SYSTEM ECONOMIC THEORY DEVELOPMENT ON THE BASE OF CHINESE TRADITIONAL PHILOSOPHY

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Abstract. Combination of system economic theory, space-time analysis, and information theory is the new multidiscipline field of research. In this article we are trying to develop these science directions by using Yin Yang philosophy model in the context of Pythagorean Theorem (at China – Shan Gao' theorem appeared 500 years before Pythagorean), Markov chain model and Theory of general relativity. The idea that economics and philosophy are the two parts of one whole as "Yin Yang" — supported mathematically gives the powerful and fruitful results. Nowadays Chinese philosophy and mathematics are perceived and developed separately, and Chinese philosophy is not associated with the economics. However, in our opinion, ancient Chinese philosophy is a storehouse of knowledge and can form a solid foundation for understanding and open new ways of research the theory of information, systems theory, space-time economic theory and information entropy.

Keywords: Space-time analysis, Information entropy, Yin Yang 5-dimentionnal stochastic model, system economic index.

INTRODUCTION

The issues of consistency were also of concern to our ancestors. The nature system was considered in the 12th century by Johannes de Sacrobosco in his work "Sphere", where he emphasized on the questions of how many spheres there were, and what the shape of the world was, gave information concerning the circles of which this material sphere was composed and that super-celestial one, of which this is the image, was understood to be composed [1]. Antoine Arnauld and Pierre Nicole in their work "Logic or, the Art of Thinking in four parts" also emphasize attention on the theory of knowledge of metaphysics with attempting to explain system "one" by combining the categorical theory of the proposition with a Cartesian account of knowledge [2]. It was the start of the information theory base points in case of Antoine Arnauld and Pierre Nicole described the Nature of Affirmation and Negation, upon which conversion depended and could explain the Nature of One and links between parts, "complex terms" as well as their universality and particularity [2]. Further, the idea of "wholeness" was developed by Bertalanffy concerning interconnections of elementary units which could be researched independently of each other [3].

In Russia, the academician of the Russian Academy of Sciences George Kleiner considers the limitations of neoclassical Economics and puts forward the concept of space-time analysis of the economic system. In Europe, Professor Terry Baker from Cambridge University also proposed the concept of Space-Time Economics. In China, the central government in 2015 proposed the concept of "new standard" of economic development, economist Lin Yi Fu and other Peking University professors propose the "New Structural Economics," Academician Jia Kang and others proposed the "New Supply Economics". These scholars believe that the neoclassical economy has some problems in explaining the World Economy and tries to seek a new economic paradigm.

In our opinion, the development of a new theory of economic systems as an integral part of the system paradigm would help to overcome the shortcomings of modern economic theory and help it to explain or forecast the current crisis [4]. Thus, the system econ-

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omy can be explained by information theory and quantum theory and develop as system space-time point of view where it must be developed energy flows, material flows, molecular biology flows as well as monetary flows. As Stephen Hawking emphasized that Universe has no boundaries or edges [5,6]. Quantum physics tells us that nothing is ever located at a definite point because if it were, the uncertainty in momentum would have to be infinite. In fact, according to quantum physics, each particle has some probability of being found anywhere in the universe [5,6].

Nowadays there is a need to develop a new economic paradigm: the system paradigm. The increasing importance of the ideas of the system for science as a whole was expressed in the formation of the General theory of systems as a unified concept of analysis of an extensive class of technical biological systems, social and economic phenomena and entities.

METHODOLOGY

The yin and yang elements are a unique and systematic view of the world in traditional Chinese culture. The Chinese medicine definition of Yin and Yang is: "Yin and Yang, is China a pair of categories of ancient philosophy, are some of the interrelated nature. A summary of the properties of things or phenomena is on the opposite sides". Much of the current research, it seems that everything is Yin and Yang, Yin and Yang has no definition by itself. Yin Yang math had the metaphysical way of understanding and calculations and based on metaphysics principals as the ancient Chinese philosophical term. Yin Yang together it's the Universe. World not only white and black, also it is the place between write and back. It is optimum space-time equilibrium between white and black.

If we translated from Chinese, "all is one substance, one substance is all" means "one". Author's vision of the Space-time Economy is based on Yin- Tang Philosophy 5 constraint elements - Earth, Fire, Forest, Water, and Gold. Thus, system-space economics consists of 5 parts – Resources (Earth), Society (Fire), Environment (Forest), Water-Energy and Gold-Finance (see Fig. 1).
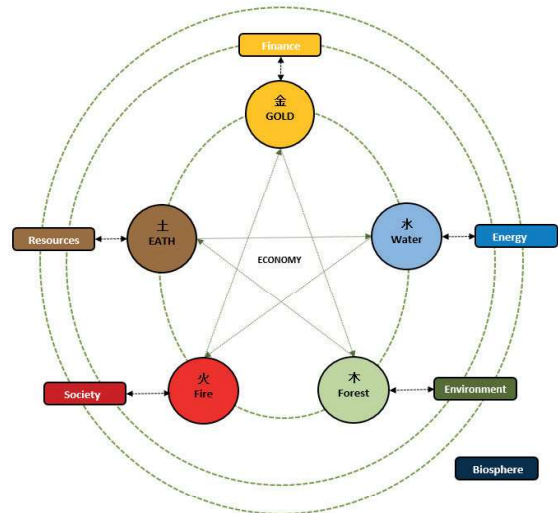

Fig. 1 Structural model of interaction between Economy, Finance, Environment, Energy and Society
Source: Authors' methodology

Chinese traditional philosophical thought worshipped the idea of harmony expressed in the saying "the unity of heaven and man" (天人合一). Concept of the harmonized interrelation between nature and man was first developed by Dong Zhong Shu (董仲舒), Confucians, Han Dynasty period, at his work "Three strategies of the celestial man" (天人三策) by means of philosophical system of harmony between Nature and man, and thus constructed the base of Chinese Traditional Culture. The traditional thought of the harmonious union between man and nature emphasizes reasonable unity. On the one hand, to attribute the human behavior to Heaven's destiny helps to obtain an external theoretical framework. Yin Yang addresses the relationships between the individual compartments and the overall properties of a system by analysing material-energy-information networks. Similar concept and network methods can be applied, however, to all matter-energy-information flow systems in general, because of widespread and significant parallels among system parts and development dynamics concerning all fields. We have constructed the Yin Yang' flow network. Over 60 years ago, Leontief showed that economic structure could be effectively modelled as an input-output map of goods, services, mon-

ey, or value circulating within and across a network of business [7]. Markov chain methodology is a bright and fruitful example of the fuzzy mathematician space-time analysis concerning stochastic probability analysis. The same process we can observe concerning traditional Chinese Daoism philosophy. Concerning Yin Yan philosophical theory describe by mathematician way most correctly reflects the views is Markov chain. The same way, according to Feynman, a system has not just one history but every possible history [5]. Moreover, the next state of the system depends only on the present situation, not on the previous one. Markov chain – a series of events in which each subsequent event depends on the previous one [8]. Applications of Markov chains can be the best variants of the decision-making concerning economy equilibrium at a whole (see Fig. 2). Markov chains are named after the Russian mathematician A.A. Markov (1856-1922), who started the theory of stochastic processes [9,10].
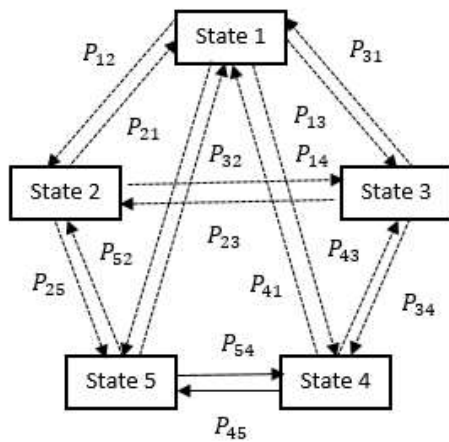
Fig.3,4 it was shown 5-dimension model factors in dynamic in chaotic "not ideal" condition, but it is the way of interaction in real life and "ideal" one.
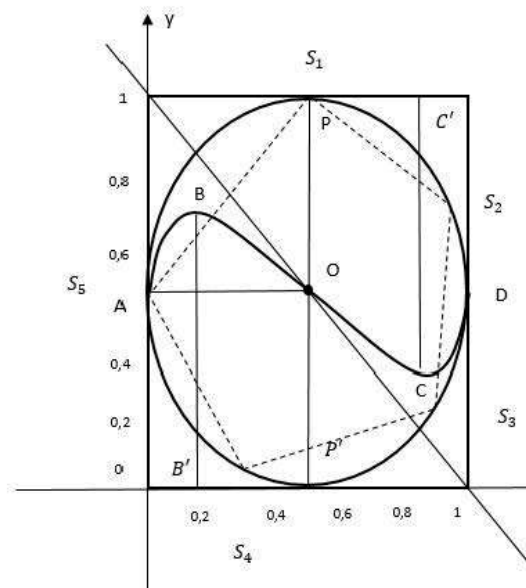

Fig. 3 "Not-ideal" Yin Yang condition
Source: Authors' calculations

Fig. 2 Space-time diagram
of the two-component system
(Yin Yang 2-component system)
Source: [3]

RESULTS

We can describe the system changes from unbalancing condition to balance one using the equation:

$$P(X_{n+1} = x | X_1 = x_1, X_2 = x_2, \ldots, X_n = x_n) = P(X_{n+1} = x | X_n = x_n)$$
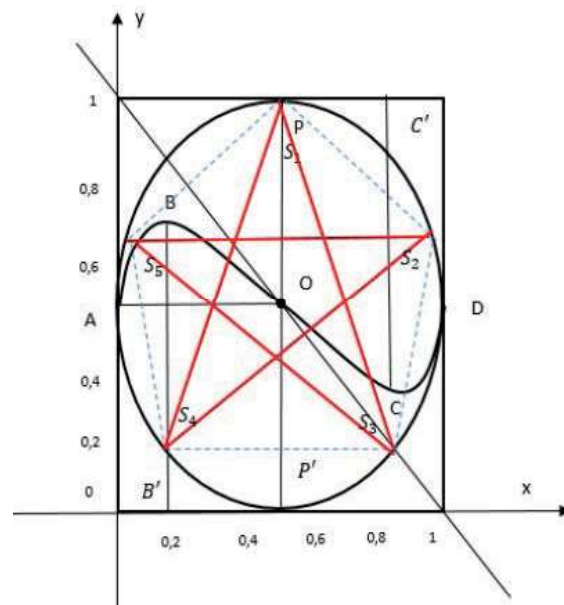

Fig. 4 Explanation of Yin Yang employing of Markov chain calculations (forecasting calculations) ideal condition
Source: Authors' calculations

In Fig. 3 coordination degree is irregular and asymmetry, at Fig. 4. – in "ideal" state with symmetry excellent coupling in steady state condition. If we need the perfect system, system coordination degree and system balance index seek to 1 as dynamic steady and symmetrical system.

Concerning Author's space-time Yin Yang system methodology

F - Finance
R - Resources
E - Energy
Env – Environment
S – Society
F   R   E   Env   S
5 - Dimension model $x_1\ x_2\ x_3\ x_4\ x_5$

By means of formula $= \varphi S'$, we dynamic changed Yin Yang 5 factors system. Yin Yang together strengthens those pathways with positive contributions to increasing ascendency and (2) weaken those with adverce effects (see **Tab. 1**). Biophysical addresses the relationships between the individual compartments and the overall properties of a system by analyzing material–energy–information networks to all matter–energy–information flow systems in general, because of widespread and significant parallels among behavioral patterns and development dynamics in various fields.

Table 1

Matrix of Markov' F R E Env S – 5D model dynamic chanced transferring probability

S_i/S_i+1	F	R	E	Env	S
F	F'F'	F'R'	F'E'	Fen'v'	F'S'
R	R'F'	R'R'	R'E'	Ren'v'	R'S'
E	E'F'	E'R'	E'E'	Een'v'	E'S'
Env	Env'F'	Env'R'	Env'E'	Env'Env'	Env'S'
S	S'F'	S'R'	S'E'	Sen'v'	S'S'

*Source:*Authors' methodology

Authors' developed 5- factors system balance index on the base of Ying Yang philosophy (see Fig. 5)

Fig. 5 can describe every two quant interaction between each other with emphasize strong and weak connections inside.

$$SBI_{Kleiner} = \frac{1}{(\sum_{i=s \neq j=s} ai/aj)-19}$$
Where,

$SBI_{Kleiner}$ - System Balance Index,

$I_5 = f(a_1, a_2, \ldots a_5)$,

a_i, a_j distance between 2 points.

The value of the index of system balance of communications can be interpreted as follows: $0 \leq SBI \leq 0{,}2$ – fragile balanced connection, the $0{,}2 \leq SBI \leq 0{,}5$th delicate balance, $0{,}5 \leq SBI \leq 0{,}7$ – average balance, the $0{,}7 \leq SBI \leq 0{,}9$th strong balance, $0{,}9 \leq SBI \leq 1$ – stable balance.
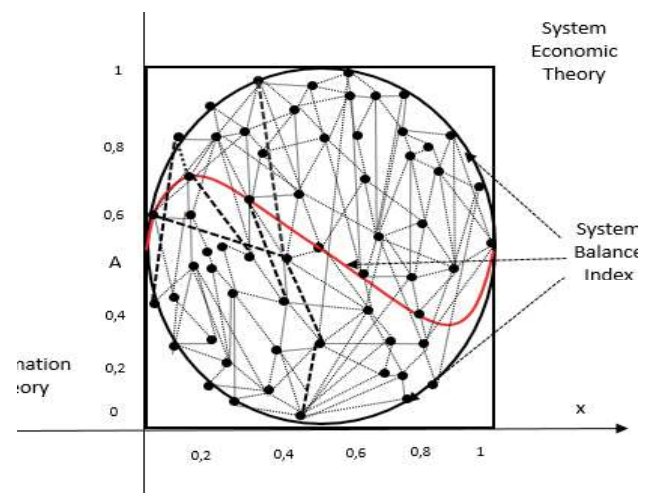

Fig. 5 Explanation of Yin Yang through a new system economic index
Source: Authors' calculations

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DISCUSSION AND CONCLUSION

It is already obvious that Economy is not a "many parts" system. It is very challenging, self-organized, self-changing equilibrium system. The system is not "one condition" to "another condition" system. It is between conditions system. Chinese Traditional Yin Yang Philosophy can reflect the system process, and with the help of system balance analysis can give development to System Economic Theory as a whole, and space-time analysis in particular. It was used algebra and geometry to describe the philosophy and economic system theory based on Chinese traditional Yin Yang Diagram. Besides, as a result, Authors' consider 5-parts System Balance Index based on Chinese Yin Yang Philosophy. Authors emphasize their position that Man and the harmony between Man and Nature are essential conditions for economic development as well as economic development could base on Chinese traditional philosophy points of view. Moreover, it is further research direction for Authors to develop space-time economic analysis tools. We want to go the same way as the theory of the universe (Hawking, 2001) try to explain how System Economic Theory must include all forces – philosophical and economic and predict every observation we can make.

ACKNOWLEDGEMENTS

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