Existence is Difference and is expressed and transformed by Information

"reality is changing by virtuality and at the same time it reveals the latter's existence and role"

Ioannis Hadjidakis (NARSEP)
ihatzida@cc.uoi.gr

Introduction

Our conceptual reality is our interpretation of the information we can get from our environment. During this long process a great deal of misconception or oversimplification could lead us to a reality that has little to do with its wholeness (the reality that includes the information of everything). It is evident that each of us has his own reality that depends on:

- His position in spacetime
- The information he can get as a consequence of his abilities
- The interpretation each of us does to any information he gets.

Each of these matters relates to a wide spectrum of human knowledge and we could only say a few words in order to clarify what we mean.

It is common for individuals to arrive to different conclusions starting from the "same" information. This is mainly due to our different experiences and the way our mind interprets them. Even a single person could react differently under the same circumstances (the same information) depending on his psychological state. In other words, there are a lot of factors that affect the interpretation of information that are not related to the environment or the information, but to the process of interpretation itself.

Humans perceive their environment by their senses. The sensitivities of the relevant organs differ for each person and so an individual profile of conceptual senses is formed. This difference of our "inputs" is another factor that deviates our reality according to our sensual organs' ability.

Finally, our conceptual reality is mainly related to the information that reaches us and which is dependent on our position in spacetime. The spacetime position of a physical entity is the data required in order to define any influence of the environment on it. The knowledge of the environment however is a prerequisite that can never be fulfilled. In addition to everything else, environment is also dependent on the entity under examination. This is why Universe reacts as an inseparable system and why reductionism (separable systems) is not the proper method for its study.

In this essay we try to explain the findings we get by applying simple ideas to the Natural Coordination System (NCS) we have proposed for the examination of Nature[(1)].

The essay refers to a two dimensional space for simplicity reasons alone. Although the complexity of a three dimensional space is beyond the author's ability, the findings are not expected to be much different in three dimensional space.

Information in NCS's nodes-vertices and how it is transferred

It is stated that NCS' spacetime consists in a manifold of vertices that are connected to their neighbors through precisely defined edges.

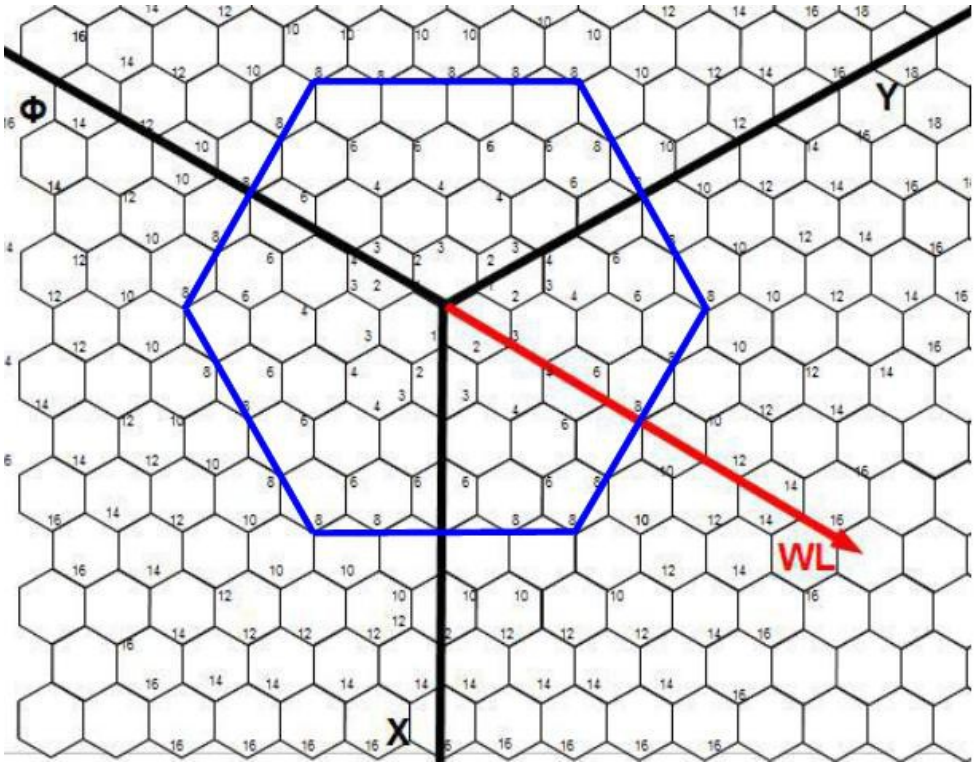


Figure 1

It is supposed that any information represents difference and this is conceived as existence (IDE). Information is "transferred" through NCS' edges to the vertices. A set of vertices composes an entity and the sum of information included in this set is the set of the entity's properties.

Each vertex in real part of NCS hosts four Natural Information Bits (NIBs). Each NIB belongs to one of the four basic properties (mass, charge, spin and time activity). In other words, vertex's properties are characterized by its Natural Information BYte (NIBY) or its four NIBs. So, there are sixteen different vertices according to their elementary properties. The overall sum of the information that a set of vertices - that belong to an entity - possesses is the set of entity's properties . This sum of the of the vertices, that are part of - let us say - an elementary particle (e.g. electron), can be consisted by a huge number of vertices ($>>10^{30}$).

NIBY	mass	spin	charge	time-activity
0000	negative	negative	negative	future
0001	negative	negative	negative	past
0010	negative	negative	positive	future
0011	negative	positive	positive	past
0100	negative	positive	negative	future
0101	negative	positive	negative	past
0110	negative	positive	positive	future
0111	negative	positive	positive	past
1000	positive	negative	negative	future
1001	positive	negative	negative	past
1010	positive	negative	positive	future
1011	positive	negative	positive	past
1100	positive	positive	negative	future
1101	positive	positive	negative	past
1110	positive	positive	positive	future
1111	positive	positive	positive	past

It is not far from reality to regard any elementary particle as a “small” universe that we realize only through its own event horizon. It has an enormous complex and yet unknown organization.
Information transfer is the elementary and the universal process that causes the change of reality and its law(s) form(s) the principal physical law(s). Information transfer is related to the world line (WL) of an entity. Given that any entity can choose from an enormous amount of information (vertices) that forms its identity. it may occupy a common part in spacetime manifold with another entity of a different kind. We can suppose - for example - that two electrons and a virtual photon occupy a common part in spacetime during electromagnetic interaction according to the appropriate Feynman diagram.

From the direction of WL of an entity in relation with the reference's coordinate system we can easily calculate the probabilities of a NIBY to be transferred to its two forward vertices (Apendix 2). By using simple formulas we can calculate the probabilities of all possible information's paths that are the probabilities of IDE to actually happen on a certain vertex of spacetime. Needless to mention that apart from the simplicity of Information Transfer Law (ITL) it is impossible to calculate the exact probability in any applicable situation because of the extent of the calculations needed. However, extremely useful conclusions could be extracted from the application of this notion of physical law even to a minor spacetime area.

•The greatest probabilities for IDE to occur are on the vertices with the geometrically shortest distance from the entity's start. These vertices are found approximately on a straight line, if there is no interference with the environment. It is also very important that the six shortest distances from start are not equivalent as three of them are on the extension of the very first step of IDE spread while the other three are in between. It is found that the latter have the maximum probabilities to occur. These findings forced us to correct our opinion about WL's direction in relation to our previous correspondence (see fig. 1 in ref. 2).
The WL of referee, that defines the referee's frame of the system is shown in red in figure 1. The WL of any other existent, differs in spacetime and it never coincides with that of referee's as no two entities can occupy the same set of vertices.

•Because information transfer does not occur on a straight path, it is evident that, after a certain time, IDE exists into a wide space time area, though with a variety of probabilities. It is this probabilities' variation that allows uncertainties to happen and this is the fundamental justification of quantum physics. By applying ITL to a system for up to twenty steps, we can establish the trend of IDE probabilities. It is understood that - as time passes - a probability front (zone) is formed that comprises a number of - limited time spanned – paths with the greater probabilities to occur. A number of paths with considerable IDE transfer delay appear outside this zone, but with extremely low probabilities to be followed. (fig. 2)

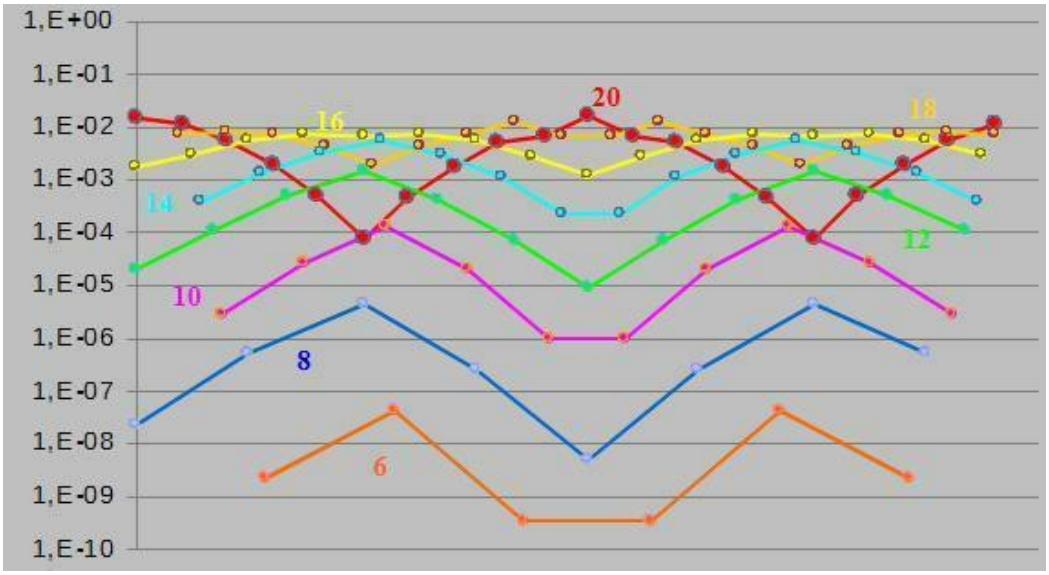


Figure 2

Each dot represents the set of information paths that end onto a different vertex with a certain distance from start. Ordinate shows the sum probability for this set to be followed. The numbers on the curves indicate the distance (in time steps) information has traveled from start. The middle highest point corresponds to all the paths that end to the vertex on referee's WL with distance equal to 20 time steps. The two lows of red line correspond to the paths that end to the two corners of the synchronous hexagon that are closer to WL.

•IDE transfer happens in a spherical spread manner. Obviously, probabilities are dropped accordigly. However, when somehow IDE has been concentrated into a limited spacetime area, far away from its start, IDE transfer follows a path on a rather straight line, if there is no interference with environment.

•Any entity has a point (vertex) in spacetime from which it is supposedly created from. This special vertex's properties (or NIBY) and position in spacetime are fundamental for all entity's life and its behavior. This vertex has the role of Start (or entity's Big Bang). The way that the direction of entity's WL changes defines the entity's behavior in spacetime. The “death” of an entity occurs by the attribution of any vertex of its set to other set(s) of different entity(ies). According to ITL, reality changes in a certain way because of the movement of NIBYs through spacetime manifold that causes the alteration of the properties of vertices and hence the properties of the entity that these vertices belong to.

It should be reminded that an entity is composed of a real set and a virtual set of vertices. Each vertex of real part bears a NIBY (four NIBs) that is complimentary (similar to NXOR gate) to their virtual part in relation to its start. This means, for example, that if the start vertex's NIBY was 0110

and the real vertex has at present the 1100 NIBY in the real part, its virtual vertex - in virtual part - should has the 0101 NIBY.

•If we consider that an entity is the set of its vertices in real part and their complimentary vertices in virtual part we conclude that the overall probabilities are the product of real and virtual probabilities. The product of real and virtual probabilities is not the square of each because these are not the same. This happens because the two frames (real and virtual) differ in their orientation. If we consider real era, the referee's manifold is oriented according to the maximum probability of real referee's WL. However, this forces virtual manifold to not take the optimum orientation, as direction of virtual referee's WL in virtual manifold is on the extension of the very first step of the expansion. However, this difference in probabilities is getting negligible as time passes and the overall probability could be considered as the square of the real one.
Probabilities calculated as the product of real and virtual part, follow the same trend but their overall values drop dramatically (trend as in fig. 3, but ordinate's scale is the square of the scale shown, e.g. 1E-2 becomes 1E-4). The physical or deep metaphysical meaning of this is not discussed here.
The opposite spacial distribution of probabilities between the paths without delay and the paths with delays is more than obvious and extremely interesting.

Conclusion

Going back to the manifold of spacetime and looking at Nature in a different fundamental way we can develop new physics. Right now this view cannot yet be useful in solving practical problems because of the extensive computation needed but it could offer an enormous amount of qualitative insight in respect to the way Nature works.

P.S. This essay is based on the ideas first published in ref. 3.

References:

1.Ioannis Hadjidakis, Has the time come …?, http://www.fqxi.org/data/essay-contest-files/hadjidakis_Has_the_time_com.pdf

2.Ioannis Hadjidakis, Natural Coordination System (NCS) and Existing Theories in Physics and Cosmology , http://www.fqxi.org/data/essay-contest-files/hadjidakis_FQXI_3.pdf

3.Ioannis Hadjidakis, Information Within Universe, http://vixra.org/pdf/1304.0165v2.pdf

Appendix 1

The complex system of Information, Difference and Existence (IDE)

Let us state the definition of these three widely used words:

Information: knowledge that is or can be transferred.

Difference: is the quality of being unlike or dissimilar.

Existence: empirical reality, the state of being or occurring.

Based on these definitions it is easily concluded that existence is realized by its difference from the "rest". This difference is then communicated by transfer of information. In other words, **information expresses the difference that is existence**. No existence can be realized if there is no difference, and difference can be communicated only by information.

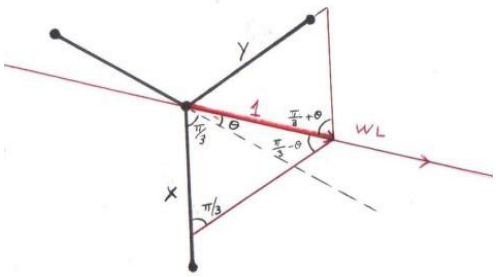
NIB is not an information BIT, that implies the existence or not of a certain state, but it denotes the existence of a certain state between two opposite ones. In other words it **always** represents existence and designates the kind of this existence. **No existence** is not a state but the sum of two or more (2n) existents , half of them in a certain state and the rest in the opposite state.

Furthermore, information could create difference by itself. This special difference (created by information), named "knowledge existence", is the basis of intellectual individuality.

Appendix 2

Formulation of Information Transfer Law (ITL).

The main idea for the process of formulating information transfer is to consider probabilities as vectors. According to this way of thinking, we calculate the two components resulted by the splitting of the information to the two directions of the edges that connect the emitting vertex with the two forward vertices of NCS' manifold.(fig. 3)



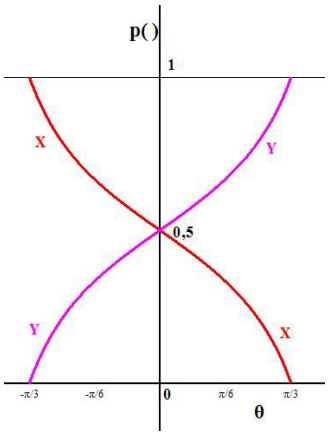


Figure 3 **Figure 4**

After a time step (quantum of time, Plank time) these two forward vertices receive the information probabilities. By using simple trigonometric relations (sine formula) we get the following formulas

$$\frac{1}{\sin\left(\frac{\pi}{3}\right)}=\frac{X}{\sin\left(\frac{\pi}{3}-\theta\right)} \quad \text{and} \quad \frac{1}{\sin\left(\frac{\pi}{3}\right)}=\frac{Y}{\sin\left(\frac{\pi}{3}+\theta\right)}$$

From these formulas we have, X+Y=2cos(θ)

so in order p(x)+p(y)=1 we have to divide by 2cos(θ).
Hence,

$$p(x)=\frac{\sin\left(\frac{\pi}{3}-\theta\right)}{2\cos(\theta)\sin\left(\frac{\pi}{3}\right)} \quad \text{and} \quad p(y)=\frac{\sin\left(\frac{\pi}{3}+\theta\right)}{2\cos(\theta)\sin\left(\frac{\pi}{3}\right)}$$

or

$$p(x)=\frac{1}{2}-\frac{\tan(\theta)}{2\sqrt{3}} \quad \text{and} \quad p(y)=\frac{1}{2}+\frac{\tan(\theta)}{2\sqrt{3}}$$

The graph of the above two relations is shown in fig. 4.
For exemplary, we give the first steps of a new entity's information transfer.
The first three vertices with distance one - in time steps - have information probabilities =1/3 (one information path). At distance two, there are six vertices with information probabilities = 1/6 (one information path). At distance three, there are nine vertices with probability = 1/9 (sum of two information paths). At distance four, there are twelve vertices. Their information probabilities start to vary in relation to their direction (of WL) from the vertex of emission (probabilities' values: 0.111111, 0.066666 and 0.088889). At distance five, there are fifteen (3n) vertices. From the distance six and afterward, information can delay. This means that the distance traveled, in time steps, differs from (is less or equal to) the number of time steps. From distance eight and afterward, the asymmetry of the synchronous hexagon becomes evident (hexagon's corners and edges have not all the same possibilities).