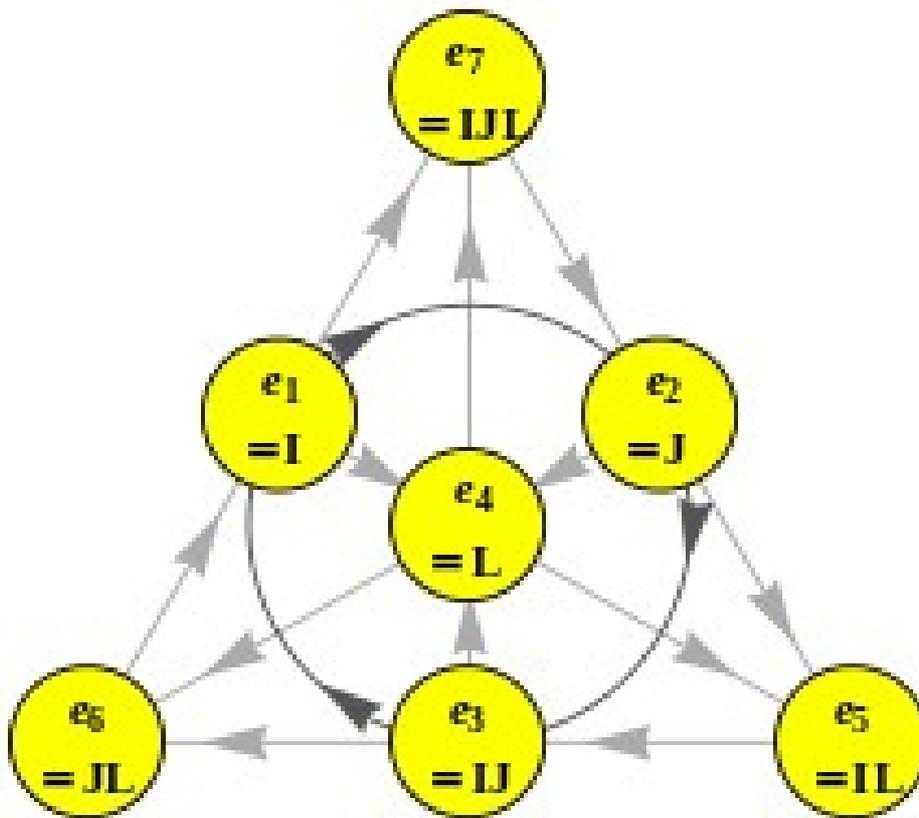


Vedic Physics Justification for Octonions

By John Frederick Sweeney



Abstract

Sir Roger Penrose, Nobel Laureate, has described them as “useless” for physics, yet the old uncle locked up in the attic, as John Baez describes them, play a fundamental role in the physics of the Universe, according to Vedic Physics theory. This paper explains why.

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Introduction

The huge website that Tony Smith built introduced me to Octonions. Tony had made all the connections with the various Octonion researchers of the 1990's and synthesized his understanding on his website, including the work of John Baez and others. Until that time, the Octonions had been ignored, as Baez wrote, much like an old uncle in an attic, locked away and dismissed by Nobel Laureate Roger Penrose as “useless” for physics.

How wrong can one man get? What does Penrose's blunder say about mainstream, academic physics in the 21st Century? Britain's knighthoods must come cheap these days when they are freely doled out to idiots.

Octonions comprise the essence of our Universe. Plato wrote that some 2,700 years ago, and none believe him, despite the pride Europeans take in “Greek” culture as the foundation of European civilization. The Fano Plane, an equilateral triangle, forms the multiplication table of the Octonions, and the Universe is composed of Quaternions, Octonions and Sedenions.

This paper explains how and why Octonions form an essential part of our Universe, on the basis of Vedic Physics. The original author failed to make the case, perhaps because he was trained under the auspices of the education system which produced Sir Roger Penrose.

The author of this paper made the connection between after reading a book on Vedic Physics, having long understood the importance of Octonions to Vedic Physics. S.M. Philipps has explained the connections between Octonions, the Pythagorean music system and the Sephirot, but he fails to explain why this is so. The original explanation is given here, with accompanying material for the non – specialist.

If the Octonions are connected to the Sephirot, as Philipps argues, then the author of this paper argues that this is so, because the Jews learned about the Sephirot in Egypt, and have carried that knowledge with them since their days in Egypt. The Greeks did not invent this knowledge, as the Pythagoreans studied this knowledge in Egypt and borrowed this culture from Egypt, before the civilization of Ancient Egypt disappeared. The Jews have carried around this knowledge in the form of the Cabala while the Greeks preserved the knowledge in their books, yet the origin of this knowledge is quite ancient, more ancient than current academia acknowledges about Ai – Kamir, the “Black Land” of the Nile Delta.

Wikipedia on Octonions

In [mathematics](#), the **octonions** are a [normed division algebra](#) over the real numbers, usually represented by the capital letter O , using boldface **O** or [blackboard bold](#) \mathbb{O} . There are only four such algebras, the other three being the [real numbers](#) \mathbb{R} , the [complex numbers](#) \mathbb{C} , and the [quaternions](#) \mathbb{H} . The octonions are the largest such algebra, with eight dimensions; twice the number of dimensions of the quaternions, of which they are an extension. They are [noncommutative](#) and [nonassociative](#), but satisfy a weaker form of associativity, namely they are [alternative](#).

Octonions are not as well known as the quaternions and complex numbers, which are much more widely studied and used. Despite this, they have some interesting properties and are related to a number of exceptional structures in mathematics, among them the [exceptional Lie groups](#). Additionally, octonions have applications in fields such as [string theory](#), [special relativity](#), and [quantum logic](#).

The octonions were discovered in 1843 by [John T. Graves](#), inspired by his friend [William Hamilton](#)'s discovery of quaternions. Graves called his discovery **octaves**, and mentioned them in a letter to Hamilton dated 16 December 1843, but his first publication of his result in ([Graves 1845](#)) was slightly later than Cayley's article on them. The octonions were discovered independently by [Arthur Cayley](#)^[1] and are sometimes referred to as **Cayley numbers** or the **Cayley algebra**. [Hamilton \(1848\)](#) described the early history of Graves' discovery.

Vedic Physics Explanation

From Srinivasan



Fig: The Guna Diagram.

The Universe stands composed of three types of matter: Thaamasic, or Dark Matter, which remains invisible to humans; Satvic, the stable 8 x 8 form of diamonds and hard, durable substances, and the Rajic, 9 x 9 dynamic forms of fluid and ephemeral substances. Octonions belong to the stable Satvic form of matter.

These three forms of interactive stress could only exist if the Self - similar (field of components in space) have the following four qualities: namely, Aikaantha, Aathyanta, Atho and Abhavath, as synchronised, perpetual, dynamic and invisible state of existence. These states are analysed and their axiomatic values derived below. The diagram above clarifies the concept.

Aikaantha	Aathyantha			Atho
Thaama	Raja			Sathwa



Fig: The Guna Diagram.

The dot represents the stored stresses in the Thaama compressive, dense, coherent and stable state of Aikaantha. The double arrow head shows the periodically released Raja interactive, resonant, stationary but trans - migratory state of Aathyantha.

The long, single ended arrow shows the 'instantly' released Sathwa expansive, radiant and mobile state of Atho.

The single arrow indicates that counts along two axes stand synchronised. When counts along 3 axes synchronise perfectly in the Thaama state, then the double and single arrows turn inwards or 'disappear.' Then space becomes invisible and the undetectable state of Abhaavath and the Universe remains in the Aikaantha state.

Space, the fundamental reality, can exist in only one state of Aikantha - the coherent state of three dimensional, cubic resonances. Movement needs the fourth power.

Aikaantha is a synchronised (coherent) singular state where all components act simultaneously as a single entity in the Thaama state, shown as the dot. This can comprise activity in both forms, where relative movement between interacting components may or may not exist. That is, relative activity may all proceed together or may be in a sequential form within the cycle.

As an example, ten people can clap periodically either simultaneously or sequentially. Though the ten simultaneous claps will be counted as one, it still contains the ten claps. Only the degree of non-synchronisation will allow one to differentiate between the ten different claps.

For this reason, all the interactions can remain together in the same relative relationship of a frozen form or move relative to each other in a cyclic period of movement, and yet remain a singular entity.

Thus, Aikaantha has two mathematically - limiting values, depending on its state of internal relative movement.

Assuming there are n components, then the maximum number of possible interactive states must be $N / 1$. Comparing the relationship with the smallest possible value of an isolated component of one unit, the number of possible interactive states becomes $N-1$ and the incremental ratio of a change, simultaneously or instantly, becomes

$$F2 = (1+(1/(N-1)))^{N-1}$$

(as simultaneous interactions are logarithmic):

As N approaches Infinity, F2 equals the base of the natural logarithm e in modern terms. If all possible interactions are carried out n-1 times simultaneously then they will approach the value of e or F2.

Here the logarithmic sum of the incremental value and its ratio reach an asymptotic or limiting value of a transcendental number.

Equation. S.1A.

$$e = \left[\left(\frac{N}{N-1} \right)^{N-1} = \left(1 + \frac{1}{N-1} \right)^{N-1} = 2.7182818285 \right]$$

the larger the number of interactive components or larger the relative volume acting as a single unit, it will always tend to equal 2.718, or e at the maximum rate of simultaneous or 'within a cycle' or instant period of interactive changes or counts.

Any count of an interaction can be obtained only after the completion of the cycle and therefore the unit count per unit cycle is a relative instant.

Aikaantha is an axiomatic state that shows the Self - similar of space will always remain in this singular or frozen state of dynamic interaction when unhindered.

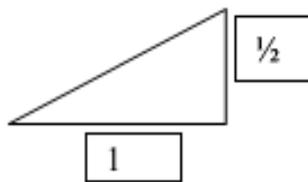
The next possible variation is a relative cyclic-period difference between the interactive components which can result in a 'rotary' or cyclic periodic movement of the interactive stress forms or oscillatory waveforms. Here the interactive forms, despite a relative movement, must remain in the same location to fulfil the condition of Aikaantha or singular (unitary) state.

The reason is that in any confined plenum, a sea of components or a vast field of matter, where there exists no possibility of external intervention, or else far from the boundary of influence, interactive exchanges can take place only by a process of simultaneous exchange of required parameters from within itself.

This law of Swabhava (self-similarity) leads to a unique ratio that defines the value of a cycle as 10, if the Aikaantha state is to be ensured. Axiomatically, the rate of variation in cyclic time between any two identical interacting components has to be 1 – 2, as shown in FM3:

Problems on vectors etc were solved by variant methods called triangulation long before the Greeks.

Equation. S.1B



Solving the cyclic period-difference or ratio by triangulation works out to x as the golden mean:

Equation. S.1 C.

$$\frac{\sqrt{1 + 2^2} - 1}{2} = 0.618034 \blacksquare$$

If x is halved and triangulated, and the difference is again halved and triangulated iteratively and the result multiplied by the Equation S.1 D.

Secret Of Sankhya: Acrifice Of Scientific Unification₇

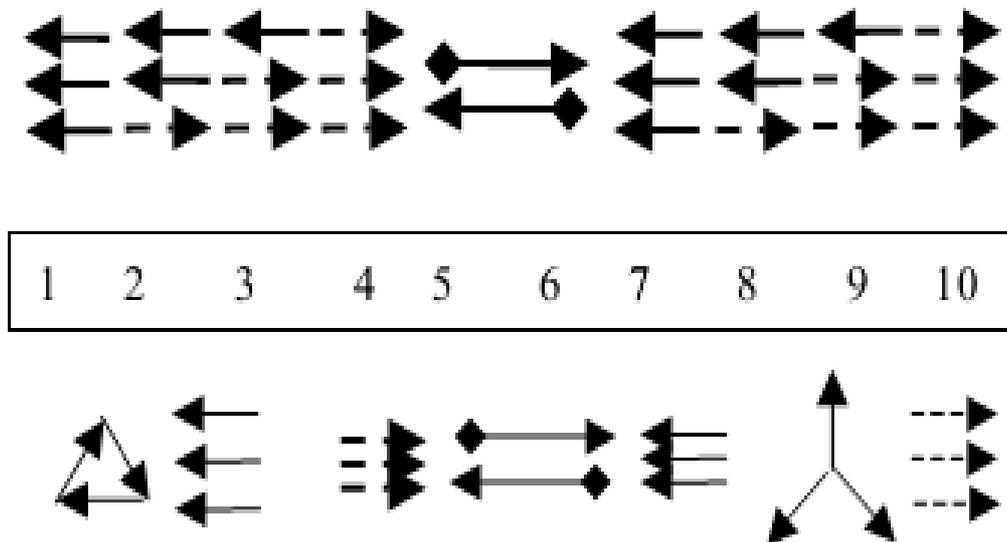
$$A_0 := \frac{x}{2} \quad A_{i+1} := \frac{\sqrt{1 - \sqrt{1 - (A_i)^2}} + (A_i)^2}{2}$$

powers of two raised by the same number of iterations, as follows, the formula is shown as F4. The relationship to the current value of π has been brought in as proof to show that the cycle is indeed of ten counts.

An interaction with a relative cyclic period difference remains in the same singular or stationary position of the Aikaantha state, because the sum of all the interactions within the cycle only add up to π /10, provided the initial displacement is x or x/2. Even though any interaction is always directed towards the line of action, the relative direction between two axes changes with a variation in rate of interaction between the two axes. Regardless of

the rate of interactive counts per cycle, the interactive stress forms (waveforms) follow a circular path and complete the circular cycle only after 10 sequential interactions, yet remain in the Aikaantha state.

There can exist only three modes of interaction as derived in the Guna Suthras. Then these three modes act simultaneously or sequentially. The permutation combinations shown below indicate only 10 possible states:



Axiomatic Cyclic Limit Of 10 Counts

It is highly indicative that the observed complication is because the three modes of an interaction are directly related to the direction of the 3 axis. The solid arrows mark the original inward state and the dashed ones radiate. The closed triangle show the simultaneous dense Thaama state while the radiating arrows show the radiant Sathwa mode.

The mix of dashed and solid arrows indicates the number of axes that are not synchronised with the original state, which shows 10 distinct combinatorial states. Three counts for the closed triangle with 3 axes converged, another three counts for the 3 axes in radiant mode totalling 6 ways. Then there are four additional variants of inward & outward going combinations of parallel and anti - parallel combinations. Two axes synchronise perfectly to reduce the interactive counts logarithmically when the value of a count is less than

$$1 / C^{1+x} = 5e-13$$

About a femtosecond differentiates the synchronised from the non - synchronised state as identified in Suthra 32 as a bonding action.

bonding action. Similarly $1/C^{1-x}$ defines desynchronisation is complete and leaving $1/(C^x)^2$ as the period in which the bonding or resonant or coupled state can exist. These three parameters have a fundamental identity in Physics and is shown in the axiomatic derivation section.

The transfer of interactive parameters acts only along one axis, albeit in both ways, within the duration of such activity.

Sequences 1,2,3 & 4 and 7,8,9 &10 transfer the effects only through 5 and 6.

In a confined region, the 1 to 4 states represent the ingoing, centered and highly compressive states symbolised by the closed triangular set of arrows.

The 7 to 10 are expansive, free to act outwardly again symbolically as an opened set of three arrows. However the constraint is at the interface of the transition state at 4 and 7. .

The outgoing three axes, which are constrained to act inwardly in a confined way through a double - axis path of 5 and 6, which act as a single channel by synchronising the two paths. Because of these two axiomatic and transcendental ratios of 'e' and 'π', any interaction between identical components in a confined region bounded by other similar components, will remain in the Aikaantha state and only transmit the stresses in a trans - migratory mode, following the 3 Guna interactive characteristics.

Logically, the components cannot move away relative to another unless there exists freedom to move. Since the Substratum is a sea of identical components, there is no freedom to move along any axial direction. For this reason, the Aikaantha state is maintained by two values of e and π /10 as a ratio, and causes the stress values to build up to a constant limiting value.

Since the interactive reactions follow laws of self - similar action, these can be expressed as an infinite power series. The accumulated stress provides the potential to respond instantly to any change caused by an unbalanced interaction and causes interactions to take place simultaneously. This is mathematically defined as a coherent state, because space - wise it oscillates symmetrically at the same nodal positions and in terms of cycles (or periods) it is in synchronous step with previous cycles and forms the background state.

The Self - similar or background Thaamic state is where all the components in the Self - similar oscillate periodically in locked step. For this reason, it is an undetectable state, as **only a change from a standard state can be detected** in relation to it. It is a self – similar, balanced and synchronised state.

The self - similar fraction x and its internal division adds up to one with increasing powers of x (representing fraction of unitary cycle) to any level.

Though an Aikaantha state is depicted as a stationary state with a unitary value because

Equation. S. 1.E.

$$\sum_n x^n = 1.618034 \blacksquare$$

of its coherent, synchronised and simultaneous behaviour, it can still be described numerically by the above equation to any level of accuracy. If one state can be identified as having a real relevance with a value of x^n , then the spectrum of possible states that have a relative harmonic or proportional connection can be identified within the unitary Aikaantha state.

Since it remains in a stationary position and symmetrical state it cannot rotate or change its orientation relative to any point of reference.

It is an extraordinary state wherein all the stable states exist simultaneously and harmoniously all the time. It is a dynamic state that maintains the same stable conditions at the same positions all the time. It is a symmetrical state that maintains its symmetry all the time. It contains the same set of coherent vibrations in every location or point.

For example, if an extremely small section can be broken off, it will contain all the coherent oscillatory combinations in this infinitesimal section from which the original information can be regained. It is a holographic state, described as an Andhatamishra state in Sanskrit or the equivalent of a tiny black hole state.

Coherent states have identical conditions in a self similar and scale invariant mode everywhere simultaneously and also act in the same way. It is similar to a linear harmonic standing wave but in a 3 dimensional Self - similar. It is a cubical or spherical 3 - dimensional harmonic wave functioning in an internal breathing mode where only the logarithmic index of the potential, changes or flips one up or one down to maintain a null difference between any adjacent state, periodically. The breathing mode changes the potential level by increasing or decreasing the power index by one unit and two adjacent levels cannot have an index level difference greater than 1.

As an example:

$$n := 6 \quad (1 + x)^n \cdot x^n = 1$$

$$x^6 + 6 \cdot x^7 + 15 \cdot x^8 + 20 \cdot x^9 + 15 \cdot x^{10} + 6 \cdot x^{11} + x^{12} = 1$$

The internal shift of balance is a logarithmic value of one but it implies a simultaneous change of 10 units or a cycle. For this reason, internal changes can be simply identified by the logarithmic index as cyclic changes. Stresses internally tunnel or avalanche by changing the index values by one which means a shift of 10 counts as a simultaneous cycle. Such phase changes are beyond detection.

The individual state of components being identical to each other in every way and in a state of total internal freedom, vibrate in every possible mode and transmit and share these interactive oscillations in such a way that the locations of identical stress count values fall into regions of nested cubes (or spheres) in every cycle or period that constitutes the instant or duration of activity.

All variations are registered as changes in the static potential, resulting in a phase or synchronisation difference and not by a change in linear velocity or its local position. It would seem to be devoid of motion, but that is because the entire activity is due to the super - positioning of vibrations in the same location, which forms a vertical increment in potential or decrease in the oscillatory-cycle interval, as opposed to a horizontal activity like linear velocity.

Each axis has two oscillatory states with a periodic relationship of 1 and 2, or cyclic relationship of one and half, that allows the nodes to maintain the same locations at the

same cyclic rate of two. The incremental rate needed to maintain an expanded oscillatory cycle is

$$(2^3 = 8) - 1 = 7$$

The true Aikaantha state that remains isolated, yet its sum remains 1/7, ensures the spectral characteristics of Sathwic phenomena, such as the seven bands of color in a spectrum.

FM7 lays the foundation for the Purusha state.

$$\sum_N \left(\frac{1}{2^3}\right)^N = 0.1428571429 \quad \frac{1}{7} = 0.1428571429$$

Equation.S.1 G.

The internal cycle is maintained by superposing according to the x series. The internal division can be extended to any level (FM5) and the coefficients in this series, similar to those in the binomial theorem, forms a Pascal triangle.

Aathyantha represents a state of endless activity, perpetual dynamism or interactions without end. Any cyclic time period will not end or cannot come to a stop because of the other three factors. In order to theoretically justify cyclic time periods of an eternal nature, the axiomatic factor that would provide for this quality must be identified as a quality inherent in the Self – similar nature of space.

If this quality does not exist, then it becomes a certainty for one to predict the end of dynamism and state of non-existence. The existence of the Aathyantha state can predict the continuation of dynamism, which naturally leads to sequential and repetitive state of cyclic action, which is a perpetually interactive state that is cyclic, synchronised, in-step, recurrent and never reaches a limit that stops the interactive process.

The first of three formulas shows that even if a polarisation factor x is summed up to infinite powers of index and for infinite time-duration the maximum potential will not exceed the kinetic or basic potential by more than 1+x or the rate of expansion cannot go beyond the power of 1+x. Therefore the self - similar super - positioning count at any one location cannot exceed

$$C^{1+x}$$

at a single level as the Bhava / Ahankar value of a charge, which signifies a self - induced assymetry in time that maintains the oscillatory state.

Any cyclic interaction of 10 counts of one component with another similar one gives an instantaneous product of 100=10 2 counts and the maximum delay of a count in each direction of oscillation provides a total of 2 counts in 100 per cycle.

Assuming that this delay continues ad infinitum as an endless series, then the uncertainty in an interactive count cannot exceed this count or stating it differently the cycle may be extended by this factor to bring about a balance in a free state.

$$RS = \left[\frac{100}{100 - 2} = 1 + \left(\frac{2}{100}\right)^1 + \left(\frac{2}{100}\right)^2 + \left(\frac{2}{100}\right)^N = 1.0204081633 \right]$$

displacement level. The value of RS is the natural or axiomatic delay in which the oscillations decay and remain synchronous.

The two parameters e and $\pi/10$, ensuring the Aikaantha state, have the quality of endless dynamism built into their derivation. The ultimate value of e is a constant, reachable only at an infinite rate of interaction. Similarly $\pi/10$ is a transcendental number that tends to reach a constant limit at an infinite rate of interaction. Even then it only ensures the 'circularity' of the cyclic time variation, thus ensuring a centering action.

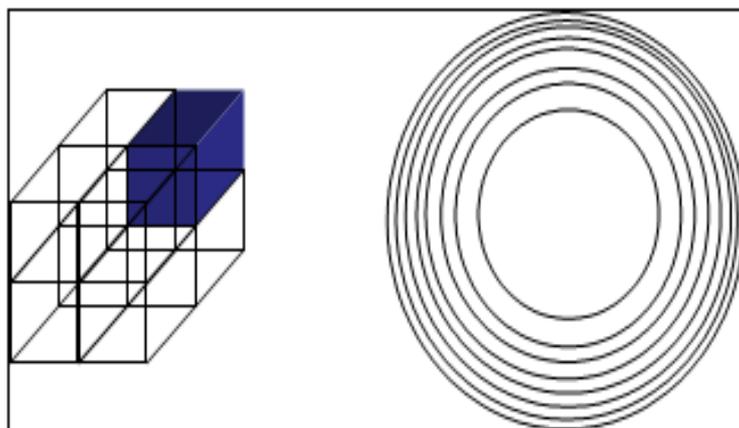
At its higher orders of interactive state, it remains centred or seems 'static'. The two other states of Atho and Abhavath must ensure the perpetual characteristics needed to sustain the cyclic state. The ratios of continued resonance and continued expansion in the two modes of simultaneous and sequential activity must be analysed and the appropriate factors derived.

Before demonstrating how these aspects of the field space support it, such parameters must be derived .

Atho is the non-symmetric space-like displacement and non - synchronous cycle (or period) characteristics in the resonant oscillatory background state that forms the dynamic base for all phenomena, which motivates manifestation of phenomena. As a state that exposes change, it can be detected. Any incremental displacement at the elemental level has to be 2 as in EP3. The spatial volumetric incremental relationship varies by 7 in relation to the first one

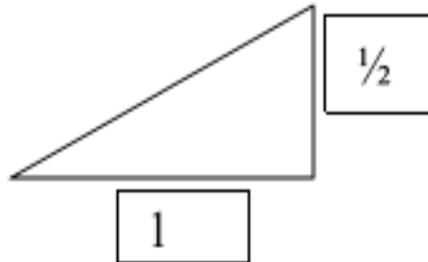
$$(2^3 = 8 - 1) = 7 \text{ counts}$$

Similarly, doubling the radius provides 7 equal incremental spherical nested volumetric units:



The additive mode is shown with the blue cube as the primary unit. The cubic space can expand by the same mode if synchronised on all 3 axes. Equal oscillatory displacements in equal time periods produce a balanced state. However, here an interactive state is established wherein there is an inherent inequality either in nodal numbers, distance or time period between any two axes at right angles. The rings expand radially as the cube root of 2 to 8.

A mathematical analysis of the very first vector state of a 1 - 2 gradient leads to some special features.



The term signifies movement or dynamic characteristics. When an interaction from an external source provides an impetus or motive force to move, then such movement is temporary or it comes to a halt on the termination of that activity potential. But the definition of the Self - similar is associated with a fundamental state that is independent of external inputs and must necessarily provide such characteristics on its own or from its internal state.

Abhaavath is the invisible interactive state that does not exceed the maximum potential, or expansion / contraction parameters. All interactions are contained internally in a balanced and synchronised state, a state where all the dynamic parameters balance and equalise to retain the coherent state, perpetually and eternally.

The Abhaavath state is a coherent, synchronised, simultaneous and symmetric interactive state where all exchanges are carried out internally. The exchanges involve stress transmigratory actions that do not involve any displacements. The nett cyclic exchanges result in zero relative displacement which ensures the maintainence of an invisible or undetectable state. The following mathematical expression symbolises and defines the invisible Abhavath state.

Equation. S.1 I

$\pi = 3.1415926536$	$RS = 1.0204081633$
$e = 2.7182818285$	$\frac{\pi}{e} \cdot \frac{x}{RS} \cdot \frac{10}{7} = 1$
$x = 0.6180339887$	

The ratio e/π spectrum represents the Thaamasic coherent state of simultaneity, where all

interactions act internally as a single unit. The e factor FM2 is a simultaneous count within a cycle. The π factor (derivation shown in FM4) represents the sequential interactive state within the Thaamasic domain.

The ratio x / RS (FM,5,6,7) stands for the Raja resonant state of interaction that remains within a bounded region. The expansive logarithmic factor 1/x = 1+x symbolising the equality of the interactive cycle in the simultaneous and sequential increments, and serves as the starting point for all interactions that externalise.

The 10 marks the simultaneous counts involved in an interaction that has each unit proportional to x/2, the axiomatic self - similar ratio to maintain an interactive state perpetually, while 7 represents the sequential increment when an interactive period doubles. These form the principle rules to contain the Guna modes of interactions. All these factors are transcendental numbers, thus ensuring their usage to Athyantha or unlimited number of interactive states.

The Abhavaath state is shown as a balanced interaction where the left and right side are perfectly equal and prevents any stressful trans - migratory states that could give rise to radiant and therefore manifest states. The expressions shown below define the Abhavaath state as a zero difference in count during an interaction. The transcendental numbers forming the ratio of simultaneous Thamaasic states, equals the ratio of Sathwic sequential states.

$$\left[\left(\frac{7 \cdot RS}{10} \right) - \left(\frac{\pi \cdot x}{e} \right) \right] = 0$$

The ratio of the Thaamasic Purusha spectrum is exactly equal to the Sathwic Moolalaprakrithi spectrum.

Equation. S.1. K.

$$\frac{Kx}{c^3} - c^3 \cdot my = 0$$

Equation. S.1.J.

Summarising the Logic.: The Sankhya view that evolves out of the complete theory is that only vibrations are detected by the observer and all manifested phenomenon are aggregates or collective states of such vibrations on a fundamental base.

Vibrations are actions and logically must be caused by fundamental objects or components. Since only relative changes can be detected, any fundamental component that is not in a vibratory state cannot be detected. Vibrations are caused by components in an interactive state or a cyclic state of colliding and separating that is common to all interactions and wave phenomena.

Interactions create three distinct modes of stresses. Collisions are compressive or inelastic. The resultant reaction is expansive or elastic. When the interacting components lack the freedom to move away, the interactive state is maintained in a cyclic mode in the same location, in a resonant state.

Vibrations can be measured if they have oscillatory amplitude or displacement or a to and fro movement. If there is no space to move, the vibratory action creates stresses or pressures. Such stresses transmigrate across the components in the three modes described earlier.

If the observed process of detection depends on vibrations, then fundamental space must contain components with those four characteristics described as states, which makes it function in a holographic way. That is to say, that all vibrations remain in fixed relationship relative to each vibratory point in a coherent and resonant state.

If vibrations are caused by interactions, then the interactions can only be between objects, what ever these might be. The objects need not be defined, as they only form background. Since only vibrational counts of interactions are measured and compared, then dimensional definitions are not needed.

Sankhya Suthras derive a unified theory that is self-similar, scale invariant, perpetual, self-organising, self starting and clock-time independent. The same laws apply in evaluating the galaxy, sun, planets, protons, electrons, etc. The distance varies with cyclic interactive period, keeping C the perpetual oscillatory rate constant, which is an axiomatic rate due to the action of vectors at the fundamental level. Therefore, that the examples chosen remain in the realm of particle and atomic physics remains a matter of convenience.

Conclusion

This paper has shown the definition of Octonions, and then given the Vedic Physics explanation for why Octonions are necessary to the structure of the Universe and all matter. This explanation may not appear readily apparent to those readers who are unfamiliar with Octonions or Vedic Physics. Here, we re – state the fundamental reason why Octonions support the stable 8 x 8 Satvic state of matter:

Each axis has two oscillatory states with a periodic relationship of 1 and 2 or cyclic relationship of one and half, that would allow the nodes or turning points to maintain the same locations at the same cyclic rate of two. The incremental rate needed to maintain an expanded oscillatory cycle is

$$(2^3 = 8) - 1 = 7$$

The true Aikaantha state that remains isolated, yet its sum remains 1/7, ensures the spectral characteristics of Sathwic phenomena, such as the seven bands of color in a spectrum.

Our combinatorial Universe consists of two types of visible matter, the stable 8 x 8 Satvic, and the dynamic 9 x 9 Rajic, while the Substratum's Thaamic Dark Matter makes up the third part of the universe. The section above describes how Octonions, which form in groups of seven around the Fano Plane, form the Satvic state of stable matter. Without Octonions, our universe could not exist.

Millenia ago, Plato stated in his *Timaeus* that our universe consists of tiny triangles. Few believe him now, as few have believed in Octonions until relatively recently. It is interesting to note that Sir Roger Penrose is described as a Platonist on the internet, yet he is the most prominent figure to dismiss Octonions and their use for physics.

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Contact

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Dedication



“There are those who look at things the way they are, and ask why...
I dream of things that never were, and ask why not?”

“Let us dedicate ourselves to what the Greeks wrote so many years ago: to tame the savageness of man and make gentle the life of this world.”

Robert Francis Kennedy