

Book of Changes – from Doubt to Fractality and Free Will

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Abstract: *The Book of Changes is one of the oldest written sources for philosophy. The Bulgarian calendar is a unique part of our ancient intangible heritage. The connections of fractal geometry with various fields of science are expanding. Combining these elements into a logical system manages to use the common points of contact to enhance the understanding of each one, as well as to reflect on human doubt and free will.*

Key words: I Ching, Bulgarian, calendar fractal, doubt, free will,

Ключови думи: И Дзин, български календар, фрактал, съмнение, свободна воля



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INTRODUCTION¹

Life constantly confronts us with difficult situations and choices on which our adaptation depends. This process is inevitably accompanied by doubt. A feeling of uncertainty or lack of conviction is called doubt, and its mismanagement can impede decision-making and lead to procrastination and maladaptation, however its integration can help expand our notions of “methodology” and begin to discover, explain and use. The opposite of doubt is a belief or feeling that one can rely on someone or something. Doubt and confidence are normal feelings arising in the functioning of the human will: (phases: 1. choosing a goal, 2. decision after a struggle of motives and counter-motives, 3. implementation of the decision). The psychological maturation of a person stimulates him to see the world as an increasingly complex and difficult to explain system. This could lead to a loss of orientation and failure to function, or to a motivation to change. In the pursuit of knowledge and meaning, every tool is valuable, and different perspectives provide a better basis for understanding the whole system.

A system is a group of interacting or interrelated elements that operate according to a set of rules to form a unified whole. Each system

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is described by its boundaries, structure and purpose and is expressed by its functioning. A complete picture of the system in which we live is impossible due to the limitations of human senses, which raises the question: How to make a decision when we cannot see the whole system. Gathering knowledge significantly reduces the risk of making a decision error. Knowledge is a multidimensional dynamic construct, inherently uncertain and requiring a flexible, context-driven approach to its discovery². Knowledge can be as an object or stream, as a personal construct achieved through meaning-making or wisdom. Some aspects of knowledge deal primarily with content, while others deal with context. Human knowledge is always incomplete and limited, which leaves room for doubt and difficulty in decision-making, especially in complex and chaotic situations. However, this feature also leaves room for the manifestation of free will.

Does a person have free will and what does it mean, can he choose and what is the best approach to find an adaptive solution. These are eternal questions that many people ask themselves, especially in interesting times that require difficult choices. Logic and systems thinking can facilitate this process. Without going deeply into the content of the term free will, we will try to look at modern and ancient systems of describing the world, in order to determine whether the idea of free choice is present in them at all or whether they are completely deterministic.

MATERIALS AND METHODS

Copies of the I Ching available; Ethnographic study of the Bulgarian calendar; Current scientific publications on doubt, fractals and free will. Systems thinking. Descriptive analysis and comparative analysis.

AIM

Localizing the idea of free will in Snowden's decision-making model, in the Book of Changes, fractal theory, the Bulgarian calendar and building synergy between different theories.

RESULTS

Modern models for system description

There are two well-known and widely developed models using narrative analysis to address the complexity of organizations: that of Wake, Michigan, and that of Snowden at the Cynefin Center for Organizational Complexity³. According to them, systems are divided into simple, complicated, complex and chaotic, and as they become more complex, the degree of freedom of choice increases.

ANCIENT MODELS FOR SYSTEM DESCRIPTION

Chinese Tradition: The Book of Changes (I Ching)⁴, is consulted to find an answer to a question. It has been used as a universal guide with a profound influence on the philosophy, religion, art, literature, politics, science, technology and medicine of various cultures throughout East Asia up to the present day. Modern physics, with quantum theory and fractal theory, largely explains in a scientific way the graph of the I Ching. The hexagram is the central component in it, as well as in Human Design and Gene Keys. Time measurement in the ancient Bulgarian calendar is also based on a hexadecimal positional number system⁵. Another important feature of that ancient source is a universal, heuristic inspiration for a closed system model, understandable even without the text accompanying the graphics. The process of divination involves tossing a coin or other objects that point to a particular hexagram. The explanation for it is interpreted as a possible option in relation to the past or the future, but a freedom for choice remains in the present and more precisely for a reaction to the situation.

The Bulgarian tradition: The Bulgarian calendar is an ancient system of time measurement used by Bulgarians and known for its antiquity, accuracy, practicality, complexity and uniqueness. It is distinguished by its complex structure and connection with

² *Sturmberg, Martin* 2008: 767-770.

³ *Browning, Boudus* 2005: 32-39.

⁴ *Smith* 2012.

⁵ *Seidenberg* 1965: 436-440.

astronomical phenomena⁶. Not only historians and astronomers, but also linguists and culturologists are interested in the Bulgarian calendar, as it provides valuable information about the cultural heritage and worldview of the Bulgarians. The Bulgarian calendar is lunisolar, meaning it combines elements of the lunar and solar cycles to measure time. This makes it similar to other ancient calendars such as the Egyptian, Chinese and Hebrew etc. The calendar is based on a 12-year cycle, with each year named after an animal, similar to the Chinese zodiac. In China, the 60-year circular calendar was introduced by Emperor Huang Di, known as the 'Yellow Emperor', who originated from the peoples living in the northwest of the Chinese principalities. This happened in 2636 BC. The Chinese lunar calendar is actually a continuation of the much older (about 2000 years old) Bulgarian Solar Calendar. Interestingly, each of the 12 annual cycles have almost the same names, the difference being that two of the animals have been swapped. Day zero in the Bulgarian calendar is a unique phenomenon that reveals the complexity and accuracy of this ancient time measurement system, and its meaning is subject to multiple interpretations. It is seen as a special day that does not belong to any month or year and has a specific purpose. Besides its corrective function (synchronization of the calendar year with the astronomical year) and its transitional function (transitional day between two calendar years or cycles), we see it as a symbol of free will superimposing physical constants and forces. Astronomically, day zero can be associated with specific astronomical phenomena such as solstices, equinoxes or lunar phases. Culturally, it can be associated with certain rituals or customs, as it is used for celebrations, religious rites or other important events. Modern studies of day zero in the Bulgarian calendar include many disciplines such as history, archaeology, astronomy and ethnography. Scholars seek to reconstruct and understand the role of this day through analysis of historical texts, archaeological finds, and comparisons with other

ancient calendar systems⁷. There is a similarity in the name between Ignazhden and Ednazhden (zero day, Eni, Sur, Young year, Surva year, Ignazhden, St Ignatius' day). It is currently celebrated on 12/21 or 12/22. At this time of the year we mark the beginning of the beginning, the shortest day of the year, coinciding with the winter solstice. The Bulgarian calendar does not count these days, but it contains them. This day and the other solstice 22.06 are 'zero' days, giving the idea of freedom of choice, exceeding even the sequence determined by the time. Through these 'zero' days, the Bulgarian calendar always has the same beginning of the year – Sunday (which is the first day of the week, according to the calendar) and every season always starts on Sunday. Dividing the calendar into 364 days and one zero is called the 'Golden Bulgarian calendar number'. Through it, every year an ending is formed – a cycle, leaving room for a day outside of time. Christianity declares the day before 'zero' day, the day of Saint Ignatius. It is necessary to note that, apart to the Roman calendar, which we use for administrative purposes, there is also a Bulgarian tradition in counting years, of which we are heirs and transmitters. As such, we are obliged to distinguish the ideas embedded in them, even more so when they are absent in analogous modern practices. One of the most important such ideas is that of free will expressed through the day in the calendar, free from the 'slavery' of deterministic time. This idea in Orthodoxy is reflected in the description of the Heavenly Eucharistic Liturgy, which, according to the unanimous testimony of the Holy Fathers, is permanent. It does not last 24 hours like the earthly one, for which it can be said that always and at every moment somewhere in the world the Holy Divine Liturgy is performed, but is outside of time⁸.

Bulgarian folk games remain an important source for ancient traditions⁹. From an early age, the child experiences the influence of the environment, and reacts actively, reflecting it in his games. This gives him the opportunity to get to know the world around him, to learn new

⁶ *Bulgarian calendar* 2024.

⁷ *History of the Bulgarians* 2024.

⁸ *Ivanova* 2005.

⁹ *Doncheva, Ilieva* 2014: 126-130.

forms of behavior characteristic of a person. The game problem has always occupied a certain place in the searches and researches of educators, psychologists, sociologists, logicians, doctors, physiologists, etc. A wide range of questions related to the essence of the game activity and its importance for the child's development have been developed. Games with different objects, 'chilik' and 'ashik', in all their varieties, are perhaps the most common in Bulgaria¹⁰. They closely resemble the 'game' of divination with the Book of Changes. We emphasize the possibility that it was used as a tool for understanding the world and an aid for decision-making in difficult situations, similar to modern models of systems organization and decision-making. In our opinion, the use for divination is a secondary function, perhaps due to an incomplete understanding of the main purpose of a philosophical description of a chaotic system. Bulgarian children's folk

games are part of the treasury of our intangible cultural heritage, and their roots and meaning need to be explored. Life is about receiving, processing and transmitting new knowledge about oneself and the surrounding world. The processes of self-knowledge and self-evaluation are constantly active and need to be directed beyond the difficulties of acquiring and integrating knowledge, despite constant uncertainty and doubt, to their final form in the daily rediscovery and realization of the free will of man. How the dice would fall is determined, but whether we will be happy or saddened by the game is a matter of choice.

Both modern systems models, as well as ancient Chinese and Bulgarian traditional models (between which there are numerous references), unequivocally indicate the presence of the idea of free will, giving it a special, controlling place. We have graphically depicted this in Fig. 1.

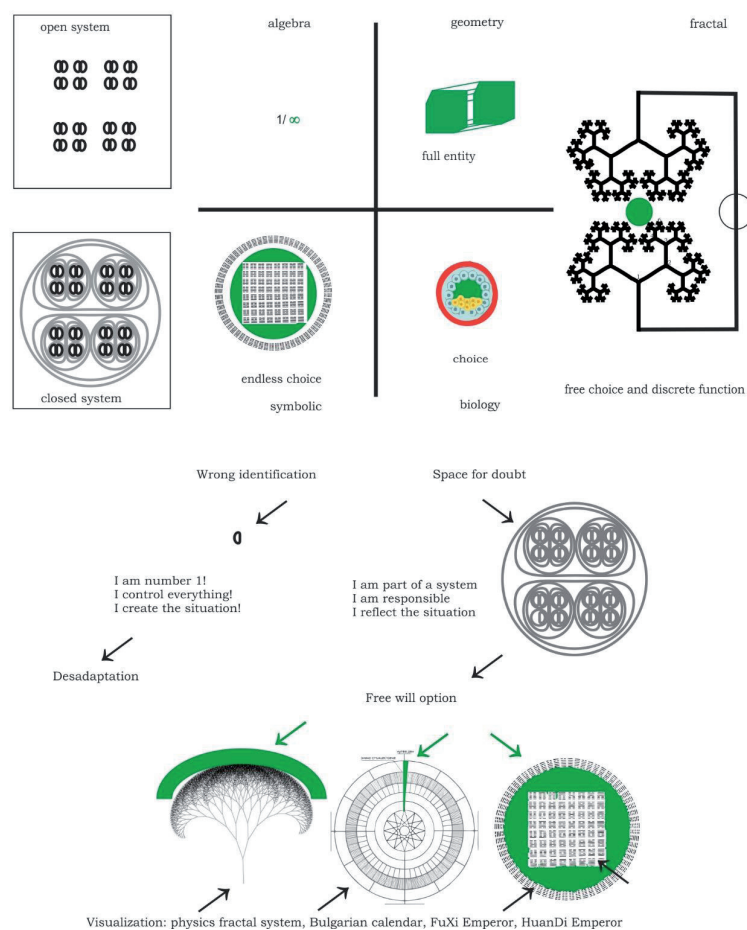


Figure 1. Comparative analysis with different methods and determination of place for free will in different models, marked in green. N. Pirovski, 2024.

And I Ching, mathematical, fractal and biological approaches have been used to describe a closed system model. The top part of the figure has seven areas. Layout of the comparison page: The left part is for the author's representation of the subdivisions of the scale in a closed system (lower square), for an open system (upper square). The four fields in the middle – for digital, geometric, traditional I Ching and biological image. The right part visualizes a fractal. Each approach to describing the hierarchy and transformations in the system has its advantages and disadvantages. The open system leaves room for the development of the Ego as a tool for interaction with the other parts in the system, but loses connection with the original source and the whole system. A closed system allows for an endless cycle, but limits the sense of freedom. Numerical expression is concentrated and the basis of algebra and graphical expression is the basis of geometry, but they are too abstract. The fractal emphasizes on hierarchy and bifurcations, but is limited by Planck space. The symbolic gives universality to the expression of ideas, but not to personal experience, and the biological is the basis for the development of the psyche and personality, but it is very difficult to distinguish through it the basic principles of organization. A synergy between mathematical, physical, psychological, biological, visual and other arguments is needed to formulate a reasonable approximation to the true design of our world.

The lower part of the figure reflects the place where free will manifests itself most strongly in the various models. On the far left is a model of a fractal system reaching the Planck distance, in the middle is a diagram of the Bulgarian calendar with the zero day marked in green, and on the right is the image of I Ching with three parts – an outer circle, an inner square and a middle empty area.

Zero as the empty set is a relatively new concept in mathematics, but not in philosophy. This is described as primordial chaos in Taoism, and in modern science as the quantum vacuum. In fine art, it is described as background or

negative space. It is the first scale that is a logical necessity but an intellectually impossible challenge. In geometry it is the definition of a point, and in biology it is the life-giving force, the beginning of the fractal system in physics. This phenomenon is not binary and in our opinion is a subject. In anthropology, it can be defined as an anthropological point.

A conscious person can understand much of this process, but only through personal experience can he go through it all. When the whole system is categorically organized, the worldview becomes complete, everything finds its place and calms down, despite the constant movement, and man becomes a closed system, as an element of the system he has realized. In this state, doubt is transformed into awareness, and only experience remains relevant. Confidence replaces doubt and respect replaces fear. Awareness does not change the situation, but the person, making him free.

The first and last stages of system development are chaotic. Cynefin model, I Ching and Fractal Theory point to the finite system as chaotic and it should be approached as such rather than as complex. I Ching is compatible with Fractal Theory and both lead ultimately to chaos, which is the only place where free will can be found in full.

FREE WILL AS A FUNCTION OF CHAOS

Both ancient and modern sources point to free will as being most strongly present in a system describing the universe as chaos. Today, chaos theory¹¹ is an interdisciplinary field of scientific study and branch of mathematics focused on the underlying patterns and deterministic laws of dynamical systems that are highly sensitive to initial conditions and were once thought to have completely random states of disorder and anomalies. In physics: a property of a complex system whose behavior is so unpredictable as to appear random, due to great sensitivity to small changes in conditions, or the formless matter assumed to have existed before the creation of the universe. In mythology, it is the first created being from

¹⁰ Bankova 2024.

¹¹ Britannica 2024.

which the primal deities Gaia, Tartarus, Erebus and Nyx are descended. In philosophy, chaos theory describes the qualities of the point at which stability turns to instability or order turns to disorder. Fractal geometry is a working geometric medium between the excessive geometric order of Euclid and the geometric chaos of general mathematics. Before the bifurcations (transformation) are completed, the fractal patterns of a system can look like a maze or a puzzle¹². Fractals are infinitely complex patterns that are self-similar at different scales¹³. Chaos is full of surprises, of the non-linear and the unpredictable. Recognizing the chaotic, fractal nature of our world can give us new insight, strength and wisdom^{14,15}. The completed patterns appear to be completely determined and predictable unless we consider them as a discrete function. The monad at the beginning of the I Ching and Day Zero in the Bulgarian calendar point us to a system that is discrete (discontinuous) and chaotic in complexity. This is why we need to look for patterns, not to write plans¹⁶. The Yi Jing can also be seen as an ancient description of fractals¹⁷. The calendar system of dividing time also has a fractal progenitor in its infinity and the non-trivial self-similarity of the various cycles.

Free will is the ability to freely choose between different possible courses of action. Free choice – the ability and autonomy of the individual to perform an action chosen from at least two available options, without restrictions from external parties¹⁸. It is inevitable, as described by Thomas Aquinas¹⁹. A product of consciousness that manifests itself through decisions (actions, habits), fixed in the past as a model, actual in the present, desired in the

future. Free will is compatible with determinism insofar as we can choose our response to the situations in which we find ourselves. An opportunity for such action appears only on the scale of a conscious person²⁰. Freedom of choice (freedom to choose one's will) is logically separate from freedom to exercise that choice (freedom to do one's will). Thus, freedom is complete only after conscious choice and subsequent action.

DISCUSSION

Intangible heritage – architecture, culture, art – are valuable and their preservation is also related to a deep understanding of the meaning invested in them. It is also important the tradition to create, to recreate the beautiful in a new way, to adapt and win, for an intelligent growth. To be in sync with the ancestors, we need to understand them.

With over a thousand entries covering a diverse range of sources, including books, articles, unpublished dissertations, recorded lectures, devices, and software, the most comprehensive annotated bibliography of English works on the I Ching is published by Hacker and Moore²¹. Other authors also describe the structure of change in the I Ching²² and its benefit to ergonomics²³. I Ching's comparison to Human Design and Genomics is introduced as part of an 'activation sequence'²⁴. There are also a direct references to the I Ching as a fractal²⁵. The scientific value of the Book of Changes (the most accurate Chinese method of divination) increases by comparing it to a fractal and reinterpreting it from the perspective of chaos theory. 'I have seen many people who, when consulting the I Ching, pay attention to

¹² *Fractal foundation* 2024.

¹³ *Mandelbrot* 1989: 3-16.

¹⁴ *Rössler* 1976: 1664-1670.

¹⁵ *Fernández, Jelinek* 2001: 309-321.

¹⁶ *Bellavita* 2006: 1-21.

¹⁷ *Zheng, Cao* 2023.

¹⁸ *Carus* 1910.

¹⁹ *Hartung* 2013.

²⁰ *Vezenkov* 2015: 298-305.

²¹ *Haker, Mur* 2023.

²² *Hershock* 1991: 257-285.

²³ *Walter* 1995: 1053-1057.

²⁴ *Rudd* 2013.

²⁵ *Xutong* 2024.

the changing lines while ignoring the overall situation. Thus, they simply see the trees and are blind to the forest'²⁶ said an eminent Bulgarian researcher of martial arts and their philosophy related to the Book of Change is Stefan Hinkov²⁷.

The astronomical and scientific soundness of the Bulgarian calendar is unequivocal. The measurement of time is an essential ethnographic and cultural question that can also point us toward the free will.

Our results do not support the claims of some authors²⁸ for total determinism and lack of free will. According to some authors, only the theological function could overcome metaphysics²⁹.

CONCLUSION

A synergy between mathematical, physical, psychological, biological, visual and other arguments is needed to formulate a reasonable approximation to the true design of our world.

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Doubt should be integrated as an element in decision-making and thus not considered an obstacle, but should remain a distal function for feedback and motivation for new discovery.

The Book of Changes has a fractal structure and is a valid model for describing structure and transformations in various fractal-focused systems, but free will is difficult to be localized and described by it.

Our perception of fully developed fractal systems is limited by the Planck distance. What lies beyond is chaos. The chaotic state allows and requires free will to make decisions.

Free will is the defining function of a fully developed (conscious) system in a chaotic state.

Different cultures have integrated free will into their beliefs and visualized it differently, with emphasis on their understanding. Day zero in the Bulgarian calendar is such an example.

Both modern and ancient models point to free will as the optimal, constant and infinite adaptation to chaos.

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²⁶ *Huang* 2010.

²⁷ *Drumev* 2017.

²⁸ *Harari* 2018.

²⁹ *Westphal* 2007: 253-278.

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Книга на промените – от съмнение към фракталност и свободна воля

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Има много модели за описание на вселената. Авторите локализируют идеята за свободната воля в модела на Сноудън за вземане на решения, теория на фракталите, в Книгата на промените, Българският календар и изграждат синергия между различните теории. Комбинирането им в логическа система успява да използва общите допирни точки за подобряване на разбирането на отделните елементи. Правят се препратки между древните китайски и български традиции. На преден план се изтъква валидността на теорията за хаоса и свободната воля като системообразуващ фактор в хаотични системи. Приноса на автора е в логическото подреждане на неговото изследване, водещо читателя от феномена на съмнението, през съвременни и древни модели за описание на вселената, до преоткриване на свободната воля и увереност в нейната значимост.



