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A magic square in sri hayagriva stotram of sri swami vedanta desika

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Abstract

Vedanta Desika (1268-1369) was an Indian polymath who wrote philosophical as well as religious and poetical works in several languages, including Sanskrit, Tamil, Prakrit, Manipravaḷam (a mixture of Sanskrit and Tamil). The vastness of his knowledge can be compared to an ocean. Those who delve deep into the realm of his compositions can gather numerous pearls, mathematics being one among them this paper deals with one concept of Magic Square as revealed in Sri Hayagriva Stotram.

Keyword: 'Magic Square', 'Sri Hayagriva Stotram', 'Sri Swami Desika'

Introduction

Swāmī Śrī Deśika, an unequalled Vaishnavite Acharya, mastered all branches of knowledge as we find in one of his works thus:

Text विंशत्यब्द विश्रुत नानाविध-विद्यः

Transliterations: *Viṁśatyabda viśruta Nānāvidha-Vidya (Sankalpa suryodhayam Act 1)*

Meaning: One who has mastered various branches of learning at the age of twenty. The vastness of his knowledge can be compared to that of an ocean. He has been rightly honoured as 'the Lion of Poesy and Logic' '*Śrī Hayagrīva Stotram* is a Hymn on Lord Sri Hayagriva Lord of learning composed by *Svāmī Śrī Deśika of 32 verses*. This paper is an attempt to reveal a concept of mathematics that is seamlessly interwoven in the First Stotra.

Knowledge of magic square

First Stotra of Sri Hayagriva Stotram

ज्ञानानन्द मयं देवं
निर्मलस्फटिकाकृतिम्।
आधारं सर्व विद्यानां
हयग्रीवम् उपास्महे ॥ १ ॥

Transliterations

jñānānanda mayam devam
nirmalasphaṭikākṛtim|
ādhāraṁ sarva vidyānām
hayagrīvam upāsmāhe || 1

For converting the Sanskrit letters, we require decoding by using Katapayadi or Vedic Numeral Coding Katapayādi (कटपयादि) system, is an Alpha-syllabic numeral system to depict

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numbers as letters for easy remembrance as words or verses. As more than one letter is assigned the same numeral and vowels are rendered valueless when preceded by consonants, this system provides flexibility in forming meaningful words by combining the consonants and vowels.

In this system, the consonants (vyañjana) beginning with ka (क), ta (ट), pa (प) and ya (य) refer the digits from 0 to 9.

1. Letters from ka (क) to jha (झ), from ṭa (ट) to dha (ध), denote 1 to 9 in order.
2. pa (प) to ma (म) stand for 1 to 5 in order.
3. Letters from ya (य) to ha (ह) represent the digits 1 to 8 in respectively.
4. The nasals ña (ञ) and na (न) denote 0.
5. In the case of conjunct consonants, the number denoted only by the last consonant is taken.
6. The vowels following consonants have no value.
7. The vowels not preceded by any consonant represent 0.
8. The arrangement of the digits is from right to left as per the rule.
Ankānam vāmato gatiḥ (अङ्कानाम् वामतो गतिः)
9. The cerebral ḷa (ळ), peculiar to the Dravidian languages, represent 9.

The rule is given by the phrase, kādi nava, ṭādi nava, pādi pañca, yādyashtau’.

(कादि नव टादि नव पादि पञ्च याद्यष्टौ)

1. ‘Kādi nava’ means ka and the following eight letters.
2. ‘Ṭādi nava’ means ta and the following eight letters.
3. ‘Pādi pañca’ means pa and the following four letters.
4. ‘Yādyashtau’ means ya and the following seven letters.
5. ‘Ksha’ represents zero.

To make this clearer and more understandable, the notation is given by the following table.

Syllable Coding - Katapayādi system

| Consonant | | | | | | | | | |
|----------------------------------|-----|----|-----|-----|----|-----|----|-----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| <i>Devanagari</i> | | | | | | | | | |
| क | ख | ग | घ | ङ | च | छ | ज | झ | ञ |
| ट | ठ | ड | ढ | ण | त | थ | द | ध | न |
| प | फ | ब | भ | म | | | | | |
| य | र | ल | व | श | ष | स | ह | | |
| <i>Transliteration - English</i> | | | | | | | | | |
| Ka | Kha | Ga | Gha | Nga | Ca | Cha | Ja | Jha | Nya |
| Ṭa | Ṭha | Ḍa | Ḍha | Ṇa | Ta | Tha | Da | Dha | Na |
| Pa | Pha | Ba | Bha | Ma | | | | | |
| Ya | Ra | La | Va | Ṣa | Ṣa | Sa | Ha | | |

It is suggested by the poet through the decoding of the word कृतिम्...in the First Stotra in the second line 11 16 It is a magic square with 11 rows and 11 columns i.e. 11 x 11 = 121. The Factorization of 671 results in two prime numbers. This is supported by the meaning of the word कृति which means square to be used as suggested by Bhaskara, a very great mathematician this results in an 11*11 Magic square.

671 is the sum of an 11 x 11 Magic Square

6 - 7 + 1 = 0 so 671 is divisible by 11.

671 is the sum of the fifteen prime numbers from 17 to 73.

671 is the magic sum of an 11 x 11 Magic square.

| 11 x 11 Magic Square | | | | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 68 | 81 | 94 | 107 | 120 | 1 | 14 | 27 | 40 | 53 | 66 | → 671 |
| 80 | 93 | 106 | 119 | 11 | 13 | 26 | 39 | 52 | 65 | 67 | → 671 |
| 92 | 105 | 118 | 10 | 12 | 25 | 38 | 51 | 64 | 77 | 79 | → 671 |
| 104 | 117 | 9 | 22 | 24 | 37 | 50 | 63 | 76 | 78 | 91 | → 671 |
| 116 | 8 | 21 | 23 | 36 | 49 | 62 | 75 | 88 | 90 | 103 | → 671 |
| 7 | 20 | 33 | 35 | 48 | 61 | 74 | 87 | 89 | 102 | 115 | → 671 |
| 19 | 32 | 34 | 47 | 60 | 73 | 86 | 99 | 101 | 114 | 6 | → 671 |
| 31 | 44 | 46 | 59 | 72 | 85 | 98 | 100 | 113 | 5 | 18 | → 671 |
| 43 | 45 | 58 | 71 | 84 | 97 | 110 | 112 | 4 | 17 | 30 | → 671 |
| 55 | 57 | 70 | 83 | 96 | 109 | 111 | 3 | 16 | 29 | 42 | → 671 |
| 56 | 69 | 82 | 95 | 108 | 121 | 2 | 15 | 28 | 41 | 54 | → 671 |
| ↙ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↘ |
| 671 | 671 | 671 | 671 | 671 | 671 | 671 | 671 | 671 | 671 | 671 | 671 |

Every row, column, and diagonal on the square sums to 671. The reason it is the magic sum is because the sum of all the numbers from 1 to 121 can be computed and then divided by 11 (the number of rows). Here is the equation:

$$671 = (121 \times 122) \div (2/11)$$

Thus, the Magic Square is beyond imagination in the 13th Century itself by Sri Swami Desika

Conclusion

A reader of Sri Hayagriva Stotram will identify Sri Swami Desika not only a colossus of philosophy but also a great mathematician beyond human comprehension.

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