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Fixed point, kutasth vindu and Vedanta philosophy

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Abstract

The aim of this paper is to discuss fixed point notion, kutastha vindu and Vedanta Philosophy and also to find their interrelationship used in Hindu mythological books.

Keywords: Fixed point, kutasth vindu, Vedanta

1. Introduction

Mathematics is the science of numbers and space. It is also defined as the science of measurement, quality and magnitude. It is derived from Greek word "máthēma", means knowledge, study and learning of numbers. In Indian mathematics, it is known as Ganita (गणित) which in Sanskrit means is counting and calculation of number. The importance of mathematics in Hindu system can be understood by knowing the following sloka used in Vedanga Jyotisa as:

यथा शिखा मयूराणां नागानां मणयोयथा
तद्वद् वेदांग शास्त्राणां गणितं मूर्ध्नि संस्थितम् ॥ (R-VJ 35; Y – VJ 4)

In English translation, we have

Yatha Sikha Mayuranaam, Naganam Manayo Yatha |
Tatvd Vedanga Shastranam, Ganitham Murdhani Sthitham | |

This means –“Like the comb of peacocks and the crest-jewels of the serpents, so does the lore of Jyotisa (Ganita or Computation) stand at the head of all the lores forming the auxiliaries of Vedas”. This shows Ganita is the essence of all the sciences.

Analysis is an important branch of mathematics that deals with continuous change and with certain general types of processes which have emerged from the study of continuous change, such as limits, differentiation, and integration. Since the discovery of the differential and integral calculus by Isaac Newton and Gottfried Wilhelm Leibniz at the end of the 17th century, analysis has grown into an enormous and central field of mathematical research, with applications throughout the sciences and in areas such as finance, economics, and sociology.

It has been classified into linear and nonlinear parts. The linear analysis deals with infinite dimensional topological vector space and their operators acting upon them. Nonlinear analysis since 1960 deals with the extension of linear things to various kinds of nonlinear operators. Nonlinear analysis is characterized by a remarks mixture of analysis, topology and applications. The origin of fixed point theory lies in the method of successive approximations used for proving existence of solutions of differential equations introduced independently by Joseph Liouville in 1837 and Charles Emile Picard in 1890. Fixed point theory is an important branch of nonlinear analysis.

Definition: If $T: X \rightarrow X$ is a mapping where X is any nonempty set. Then, an element x_0 with $T(x_0) = x_0$ is called a fixed point of T .

Currently, Fixed Point Theory has been classified into three major areas:

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1. Topological Fixed Point Theory ^[10],
2. Metric Fixed Point Theory, and
3. Discrete Fixed Point Theory

which are defined respectively by the discovery of following three major theorems:

1. Brouwer's Fixed Point Theory : It states that any continuous self mapping f defined on a compact convex set has a fixed point,
2. Banach Fixed Point Theory: Let (X, d) be a metric space. Then a contraction mapping T on X has a unique fixed point.
3. Tarski's Fixed Point Theory: Let L be a complete lattice and let $f : L \rightarrow L$ be an order-preserving function. Then, the set of fixed points of f in L is also a complete lattice.

In 1886, H. Poincare was the first to work in this field. Then, Brouwer in 1912, proved fixed point theorem for the solution of the equation $f(x) = x$. In 1922, Banach contraction principle came in to existence which was considered as one of the fundamental principle in the field of functional analysis. This principle guarantees the existence and also gives a method to compute the fixed point. As it gives constructive results, it has wide applications ^[6].

For example, consider the equation: $f(x) = x^3 - 2x - 1 = 0$ for which $f(2) = 3$ & $f(-2) = -5$ and $f(2).f(-2) = -15 < 0$. So, using the Initial Value Theorem (IVT) ^[7], the solution of given equation lies in $[-2, 2]$. This equation can be written as function equation $x = Tx = \frac{1}{x^2-2}$. Then, for $x = -1$, we have $T(-1) = -1$. Therefore, by definition, $x = -1$ is the fixed point of T which is also the solution of given equation.

2. Kutasth Vindu and Vedanta Philosophy

Gita is the divine discourse spoken by the Supreme Lord Krishna himself and is the most popular and well known of all the sacred scriptures from ancient India. Always being revered as a true source of spiritual knowledge, it reveals the purpose and goal of human existence ^[1]. On the other hand, "Vedanta" is a combination of two words: "Veda" which means "knowledge" and "anta" which means "the end of" or "the goal of." It is one of the world's most ancient spiritual philosophies and one of its broadest, based on the Vedas, the sacred scriptures of India. It is the philosophical foundation of Hinduism; but while Hinduism includes aspects of Indian culture, Vedanta is universal in its application and is equally relevant to all countries, all cultures, and all religious backgrounds ^[3].

We have some following slokas dealing with Kutasth vindu in Gita ^[3, 9] and Panchadashi as ^[1]:

Sloka 2.1

ये त्वाक्षरमनिर्देश्यमव्यक्तं पर्युपासते।
सर्वत्रगमचिन्त्यञ्च कूटस्थमचलं ध्रुवम्॥ [Bhagvat Gita /12 / 3]

In English translation, we have

Ye tvaksaramanirdesyamavyaktam paryupasate /
sarvatra-gam acintyan ca kutasthamacalam
dhruvam//

That means, All country, time, objects, persons have ever living, never destructive, always determined, constant and

never changing, that is constant element, knowledge, Kutastha. This is the same heavy metal remains the same through many things are reshaped and changed on this same metal. The universe gets everything from the same source, knowledge that is unchangeable.

Sloka 2.2

द्वाविमौ पुरुषौ लोके क्षरश्चाक्षर एव च।
क्षरः सर्वाणि भूतानि कूटस्थोऽक्षर उच्यते॥ [Bhagvat Gita/15/ 16]

In English translation, we have

Dvvimau purusau loke / karackara eva ca /
Kasarh sarvibhtni bhutani kutassthokara ucyate //

That means, While describing destroyable and undestroyable men, undestroyable person is always the same, constant and becomes cause of creativity of destroyable person. All living things are destroyable but never changing and ever living soul is undestroyable element inside those living things. This soul is called Kutasth. The constant point, which we have raised as an issue, is exactly the same like the soul. The constant point is Kutastha point. Constant point is generally common and simple but Kutastha point includes conscience.

Similarly Panchadashi is a simple yet comprehensive manual of Advaita Vedanta written in the fourteenth century A.D. Pancha means five and dasi means ten, are the total fifteen chapters divided into three quintets the three aspects of Brahman, Sat (Vivek), chit (Consciousness) and Ananda (Bliss) aspects of Reality. It elaborates Advaita (view of Brahman and its derivatives), Consciousness, Jiva, Maya, Prakriti (prakrti, primary substance, Mahat (Omnipotent, Matter), Buddhi (Intellect), Ahankara (Ego), Avidya (Ignorance), and ānanda (Bliss) ^[5].

This is very much like the three aspects of Brahman – sat (existence), cit (consciousness) and ananda (bliss), respectively.

Sloka 2.3

द्विगुणीकृतचैतन्ये जन्मनाशानुभूतितः।
अकूटस्थं तदन्यत्तुं कूटस्थमविकारतः॥ [Panchadashi /8/24]

In English translation, we have

Dvigunikitchaitanye janmanashanubhutitah /
Akutastham tadanyantu kutasthamvikartah //

That means, Conscience (chidavas) changes in awakening stage and sleeping stage but self-consciousness (Kutastha) never changes. It neither dies nor changes. So it is undividable, unchangeable and immortal.

Sloka 2.4

सामानाधिकरण्यस्य बाधार्थत्वं निराकृतम्।
प्रयत्नतो विवरणे कूटस्थस्य विविक्षया॥ [Panchadashi /8/46]

In English translation, we have

Samanadhikrnyasy badharthvng nirakritam /
Prayatnato vivrane kutasthasy vivikshaya //

That means, Many Vedanta Acharyas believe that the ultimate aim of Vedanta is to know 'All the world as Brahma (Kutastha) or Me myself is Brahma (Kutastha). If we accept this theory then Kutastha can be changeable as man and the world are changeable. So to clarify this confusion the writer of Vivarana scripture, Shreeprakasatmayati, one of the Vedanta philosophers criticizes the theory of obstacle for the sameness (Vadhasamanadhikaranya- I=You=Brahma (Kutastha)). He opines that Aham (I) means a conscious being or Chidavas. Therefore I cannot be Brahma/Atma/Kutastha. He says that I is not the Kutastha but absence of I or unification of I with Brahma is the Kutastha.

3. Conclusion

The classical notion of fixed point introduced by Joseph Liouville in 1837, Charles Emile Picard in 1890 and S. Banach in 1922 plays very important role to provide solutions of various functional equations in applied mathematics. Also, the notion Kutastha Vindu as mathematical philosophical terminology has been used long ahead in Hindu mythological books, by Hindu gurus and different Vedanta philosophy. Our study indicates that both the terms "fixed point" and "Kutasth Vindu" are invariant under self-mapping. Similarly, Vedanta asserts that the goal of life is to realize and to manifest our own divinity. This divinity is our real nature, and its realization is our birth right. We are moving towards this goal as we grow with knowledge and life experiences. It is inevitable that we will eventually, either in this or in future lives, discover that the greatest truth of our existence is our own divine nature. Recently, Rani *et al.* ^[11] has beautifully applied this approach to find Vedic fractals. This also indicates the interrelationship between these two important notions. The topological structure of sudrashan chakra and Chakrabueha in Mahabharatha shows the iteration pattern like in classical mathematics and so we have the concept of fixed point.

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