

REVELATION OF AN ESOTERIC GEOMETRY OF NORTH INDIAN HINDU TEMPLES

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Abstract: Every religion has its own identity which is scripted in various religious texts in the form of sacred diagrams, motifs, etc. The power of these holy apices depends on the worshiper's beliefs and their satisfaction. Every natural geometry signifies its shape, size, character, and principles. Every aspect of an element present in the Universe can be analyzed through their governing attributes like – point, line, distance, angle, etc. The religious geometry of Hindu diagrams called Sri Yantra and Mandala, both are being an enigma in the whole Universe. It is a metaphysical philosophy which deals beyond the reality. Here, the paper proposes four strategies that can endeavors to reveal the mystic curtain of these religious diagrams over the world. First, study the geometrical configuration of the Sri Yantra and Mandala. Second, establishment of the fractal linkages between these sacred geometries. Third, construction of Sri Yantra and three suitable groups of Mandala. Lastly, interaction of the Mandala and Sri Yantra with the internal spaces in the sanctum sanctorum of Rajarani temple. Therefore, it is tried to make the study approach unique on its own to provide a basic platform and create some space for religiously oriented researchers.

Keywords: Sri Yantra, Mandala, Temple, Geometry, Configuration, Mystic.

1. Introduction

Various geometrical symbols, figures and configuration exist in Hindu religion which has a significant positive belief among its proponents. Every consecrated apex possesses some meaning for its geometrical character. Followers of Hinduism and Tantricism have reverence for these metaphysical geometrical patterns without raising any queries out of faith imbibed in them. The elements of an enigmatic spiritual tradition of Tantricism suffuse the Indian religions mainly Hinduism, Buddhism and Jainism. The Tantric elements of both the Hindu and Buddhist religious traditions are closely connected with the Sanskrit term mandala as Tantric Mandala acts as the meditational device. (Bafna, 2000). Popular literature is unable to find the genesis of these sacred symbols. However, this research paper is trying to find interesting facts regarding the geometrical configuration of the Sri Yantra and Mandala. Did these yantras and mandalas act as the generative figure for planning the temple? This is the basic question which we are trying to figure out, although a lot has been scripted about the geometry of these mystic figures carved out of lines and curves. We are applying it on Rajarani temple at Bhubaneswar to check the usage and application in temple design.

In Hindu religion there is a belief that, cosmologically there is an invisible power that exists between the Hindu temples and divine Gods which are connected by the help of these supernatural diagrams. All logical patterns given in the Hindu texts have different perceptions

at different angles. The swastika is another kind of holy symbol widely used in the Hindu religion. The reason behind the formation and evolution of these sacred characters is still an enigma that prevails among the researcher community. All the natural and man-made objects are shaped with basic elements of geometry i.e. point, line, curves etc. Various postulates related to basic geometry like – the Golden ratio, the Fibonacci's series, Euclidean geometry, and symmetry are vividly used in architectural domain. For example, the spire of the Hindu temples are constructed based on the prototype of the peak of the holy mountain called Meru, dedicated to Lord Shiva. Fractal geometry is incorporated widely and can be seen in every Indian Hindu temple.

2. Materials and Method

The research paper is highly subjected to qualitative research. The formation of this research paper is based on collecting information from various sources in the form of books, journals, conference proceedings, etc. However, some other sources like internet-based materials provide important key elements in determining and collecting information for preparing this research paper.

3. Discussion

This research paper aims to discuss mainly four aspects elaborately through pictorial representation to understand easily and effectively which are as follows:

Sri Yantra – Sri Yantra is a geometrical figure similar to the Mandala and being used by both Hindu and Buddhist Tantrism. In the Shiva school of Tantricism the mandalas are created with linear figures like triangle, square, circle and so on (Bafna, 2000). The meaning of this sacred diagram indicates beauty and harmony as well as it is symbolized as an instrument of worship of pictures, idols, or geometrical illustrations.

As per the construction point of view, it is based on 'Euclidean Plane Geometry' with real parameters. The Lotus pattern is based on Postscript 'Bezier Cubic Curves primitives. According to Zimmer, "basically the Yantra is an instrument designed to curb the psychic forces by concentrating them on a pattern. This pattern becomes reproduced by the worshiper's visualizing power.

It is a machine to stimulate inner visualization, negotiations, and experiences" (Huet, 2002). Sri Yantra is also called Sri Chakra or Navachakra. As per Mircea Eliade, "the Yantra is the linear paradigm of the mandala, expressing the same principles in geometric form. Sri Yantra is a 'cosmogram' – a graphical representation of the Universal processes of emanation and reabsorption reduced to their essential outline" (Bolton, Nicol and Macleod, 1977). "The Śri Chakra ritual infuses the design of the yantra with chant, representing the union of space and sound. Its closed, concentric circuits correspond to the nine planes of consciousness of the spiritual seeker. Each plane is a stage on the ascent of one's being toward the inner self" (Kak, 2009).

It is a difficult geometric construction and it is considered as an enigma about its establishment. It is difficult to draw a correct symbol with free hands. The Sri Yantra is composed of five damsel's of Siva (i.e. downward-pointing Śakti principle, female which correspond to the Yoni which is considered as static). The set of five downward pointing triangles symbolizes 'the first

phase of expansion from one to all' and four Srikanthas of Siva (i.e. upward-pointing Śiva principle, male which corresponds to the Linga (phallus) which is considered as dynamic). The set of four upward triangles symbolizes 'the phase of return or reintegration'. Now, the whole set of nine triangles is being identified as the 'well spring of the law' (dharma) which indicates the two stage ritual of meditation that the worshipper follows (Bafna, 2000) and the it is shown below in the figure no. 1.

Through overlapping of these nine (9) basic triangles give rise to forty-three (43) number of subsidiary triangles enclosing the Siva Bindu (Sambhu) which possess the placement of abodes or deities. The nine triangles are surrounded by a layer of the eight lotus petals called Sarva – sankshobhana Chakra followed by a layer of sixteen lotus petal called as Sarvasaparipuraka Chakra.

Various accessories like – umbrellas, vases and standards are being placed in the space made between the square and the outer rings of the Sri Yantra. These resembles the mechanism of the ritual and offerings that respect sanctified places, heavenly surfaces, and the territory of the king (Bafna, 2000).

The whole apices i.e. geometry of the Sri Yantra is surrounded by a square of three straight lines having four openings or doors at the cardinal points called Bhupura or Bhugrha. Bhugrha is considered as the ground plan of the Sri Chakra or Sri Yantra.



Figure 1 Composition of *Sri Yantra Geometry* (a) 5 Downward Triangles (b) 4 Upward Triangles (c) *Sri Yantra* (Source: Author)



Figure 2 *Sarvasaparipuraka Chakra* and *Sarva-Sankshobhana Chakra* (Source: Author)



Figure 3 *Trailokya Mohana Chakra* (Source: Author)

Trailokya Mohana Chakra consists of Bhupara and three concentric circles, girdles called Mekhala. This chakra is defined as the space between the square and three girdles i.e. enchantress of the triple world. This chakra represents aspirations and desires. While Sarvasaparipuraka and Sarva – sankshobhana Chakra denotes the fulfillment of desire.



Figure 4 Components of Sri Yantra (a) *Sarva-Sambhagyadayaka* (b) *Sarvartha-Sadhaka* (c) *Sarvarakshakara* (d) *Sarva-Rogahara* (e) *Sarva-Siddhiprada* (f) *Sarva-Anandamaya* (Source: Author)

The adoration of the Sri Chakra/ Sri Yantra can be accomplished on a flat surface drawn on the earth or ground or on a piece of paper called Bhuprastra, or in a three dimensional form, called Meruprastara (Baumer 1994).

The geometrical equivalents states that the total number of chakras as well as sikharas is twenty four, but at the level of the miniature spires above the melana, the fourteen triangles of the Sri chakra (Caturdasara) find their correspondence in the fourteen upper sikhara; the plinth (pitha) corresponds to the Bhupra enclosure of the yantra; the amalaka crowning to the inner circle (vrta), and the kalasa to the central point (bindu) (Baumer 1994).

The components of Sri Yantra include Sarva-Sambhagyadayaka, the fourth chakra which forms 14 triangles after interlocking each other from upward and downward directions and refers as the giver of auspiciousness. Sarvartha-Sadhaka and Sarvarakshakara chakra are placed at the fifth and the sixth in position withholding ten triangles each. The former chakra is used as a fulfiller of all-purpose and the later chakra acts as the giver of protection. These chakras are similar but possess differences in scale. Sarva-Rogahara chakra is the seventh chakra consists of eight triangles which denotes a remover of all desires and illness. Sarva-Anandamaya, the eighth chakra is an inverted triangle that denotes a giver of all accomplishment. And the last component of Sri yantra is the Bindu which denotes as full of bliss (Huet, 2002).

Mandala – Its full name is Vastu Purusha Mandala. Vastu, Purusha, and Mandala are equally important and significant. The Vastu-vidhana (VIII 26-32) of Narada says that “the Vastu Purusha Mandala is the magic diagram (yantra) and the form (rupa) of the Vastupurusha: It is his body (sarira) and a bodily device (sarira-yantra) by which those who have the requisite

knowledge attain the best results in temple building. The Vastu had come to be the place of the adjustment of solar and lunar cycles”. “The number thirty-two of the divinities residing in the squares of the border of the Vastu Mandala is also the sum of 4 and 28, the number of the regents of the four planets who rule over the equinoxial and solistical points referred to the cardinal points, and of the reagents of the 28 Naksatras” (Shukla, 2019).

As per the elucidation of Kramrisch, “Brahma occupies the central region in the Vastu Mandala that signifies as the "regent of the place". The twelve deities surrounding him are identified as the twelve Adityas-the regents of the twelve different" aspects" of the sun. These are arranged in a dual sequence. The four sides, beginning from the east and moving toward the south, are assigned to Aryaman, Vivasvan, Mitra, and Mahidhara in that order. The remaining eight Adityas are arranged in pairs at the four corners: Savitr and Savitri at the southeast corner, Indra and Indrajayain the southwest, Apa and Apavatsa in the northeast, and Rudra and Rudrajaya in the northwest” (Bafna, 2000).

Rog	Nag	Mushya	Bhalata	Soma	Charak	Ist Agni	Diti	Agni
Papa Yakama	Rudra						Aap Vatsa	Prajanya
Shosha	Raja Yakama		Prithvishara		Aapa	Jayanta		
Asura								Indra
Varuna	Mitra		Brahma		Aryama			Ravi
Puapa Danta								
Sugriva	Jaya				Savirat	Bhriya		
Dauwarka	Indra	Bhishani		Vivaseer		Vashya	Savira	Nabha
Pitrat Gann	Mriga		Gandava	Yama	Griha ksata			Pusha

Figure 5 Vastu Purush Mandala (Source: Author)

“The thirty-two padadevatas are grouped into four sets, each associated with a particular direction and led by a dikpala, the warden of spatial directions. Mahendra, or Agni, is associated with the east, Yama with the south, Varuna with the west, and Soma with the north. Each of these directions has a special signification: the east is the quarter of the gods; the south is the region of ancestors; the west is the area of darkness (the inverse of the brilliant Agni in the east); and the north is the region of men” (Bafna, 2000).

There is two ways perception of seeing Mandala – a) Mesh Zone & b) Concentric Zone which are elaborated as follows:

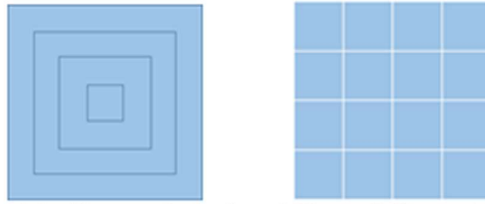


Figure 6 Mesh Pattern of *Mandala* (Source: Author) and Figure 7 Concentric Pattern of *Mandala* (Source: Author)

The general form of the Vastu Purusha Mandala is a square. Prof. Kramrisch rightly interprets it as – “the square, as a fundamental figure of sacrificial symbolism and temple architecture, lends itself to many variations”. As a rule, its shape is square which acts as the fundamental form of Hindu Architecture.

The Vastu Purusha Mandala acts as a planning guide as per various writers. It can be seen in the design pattern of streets in town, the wall of a building, and functional zones within built structure. The regional style of Odishan temples has been illustrated in a number of texts like- Silpsarini, Silpaprasa and Silparatnavali (Nirmal Kumar Bose, 1932).

In Town Planning in Ancient India, B. B. Dutt agreed with the idea that plan layouts of towns and villages were based upon the padavinyas schemes. The diagram according to him was a basis, not so much of formal planning, but of what he calls "folk-planning"-the assigning of particular classes of people to particular sections of the village (Dutt, 1925).

"The Vastupurusa mandala is the magic diagram (yantra) and the form (rupa) of the Vastupurusa. It is his body (sarira) and a bodily device (sarira yantra) by which those who have the requisite knowledge attain the best results in temple building". The Vedic tradition, according to Kramrisch, conceives of the form of earth as a circle. However, once it is given orientation and made inhabitable, the earth is seen as vastu and is visualized as a square fixed with respect to the cardinal directions (Kramrisch, 1946)

According to the generative role of the mandala, the square grid of the Vastupurusamandala is believed to provide a metric that governs the shapes, dimensions, and proportions of built forms. The mandala itself carried no information about the architecture of the superstructure (Bafna, 2000).

Fractal Geometry – The fractal can be defined as a geometrical figure which is subdivided into identical parts of reduced or increased scale of the original geometry. Simply, self-similar on multiple scales can be said as fractals. A complex rhythm can be generated through the fractal process (Sala, 2006). “Fractals are generated by a process called iteration, in which a rule substitutes each segment by a similar object, in other words, is the repetition of a block of actions in a computational program” (Sedrez, Meneghel and Celani, 2014). There are 32 types of Vastu Purusha Mandala which are based on Square pada and follow the fractal path to describe each type of it. “The number of pada may vary from 1, 4, 9, 16, 25, and so on 1024, where it follows the geometric progression of 1, 2, 3, 4, 5,.....,32 of common ratio 2” (Md Rian et al., 2007). Fractal dimension can be calculated by various methods like - box-counting method, range analysis, midpoint displacement methods, iterated function systems, and random fractal dust, and also through Bezier Curve.

Indian Hindu Temple – The Hindu temples are a microscopic representation of the macrocosm. Temples are considered as the centre for traditional & spiritual learning. It depicts the pattern of art, architecture, planning as well as culture and tradition of the place. Hindu temples are composed of various mystery and these mysteries are invisible which can be captured by some magical diagrams i.e. Sri Yantra & Vastu Purush Mandala. The shape and size of such supernatural diagrams can affect the gravity/ power of space of Hindu temples. These geometries are widely used in rituals activities performed in Hindu religion. Recently, Bettina Baumer presented a convincing analysis of a yet unattributed Orissan temple, known locally as the Rajarani temple, identifying it as a Devi temple—a type of temple that, according to local texts, was supposed to be constructed literally as a mandala (Bafna, 2000). Here, Rajarani Temple is taken for the analysis purpose. The background of this temple is briefly elaborated as the temple was constructed during 10th-11th century A.D. near Bhubaneswara, Khurda, (20°15' N, 85°50' E) Odisha. The facing of the temple is in the east direction and having square shape plan Garbhagriha with 16 sq.m. area.

Rajarani Temple – The history of Rajarani temple is very interesting as the temple is fully dedicated to the art and not pertains to any deity. It means Rajarani temple acts as a pleasure resort of a king and his queen. The derivation of the name of its temple has been explained excellently by Panigrahi through stating the sandstone of very fine-grained yellowish colour called Rajarania in common parlance. In fact, the name Rajarania is being provided to the stone from the temple and not from the stone to the temple. According to the Local Sthala Puranas K.C. Panigrahi has stated that “original name of temple was Indresvara and that it was a Saiva shrine”. His logic was based on the distance of Rajarani lying east of Siddhesvara in the Muktesvara compound (Baumer 1994).

This theory of its naming of the temple is also expressed by Th. Donaldson in his standard work on Hindu Temple Art of Orissa as the temple was constructed at the beginning of the 11th century (circa 1025 A.D.) by Indraratha.

Debala Mitra also stated in her guide book on Bhubaneshwar that “The name Rajarani is believed to have owed its origin to the particular variety of sandstone, locally known as Rajarania, of which the temple is made, it is, however, more likely that the temple itself lent its name to this variety of sandstone, The temple is now without a deity, but the presence of attendants holding tridents on the jambs of the door, coupled with the figure of Lakulisa at the centre of the lintel, and panels like the workshop of the linga Natraja & Parvati on the platform & the pabhaga, strongly indicates its Saiva association” (Baumer 1994).

The author of the Silparatnakosa seems to be deluded by this temple and fully conscious with its spiritual significance. The author stated in the middle of the description that “this temple is built in the shape the Srichakra”. (v.377). The elements of the temple from plinth to kalasa are equated with the elements of the Srichakra, such as Bhupura and bindu (Baumer 1994).

The Silpasastras always focus on the types of temple and not individual temples. Hence, Rajarani temple is being considered as the classic temple of a Majusri temple. Based on the holy texts this temple is referred for Sakti, and its feminine nature. The spire of Rajarani temple

is covered by the female figures like- Kanya or Alasa that represents the associated goddesses (upasaktis or ganasaktis) assigned to the parts of the Sriyantra (cf. verses 383, 391, 396) (Baumer 1994).

The text is practically silent about the garbhagriha. The only indication is the already quoted verse, which, after mentioning the associate goddesses (upadevi), says: “The goddess Rajarajesvari, the presiding deity of the Srichakra, is at the centre”. (v. 384) The Sanskrit: srichakradhishthita devi madhye rajarajesvari, can also be understood in the sense that there was a Srichakra in the centre of the garbhagriha, on which perhaps a murti of the Devi was installed. This is a common feature in Sakti temples. The esoteric worship is offered to the yantra beneath the murti, and the murti is there for the esoteric worship of the non-initiated common devotees (Baumer 1994).

Thus we get two levels of worship of the Sriyantra: as the temple itself, and as the central yantra in the garbhagriha. There is a third level, which is also symbolically hinted at by the sculptural decoration on the shikhara: the body of the worshipper itself is a yantra and is the abode of the shakti. In the common tantric classification, these three levels would correspond to sthula (gross form, the body of the temple), suksma (subtle form, the hidden yantra in the centre), and para (the transcendent reality experienced in the body of the worshipper or sadhaka by the rise of kundalini sakti) (Baumer 1994).

On the basis of our text and the of the architecture and sculpture of the Rajarani temple, there seems to be no doubt that it is a Sakti temple, it represents a Sriyantra, and it is dedicated to Rajarajesvari Maharajni, that is goddesses Sri with her various names. The name Rajarani is a short form of Rajarajesvari, and it has been preserved in the oral tradition in spite of the fact that its worship had been interrupted (Baumer 1994).

4. Results

4.1. Fractal Geometry used in Sri Yantra

It is seen that all nine triangles which are used during the construction of the holy Sri Yantra are being isosceles (have equal opposite sides and angles) as shown in figure no.7. Accordingly, the subsidiary triangles of 43 in numbers are scalene having unequal angles and sides of each part triangles.



Figure 8 Major nine triangles with angles (Source: Author)

Table 1 Angle Dimensions of Sri Yantra (Source: Author)

<i>Name of Downward triangles</i>	<i>Nature of Triangles</i>	<i>Angle Dimension</i>	<i>Name of Upward triangles</i>	<i>Nature of Triangles</i>	<i>Angle Dimension</i>
<i>AY4A'</i>	<i>Isosceles Triangle</i>	<i>63°, 58° and 58°</i>	<i>FX2F'</i>	<i>Isosceles Triangle</i>	<i>55°, 62° and 62°</i>
<i>BY1B'</i>	<i>do</i>	<i>56°, 62° and 62°</i>	<i>GXG'</i>	<i>do</i>	<i>76°, 52° and 52°</i>
<i>CYC'</i>	<i>do</i>	<i>73°, 53° and 53°</i>	<i>HX1H'</i>	<i>do</i>	<i>58°, 61° and 61°</i>
<i>DY2D'</i>	<i>do</i>	<i>51°, 64° and 64°</i>	<i>JX3J'</i>	<i>do</i>	<i>54°, 63° and 63°</i>
<i>EY3E'</i>	<i>do</i>	<i>81°, 49° and 49°</i>			

The figure of Sri Yantra depicts symmetrical as well as fractal properties. These properties can be self – visualised and self-analysed easily. Sri Yantra is constructed through following procedures:

1. First of all, a circle of diameter 48 units is drawn and its vertical diameter is being denoted as XY.
2. Then the vertical diameter is divided into 48 equal parts.
3. Now, the vertical line is marked at 6th, 12th, 17th, 20th, 23rd, 27th, 30th and 42nd segments from point X to point Y in vertical diameter as XX1, X1X2, X2X3, X3X4, X4X5, X5Y4, Y4Y3, Y3Y2 and Y2Y1.
4. Subsequently, chords are drawn on these nine marking points normal to vertical diameter, XY as AX1A', BX2B', CX3C', etc.
5. The construction of these chords is taken place by marking spaces on either side of these nine chords as 3/48th, 5/48th, 16/48th, 18/48th, 16/48th, 4/48th and 3/48th starting from first, second, fourth, fifth, sixth, eighth and ninth respectively. And on the third and seventh chords are drawn from edge of the circle.
6. After that downwards triangles are constructed by joining the points YC, Y1B, Y2D, Y3E and Y4A and then mirrored it on other side.
7. Similarly, upwards triangles are constructed by joining points XG, X1H, X2F and X3J and then mirrored it on other side.
8. In this way, the circumference of the circle is divided into eight segments and formed eight petals around it and another circle is drawn with sixteen petals by dividing it into sixteen segments.
9. Then, two concentric circles are drawn at an equal distance around the sixteen petal lotus with a circle.
10. At last three squares are constructed at equal distance from each other with four gates without touching the outer most circle.

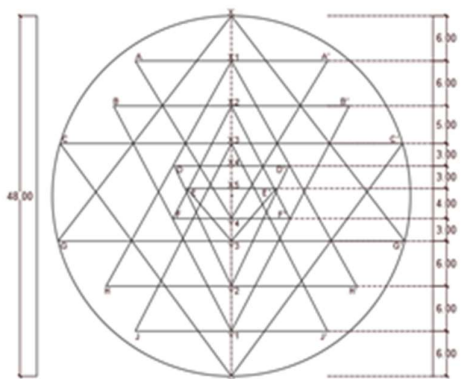


Figure 9 Dimensions of Vertical Diameter of Sri Yantra (Source: Author)

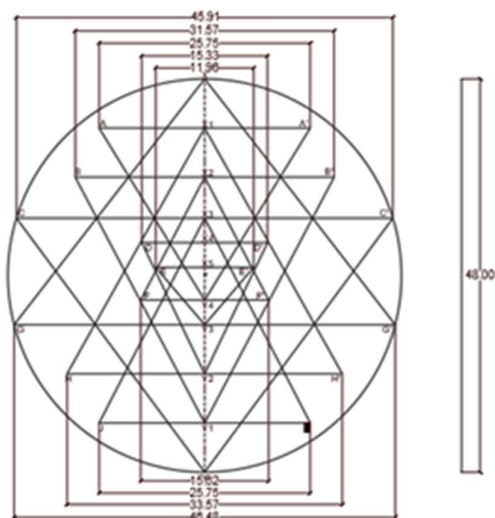


Figure 10 Chord Dimensions of Sri Yantra (Source: Author)

Table 2 Chord Dimensions in Sri Yantra (Source: Author)

Name of Segment	Chord Dimension	Name of Segment	Chord Dimension
AX1A'	25.75	FY4F'	15.62
BX2B'	31.57	GY3G'	46.48
CX3C'	45.91	HY2H'	33.57
DX4D'	15.33	JY1J'	25.75
EX5E'	11.96		

Table 3 Diameter Dimensions in Sri Yantra (Source: Author)

Name of Segment	Diameter Dimension	Name of Segment	Diameter Dimension
XX1	6.00	X5Y4	4.00
X1X2	6.00	Y4Y3	3.00
X2X3	5.00	Y3Y2	6.00
X3X4	3.00	Y2Y1	6.00

X4X5	3.00	Y1Y	6.00
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During the construction of the Sri Yantra, some errors occurred particularly at joining points of the triangles which can be seen easily in the figure. Due to this reason, some triangles cannot be said as perfect triangles. But the scale of the error is too low that no one can find it easily without going into minute details as have shown in this research paper. Error triangles have four or five vertices that do not follow the definition of the triangle. According to T. A. Gopinatha Rao, Sri Yantra contains 43 sub triangles (Rao, 1914). But after analysis, this research paper helps to find the fruitful result about Sri Yantra that there are 19 triangles that are perfect triangles and rest 24 triangles have some error which can be figured out elaborately in the upcoming pages. Triangle Analysis has been done to clarify the error occurring in the preparation of the Sri Yantra. This paper tried to find three types of error during construction of the Sri Yantra i.e. first error is called “Space Error”, the second error is called “Overlapping Error” and the third error is called “Cut Error”. Now, Space Error means the error having extra space is being intervened in the Sri Yantra while Overlapping Error occurs due to overlapping of triangle space and no perfect triangle can be made in this case. As the name of the Cut Error suggests that some space of the triangle get cut down during formation of Sri Yantra. Hence, the total number of Space Error is eight which include 1E, 2E 3E, 4E, 5E, and 6E, 10E and 11E. In the case of Overlapping Error, there are ten errors which include 7E, 8E, 13E, 14E, 15E, 16E, 17E, 18E, 19E, and 20E. While there are two errors in Cut Error include 9E and 12E where ‘E’ stands for error.

Table 4 Triangle details in Sri Yantra (Source: Author)

Name of Layer/ Chakra in Sri Yantra	Total Number of Triangle	Number of Perfect Triangle	Number of Imperfect Triangle
Sarva- Sambhagyadayaka	14	8	6
Sarvartha-Sadhaka	10	6	4
Sarvarakshakara	10	2	8
Sarva-Rogahara	8	2	6
Sarva-Siddhiprada	1	1	0

Table 5 Area Measurement of Errors occur in Sri Yantra (Source: Author)

Name of Error	Nature of Error	Area Measurement
1E	Space Error	0.0035
2E	Space Error	0.0035
3E	Space Error	0.0001
4E	Space Error	0.0002
5E	Space Error	0.0002
6E	Space Error	0.0001
7E	Overlapping Error	0.0069
8E	Overlapping Error	0.0069

9E	Cut Error	0.0228
10E	Space Error	0.1802
11E	Space Error	0.1802
12E	Cut Error	0.0228
13E	Overlapping Error	0.3538
14E	Overlapping Error	0.3538
15E	Overlapping Error	0.0037
16E	Overlapping Error	0.0697
17E	Overlapping Error	0.0697
18E	Overlapping Error	0.0037
19E	Overlapping Error	0.3213
20E	Overlapping Error	0.3213

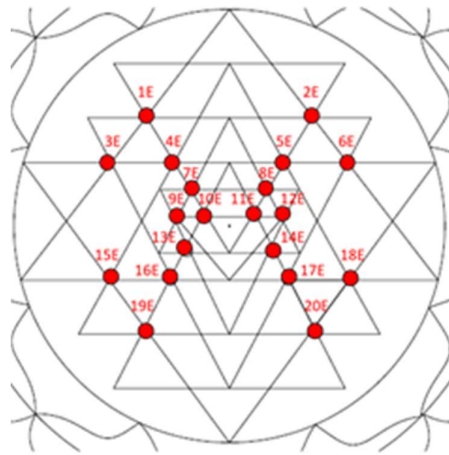


Figure 11 Errors in Sri Yantra (Source: Author)

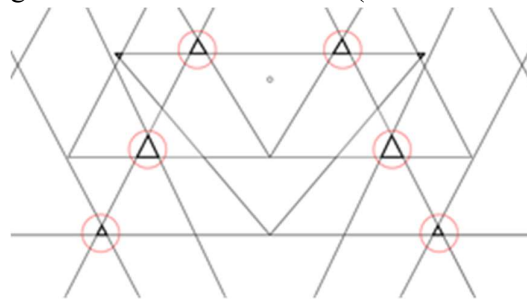


Figure 12 Overlapping Errors in Sri Yantra (Source: Author)

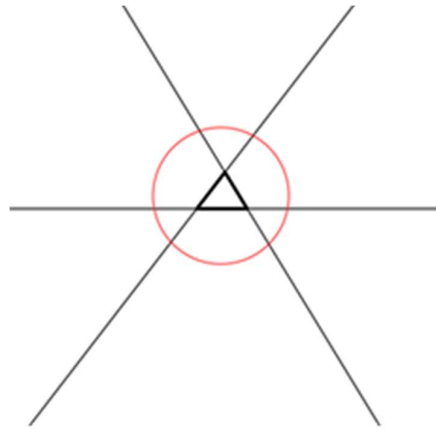


Figure 13 Space Error in Sri Yantra (Source: Author)

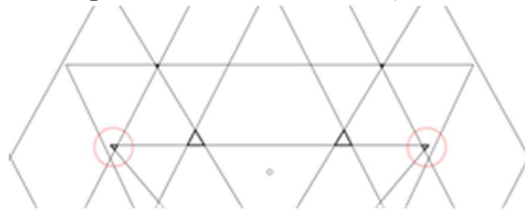


Figure 14 Cut Error in Sri Yantra (Source: Author)

4.2. Fractal Geometry used in Vastu Purusha Mandala

The evidence of Vastushastra is found in the ancient Vedic text known as Rig Veda. Vastushastra is also called Vastu Vidya which deals with sacred space. Its application is still working and followed till present time. Various types of Mandala can be possible and made through the process of iteration of the fractal geometry which is described in pictorial form as follows:



Figure 15 Types of Mandala (a) Sakala (b) Paisacha (c) Pitha (d) Mahapitha (e) Manduka/Chandita (f) Paramasaayika (Source: Author)

4.3. Fractal Sri Yantra used in Fractal Vastu Purusha Mandala

The research paper has also tried to establish the relation between the concept of Sri Yantra in Vastu Purusha Mandala and vice versa. Sri Yantra is being placed over the Manduka Mandala and the same being placed over Paramsaayika Mandala in the middle of these mandalas.

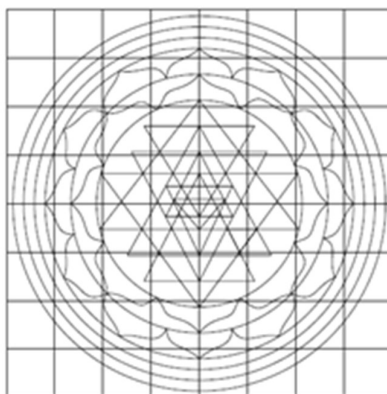


Figure 16 Manduka Mandala with Sri Yantra (Source: Author)

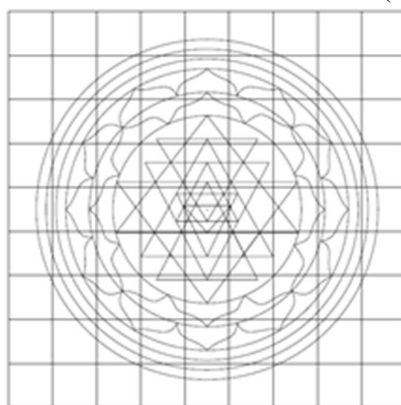


Figure 17 Paramasaayika Mandala with Sri Yantra (Source: Author)

The fifth, sixth, seventh, eighth chakra and Bindu of the Sri Chakra is the most critical place where major deities reside. So these areas are being called sensitive zone in Vastu Purusha Mandala. The central area of every mandala is regarded as the space of Brahma who created the whole Universe which is superimposed with the Bindu element of Sri Yantra in this case. The central place is surrounded by various deities like – Vivasvat, Indra, Mitra, Rudra, Prithvidhara, Apavatsa, Aryamaan, and Savitri.

4.3. Application of Vastu Purusha Mandala and Sri Yantra in Rajarani Temple, Odisha

These esoteric geometries are being applied in one of the Indian Hindu temple i.e. Rajarani temple in order to validate the geometrical mystery. The validation process is carried out by both sacred symbols – Vastu Purush Mandala and Sri Yantra over the Garbhagriha of the temple in a sequential way. Firstly, Vastu Purush Mandala geometry is being tested over the concerned temple in following steps:

Table: Steps used for validation of Vastu Purush Mandala

Criteria used	Steps involved
Division of Plan of the <i>Garbhagriha</i>	1. The first prototype of the actual plan of <i>Garbhagriha</i> of the temple is being divided equally into eight (8) parts across length and breadth wise which resembles the <i>Vastu Purush Mandala</i> of 8 x 8 grid pattern.

	<ol style="list-style-type: none"> 2. The second prototype of the actual plan of Garbhagriha of the temple is being divided equally into nine (9) parts across length and breadth wise which resembles the <i>Vastu Purush Mandala</i> of 9 x 9 grid pattern. 3. The third prototype of the actual plan of <i>Garbhagriha</i> of the temple is being divided equally into ten (10) parts across length and breadth wise which resembles the <i>Vastu Purush Mandala</i> of 10 x 10 grid pattern.
Formation of <i>Vastu Purush Mandala</i>	<ol style="list-style-type: none"> 4. Now, draw the <i>Paisacha Vastu Purush Mandala</i> i.e. <i>dwi-pada</i> (2 x 2) having four squares over Step 1. 5. Again, draw the <i>Maha-Pitha Vastu Purush Mandala</i> i.e. <i>chatush-pada</i> (4 x 4) having sixteen squares over Step 1. 6. Further, draw the <i>Ugra-Pitha Vastu Purush Mandala</i> i.e. <i>shashtha-pada</i> (6 x 6) having thirty-six squares over Step 1. 7. Subsequently, put the <i>Paisacha Mandala</i>, <i>Maha-Pitha Mandala</i> and <i>Ugra-Pitha Mandala</i> over Step 2 and Step 3.
Result	<ol style="list-style-type: none"> 8. Clearly, it is seen that these mandalas (follow Step 3, Step 4 and Step 5) are being superimposed perfectly over <i>Vastu Purush Mandala</i> of 8 x 8 grid pattern. 9. Meanwhile, these mandalas (follow Step 3, Step 4 and Step 5) are not being superimposed perfectly over <i>Vastu Purush Mandala</i> of 9 x 9 and 10 x 10 grid patterns.

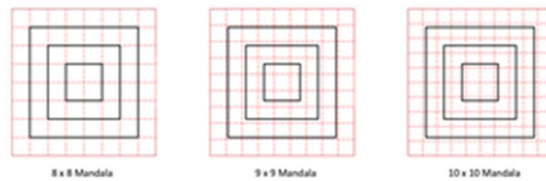


Figure 18 Paisacha Mandala, Maha-Pitha Mandala and Ugra-Pitha Mandala over 8x8, 9x9 and 10x10 grid Mandala (Source: Author)

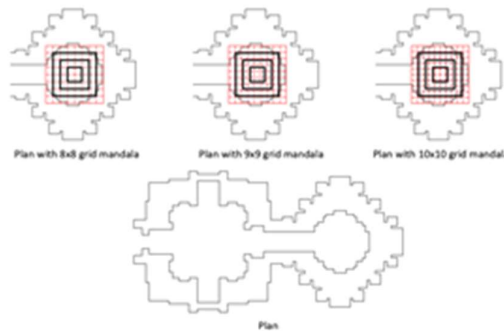


Figure 19 Overlapping of Paisacha Mandala, Maha-Pitha Mandala and Ugra-Pitha Mandala over Garbhagriha of Rajarani temple (Source: Author)

In second part, two geometrical shapes – squares and circles are used over the plan of the specific temple to relate the features of it with the elements used in Sri Yantra. These shapes signify some meaning as in the case of downward and upward triangles used in Sri Yantra. The square shape resembles masculine character while the shape of circle possesses feminine character (Patel, 1992). Sri Yantra geometry is being tested over the concerned temple in following steps:

Table: Steps used for validation of Vastu Purush Mandala

Criteria used	Steps involved
Formation of <i>Sri Yantra</i>	<ol style="list-style-type: none"> 1. Make four (4) Squares and five (5) Circles over the <i>Garbhagriha</i> of the Temple based on the assumption that deities placed at the centre. 2. Copy the whole four (4) Squares and five (5) Circles from the central point of <i>Garbhagriha</i> and placed it in the centre of <i>Mandapa</i> portion again. 3. Draw three (3) straight lines i.e. one from the centre of <i>Garbhagriha</i>, one from the centre of <i>Mandapa</i> and last one at the intersection point between them. 4. Measure the dimension between the overlapping portion of two Larger Circles as 'm' and equals to 5.48 m. 5. Proportionate the <i>Sri Yantra</i> with that dimension 'm' (Step 4) from the middle point of <i>Sri Yantra</i>. 6. Place the <i>Sri Yantra</i> over the <i>Garbhagriha</i> from the centre.
Superimposition process	<p>Here, we find that the <i>Sri Yantra</i> does not correctly super-impose over the <i>Garbhagriha</i>. So, again some steps have to follow to correct the superimposition of it.</p> <ol style="list-style-type: none"> 7(a). Take vertical measurement from the centre to centre from <i>Garbhagriha</i> and <i>Mandapa</i> as 'm1' and equals to 9.35 m. 7(b). Also take dimension of the chord of larger square which is circumscribed over the <i>Garbhagriha</i> as 'm2' and equals to 10.84 m. 8. Take vertical dimension of <i>Sri Yantra</i> from upper to lower point as 'm3' and equals to 7.21 m.
Result	<ol style="list-style-type: none"> 9. Fit the proportionate <i>Sri Yantra</i> based on getting Mean Length 'm4' equals to 9.13 m from doing Step 7 (a, b) and Step 8. Here, <i>Sri Yantra</i> is perfectly superimposed over the <i>Garbhagriha</i>.

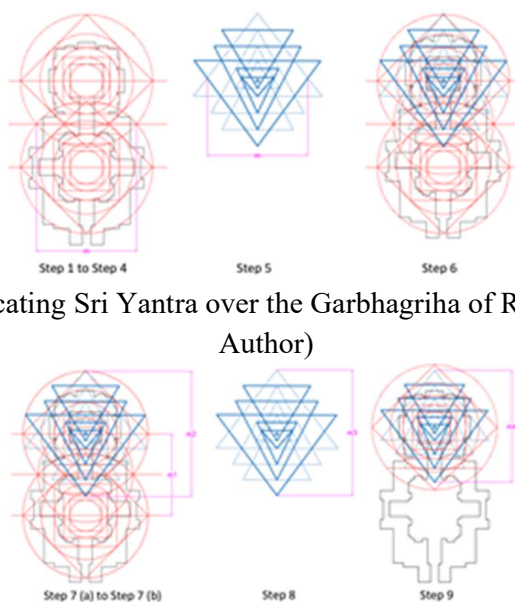


Figure 20 Steps for locating Sri Yantra over the Garbhagriha of Rajarani temple (Source: Author)

Figure 21 Steps for locating Sri Yantra over the Garbhagriha of Rajarani temple (Source: Author)

Rajarani temple at Bhubaneswar is perhaps the only temple which is dedicated to art rather than deity (Baumer 1994)

5. Conclusion

The research paper concludes that fractal geometry can be implemented in Vastu Purusha Mandala and Sri Yantra. Apart from that, this paper has also tried to superimpose the Sri Yantra over the Vastu Purusha Mandala which can strengthen the metaphysical power and also create a strong bonding between God and the devotee. Apart from that the composition of triangles in Sri Yantra has been established by constructing the sacred diagram of Sri Yantra in a systematic way using architectural software Auto CAD 2018. Hence, the research paper has tried to reflect the importance of Sri Yantra and it is proved that the construction of Yantra is not an easy task. Everyone wants to do with least mistakes during the preparation of Sri Yantra. But the perfect triangles have not been achieved fully due to some minute errors which have already been explained earlier in this paper. According to Dr. Srikrishna 'Jugnu' ('Jugnu', 2005), 8x8 is considered as an auspicious mandala for constructing mandapas and prasadas. As per the holy text, it is being analyzed that 8x8 square mandala called Manduka mandala is the divine diagram which is suitable for constructing Hindu temples. In fact, Sri Yantra is also one of the mysterious geometry which is fixed perfectly in proportionate manner over the center of sanctum sanctorum of the Rajarani temple with occupying minimum area of the inner space.

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