number of the species of the $i-th$ sort; L is the Langrangian of a system. Equation (8) describes a process initiated by small deviations from the general equilibrium condition $\delta S = 0$, where S is the action. It is worth noting that in the frame of the theory of boundedness the condition for stationarity of the action holds for all trajectories where the condition for boundedness of rates and amplitudes holds. Thus, the advantage of this definition is that it automatically delineates only admissible trajectories where the boundedness holds permanently by means of taking into account the functional relations built-in in the state space of a many-body system. Indeed, Equation (8) is an explicit expression for taking into account the intrinsic functional "relations" among the constituting species as well as their modification under the interaction of the system with its environment. By means of the new definition, I will demonstrate that a system stays stable if and only if the amount of energy/matter that it exchanges with the environment is bounded.

Thus, the condition for providing stability of a system stands primary. In the line of the present considerations, it implies that breaking the stability of a system happens when its chemical potential turns to zero. The structure of the state space under boundedness is supposed divided into a "bulk" and a "surface" part. The former one is to be associated with that part of the system that remains stable under a given interaction and as I will demonstrate further it is to be associated with the so called "homeostatic" pattern of a system. On the contrary, the "surface" part is associated with the current boundary of a state space and as it will become clear in the next section, it is to be it is to be associated with current interactions with the environment. In turn, the "surface" part of the chemical potential is strongly sensitive to the current curvature which culminates in strong sensitivity on the current number of exchanged species. Since any exchange of a species modifies the shape of state space "surface", the natural measure of the surface part of the chemical potential is its local curvature:

$$\mu_s = \int_S \alpha k ds \tag{9}$$

where α is the density of the surface energy; S is the area of the state space surface. The permanent variations of the number of species result in permanent modification of the value and sign of the local curvature. So, μ_s permanently varies and eventually turns the total chemical potential μ_{tot} to zero. This immediately yields the system falling apart. The next task is to illustrate that this happens when the number of exchanged species is limited. According to the above considerations, the destruction of the system happens whenever:

$$\mu_{tot} = 0 \tag{10}$$

Since the bulk part of the chemical potential is insensitive to the variations of the state variables, Equation (10) holds whenever the following relation holds:

$$\mu_s = -\mu_b \tag{11}$$

where μ_b is the bulk part of the chemical potential.

An immediate consequence of the above setting is that a collapse happens always at bounded number of associated/dissociated species and so that the way to collapse strongly depends on the spatio-temporal path through which the association/dissociation proceeds. The chemical potential for different species and paths also turns different. This result constitutes the fundamental difference with the traditional thermodynamics where notion of the chemical potential is supposed to be inherent property of the chemical identity of a single sort of species. It is worth noting that the notion of functional relations among species and the notion of stability straightforwardly participate in the notion of the chemical potential in the present setting.

An immediate consequence of the above considerations is that it sets a condition for a system to operate steadily to be a permanent sustaining its chemical potential to be non-zero. It is obvious that the notion of the chemical potential is apparently related to the size, the structural and the functional organization of any system. In turn, the latter justifies the assertion that for each and every system a threshold arises below which the system is not able to operate steadily. The size, structure and functional organization of the threshold are specific to a system, but the existence of the general ban over further miniaturization is a general property. It should be stressed that it appears as an exclusive property for the theory of boundedness. Thereby, the way to further miniaturization lays in the use of new materials and is grounded on the specificity of any concrete ban.

One of the major goals of tailoring any device is providing its stable functioning in any environment. So far the major approach for accomplishing this task is to put the device at stationary stable conditions by means of, e.g., plugging to an artificially designed electric grid. Then, the principle of locality provides a one-to-one correspondence between any software and any hardware. The latter correspondence culminates in the properties of the so-called Turing machine. Consequently, any hardware (those constituting by a single component included) can execute any software (a probabilistic one included). At first glance this matter becomes extremely difficult since the path dependence of the chemical potential opens the door to functional inequality of otherwise structurally identical species. Then, it seems that any such system is doomed to unstable and unreproducible functioning because different inputs would create different path dependences and thus different functional structure. This issue is resolved by means of the central for the entire theory of boundedness result, the so called by the author decomposition theorem and proven by her in [1].

The decomposition theorem states that for each and every bounded irregular sequence (BIS) a presentation basis exists which is power spectrum, where the latter is additively decomposed to two parts: a specific to a system discrete pattern, called, homeostasis, and a universal continuous component whose shape is $1/f^{\alpha(f)}$ where $\alpha(f)=1$ at $f=1/T$ where T is the current length of any given

BIS. Both the structure of the discrete pattern and the shape of the continuous band are robust to the details of the statistics of the variations in any given BIS. The crucial property of that decomposition is that it holds even when a system operates in a non-specified ever-changing environment under the mild condition of keeping rates and amplitudes of exchanging matter/information/energy with the environment permanently bounded within specific margins alone.

An immediate consequence of the decomposition theorem is that any homeostatic pattern appears as stable functional pattern robust to small environmental variations. It is worth noting that the latter property justifies the intuitive notion about the "bulk" part of the state space involved in the considerations of the previous section about constituting a new notion for the chemical potential. Alongside, the continuous part is to be associated with the current interaction of a system with its environment and hence with the "surface" part.

Let me now briefly discuss the withdrawal from the principle of locality. Indeed, in the traditional setting, it is strongly involved through the idea of separation of the thermodynamic variables to intensive and extensive ones. Then, chemical potential turns provided by chemical identity alone and turns robust to the functional relations among the constituting a system species which yields to the opportunity for association/dissociation of arbitrary amount of species regardless to whether a system remains stable or not. On the contrary, the replacing of the principle of locality with the principle of boundedness renders the notion of the chemical potential to be apparently related to the notion of stability and renders strong sensitivity on the path through which the association/dissociation proceeds.

In turn, this justifies Moore's law by means of providing another strong argument in its favor. Yet, it also opens the door to its overcoming: by means of the use of new materials, new structural and functional organizations. In turn, this makes the relation structure/functionality to be more diverse than mere proportionality alone. In the next section, it is demonstrated that this yields to its diversity through non-extensisvity.

3. Non-Extensivity and Diversity of the Relation Structure-Functionality

The roots of non-extensivity of the relation "software-hardware" lay deeply into the decomposition theorem. It is worth reminding one of its most non-trivial immediate consequences, that is that the notion of homeostatic pattern represents steady causal correlations for any functionality [2] [3] so that the logical and quantal error are kept bounded in a long run [4]. These properties give rise to the question about whether a general rule for their match to the relation "structure-functionality", *i.e.* "software-hardware", exists. It is worth noting that since the semantic intelligence is spontaneously executed by natural physico-chemical processes, the role of "software" is played by the functionality, the role of "hardware" is played by the structure and their relation is provided by the

existence of a general protocol for their match governed by an equation of the following general type:

$$\frac{\partial X}{\partial t} = \left(\alpha(\boldsymbol{r},t) X - \beta(\boldsymbol{r},t) X + \mu(\boldsymbol{r},t) X \right) - \nabla \cdot \left(\hat{D}(\boldsymbol{r},t,X) \cdot \nabla X \right) \tag{12}$$

where $\alpha(\boldsymbol{r},t)$ and $\beta(\boldsymbol{r},t)$ are the "stoichiometric" coefficients of the corresponding local adsorption and reaction terms; $\mu(\boldsymbol{r},\boldsymbol{t}) X$ is the current bounded noise. The basic equation is a single scalar equation for the entire network because it represents a system without stirring thus allowing formation of utilizable long-range physico-chemical correlations. To remind, the stirring destroys long-range correlations thus making different species (hence different types of species) independent and in turn it makes the governing equation local.

This type of governing equation was derived in [1] and its solution comprises both a real and imaginary part. The solutions of both real and imaginary part of the above equation are trajectories which are confined in tubes restrained by the specific thresholds which commence from the thresholds of the noise component but not proportional to them. Since each part of a solution is a BIS, both real and imaginary part comprises a stable discrete pattern which contributes to the corresponding homeostatic pattern.

The imaginary part of the solution has a generic solution which consists of emitting specific travel waves so that to deliver specific reaction outputs to specific distant spatio-temporal points where they serve as inputs for other specific reactions.

It should be stressed on the exclusive generic property of the adsorption and reaction terms in the governing Equation (12) to be linear with respect to the total concentration. This is because different species, in non-reactive conformations, maintain the same relative velocity [5] which property provides laminarity without stirring of a flow consisting of different sorts of species. Thus all different species participate linearly in the flow yet with different "weights" (adsorption and reaction rates correspondingly). Put in other words, the stoichiometry is executed in fundamentally different way. Note that the "stoichiometry" for the same reaction could be different in different spatio-temporal points which assertion is in sharp contrast with the case of stirring where the stoichiometry is local and thus is the same throughout the entire system. This contrast arises because the reactants are brought together not by means of stirring but by means of a sequence of specific passages from one spatio-temporal point to another. Note that stirring destroys any correlations among species thus rendering reactions only local.

In turn, the linearity of the adsorption and reaction terms with respect to concentration, viewed as their generic property, provides not only the emitting of travel waves as a generic type of solution of the imaginary part of Equation (12) but it also immediately constitutes a generic property of those matter waves to be the confinement of any matter wave into a specific to it "tube" of bounded section. The proof of this confinement can be traced back to the Chapter 7 of

[1]. This confinement could be considered figuratively speaking as a process of auto-collimation. The value of the latter property lies in its ability to provide exact repetition of distant spatio-temporal homeostatic relations in an ever-changing environment. It is worth noting that the auto-collimation turns out to play also the role of implement for providing and self-controlling the robustness of any homeostatic pattern in an ever-changing environment. The role of self-control is that when a travel wave deviates from the target, the corresponding reaction do not happen which in turn signals out a local damage.

Thus, the solution of any basic governing equation is a result of highly non-trivial interplay between short- and long-range correlations. The goal of that interplay is to maintain a stable long-run functioning of any current homeostatic pattern. It is worth noting on the non-separability of spatial and time coordinates for distinguishing the causal correlations encapsulated in a homeostatic pattern from the provisional ones and from the correlations associated with the individual peculiarities. That non-separability is best illustrated by the fact that the separation of the causal correlations from the other types occurs only in the power spectrum of any time series which represents the behavior of a complex system. These considerations are one argument more in favor of the assertion sustained by the author why the semantic intelligence is irreducible to the Boolean logic.

It is worth noting that one of the most general properties of any solution of the governing Equation (12), that is that its state space is partitioned into basins of attractions each of which is characterizing by a specific to it homeostatic pattern, lays the fundament for diversity of the relation "hardware-software" for the semantic intelligence.

Moreover, the governing Equation (12) provides not only a stable diversification of the relation structure-functionality but the highly non-trivial interplay among short- and long-distant correlations renders the match between structure and functionality non-extensive as well. It is worth comparing to the algorithmic intelligence where the principle of locality renders all physical correlations only local thereby making the recognition of any long-range correlations subject to artificial, *i.e.* that of a human mind, intervention. To remind, our human mind is subject to our current beliefs, views and abilities and so any thus obtained long-range correlations would be subjective and indiscriminating from the provisional ones and from those that come from the individuality of any complex system.

Yet, there is a decisive step ahead to further diversification of the match structure-functionality. This step is grounded on the exclusive properties of semantic intelligence that read: 1) the meaning of each and every semantic unit is executed as a non-mechanical engine built on the different basins-of-attractions to which the state space of Equation (12) is divided. Thus, the semantic meaning turns irreducible to that sequence of "letters" which constitute it and thus it is irreducible to the Boolean logic encapsulated in that sequence; 2) the semantic

units are organized in a bi-directional hierarchy so that governing equation on each and every hierarchical level is equation of the type represented by Equation (12). From the computation point of view its greatest advantage lies in the fact that the computation at all hierarchical levels is not always necessary: sometimes it is enough to complete computation only on higher hierarchical levels. This result is an immediate consequence of the rule for synchronization of homeostatic patterns that comes from different hierarchical levels [6].

Thus, further diversification of the relation structure-functionality goes in two ways: 1) changing the number of hierarchical layers; 2) by means of changing environment, a system can "switch" to another homeostatic pattern. It is worth noting that those implements of diversification serve also as implements for strengthening the stability of a system.

Summarizing, the new form of intelligence, semantic intelligence, opens the door to the entirely new reading of the Moore's law with regards to the issue about the match between structure and functionality.

The functional distinguishability of structurally identical species is successfully utilized by the computation which thus proceeds in non-recursive means as discussed in [1]. Indeed, it is implemented by non-linear steps executed in a non-homogeneous way whose generic property is algorithmic un-reachability from one another in any finite number of linear operations. This is another consequence of the decomposition theorem where the power spectrum comprises an irrational frequency along with the homeostatic pattern and the continuous band [1]. Moreover, the presence of a specific interplay among short- and long-range spatio-temporal correlations among reactions renders the entire system irreducible to linearly connected moduli where the linearity is the necessary fundament for a "hardware" to be able to execute any piece of algorithmic intelligence in a reproducible way. However, linear operations allow unlimited accumulation of matter/energy/information in any locality thus contradicting the very core of the idea of boundedness which puts bounds on accumulation and/or depletion of energy/matter/information beyond specific margins as a primary condition for stable long-term functioning of any system. On the contrary, the non-recursive computing is implemented by means of spontaneously executed natural processes which automatically maintain boundedness of rates and amplitudes in each and every spatio-temporal point.

As an immediate consequence, the number of logical operations and the number of hardware components for semantic intelligence are intertwined in a highly non-trivial and complex interplay whose general properties are diversity and non-extensivity.

In turn, these differences once again prompt to suggest that the diversity of properties and abilities of any new form of intelligence are still far ahead to be discovered and utilized. What is more exciting is that such things as laws and rules which hold for one type of intelligence, e.g. Moore's law for algorithmic intelligence, transforms to new view point, that is non-extensivity and adaptabil-

ity of relation structure-functionality for the semantic intelligence.

4. Conclusions

The present paper is an example that practical rules such as the famous Moore's law hold for specific setting only and that the way of overcoming their limitations goes via fundamental changes of those settings. Thus, the replacement of the principle of locality with the principle of boundedness yields a cascade of consequences. The cascade starts with the central for the entire theory of boundedness decomposition theorem and passes through the grounded on it novel notion of the chemical potential. It culminates in a new approach to the matter about the match between software and hardware based on non-extensivity of the number of the logical operations and the hardware components, and the wide use of new materials as well. To compare, the principle of locality provides only proportionality between the number of logical operations and the hardware components.

Thus, despite its role for practical needs, the present paper appears as a methodological implement for delineating the deep and highly non-trivial role of the basic settings of any theory.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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