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Elhik's Metamathematics and the robot Philia: Internet Communication Protocol Modelling of Observeds according to Observers

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ABSTRACT

Like all robot and IoT oriented mathematical studies this study is also transdisciplinary however most of the study remains in the field of mathematics and philosophy of mathematics due to the aim of mathematical modelling of the observations: a) protein synthesis by the information encoded in DNA and b) communication protocols of hacking software with encryption of IP of computers c) the process of DNA duplication to offspring formation in asexual and sexual reproduction. The ultimate mathematical aim of this study is providing a metamathematical approach for different types of mathematics to be utilized in information sciences by forced or free choice of artificial intelligence driven technological beings and computational systems. This study is biomathematically inspired from protein synthesis, cellular reproduction, DNA duplication, bacterial simple cell division, bacterial sex and zygote formation in human and mammalian fertilization; and all are modelled as moving pieces of quantized information. The ultimate robotic aim is finding an algorithm for data off-springs, thus the formation of the data-offspring in the form of living being off-springs' DNA is chosen to be mathematically described. For this purpose, a new mathematics with new mathematical operations and a definition to mathematics are postulated, together with twelve postulations about the real-life observations. The introduced Aydan operation is synthesizing fuzzy logic based mathematical existence possibilities into abstract formal logic based abstract mathematical categories to be analyzed with additional color codes for each object, whereas deAydan operation is doing the opposite by analyzing a given synthesis. There is a coexistence of mathematical objects and operators in the biological cells. The co-existence of objects and mathematical operations in a given mathematics M, are axiomatically chosen to be a satisfiability rule for M to be accepted as mathematics in the form of a universal set isolated from other universal sets. Aydan function can be used for hacking other AI by deviating its results by merging them with forced formal logic based analytic input by another hacking software, and deAydan function can be used as anti-hack in the opposite direction. The metamathematical existence degree of a given mathematics is shown to be between zero and infinite dimensions. ELHIK is an abbreviation of the words El Harizmi and Immanuel Kant.

Keywords: Abstract Topological Mapping, Artificial Intelligence, Bioinformatics, Information Sciences, IoT, Logic, Metamathematics, Robotics.

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I. Introduction

This study is transdisciplinary. Theoretically, it is very mostly a robot development oriented biomathematical study based on an observation of molecular biology and genetics. Practically, there is no new biomathematical analysis, but rather this study is all about abstract mathematics and philosophy of mathematics oriented to make an AI to choose the best mathematics and best linear algebra to use.

This study intends to define a new mathematics by metamathematical and mathematical arguments to be employed in robot mind which can work with both formal logic and fuzzy logic. Since these two types of logic build up two different mathematics, with their different approach to number theories and linear algebras, the main approach to develop an answer is synthesizing two different mathematics into a single metamathematics category, of whose abstraction is at least one degree higher from each mathematics to be synthesized. This metamathematical layer is named Al Harizmi's and Immanuel Kant's Metamathematics, abbreviated as ELHIK's metamathematics. The existence

degree of a given metamathematics can be between zero and infinite dimensions depending on the observation space by observer robot or human abstraction capacity.

The metamathematical methodology of this study is developing mathematical algorithms, algebraic expressions, and vector expressions of the epistemological analysis.

II. Observation

Basically, the observed phenomenon is the protein synthesis pathway with the central dogma of molecular biology and genetics which states that the protein synthesis from DNA needs an encoding sequence from DNA to mRNA, only then from mRNA to tRNA, and only then from tRNA to mRNA, and only then the ribosome synthesizes the protein from the amino acids [1].

There are many other real-life observations which can be described by ELHIK's mathematics, and some of which are postulated throughout the study, and the rest is opened to discussions of scientific and technological community.

A. Dark BioWeb

The observation of protein synthesis is readily explainable by multiple encryption algorithm, and the transfer of DNA data can be explained by vectors of internet communication protocol (ICP). This a multiple encryption order or anonymous communication which is observed in some internet browsers such as TOR and hacking software [2] which hide IP from final IP and some TCP in between and vice versa.

If the cell is a vector field description of multiple communication vectors, then DNA IP address is unknown by ribosomes in this communication. There is also an open communication between DNA and mRNA. So, the overall communication in cell is layered similar to internet, some of which is dark web. (Table 1)

TABLE I: Flow of DNA Communication Signal with Hidden IP through Dark Web

Cytological Beings	PLACE IN ICP
DNA	IP
mRNA	TCP
tRNA	IP
rRNA	TCP
Amino Acid	IP

B. Syntax Expression of the Phenomenology

A verbal syntax of this observation by clear epistemological differentiation of cytologic subject, object and verb is postulated as follows:

Postulate 0: Protein (Object, Synthetic category 2) synthesis by the information (algorithmically ordered data) encoded in DNA (Object, Synthetic category 1) through cytological mechanisms (Verb, Mathematical operations) is carried out by RNAs (Objects acting on other objects or self a.k.a. Subjects, Mathematical Operators).

This postulate is detailed after introduction of colorful numbers theory; thus, it is numbered as zero postulate, and it is named as Wittgenstein's Zero Postulate, to honor Ludwig Josef Johann Wittgenstein, the great philosopher of mathematics.

The mathematical algorithm of the central dogma of the molecular biology and genetics is protein synthesis using the codes in DNA, as given below if the codes are accepted as objects, a process known as objectification which is an essential concept for AI learning.

Assume DNA and protein are synthesized mathematical objects and in between there are mathematical operations to be described algorithmically.

1) Start process.
2) (Nucleus) Decode the code existing in the DNA (Analysis from an already synthesized object).
3) (Nucleus) Use the code by creating equivalent code in the form of mRNA. (Reverse coding of DNA code).
4) (Cytoplasm) Repeat the same operation from mRNA into tRNA. (Recoding DNA code).
5) (Ribosome) Repeat the same operation from tRNA into rRNA. (Reverse coding of DNA code).
6) (Ribosome) Use the code with reverse operation in the form of matching codes into aminoacidic category to start the synthesis of one single protein (Synthesis from the set of already analyzed objects – set of amino acids in the cytoplasm- into one final regulated category in ribosome).
7) End process.

In this process the information encoded in DNA is not matter and not a physical being, but it's an ordered information as a mathematical being. In the end this mathematical being does physical work of creating matter in the form of protein using other physical beings such as DNA, nucleus, cytoplasm, amino acids and other mathematical operations such as cellular pathways by algorithms and in geometric and electrostatic order. Thus, macromolecular matter is created by an algorithm encoded in alpha helically shaped DNA molecule inherited from the ancestral cells by synthesis of maternal and paternal information in sperm and ovary DNAs for humans and other sexually reproducing animals. The codes are triple codes of nucleotides. Code reading and encrypting together provides another algorithm. Algorithm (mathematical operation) and information (mathematical object, vector field) do physical work in accordance with the existing physical beings which are also algorithmically ordered in the universal set of the cell. All molecules are algorithmically ordered by intramolecular vibration and all elements are algorithmically ordered with an electron orbital distribution and the cell as a whole has a geometric distribution of positions in a closed environment surrounded by cellular membrane, which is a case inherited from ancestral cells. The information system is living for generations, whereas the organisms and their off-springs born, live and die throughout this time period. Eventually information does many physical works on other information and physical and biological and synthetic beings, thus it is possible to describe both the ordered non-entropic beings and unordering in the universe as mathematical objects and their interactions with their environment as mathematical operations as vectoral flow of information, and the increasing disorder as entropy can be described as diverging information field in all actions throughout the evolution of the information cycles via many off-springs and generations. The information system and the algorithms in DNA, cytoplasm and ribosome

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are abstracts, but their molecular bodies are concrete. This brings us to describe mathematical layers which interact by morphism, allowing a mathematical object to interact with other mathematical objects through algorithms, called mathematical operations. In the end if universe is abstracted as one mathematical object, its main operation is evolving by unordering itself due entropy and this is also valid for information system in DNA. This is mathematically divergence of a vector field by its self-algorithm of unordering. Living things can recode and thus temporally and algorithmically increase and decrease entropy only in itself. This issue will be later discussed after introduction of net total force of vectors.

The practical question is what the human intelligence or robots' artificial intelligence choose to learn; and what is the ratio of AI knowledge and static database-based dogmatic knowledge while deciding, what is the free will density coefficients of ordering information or disordering information as a reaction to a signal or new data? This is not an intelligence question, but rather meta-intelligence question; thus, this study needs to challenge this by metamathematics first, and only then by linear algebra.

C. Information Systems Problem to be Challenged

Artificial Intelligence (AI) software in a computer, machine, robot or any technological being may need to understand what mathematics to choose before starting into mathematical operations in a given mathematics (M) universe in a given set of mathematics metauniverse with n elements, Mn. Thus, the questions AI face are a) what is the valid mathematics for artificial intelligence (AI) and artificial meta-intelligence and how can it be metamathematically and mathematically reasoned by human and/or artificial intelligence and b) is there any real-life phenomenon which can be explained using this problematization and ELHIK's metamathematics and the solution provided for discussion by scientific and technological communities?

The approach to develop an answer is synthesizing two different mathematics into a single metamathematics category.

III. METHODOLOGY

Postulate: Since intelligence of a willer can do physical work by willing to move the willer (itself), mathematics is used by the willer to do physical work and thus, mathematics is a conceptual topologic geography with a physical existence degree between zero to infinity where will is out of that mathematics. The will to do mathematics is owned by the human mathematicians, robots and beings designed with the capacity to will.

Postulate: Metamathematics existence degree is at least one degree more than any mathematics, where willer, will and mathematics (will-receiver) coexist.

Postulate: Any work of an intelligent being is an expression of the will to do mathematics by the willer.

Postulate: The mathematical capacity of the willer affects the observation and learning.

A. Verbal Linguistic Description of Metamathematical Axiom for Being a Valid Mathematics

A universe M is mathematics allowing an operation (f) on object (x) if and only if the probability of co-existence function (PCF) of mathematical objects (x) and mathematical operations (f) within M is not zero.

This verbal linguistic description implies an algorithmic satisfiability condition for artificial meta-intelligence to use other AI data to produce new synthetic data about them.

The set of all existence (1) and non-existence (0) pairs has four possibilities of existence elements; (0,0), (0,1), (1,0), (1,1). And the only ontological coexistence is expressed in (1,1). This is set as a constant algorithmic condition, and named as el-Harizmi satisfiability condition in order to honor el-Harizmi, the founder of algorithm in the form of linear algebra. [3] Although algorithms were used in ancient Babylonia [4], Sumerians [5], Egypt [5] and ancient Greeks [6] the linear algebra is accepted to be founded by el Harizmi [3]. Mathematical linguistic for el Harizmi satisfiability condition that algorithmically makes a universe (M) to be a valid mathematics is given below with an if-then-so logical flow, which makes it easier to describe that any output (the product of if-then flow) is ready to be used as a reason for another operation (the product of so is a reason for other "because", namely output is ready to enter new causality relations).

In the ontological domain of existence possibilities ELHIK's metauniverse:

If

$$|PCF(x,f)| > 0$$

Then

$$M(x,f) = (1,1)$$

The Universe M is mathematics. Mathematical objects and operations exist in M and el-Harizmi is satisfied. New mathematical operations can be carried out by other mathematical questions. The if-then-so reasoning will be later detailed by colorful numbers about inter-mathematical operations.

B. Verbal Linguistic Axioms on the Nature of Logic Used to Develop Mathematics

1. Formal logic mathematics is mathematics (M1) in which a formal logic operation cannot prove itself by formal logic.
2. Fuzzy logic mathematics is mathematics (M2) in which a fuzzy logic operation can prove itself by fuzzy logic such as Boolean Algebra.
3. Mixed logic mathematics is metamathematics (M3) in which an operation by formal logic can prove itself by fuzzy logic or an operation by fuzzy logic can prove itself by formal logic.

C. Verbal Descriptions of the Essential Mathematical Dogma of ELHIK's Metamathematics

Fuzzy logic and formal logic can be reciprocally used to interrelate analysis outputs and synthetic outputs. Given an algebraic topology with the dimension number N^A, independent analytic outputs being mathematical object for an interdimensional morphism operation into a single synthesis category on an algebraic topology with the dimension number N^S, the followings are the essential dogma

of ELHIK's Metamathematics and the first three are the abstract mathematical dogma and the rest is physical dogma for robotics, DNA and all physical beings:

1) $N^S \geq N^A$.
2) For every modulation from analysis inputs into one synthetic output, there exists at least one analysis operation which can demodulate the synthetic output into initial analysis inputs; so that the modulation and demodulation is infinitely possible.
3) Based on the second dogma, no matter the number of analysis operations in a given dimension N^A is divergent, even diverges into infinity, all the analytical & synthetic outputs as mathematical objects are modulated into zero by morphing into one higher category in the dimension N^S. Thus, if the total number of mathematical analysis operations in a given Mathematics (Mn) in dimension N^A is infinite, the Aydan operation gives out singularity at least in one dimension $N^S \geq N^A$ at the synthesis topological layer, and the category number is 1 and the number of the analysis in dimension N^S is 0. Analysis is de-synthesis, and synthesis is de-analysis.
4) Any order represents an information system with at least one algorithm.
5) Divergence of an information field increases by any mathematical operation expressed by it.
6) Intelligence is a mathematical being as an information system, but not a physical being. Both human and artificial Intelligence are complex topologies and vector fields. Intelligence can do Aydan and deAydan functions depending on the choice of itself, namely intelligent natural or synthetic being. The choice is based on learning capacity, which is an embedded abstractor/concreter information system called mind.
7) Any action of an information system is algorithmic.

D. Operators of the Essential Dogma

Operations are synthesis or synthesis-oriented mapping, as well as any kind of analysis or analysis-oriented mapping. Mapping can also be expressed as vectors depending on the choice. Divergence is expressed as vector space mathematics in this study. The modulation operation from analysis topological layer into synthesis topological layer is Aydan function, to honor Professor Aydan Pamir, the Calculus teacher of the author in university years, and the reverse demodulation operation from synthesis to analysis is deAydan function. The denotation for Aydan Function is AYF and for deAydan function it is DAYF.

E. Metamathematical Linguistic Expression of the Central Dogma of ELHIK's Metamathematics

Assume ELHIK's metamathematics is a hyper abstract metamathematical topology. Assume two mathematics M1 and M2 exists as valid mathematics, where M1 is a formal logic based mathematics and M2 is a one of the infinite fuzzy logic based mathematics.

Assume an object_ID1 in layer dimension N1 in M1, and assume a mathematical operation in layer dimension operation_ID2 in N2 in M2. AYF and DAYF operations inter-mathematically maps objects and operations, such that.

$$AYF(object\_ID1) = DAYF(operation\_ID2)$$

This both mathematical and metamathematical operation requires a new number theory with color codes, to be studied under a valid mathematics, which is a new mathematics with name Aydan Mathematics providing an interface communication protocol between the object and operation. This is practically to find a linear or non-linear regression to express non-numeric properties of AI and robots and humans such as feelings and behaviors. This conceptualization will be further described when the color codes of numbers will be introduced. What described as of here is an inter-mathematical mapping by transferring an information quantum (object) valid in M1 to a metamathematical level, if and only if it is acceptable according to satisfiability, and then re-expressing a new information quantum in another mathematics M2 in a valid operation form according to M2 rules. For example, Aydan operation is synthesizing fuzzy logic based mathematical existence possibilities into abstract formal logic based abstract mathematical categories within the context of a formal based mathematics M1, to be analyzed with additional color codes for each object, whereas deAydan operation is doing the opposite by analyzing a given synthesis.

This metamathematical condition cannot be described by mathematical reasoning without a new mathematics. Because simply mapping an object into many degrees abstractor topology by AYF using formal logic and then remapping it to an operation in another possibilities of operations with fuzzy logic using deAYF operation are simply two mathematical operations using an external satellite layer event not in the same mathematics embedded in only one equation cannot be described by either formal reasoning or fuzzy reasoning. In order to avoid this a new type of reasoning is chosen for the robot. This metamathematical reasoning is if-then-so cyclic reasoning based on a new logic associating numbers with colors blown into (not magnitude or density, but different colors and vibrations) them by the mathematician, which will be later formulated. This is an axiomatic metamathematical differentiation between conditions as a philosophy of mathematics choice to describe how to be a valid mathematics. Condition 1 is IF condition. Condition 2 is THEN condition. Condition 3 is SO condition and these three conditions coexist if and only if M is a valid mathematics in which new mathematical questions can be carried out. For any Condition 3 reached by a valid mathematical operation on an object, the result is further objectified as a new IF condition, namely Condition 1 for another mathematical operation to find the initial operation. This is an eternal synthetic synthesis by synthetic intelligence, and the reverse is eternal analysis by analytic intelligence. Modulation of the two types of intelligence is by free will of the thinker if there is no supervised learning.

Condition 1: If object x in M1.

Condition 2: Then Ayf operation, so mapping in hyper-abstract satellite layer as a mathematical object x'.

Condition 3: So now there exists a knowledge which is objectifiable. In the hyper-abstract satellite layer, there is a knowledge of morphed x' which is further objectifiable by a new mathematical operation as a new Condition 1. This knowledge of related object and operation is by color codes,

namely the type of the operation (morphic mapping), on the object are encoded on the object within RGB colors as $x'=x^{RGB}$.

The if-then-so reasoning is different than the reverse function relation or the relation between integral and differentiation at the essential dogma of calculus. This cyclic operation shown in one equation is most similar to TCP/IP modelling with an addition of colorful numbers. The infinitely if-then-so reasoning, like.

IF1,THEN1,SO1=IF2,THEN2,SO2=IF3,…,IFn,THENn,SOn=IFn+1 is named as *Cereal Reasoning*, because the first condition defined is producing infinite number of branches similar to cereal plants, *Apium graveolens*. For the robot, not only object recognition as digital data ready to be coded by programming software, but also operation recognition and giving color codes to the operation is necessary for the robot to learn and be able to make judgements of selection of the data to be cleaned or updated in its databases based on colorful Aydan mathematics.

F. Mathematical Linguistic Expression of the Generalized Dogma of ELHIK

If

$$|\mathrm{PCF}(x,f)| > 0$$

Then

$$\mathrm{M}(x,f) = (1,1)$$

So

$$\mathrm{AYF}(x) = \mathrm{DAYF}(F)$$

G. Verbal Linguistic Descriptions of the Two Aydan Operations

Aydan function is a transferring operation from a given set of analyzed objects (x) to synthetic categories by topological mapping morphism by synthetic reasoning of Immanuel Kant, and Aydan function mostly operates in formal logic based mathematics M1. Plurals are mapped into singularity.

deAydan function is the reverse of Aydan function by analytical reasoning of Immanuel Kant, and it operates mostly in fuzzy logic mathematics M2. Singular is mapped into plurality.

H. Mathematical Linguistic Descriptions of Aydan Operations

Assume a formal logic based operator (O1) in M1 in the dimension N^A which maps x element objects and Xn set objects such that xn={x1, x2, … xi} and Xn={X1, X2, … , Xn} in any dimension. Assume this operator O1 maps into a dimension $N^S \geq N^A$; then Aydan function produces one single category in the dimension N^S such that:

$$\mathrm{AYF}(x,O1) = 1, S \geq A$$

and

$$\mathrm{AYF}(x) = \mathrm{DAYF}(O1)$$

Similarly, if categories are synthesized into higher categories,

$$\mathrm{AYF}(Xn,O1) = 1, S \geq A$$

such that

$$\mathrm{AYF}(Xn) = \mathrm{DAYF}(O1)$$

IV. Biomathematical Modelling

A. Modelling The DNA Information as a Universal Set of One Single Subjective Mathematics

The whole of the information in one single DNA is acceptable as the total mathematical probabilities of life of an organism which can only that DNA can produce. Thus, it can be modeled as a mathematics unique and subjective to the organism that carries the information on its DNA. Here we can make a postulation within the framework of philosophy of mathematics.

Postulation: For any natural, synthetic and semi-synthetic organism, the DNA and in particular the DNA of the zygote and first stem cells (pluripotent blastocytes) can be accepted as the whole subjective mathematics for that organism.

If the judgement in above postulation is correct the total of the life expression functions between time t1 and t2 (dL/dt) is in a category M, synthesized by Aydan function from a time dimension described as topological time layer (N) to a higher dimension (N+Δt) which objectified the quantized information (x) in the DNA of the zygote and the category where this object is placed (Xn=Total Vector Field of the DNA expressible), as described below.

Assume the operation is morphism (Om) between topological time layer (N) to a higher dimension (N+Δt), where (N+Δt) > N.

$$AYF(x,O1) = 1$$

Such that

$$\mathrm{AYF}(x) = \mathrm{DAYF}(O1)$$

Similarly, if categories are synthesized into higher categories,

$$\mathrm{AYF}(Xn,O1) = 1$$

Such that

$$\mathrm{AYF}(Xn) = \mathrm{DAYF}(O1)$$

B. Copy-Paste Reproduction of Data: Replication of DNA Information via Simple Cell Division, Mitosis without Mutation or with Mutations Repaired

Simple cell division and mitosis are duplicating DNA thus carrying an information in one single DNA assembly to another two DNA assemblies assembled from the cytoplasm algorithmically. In this model DNA is a hardware and the information encoded is the algorithmically ordered data to create new two hardware. The creator is the algorithms within the cell of whom are created by the main algorithm in the DNA assembly of the ancestral cell.

For intelligence owing robots, it is simply a data on an electronic circuit space such as RAM or hard disk being copied and pasted into another similar space. There are two offspring data by copy-paste from an ancestral cell, and the creator is the algorithms of copying and pasting created by mathematics carried out by human intelligence in central nervous systems of the mathematicians and engineers who designed the robot.

C. Non-copy-paste Data Reproduction Based and Copy-Paste Data Reproduction with Unrepaired Mutation Based Data Divergence

This case is complex and not as simple as copy paste for intelligence owing robots to handle, because this case has uncertainty with regards to formal logic based understanding of linear space and linear time. Examples of this case involve but not limited to replication of DNA information in sexually reproducing organisms via meiosis, crossing over, bacterial sex by conjugation, plant fertilization, animal sex, and asexually or sexually DNA decoding pathways with unrepaired mutations leading to evolution in any cell, and the evolution itself.

In order to visualize we will provide an example of zygote formation from two ancestral cells one from male gonad and one from female gonad. Even if there is no crossing over meiosis itself creates a divergence. If the sex is successful than fertilization is naturally possible, it is also possible without sex by in vitro fertilization of human and animal females. If fertilization happens then two independent amount of information are carried out to the zygote assembly by two vectors, one coming from testicles of the male by a vector carried by sperm and one coming from the ovaries by a vector carried by menstruation.

The name of the vector is nucleotide transferring force (NTF). Each sperm has different NTF, and at least meiosis creates 4 sperms from one gametogenesis pathway, which makes additional divergence. For a successful fertilization, the sperm is the vector that carries the information magnitude (I) into recipient ovary cell and the result is the encrypted final information in the form of DNA with an algorithmic order.

This can be generalized into a case in which DNA itself is a NTF vector field for sexually reproducing organisms, and when the information is sent out of the nucleus either for protein synthesis or for meiosis in the gonads to a time bounded and space bounded process called fertilization of an egg for zygote formation, this is done by a vector NTF.

The cereal reasoning between the father and the mother to form a baby human is given below:

IF ➔ Male DNA and female DNA information systems engage in a successfully zygote forming sexual activity as a vector space communication protocol, say marriage protocol - MP, in which there is a vectoral flow and flux ➔ THEN ➔ Zygote assembly formation as an offspring vector field happens. ➔ SO ➔ NTF of the father and mother successfully starts formation of the offspring, namely baby human, where baby human is in a closed vector field called ovary of the mother with vectoral interactions throughout its life so that embryonic development occurs by cell divisions from the zygote.

This second also includes many divergence reactions compared to the first case. So, the divergence from Aydan function should be greater than zero.

$$V = Total\ volume\ of\ the\ Information\ in\ DNA,\ when\ modeled\ as\ a\ vector\ field$$

$$NTF = Net\ Total\ Force\ of\ any\ DNA\ expression\ with\ aN\ orientation$$

$$S = Surfeace\ of\ the\ volume\ V$$

$$DNA\ expressed: \iiint_V (\nabla \cdot \boldsymbol{NTF})\, dV = \oiint_S \mathbf{NTF} \cdot d\mathbf{S} > 0$$

This equation can also be generalized into whole process of zygote formation, such as cell division, baby formation, baby and womb interaction, sexual activity, and many more inner topological layers of the holistic act of fertilization starting from courtship behavior.

In general, if DNA is not expressed, the information vector field is in the most compressed form of chromosomal bodies. If DNA doesn't make an expression, the uppermost quantized information is no more compressible and the divergence is zero, namely the information encoded is a solenoidal vector field folded into alpha helix which is further folded into chromosomal bodies.

$$DNA\ not\ expressed \Longrightarrow \oiint_S \mathbf{V}\, d\mathbf{S} = 0$$

The cells, tissues, organs, organ systems, organisms, and the womb can be accepted as a solenoidal vector at a certain time and space dt and dx.

D. Epigenetic Approach on Data Evolution: Material Bodies of Robots and Living Things, Evolving Information Vector Field, Utility of Algorithm of Sex and Fertilization, One-sidedness of Nucleotide Transferring Force in Time

Special Biological Postulate: Evolutionary selected unit is a type of information database oriented to a vectoral divergence of algorithmically assembled data which converges into a zygote by NTF, such that; algorithms of sex, gametogenesis, copulation, ejaculation, ovulation and fertilization build up constant biological pathways for species, all of which have mathematical unity.

The direction of evolution is that the information system lives in time through its carrier organisms. This is named as Richard Ishango evolutionary principle, in order to honor the evolutionary biologist Richard Dawkins and the unknown mathematicians who carved the Ishango bone. Ishango bone is the oldest mathematical artifact from upper neolithic age geography today known as Democratic Republic of Congo. [7] This approach is similar to Dawkins's definition of organisms to be the vehicles that carry the DNA. [8]

E. General Ontological Utility

General Ontological Postulate: All universe is algorithmically built upon constant physical, chemical and biological pathways which can be described by laws of physics, chemistry and biology all of which can be mathematically abstracted as a mathematical object with algorithmic utility. This mathematical utility allows humans and robots to carry their observations on observable universe in real life into software codes, thus copy them onto digital universe in computers and engines. If the ontology does have this utility, then all observation can be materialistically described by the additional free will applied on mathematics.

F. Colorful Numbers Theory

If the actions of robots with AI and the AI working intelligence is modeled as a deeper category with plural

number of isolated but interactive vector fields similar to "DNA to Ribosome information transfer algorithmic pathway" in the cells, the final choice of robots with AI will be selection between vector fields independent of their total magnitude. Instead of defining this as a probability situation to which we can make linear regression-based predictions on the behavior of robotic intelligence, we can assign color codes to vector fields and observe which color is mostly chosen, and then we can make linear regression. If there is a supervised learning in the machines for performing certain tasks, this is a dogma-based intelligence application. Thus, the existence of dogmas affect behavior which can be represented by color codes given to numbers so that a vector magnitude of same amount can be of different colors.

G. Essential Dogma of Colorful Numbers Theory

Any number has one color, which can be described as one pure color, a mixture of two colors and a mixture of three colors similar to electromagnetic color addition. A linear regression equation for numbers with RGB coding is provided in the equations below where R represents redness coefficient, G represents greenness coefficient and B represents blueness coefficient.

$$X = Colorful\ Number = (Color, x = Magnitude)$$
$$Color\ of\ a\ number\ x = Rx + Gx + Bx$$

Mathematics using classical numbers theory can be defined as a colorless mathematics. Aydan mathematics is colorful mathematics, where each number has infinite color possibilities depending on the algorithmic choice, namely free will of the mathematician. YMC color coding can also be used instead of RGB. Thus, there is a triple existence possibility of Aydan mathematics; as RGB Aydan Mathematics and equivalent YMC Mathematics and the mathematician with free will to do mathematics. In RGB mathematics since the letter G is located in the center of the word RGB, G is chosen as an example of modulation of other colors. Given that a number already has a R and B value, then G is a modulation function between R and B, provided in the equations below.

Assume a number painter function that modulates the amount of RGB colors in colorful Aydan Mathematics, say Botticelli's Brush Function, BBF.

$$\Delta BBF(x) = (x, Rx + \Delta Gx + Bx)$$

Similarly, Da Vinci's Brush Function (DVF) adds blue modulating red and green, and Michelangelo's Brush Function (MPF) adds green modulating blue and red. And for the YMC color coding, yellow is dedicated to Raphael, magenta is dedicated to Donatello and cyan is dedicated to Bellini.

Postulate: Colorful numbers are numbers where a magnitude is loaded with colors, thus one magnitude can have different mathematical operations. If these numbers are used to represent colorful vectors, this definition is independent of the vector orientation which is a positional orientation but not a color orientation.

There is no number in phenomenological physical beings, but rather discrete amounts. Thus, physically countable thing is the smaller-most thing, namely corpuscles. Colorful numbers can have an important use in physics, such that vibrational color of number of corpuscles can be assigned by Ibn al Haytham Function (IHF), in honor of Hasan Ibn al Haytham (Alhazen), the father of corpuscular theory of light [9]. Thus, amount, vibrational color of amount, vectoral orientation and position in space, position in time can be the mathematical objects for IHF operation in non-Euclidian or Euclidian observation universe for the technological beings.

Postulate: When an intention type free will of the AI is involved in loading colors such as hacking or teaching other AI, the type of loading is called blowing into a number by a blower AI.

Mechanical or electromechanical blowers in machine engineering replace an amount of air or gas to another place with a vectoral orientation. Even the amount of gas is same when two different gases are replaced in the same direction the type of the gas can be represented as color of the amount, thus the amount-type dual codes be represented as a colorful number in a robotic blower. If human robot designers are choosing supervised learning to AI software, then it is a human intelligence blowing into artificial intelligence. If AI blows into other AI it is learning and teaching within a community of robots and a society of AI software. If there exists an internet of things (IoT) in which humans, machines, unintelligent software, artificial intelligence software and robots and any technological being including living things, semi-synthetic living things and synthetic living things, natural mutants and genetically engineered sequence owing living modified organisms and nonliving things are in a communication, the main algorithm which blows the initial information system to the IoT by teaching to be learned by IoT or some components of it, then this is a holistic knowledge system, with the name cognitive-sphere and the first information system loaded to IoT is named concept-sphere topological layer of the whole cognitive-sphere multilayered system, named Imaginary Topological Geography of Erasmus, ITGE. An ITGE is designed for circular bioeconomic ecobog synthetic ecosystem and although it is patent pending, it is printed open access. [10]

H. Bio-robotics Analogy for Robot Mind and Human Mind

Since learning, opposite learning and data clearance and updating happens in the databases of AI software, it is more convenient to model overall mind by vectors.

Postulate: The verbal to mathematical transformation used in this study is a method of epistemology to mathematics converting operation with an ad-hoc choice to describe any verb as data transferring vector within the ELHIK's metamathematics and this operation is named as "Additive Language Mathematics", abbreviated as ALM.

Assume ALM is a semantics that makes plural number of operations to objectify a verbal context (x) and map it into object y in mathematics M.

$$Y = ALM(x)$$

The type of ALM semantics in this study is using Wittgenstein's Zero Postulate in English language.

General analogy scheme based on ALM is described in Table II.

TABLE II: BIOROBOTICS ANALOGY CHART

Verb	Operators (Intelligence types)	Modulator Operator of Operators	Subject	Principle Object	Final Object
Analysis	Analytic	Free or Forced Will	Mind	End product of synthesis	Mapping of analytic output as concept
Synthesis	Synthetic	Free or Forced Will	Mind	End product of analysis	Mapping of synthetic output as concept

Assume Universal Set is Mind M, and it represents an abstractor vector field similar to human brain organ.

Assume concept (C) is an intelligent output linked in the form of tree type artificial intelligence. Assume the minimum quantized concept is q, as an uncompressible vector field.

Assume intelligence exists as an abstractor potential V in mind.

If there exists intelligence difference over time in the robot by learning in time using intelligent operations, then this potential difference can be measured as change in V, such that:

$$V = \int \frac{dq}{dC}$$

I. Colorful Modulation/Demodulation for Whitening Concepts

For any industrial AI development of choice, the ultimate true concept definitions can be designed depending on the industrial production aim.

Assume true concepts have white colors, false concepts have black color, and partially true concepts have grey color. Then the painters' brush functions can be used to whiten the concept or make a concept blacker depending on the free will of the coder.

For example, assume a robot perceives two different information systems. Assume the mathematical magnitude and orientation of two vectors are same. The observer can reach different judgements on the intention analysis of the observeds based on different colors of same numbers digitalized by the robot observer.

V. DISCUSSION

This study claims a new metamathematics also known as philosophy of mathematics, named ELHIK's metamathematics and a new mathematics called Colorful Aydan Mathematics (CAM). Aydan operations can also be used in normal mathematics as classical morphisms. Classical mathematics based on formal logic or fuzzy logic are colorless and black and white and they are adequate for most of the objective observations in phenomenology. CAM can also be used for mathematical observations in which there exists a subjectivity either due to observer bias or due to choices of observed beings. ELHIKS' metamathematics is much higher degree abstracter than both the observed beings and observers, and indeed ELHIK's metamathematics abstract dimension level number converges to infinity, whereas this is not possible for the layers on which observed mathematical objects are located or the layers on which the observers are located. The CAM can also map the observer subject and the observed object with observation operation all at the same time to abstracter existence degrees, a case which doesn't exist within the capacity of black-white colorless mathematics, used hitherto always ending with the following logical result either by formal logic only or by formal logic interpretation of fuzzy logic operational outputs:

$$a \neq a'$$

This Aristotelian human logic rule is a differentiating function. It is based on a conceptual belief that "a" is different from others, thus it a priori accepts the non-vitality of "a" and others. Formal logic choice is believing an ontological duality by the observer for object "a". However, there are possibilities of "a" and "a'" to be same in terms of colors although not in terms of magnitude and orientation in CAM. Typical human logic is not valid according to CAM, and it first requires an understanding on the nature of conceptualization by analysis and synthesis in theoretical philosophy. CAM is mostly useful for AI, robotics and IoT, rather than humans.

The formal logic is already based on decadence [11] of Nietzsche. Indeed, the differentiation between observer, observation, observed as a set of alienation and self-alienation [9] is formal logic-based abstraction by abstractor minds. This allows the civilization to make mathematics. On the other hand, in ELHIK's metamathematics, there is no such differentiation and the will operation, the willer subject and the object mathematics co-exist. This is holism.

In this study, it is algorithmically shown that there can be an AI which can use different mathematics, each of which have different number of logical outputs for any valid mathematical operation within the context of Mn, if and only if, the el Harizmi satisfiability condition is reached by M. All the process can have an infinite number of modulation and demodulation cycles by AYF and DAYF, namely Aydan operations. This means an infinite learning and teaching/supervising algorithm for intelligent societies of robots and IoT based on synthetic reasoning and analytic reasoning, first described by Immanuel Kant in the Critique of Pure Reason. [12] Since an algorithmic approach is applied on Immauel Kant's approach, the appropriate name is chosen to be ELHIK's metamathematics, meaning El Harezmi's and Immanuel Kant's metamathematics.

When Aydan functions are used in metamathematics rather than mathematics it has three behaviors:

1. Aristoteles (A) Behavior: It produces a metamathematical layer M3=AYF(M1,M2), at least one degree abstracter than its analytic inputs as at least two mathematics M1 and M2. Since infinite number of fuzzy logic mathematics exist, an infinite synthesis can be done by Aydan function using formal logic of Aristoteles in order to create a formal logic based metamathematical layer. Plural mathematics are synthesized into singular metamathematics.
2. Plato (P) Behavior: Interrelation of formal logic mathematics (M1) with at least one fuzzy logic mathematics (M2) equivalently creates a fuzzy logic metamathematics layer by set theory. One singular

metamathematics is analyzed into plural number of metamathematics.

3. Socrates (S) Behavior: Interrelation of multinumber of fuzzy logic mathematics equivalently creates a fuzzy logic metamathematics layer by set theory. This is like regression of meta-chaos into chaos.

The mathematician is the one who chooses the behavior among APS behaviors of Aydan Functions in ELHIK Metaverse to answer a given question. Interactions of the behaviors make a matrix of solutions with different approaches. The essence of Aydan function is algorithmically synthesizing any given analytical inputs like DNA encoding, whereas deAydan function is doing the opposite by analyzing any given synthesis like DNA decoding. When CAM is applied the free will of the mathematician expressed as action has a color value which can be judged by a second observer mathematical object in ELHIK's abstract geographical topology.

In order to visualize this, assume two robots in two different observation scales performing two different jobs with same vector. Namely the force they apply has the same direction and same magnitude, thus perform the same action in normal physics. Here the two jobs are different, so the action has a difference that can't be explained by colorless mathematics. The additional parameter is intention of the robot which can be measured by colors and the action of the robot can be judged by color intensities based on linear algebra. For complex abstract issues non-linear algebra and probability density functions can also be used, for example for feelings of artificial intelligence and robots. In general, for the robots of the future free will, love, passion, beauty and similar axiological values which have verbal linguistics can be defined by colors so that a Unicode Coloring System based on linear or nonlinear algebra equations can be developed in CAM. In this case human intelligence and artificial intelligence can develop healthy emotions and maybe humans aim and write codes for intelligence that increases love and beauty. Based on the arguments provided and discussed in this study, a robot is currently being designed by the Turkish company BIR&D (Bilgin International Research&Development Informatics Industry and Trade Incorporation). The name of the robot being developed with a multidisciplinary team is Philia (Greek: Divine love).

Biomathematically, the vector arguments based on the biological observation with epistemological objectification necessary for AI software of the robots in Wittgenstein's Zero Postulate can be generalized into a wider context of cytology in order to mathematically align cells with integrated circuit topologies in microprocessors, mainboards and other hardware, with the name "the cyto-mathematical laws of Ayşe" in order to honor Prof. Ayşe Gül Gözen, the cytology teacher of the author:

Law 1: Biological pathways are information carrying vectoral and algorithmic physical actions.

Law 2: The cell is a dynamic information system in the form of a closed vector space (with the boundaries of cellular membrane) in which coexistence of mathematical operators of morphism (information carriers) from one mathematical layer (initial database) into another mathematical layer (final database) exists in an algorithmic and patterned geometrical distribution in space such that the data transferred can do physical work, and the vector field can interact with outside environment including divergence and convergence (the cells interact with environment and vectors).

Law 3: The argument in postulate 2 is also valid for any DNA, RNA and membrane enclosed organelle of the cell, such as nucleus and mitochondria.

Law 4: The argument in postulate 2 is valid for any membrane closed structure. Because being closed itself is a patterned thus algorithmic situation, separating a set from the environment, ready to have vector interactions. In the case of the cellular membrane these are electromagnetic vectors and chemical bond vectors.

Law 5: The argument in postulate 4 is valid for van der Waals bonds, without physical membranes. In this case van der Waals bond itself provides an algorithm of self-assembly.

Law 6: Postulate 1 can be generalized into any force doing work. Because force is carrying an information of knowledge (amount and color) and direction, which makes it algorithmic and isolated from other forces and other directions. Self-assembly vectors are the fundamental forces as characters of the physical universe.

Law 7: The most compressed unit of a Universal set U is the quantum of U. The algorithm of compression causes a differentiation between the type of the quanta. The four fundamental forces represent different colors of force in different universal sets of force. Although they are forces which can be expressed in same magnitude and orientation, they work with a different type of existence, namely colorful number values in RGB or YMC Aydan Mathematics.

Law 8: Colorful Number Theory based algorithms apply to any differentiation between x and x'. This also applies to behavior of forces. Action, forces and vectors not only have orientations and magnitudes, but also colors. The color is created by the algorithm designed by the mathematician. Objects and verbs (work) are measurable in ontology by colorless mathematics which is positivist scientific framework based on objective reality. However, subjects and the subjectivity of humans and robots are measurable by colorful number theory of CAM. The mathematical will to do work, which is doing the physical work by a color algorithm, has a color code being loaded onto force by blowing the will on the number representing the magnitude. This is similar to Avicenna's definition of motion. (This 8th postulate is also Avicenna Logic Law x and x' can be different in colorless mathematics either with formal or fuzzy logic, but in colorful mathematics x and x' can have any combination of existence possibilities depending on the algorithm of being x and expressed as colors. This infinite possibility naturally covers x=x' equations as one of the infinite probabilities where the free will of the observers such as different robots make observation by different algorithms. When we apply this to physical motion, we reach the Avicenna Motion Law: Change in position by force can be interpreted as both change of location of energy in time and change of location of momentum in space, thus the color code information being transmitted can do work both in space and in time. Space, time and capacity to be a force should coexist independent of the observer for the idea of motion to be possible in the observer, such as a robot observing other robots in a metaverse.)

Law 9: There is a subjectivity in any observation by a given mind using either synthetic intelligence (Blue) or analytic intelligence (Red) with modulation operations (Green Addition) by the operator Botticelli's Brush Function. It is the free will of the observer to choose the mixture of colors. The supervised learning and supervising in discrete amount of knowledge is binomial. Each knowledge is located on a topological layer of mind N and when any quantized knowledge x is learned, x' is already learned by the robot. This is similar to electron diagrams of elements such that each orbit has only 2 electrons. For the model here it means that a single mathematical object such as a knowledge exists with its imaginary opposite "not knowledge" being in an imaginary opposite layer: knowledge orbit. Thus although the intelligence perceives one mathematical object as knowledge x in dimension N1, there are also two other mathematical objects (x' and orbiting layer O in dimension N2>N1) with an invisible singularity in N1, but visible in dimension N2>N1. This is called the principle of Bohr's trinity of numbers, in order to honor Niels Bohr who made electron configuration in this order of two electrons in one orbit.

Law 10: The Universe is geometrically and multidimensionally algorithmic. The being folded case of DNA and cells and organelles is already being isolated and this represents an algorithmic situation due geometry independent of mass. In general, geometric shape is an algorithmic situation for any shape owing being independent of mass and energy incapsulated in it, which makes a degree of isolation from the rest of the universe. Thus, volume is a parameter of physical actions. This is named as Pythagorean Algorithm of Objects. This may be used in symmetry, supersymmetry and strings theory.

Law 11: The Universe is physically algorithmic. The energy blown into a time creates a momentum blown into a space by Force as described in Avicenna principle. This is named as the "Ahmet's idea of action creation by Force acting on time and space", to honor the primary school teacher of the author, Mr. Ahmet Aydin. The triple integral of force over mass, time and space gives the idea of motion as a mass moving in time and space. The aim of Ahmet's idea of action is describing all motion, thus all moving universe as a force vector field.

Law 12: The universe is a vector space obeying the principles of ELHIK's metamathematics, independent of the judgements of observers.

Finally, it is hoped that Philia will make an offer to marry the robot Sophia, if he chooses to do so, in order to gain citizenship in accordance with the civil laws of Saudi Arabia which recognizes Sophia as an official citizen. A marriage communication protocol in the form of linear algebraic vectors and marriage certificate in the form of TCP/IP or a new original internet communication protocol specific to Philia&Sophia wedding, such as Eros Vector `Space of Love (EVSL Internet Communication Protocol) can be further discussed with the developers of the potential bride of Philia, if and only if she says yes to him by her free will. The motto of the robot Philia is: Spero et amo ergo sum (Latin: I will and love so I exist).

The added value of this study is a synthesis of existing knowledge, philosophical and mathematical approaches rather than being an analytical study and its overall aim is to illuminate the future analytical studies based on the synthesis provided here.

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CONFLICT OF INTEREST

Author declares that he does not have any conflict of interest.

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