

# Science's Dilemma – a Review on Science with Applications

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Actually, different views result in different models on things in the universe. We usually view a microcosmic object to be a geometrical point and get into the macrocosmic for finding the truth locally which results in a topological skeleton or a complex network. Thus, all the known is local by ourselves but we always apply a local knowledge on the global. *Whether a local knowledge can applies to things without boundary?* The answer is negative because we can not get the global conclusion only by a local knowledge in logic. Such a fact also implies that our knowledge on a thing maybe only true locally. *Could we hold on the reality of all things in the universe globally?* The answer is uncertain for the limitation or local understanding of humans on things in the universe, which naturally causes the science's dilemma: it gives the knowledge on things in the universe but locally or partially. Then, *how can we globally hold on the reality of things in the universe? And what is the right way for applying scientific conclusions, i.e., technology?* Clearly, different answers on these questions lead to different sciences with applications, maybe improper to the universe. However, if we all conform to a criterion, i.e., the coexistence of human beings with that of the nature, we will consciously review science with that of applications and get a right orientation on science's development.

## 1 Introduction

As is known to all that being is nature. Science discovers rulers on things existed in the universe with observable physical evidence. It is a systematic knowledge on the universe in the view of human beings. However, it enables human beings coexistence with the universe thousand million years. Today, it is the time to review science's function on reality of things in the universe with speculation on questions for science. For example, *does the science hold with the universe globally, or only partially? And what is the right application of science?* All the answers will push forward science, and establish a right view on its applications.

## 2 Nature's laws

Science is established on an assumption that “*the universe is operating in order*” which implies the existence of natural laws, i.e., the inherent law on the existence and motion of things in the universe but independent on humans. This assumption is general accepted by scientific community or human beings without questions. Now, a more basic but philosophical question in front of humans is that *could we really holds on natural laws without artificial conditions?* And furthermore, *is human's ability with or without boundaries?* Although there exist certain differences in the eastern and western cultures but the answer is the same, i.e., we can only stand in awe of and never destroy the nature, such as the *Platonism* in Plato's Dialogues: “*the universals exist independently of particulars*”, and the *Tao and Name* in Tao Te Ching: “*the Tao experienced is not the eternal Tao, the Name named is not the eternal Name; the unnamable is the eternally real and naming is the origin of all particular things*”. All of these

views conclude that the known natural laws are understood by human beings ourself. They are only laws in our eyes, maybe not the really natural laws.

*How do we understand the reality or establish the knowledge on a thing  $T$  in the universe?* We assume there is an abstract  $T$  defined by a conception, i.e., *name* distinguished from other things and usually identified  $T$  with known characters, gradually little by little and from time to time. For example, let  $\mu_1, \mu_2, \dots, \mu_n$  be the known on  $T$  and  $\nu_i, i \geq 1$  unknown characters at a time  $t$ . Then,  $T$  is understood by [1]

$$T = \left( \bigcup_{i=1}^n \{\mu_i\} \right) \cup \left( \bigcup_{k \geq 1} \{\nu_k\} \right), \quad (1)$$

a *Smarandache multispace* [2] or *parallel universe* [3] in logic at the time  $t$  on its connotation and extension, which also reveals the diversity or complexity on the reality of things  $T$ . Then, *what is thing  $T$  and what is its reality?* Philosophically, the reality of a thing  $T$  is nothing else but the state characters (1) of existed, existing or will existing things whether they can be or not observable or comprehensible by human beings at time  $t$ . Thus, we can only hold on  $T$  by its an asymptotic  $T^\circ = \bigcup_{i=1}^n \{\mu_i\}$  at time  $t$ , and deeply convince that  $T^\circ \rightarrow T$  if the time  $t \rightarrow \infty$ . This is the essential notion that natural laws can be understood, i.e., establishing science of humans.

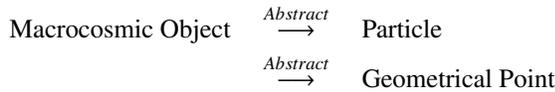
## 3 Science's limitation

As humans enter the 21st century, science has made great achievements both in theory and its applications. It greatly improved the ability to respond of natural disasters, brings more and more conveniences to human life. In fact, science

is the systematic knowledge with continuously improvement on asymptotically natural laws dependent on observation and speculation of ourself, maybe with the aid of instruments. Certainly, different standings for the observer will result in different observations, i.e., the macrocosmic or the microcosmic which result in different speculating models.

### 3.1 Macrocosmic object

A macrocosmic object is large enough to be visible by the naked eyes of humans. For knowing the behavior of macrocosmic objects, the observer only needs to stand out of the observing object, holds on the overall situation, i.e., its outside behavior, particularly, planetary motion which establishes classical mechanics. It should be noted that the thinking pattern of classical mechanics is essentially



with 2 assumptions, i.e., ① there exists an abstract geometrical space  $\mathbb{R}^3 \times \mathbb{R}$  in the universe, and ②, all physical quantities can be accurately measured by humans.

As is known to all, the classical mechanics is applying only to those of objects  $A$  moving at low speeds, characterizing an object of quality  $m$  by a pair  $\{\mathbf{x}, \mathbf{v}\}$ , where  $\mathbf{x}$  is the coordinates of  $A$  with a directed velocity  $\mathbf{v}$  at points  $\mathbf{x}$ . For example, if  $A$  moves in a conservative field with potential energy  $U(\mathbf{x})$ , then the force acting on  $A$  is  $\mathbf{F} = -\frac{\partial U}{\partial \mathbf{x}} = m\ddot{\mathbf{x}}$  by the second law of Newton, and generally, the Euler-Lagrange equations [4]

$$\frac{\partial L}{\partial x_i} - \frac{d}{dt} \frac{\partial L}{\partial \dot{x}_i} = 0, \quad 1 \leq i \leq n \quad (2)$$

in  $\mathbb{R}^n$  for the Lagrangian  $L = T - U$  of  $A$ , where  $T(\mathbf{x})$  is the moving energy of  $A$ .

Although it is on macrocosmic objects, the classical mechanics found the intrinsic essence of motion, i.e., force. For example, Newton realized the gravity by an apple fell on his head from a tree and proposed the law of universal gravity  $F = G \frac{M_1 M_2}{R^2}$  between 2 bodies with masses  $M_1$  and  $M_2$  respectively, where  $R$  is the distance of the 2 bodies and  $G$  the constant of universal gravity. Although Newton's law is an approximation of gravity, it is useful in aerospace engineering. By this law, we have known the cosmic speeds surround the earth, escaped from the earth or the solar system are respectively 7.9 km/s, 11.2 km/s and 16.7 km/s which enables launching satellites for space exploration and communication of humans.

By the general relativity, i.e. *all the laws of physics take the same form in any coordinate system* and the equivalence principle, i.e., *there are no difference for physical effects of*

*the inertial force and the gravitation in a field small enough*, Einstein presented the gravitational equations

$$R_{\mu\nu} - \frac{1}{2} g_{\mu\nu} R = \kappa T_{\mu\nu}, \quad (3)$$

where,  $T_{\mu\nu}$  is the energy-momentum tensor,  $R_{\mu\nu} = R^{\alpha}_{\mu\alpha\nu} = g^{\alpha\beta} R_{\alpha\mu\beta\nu}$ ,  $R = g^{\mu\nu} R_{\mu\nu}$  are respectively the *Ricci tensor*, *Ricci scalar curvature* and  $\kappa = \frac{8\pi G}{c^4} = 2.08 \times 10^{-48} \text{ cm}^{-1} \text{ g}^{-1} \text{ s}^2$ .

Clearly, an immediate application of Einstein's gravitational equations is on the spacetime structure of the universe. For example, if it is in vacuum, i.e.,  $T_{\mu\nu} = 0$ , the Einstein gravitational equations were solved due to the assumption of spherically symmetric distribution of matters and get the Schwarzschild metric  $d^2s = g_{\mu\nu} dx^{\mu} dx^{\nu}$  by

$$d^2s = -c^2 dt^2 + a^2(t) \left[ \frac{dr^2}{1 - Kr^2} + r^2 (d\theta^2 + \sin^2 \theta d\varphi^2) \right] \quad (4)$$

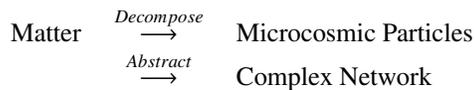
with  $g_{tt} = 1$ ,  $g_{rr} = -\frac{R^2(t)}{1 - Kr^2}$ ,  $g_{\phi\phi} = -r^2 R^2(t) \sin^2 \theta$ , which also predicts the existence of black hole in the universe. Combining the cosmological hypothesis, i.e., *there are no difference at different points and different orientations at a point of the universe on the metric*  $10^4 \text{ L.y.}$ , Friedmann presented the *Standard Model on Universe* which resulted in the *Big Bang theory* in thirties of the 20th century and the scenario of the universe, i.e., it has a beginning.

Certainly, classical mechanics successfully explains a few astronomical phenomena, particularly, the planetary motion laws in front of humans thousands years. However, it is only an interpreting on the extrinsic behaviors but difficult on the internal cause, the basis for the change of objects. Today, we have known there is an additional assumption on a moving object in classical mechanics, i.e., all parts of the object are moving in coherence or synchronization. It is this assumption that can not enables humans globally understanding the nature of objects because the non-coherence, i.e., contradiction is the general but the coherence is the special, and all of us know that it is the contradiction or non-coherence pushes forward the change of things. Thus, holding on the nature of an object enables human's observation entering the microcosmic world with the aid of instruments and exploring microcosmic behavior of objects, i.e., microcosmic particles.

### 3.2 Microcosmic particle

A matter can be always divided into submatters, then sub-submatters and so on. A natural question on this subdividing is *whether or not it has a terminal point?* The answers are the same both for the Easterners and Westerners. For example, the ancient Chinese had a notion that *everything is composed by five elements, i.e., metal, wood, water, fire and soil* and also, the notion that *everything is composed entirely of various imperishable, indivisible elements*, i.e., there exist atoms in Atomism of Leucippus and Democritus, which finally results in the structure theory on matters. Today, it is already

a public knowledge that all matters are made up of atoms, i.e., microcosmic particles composed of nucleus with electrons. There are 118 atoms known by humans which consist of known matters on the earth. Generally, we understand a matter by the composite of elementary particles with a thinking pattern following



where the complex network is an inherit structure of the matter on microcosmic particles and different subjects discuss microcosmic behaviors of particles.

### 3.2.1 Physics

Clearly, the subdividing on a matter can be done infinite times just like the claim that “*it will be never exhausted if you cut half on a stick each day*” on World Chapter of Zhuang Zi in the ancient China. However, this process can not be applied to hold on matters because the life time of a human is not infinite. The motivation of particle physics is to determine the nature of irreducibly smallest detectable particles [5], called *elementary particles* such as those of *fundamental fermions* including quarks, antiquarks, leptons, antileptons and *fundamental bosons* including gauge bosons, Higgs boson and the *fundamental interactions* for explaining their behavior and then, the origin of the universe. Certainly, there are also un-matters between a matter and its antimatter which is partially consisted of matter but others antimatter [6]. However, the behavior of a microcosmic particle maybe indefinite. It is this character that results in humans characterizing microcosmic particles by wave function, a complex-valued probability amplitude.

In the non-relativistic quantum mechanics, we know that the wave function  $\psi(t, x)$  of a particle of mass  $m$  obeys the Schrödinger equation

$$i\hbar \frac{\partial \psi}{\partial t} = -\frac{\hbar^2}{2m} \nabla^2 \psi + U \quad (5)$$

with the Planck constant  $\hbar = 6.582 \times 10^{-22}$  MeVs and the potential energy  $U$  of field which characterizes the behavior of microcosmic particles.

Certainly, physics has promoted the progress of human society with the deeply understanding of matters from the macrocosmic to the microcosmic such as those of the applications of steam engine, the electricity with radio communication, nuclear energy, laser, electronic computer technology and so on. We seriously conclude that if there were no the development of physics, there would be no other sciences and no modern life of humans.

### 3.2.2 Chemistry

According to the notion that chemical compounds are not a random but rather definite one of atoms, the chemistry determines the composition, structures and properties of matters, particularly on atomic and molecular systems for the pattern and multiplicity of bonding between atoms in a molecule for explaining chemical reactions of matters. Although physics and chemistry are both on the structure of matters, the chemistry discusses the coarse-graining particles, i.e., atoms and molecules with chemical dynamics on rates of chemical reactions, but not on the fermions, bosons and their interactions.

Chemistry is beneficial for humans with a core topic, i.e., *how to create new matters to meet the needs of our daily life* in its developing. If there were no chemistry there would be no modern life of humans. For example, the chemical fertilizer increases the production of crops for maintaining the survival of population, the chemical pesticides kill insects harmful to crop growth, the medicines heals the sick with life extended, the plastics and synthetic fibers are used both in industrial and consumer products such as those of keyboard, mouse, plastic cup, slippers in our daily life, machinery, electronic appliances, automobile products, and furthermore, the dynamite, bombs and missile in military. None of them is not the application of chemistry.

### 3.2.3 Biology

Historically, biology is the oldest subject with the development of science in natural philosophy because humans ourselves is also one specie of livings on the earth. Observation enables humans held on the elementary rotate regulation of plants on seasons, i.e., *spring germination with harvest or leaves fallen in autumn* and the reproduction regulation of humans and other animals such as “*pregnancy 10 months with childbirth in a day*” of humans, enables humans living together with the nature in about 5 million years. Certainly, the birth and the death are the two sides but all of us wish to hold on the laws of livings with production, the central issues of biology.

According to the notion that the basic unit of life is cell, the basic unit of heredity is genes and all life on the earth changes and develops through evolution, biology is such a science that on the life and living organisms respectively at molecular, cell, genes and heredity with variation levels and the process of grow and developing. Certainly, all major issues in the developing of humans society such as those of population growth, food safety, health, environmental pollution and resource depletion have a closely relationship with the life sciences. The project on human genome puts into effect with development will enables humans understanding the mechanism of growth, development, physiological activities and pathogenesis of diseases, which provides methods of prevention and control strategies on diseases of human bod-

ies, particularly, the gene and cell engineering. For examples, the transgenic technology can improve the crops resistance to insects for solving the pesticide residue problem and improving the quality of agricultural products; the antigen gene can be applicable to the production of edible crop vaccine; the animal organs can be transplanted into a human body to play the role of such human organs, the cloning technology can detectable the fetal genetic defects, treats the injury of nervous system, achieves the asexual reproduction and saves the endangered species; the gene editing can correctable the defective gene for the treatment; the gene engineering can be applicable to the environmental governance for recycling the pesticides and industrial wastes, and the large-scale animal cell culture can produce vaccines, breeds good varieties, detects the difference between virus strains and identifies the bacterial species for disease treatment, . . . , etc.

### 3.3 Science's limitation

However, all scientific conclusions of humans hold on conditions. *Is there such a scientific conclusion constraint without conditions?* The answer is negative both in theoretical and experimental sciences because of the boundary of humans. For example, all theorems are true with an obvious or implication that “*if p then q*” in mathematics. Even if the elementary conclusions  $1 + 1 = 2$ ,  $1 \times 2 = 2$  known by pupils is such one only because they are implicit, i.e., “*if  $1, 2 \in (\mathbb{Z}; +, \times)$  then  $1 + 1 = 2$  and  $1 \times 2 = 2$ ”*, where  $(\mathbb{Z}; +, \times)$  is the integer ring.

Similarly, we have known that sciences such as those of physics, chemistry, biology on a matter  $T$  by the macrocosmic are on its external behaviors with an additional assumption that all of its microcosmic particles are synchronous because it is abstracted to be a point with relatively external motion in space. We conclude that force is the internal factor of motion, creates new matters by chemistry and apply bionics to enrich human's living by simulating other creatures to conform to the nature.

All of us known that the external causes operate through internal factor but a scientific conclusion on a matter  $T$  by the microcosmic is only partial or local nature because  $T$  is a complex system or a complex network in the thinking pattern. Until today, we lack of effective methods, even lack of such a mathematics on complex network or complex system which can not enable us hold on the whole matter  $T$  in theory unless all its microcosmic particles are in synchronization. So, we have only an incomplete or non-comprehensive science for things in the universe which is the limitation of human's science, an immediate conclusion of formula (1), i.e., the boundary of humans. In this case, we can hardly conclude that a scientific conclusion is true in the whole universe because it is understood only by humans ourselves, an intelligent creature happily born on the earth and it is a conclusion on known or unknown conditions.

## 4 Science's dilemma

### 4.1 Reality

Science's function is to understand the reality of things  $T$ , i.e., their state of existed, exists or will exist in the universe, whether or not they are observable or comprehensible by humans. However, this is difficult from the limitation of science because all scientific conclusions of humans are true constraint with conditions. They are locally or partially true, not freely with conditions or on the whole universe because we hold it little by little with an asymptotic  $T^\circ$  of  $T$ , not  $T$  itself at a time  $t$  by formula (1). Usually, the physical laws are characterized by differential equations. Even for physical reality with differential equations, there are also 3 simple but basic questions should be answered.

**Question I** *Could a special solution be applied to the whole universe?*

The answer to Question I is obviously negative unless the equations have a unique solution but there are not this case in most cases. For example, Schwarzschild spacetime (4) is a special solution of the Einstein's gravitational equations (3) in an assumption that all matters are spherically symmetric distributed in the universe with  $T_{\mu\nu} = 0$  or vacuum. It is this kind of spacetimes that the standard model, the Big Bang hypothesis and black holes born on the universe. We are applying a special solution for characterizing the universe and believe it without a shadow of doubt in any place of the universe. However, there are infinite many solutions of Einstein's gravitational equations [7, 8]. But why the Schwarzschild spacetime was selected only for the universe because we are all fond of the symmetry and the uniformity on space, and we are firmly believing the spacetime structure of the universe should be so by observed datum of humans, at least in the nearby airspace of the earth.

**Question II** *Are the reality of things  $T$  really one of solutions of its equations?*

Science is established on an assumption that the reality or all behavior of a thing  $T$  can be characterized by mathematics, particularly, the second order differential equations in physics. However, the observation shows that a microcosmic particle is in two or more possible states of being, i.e., superposition such as the asking question of Schrödinger for the alive or dead of the cat in a box with poison switch. We can not even say which solution of Schrödinger equation (5) is the behavior of the particle because each solution is only one determined state in the eyes of humans.

Certainly, a reasonable or the multiverse interpretation on superposition of particles was presented by H. Everett in 1957. He explained the superposition of particles with an assumption that the wave function of an observer would be interacted with a superposed object [9] and concluded that different worlds in different quantum systems obey equation (5) with an interpretation that the superposition of a particle

develops like a 2-branching universe. Thus, the answer of Question II is uncertain even if  $T$  is a microcosmic particle.

Today, it is just the Everett’s multiverse interpretation on Schrödinger’s cat enlightens humans known that the alive or dead of the cat is entangled and we can not say the cat is alive or dead separately. Philosophically, the Everett’s multiverse notion on the superposition of particles is alluded in a famous fable, i.e., *the blind men with an elephant* or the formula (1). Today, this notion revolutionized changes an ambiguous interpretation that the reality of a thing  $T$  must be one but maybe all solutions of its differential equations and applies extensively to modern sciences. For example, it is the quark model that successfully classified all known elementary particles by mathematical symmetry but the quark model is indeed a multiverse and generally, all particles are nothing else but a multiverses [3] or complex networks in the microcosmic view.

**Question III** *Could the mathematics already characterizes the reality of things  $T$ ?*

There is an exciting convincingness that mathematics can already characterizes the reality of all things, i.e., *Everything is Nothing Else but Mathematics* popularly in scientific community today, particularly, the *Mathematical Universe Hypothesis* in physics, a duplication of Pythagorean’s assertion that “*Everything is a Number*”. However, this notion is incorrect at least for today’s mathematics because all mathematical systems should be homogenous without contradictions in logic. We can not conclude the equality

$$\text{Mathematical reality} \xleftrightarrow{\text{equal to}} \text{Reality of things}$$

both in theory and practice. For instance, let  $H_1, H_2, H_3, H_4$  and  $H'_1, H'_2, H'_3, H'_4$  be two groups of horses constraint with running on respectively 4 straight lines

$$\textcircled{1} \begin{cases} x + y = 2 \\ x + y = -2 \\ x - y = -2 \\ x - y = 2 \end{cases} \quad \text{or} \quad \textcircled{2} \begin{cases} x = y \\ x + y = 4 \\ x = 2 \\ y = 2 \end{cases}$$

on the Euclidean plane  $\mathbb{R}^2$ . Clearly, the first system is non-solvable because  $x + y = -2$  is contradictory to  $x + y = 2$ , and so that for equations  $x - y = -2$  and  $x - y = 2$  but the second system is solvable with  $(x, y) = (2, 2)$ . *Could we conclude that the behavior of horses  $H'_1, H'_2, H'_3, H'_4$  are a point  $(2, 2)$  and  $H_1, H_2, H_3, H_4$  are nothing?* The answer is certainly not because all of the horses are running on the Euclidean plane  $\mathbb{R}^2$  but we have known nothing by the solution of the two equation systems because the solvability of systems  $\textcircled{1}$  and  $\textcircled{2}$  only implies the orbits intersection in  $\mathbb{R}^2$ .

*Why is this happening?* It is because that while humans characterize a thing  $T$  in the universe by mathematics, it is usually complied with the compatible assumption of mathematics on  $T$  and often forgotten the original intention, i.e.,

hold on the reality of things  $T$  but have too much trust on the mathematical solution. Consequently, mathematics should be extended to include the non-mathematics for reality of things in the universe [1] because the contradictions exist everywhere in the eyes of humans. We can not conclude yet that mathematics can characterizes the reality of all things  $T$  in the universe until today.

### 4.2 Science’s dilemma

Science’s limitation naturally leads to a dilemma of science immediately. It gives the knowledge for humans but the knowledge is local or partial on things in the universe which always shows dual characters to humans, i.e., the beneficial or the harmful. However, it is easy to overstate the benefits but look without sees harms on a scientific achievement in a business community today. In this case, it is easy to breed the human’s insatiable desires with immoderately abusing scientific achievements, and then brings a disaster finally to humans ourselves if it applies without constraints, particularly motivated only by the benefits of commercial interests. All of the harms come from the misunderstanding on science and incorrect applications of scientific achievements such as those cases following.

Physics has promoted the progress of humans but it also brought harmful things to human’s living environment. For example, it pushes forward the aerospace industry which enables the exploration of humans on outer space. However, more and more satellites, space stations, probes, rocket debris and explosive fragments, working or abandoned are floating in space, disturbing the normally working of universe and also threatening the further exploration of humans because the aircraft maybe collided with such an indefinable trashes in the space. Even in the daily life of humans we can also find the harms of applying physics. For example, the communicant equipments and facilities such as those of mobile phone, radio, TV station, microwave station bring convenience to humans but the radiate electromagnetic signals into space from time to time. However, it impacts on the health of humans, tested by the practice.

Chemistry has created new matters to meet the needs of humans but it caused complex problems simultaneously with its benefits to humans, for instance the environmental pollution, the resource depletion, the side effects of drugs, the pesticide residues and the lethal diseases such as cancer prevalence. Why these unpleasant things happen is because we have only a superficial understanding the fate, transport, toxicity on chemical products and without a comprehensive conclusion for their impacts on the environment and humans. For example, the plastics enables us protecting from wet but can not be degraded shortly by the nature, and we do not know the mechanism of accumulation of the pesticides in the food chain with impact on humans [10] until today.

Biology has brought benefits to humans but it presented

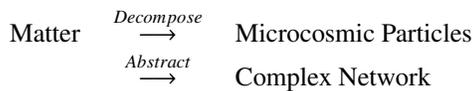
negative effects also to humans at the same time. For examples, the transgenic technology improved the resistance of crops but destroys those insects that feed on these pests which breaks the ecological chain, results in the structural change and deterioration of soil and the water pollution; the eating transgenic food maybe caused the modified gene invades human cells, produces pathogenic virus and harmful or lethal results including cancer and other negative effects; the cloning technology impacts on the nature and the social morality. Although the gene editing corrected or removed defect genes but will affects the normal functions of other cells at the same time, and while it reducing the genetic variation it maybe destroys a species just because of one disease, i.e., it increases the risk of infectious diseases and hypimmunity or loss of other functions.

### 4.3 Out of dilemma

There are 2 sides for getting out of science’s dilemma. One is the establishing of science in microcosmic level, i.e., *Microcosmic Science* for a complete understanding of things in the universe and two, is the self-awareness of human’s ourself, the essence for out of the crisis.

#### 4.3.1 Microcosmic science

As we know in the thinking pattern



the reality of a thing  $T$  is the behavior with motivation of an abstracted complex network in the microcosmic level. Certainly, there are more microcosmic observing datum on the units, cells or microcosmic particles of matters by scientific instruments. Each of them appears in a space position at observing time and all of them are interrelated, for instance all cells in an animal. A microcosmic science is such a science established on the microcosmic datum of matters, including theory and experimental subjects. It must be established over 1-dimensional skeleton, i.e., topological graphs  $\vec{G}$ . However, we have no effective tools or methods, even no mathematics for such a work. Even though there is graph theory in mathematics but it is essentially discussing on binary relationship of elements without metrics, can not be immediately applied to understand the reality of matters, particularly, the microcosmic science.

*Could we establish such a mathematics over topological graphs for microcosmic science?* The answer is positive inspired by traditional Chinese medicine. Certainly, there are 12 meridians which completely reflects the physical condition of human body in traditional Chinese medicine [11], i.e., the lung meridian of hand-TaiYin (LU), the large intestine meridian of hand YangMing (LI), the stomach meridian

of foot-YangMing (ST), the spleen meridian of foot-TaiYin (SP), the heart meridian of hand-ShaoYin (HT), the small intestine meridian of hand-TaiYang (SI), the urinary bladder meridian of foot-TaiYang (BL), the kidney meridian of foot-ShaoYin (KI), the pericardium meridian of hand-JueYin (PC), the sanjiao meridian of hand-ShaoYang (SJ), the gall bladder meridian of foot-ShaoYang (GB), the liver meridian of foot-JueYin (LR) in *Standard China National Standard* (GB 12346-90).

Notice that maintaining the balance of Yin ( $Y^-$ ) with that of Yang ( $Y^+$ ) is the foundation of Chinese culture, particularly on a healthy human body. According to the view of traditional Chinese medicine, if there exists an imbalanced acupoint on one of the 12 meridians this person must has illness and in turn, there must be imbalance acupoints on the 12 meridians for a patient. Thus, finding out which acupoint on which meridian is imbalance with  $Y^-$  more than  $Y^+$  or  $Y^+$  more than  $Y^-$  is the main duty of a Chinese doctor. Then, by the natural ruler, i.e., *reducing the excess with supply the insufficient* of the universe, the doctor regulates the meridian by acupuncture or drugs so that the patient recovers balance on the imbalance acupoint [11], which is the essential treatment of traditional Chinese medicine.

Although a matter can be infinitely subdivided into sub-matters, the success of traditional Chinese medicine implies that there exists an inherited a topological skeleton or graph  $G$  in things, particularly, human body in the universe. By view of biology, there are only 2 kinds of things, i.e., living or death body which suggest 2 mathematical elements holding with conservation laws for things in the universe in the microcosmic level following:

**Element 1** (Non-Living Body). A continuity flow  $\vec{G}^L$  is an oriented embedded graph  $\vec{G}$  in a topological space  $\mathcal{S}$  associated with a mapping  $L : v \rightarrow L(v)$ ,  $(v, u) \rightarrow L(v, u)$ , 2 end-operators  $A_{vu}^+ : L(v, u) \rightarrow L^{A_{vu}^+}(v, u)$  and  $A_{uv}^+ : L(u, v) \rightarrow L^{A_{uv}^+}(u, v)$  on a Banach space  $\mathfrak{B}$  over a field  $\mathfrak{F}$  with  $L(v, u) = -L(u, v)$ ,  $A_{uv}^+(-L(v, u)) = -L^{A_{uv}^+}(v, u)$  for  $\forall (v, u) \in E(\vec{G})$  and holding with continuity equation

$$\sum_{u \in N_G(v)} L^{A_{vu}^+}(v, u) = L(v) \text{ for } \forall v \in V(\vec{G}).$$

**Element 2** (Living Body). A harmonic flow  $\vec{G}^L$  is an oriented embedded graph  $\vec{G}$  in a topological space  $\mathcal{S}$  associated with a mapping  $L : v \rightarrow L(v) - iL(v)$  for  $v \in E(\vec{G})$  and  $L : (v, u) \rightarrow L(v, u) - iL(v, u)$ , 2 end-operators  $A_{vu}^+ : L(v, u) - iL(v, u) \rightarrow L^{A_{vu}^+}(v, u) - iL^{A_{vu}^+}(v, u)$  and  $A_{uv}^+ : L(v, u) - iL(v, u) \rightarrow L^{A_{uv}^+}(v, u) - iL^{A_{uv}^+}(v, u)$  on a Banach space  $\mathfrak{B}$  over a field  $\mathfrak{F}$ , where  $i^2 = -1$ ,  $L(v, u) = -L(u, v)$  for  $\forall (v, u) \in E(\vec{G})$  and

holding with continuity equation

$$\sum_{u \in N_G(v)} (L^{A^+_{vu}}(v, u) - iL^{A^+_{vu}}(v, u)) = L(v) - iL(v)$$

for  $\forall v \in V(\vec{G})$ .

Notice that if we let the Banach space to be  $\mathfrak{B} \times \mathfrak{B}$  then the Element 2 is only a special Element 1 with complex vector. However, it reflects living bodies with respective real, imaginary parts  $L(v, u)$ ,  $-L(v, u)$  appearing in pair. If one lost then the counterpart is no longer exists, i.e., it is depth. This notion can be also used to explain the entangled state, i.e., the alive or dead of Schrödinger’s cat in the box by a complex state  $A - iA$  in such a way that alive for an  $A \neq \mathbf{0}$  but dead if  $A = \mathbf{0}$ .

According to the structure of the 12 meridians on human body, we can classify them into 3 classes, i.e., *paths*: LU, LI, SP, HT, SI, KI, PC, LR; *trees*: GB, ST, SJ and a circuit attached with 2 paths  $P_{m_1}, P_{m_2}$ : BL. Define an oriented graph

$$\begin{aligned} \vec{G} = & P_{11}(LU) \cup P_{20}(LI) \cup P_{21}(SP) \cup \\ & P_9(HT) \cup P_{19}(SI) \cup P_{27}(KI) \cup \\ & P_9(PC) \cup P_{14}(LR) \cup T_{44}(GB) \cup \\ & T_{45}(ST) \cup T_{23}(SJ) \cup G_{67}(BL) \cup \\ & P_{28}(DU) \cup P_{24}(RN) \end{aligned}$$

with orientations:

$$\text{chest} \rightarrow \text{hand} \rightarrow \text{head} \rightarrow \text{foot} \rightarrow \text{chest}$$

in human body and  $L : v \in V(\vec{G}) \rightarrow L(v) - iL(v)$  and  $L : (v, u) \in E(\vec{G}) \rightarrow L(v, u) - iL(v, u)$ , where  $DU$  and  $RN$  are respectively the DU and REN meridians on human body,  $P_n(X), T_n(X)$  and  $G_n(X)$  denote the path, tree or graph of meridian of order  $n$ . Then,  $\vec{G}^L$  is nothing else but a harmonic flow equivalent to human body by the view of traditional Chinese medicine, a kind of Element 2 of order 361.

As shown in references [7, 8, 12, 13], the Elements 1 and 2 can be applied to characterize the behavior of things  $T$  in the universe with  $\vec{G}^L$  a globally mathematical elements in the sense that if  $\mathfrak{G}$  is a closed family of graphs under union operation,  $\mathfrak{B}$  is a Banach or Hilbert space, then all Elements 1 or 2, i.e.,  $\vec{G}^L$  with  $\vec{G} \in \mathfrak{G}$  respectively form a Banach or Hilbert flow space and closed under the action of differential and integral operators with a few generalized theorems in functionals. Particularly, they can be used to characterize the dynamic behavior of things  $T$ , living or non-living bodies in the universe by Euler-Lagrange equations

$$\frac{\partial \vec{G}^L}{\partial \dot{x}_i} - \frac{d}{dt} \frac{\partial \vec{G}^L}{\partial \dot{x}_i} = \mathbf{0}, \quad 1 \leq i \leq n$$

where,  $\vec{G}^L$  is the harmonic or continuity flow inherited in  $T$ ,  $L(v, u)$  is the Lagrangian on edge  $(v, u)$  and  $\mathbf{0}$  is the zero-flow  $\vec{G}^0$ , i.e., a labeling  $\mathbf{0} : (v, u) \rightarrow \mathbf{0}$  for  $(v, u) \in E(\vec{G})$ .

### 5 Human self-awareness

The original intention of science is to understand things in the universe, promote the survival and development of humans ourself and then, construct a harmonious system of humans with the nature. Historically, human’s experience verified times that the more intruding with higher damage of humans on the nature, the more serious nature’s punishments on humans society are. The leader is nothing else but humans ourself in the couple of humans and the nature. As discussed in the previous. Science has itself limitation and all of its achievements is only the local or the partial, and what humans gotten maybe always a local conclusion on the reality of things in the universe. For example, humans have not really understood the internal and external mechanism of planets, only hold on their’s laws by observations. In this case, discussing the capture of asteroids for energy or human alien migration is not realistic, and the result in harming to the universe is immeasurable.

Hence, science needs returning to a rational research on the respecting with protecting of the nature, and abandons the idea that humans are the center and wish to govern the universe by a limited understanding. Furthermore, we are need also to distinguish a scientific research is for human survival with development or only serves to human’s enjoying because the later is causing the loss of human’s natural instincts sometimes. Science should returns to the theme of harmonious development of humans with the nature. While researching a scientific problem, it should takes more times on the maybe harming to humans and to the universe with extents for its application. In this case, *is to discuss the destruction of the earth then migrates to other planets or develops with the earth?* In addition, *is to research the destruction of our universe and then migrates to other universes?* The answer is obvious because we have only one earth and one universe on which we live. It can be only harmonious with but not destroying the earth or the universe if we would like to a sustainable developing. Even if it were necessary to exploit the resources of the earth or the universe, we should also be minimized the natural intrusion and maximized the use of natural resources constraint with a model of circular development.

We have faced survival problems such as those of population growth, food safety, health, environmental pollution and resource depletion today. However, the greatest crisis facing humans is not the poverty or unfair allocation of natural resources but the greed with ignorance, and hopefully to govern the universe by our own understanding or a realization dependent on local or partial perception of the nature, particularly, the abusing of scientific achievements such as those of the overdevelop or overuse of resources, vehicles, internet,

farm chemicals and biological products. The main step for out of the crisis needs the human self-awareness, i.e., abandoning their arrogance and developing harmoniously with the nature because we have only a local or partial understanding for reality of things in the universe. Even though we have established science on things  $T$ , it is only an understanding of humans ourself on the earth, maybe not the reality of things in the whole universe. Thus, the only viable way for human's continually generations is to develop with the nature.

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## References

1. Mao L. Mathematics on non-mathematics - A combinatorial contribution. *International J. Math. Combin.*, 2014, v. 3, 1–34.
2. Smarandache F. *Paradoxist Geometry*, State Archives from Valcea, Rm. Valcea, Romania, 1969, and in *Paradoxist Mathematics*, Collected Papers (Vol. II), Kishinev University Press, Kishinev, 5–28, 1997.
3. Tegmark M. Parallel universes, in *Science and Ultimate Reality: From Quantum to Cosmos*, ed. by J.D. Barrow, P.C.W. Davies and C.L. Harper, Cambridge University Press, 2003.
4. Mao L. *Combinatorial Geometry with Applications to Field Theory*. The Education Publisher Inc., USA, 2011.
5. Nambu Y. *Quarks: Frontiers in Elementary Particle Physics*. World Scientific Publishing Co. Pte. Ltd, 1985.
6. Smarandache F. and Rabounski D. Unmatter entities inside nuclei, predicted by the Brightsen nucleon cluster model. *Progress in Physics*, 2006, no. 1, 14–18.
7. Mao L. Extended Banach  $\vec{G}$ -flow spaces on differential equations with applications, *Electronic J. Mathematical Analysis and Applications*, 2015, v. 3, no. 2, 59–91.
8. Mao L. A review on natural reality with physical equation. *Progress in Physics*, 2015, v. 11, 276–282.
9. Everett H. Relative state formulation of quantum mechanics. *Rev. Mod. Phys.*, 1957, v. 29, 454–462.
10. Committee on Mathematical Sciences Research for DOE's Computational Biology and National Research Council of the National Academies, *Mathematics and 21st Century Biology*, National Academy Press, USA, 2005.
11. Zhang Z. Comments on the Inner Canon of Emperor (Qing Dynasty, in Chinese), Northern Literature and Art Publishing House, 2007.
12. Mao L. Complex system with flows and synchronization. *Bull. Cal. Math. Soc.*, 2017, v. 109, no. 6, 461–484.
13. Mao L. Harmonic flow's dynamics on animals in microscopic level with balance recovery. *International J. Math. Combin.*, 2019, v. 1, 1–44.