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Mathematical decoding in Srī Aṣṭabhujāṣṭakam by Srī Vedānta desika

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Abstract

Srī Vaiṣṇaviṭe Acāryā स्वामी श्री वेदान्त देशिक (Svāmī Srī Vedānta Deśika) has given various amounts of Mathematical theories in his scholarly work “श्री अष्टभुजाष्टकम्” (Śrī Aṣṭabhujāṣṭakam). It is believed that the title of ‘Vedānta Deśika’ was awarded by Lord Ranganatha Himself, the presiding Deity of Srirangam, as he debated with many scholars, and established supremacy of the path of ‘surrender (prapatti-mārga)’. In this poem, he has praised the Lord who possesses eight hands and thus protects the world. We attempt to decode one such embedded Mathematical concept to understand the poet’s genius. There is significance for the number eight in Vedic religion. Devi Srī Lakshmi is worshipped in eight forms, known as Ashta Lakshmi. Eight is also the number of the cardinal and ordinal directions, which are ruled over by a set of eight Gods, the Ashta Dikpalas or Guardians of the Directions. स्वामी श्री वेदान्त देशिक (Svāmī Srī Vedānta Deśika) has included the Mathematical concept in the first verse of the poem श्री अष्टभुजाष्टकम् (Śrī Aṣṭabhujāṣṭakam) itself.

Keyword: Srī Aṣṭabhujāṣṭakam, Narcissistic number, Kaṭapayādi saṅkhyā, Srī Vedānta Deśika

Introduction

श्री-अष्टभुजाष्टकम् (Srī Aṣṭabhujāṣṭakam) written by स्वामी श्री वेदान्त देशिक (Svāmī Srī Vedānta Deśika) has some distinguishing features among the Srī Vaiṣṇava Bhakti literature. This poem portrays Lord Śrīman Nārāyaṇa in His form having eight divya-bhujā-s, in the divya kshetram called ‘Ashtabujakaram’. It comprises of ten verses, out of which, eight verses are for eight arms and the rest two verses reveal the benefits of reciting the poem. In the very first verse, स्वामी श्री वेदान्त देशिक (Svāmī Srī Vedānta Deśika) performs Śaraṇāgati in the prayer: “सतामष्टभुजं प्रपद्ये” (satāmaṣṭabhujam prapadye) स्वामी श्री वेदान्त देशिक (Svāmī Srī Vedānta Deśika) describes the qualities such as ऐश्वर्यं (aiśvarya), सौशील्य (sauśīlya), मोक्षप्रदत्वा (mokshapradatva) etc. of the Lord Śrīman Nārāyaṇa, and urges us to resort to Him and to no one else as the sure way to attain mōkṣa. He speaks of the quality ‘Soulabhyam’ (easy accessibility) of the Lord Śrīman Nārāyaṇa which makes Him to mingle with even the lowliest of beings with ease. Now, we consider the first verse from the poem for the analysis and decoding:

Verse

गजेन्द्ररक्षात्वरितं भवन्तं
ग्रहैरिवाहं विषयैर्विकृष्टः ।
अपारविज्ञानदयानुभावम्
आसं सतामष्टभुजं प्रपद्ये ॥

gajēndrarakṣātvāritam bhavantam
grāhairivāham viṣayairvikṛṣṭaḥ |
apāravijñānadayanubhāvam
āptaṁ satāmaṣṭabhujam prapadye ॥

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Meaning

Worldly things, like crocodiles, are dragging me towards them. Wasn't it you who, by running fast to the place, saved the elephant, Śrī Gajendran who was caught in the crocodile's mouth, in a pond. I want you to bring me to the right path, by safeguarding me and saving me from worldly desires. There is no limit to your knowledge, mercifulness and greatness. So, I request you to safeguard me by your mercifulness, even if you know my mistakes, to maintain your greatness. You are really a friend of Sadhus and Saints. In order to safeguard them, you are having eight hands; I surrender myself to you. Now, we apply the Vedic numerical system which is used in analysis of the verse.

Kaṭapaya saṅkhyā: (Vedic numerical system)

1	2	3	4	5	6	7	8	9	0
क	ख	ग	घ	ङ	च	छ	ज	झ	ञ
ka	kha	ga	gha	ṅa	ca	cha	ja	jha	jña
ट	ठ	ड	ढ	ण	त	थ	द	ध	न
ṭa	ṭha	ḍa	ḍha	ṇa	ta	tha	da	dha	na
प	फ	ब	भ	म					
pa	pha	ba	bha	ma					
य	र	ल	व	श	ष	स	ह	ळ	क्ष
ya	ra	la	va	śa	ṣa	sa	ha	ḷa	kṣa

Rules to be followed in Kaṭapaya saṅkhyā

- The vowels that occur alone, without consonants before them, will be assigned the number '0'.
- The vowels which follow consonants will be unassigned.
- The consonants from 'क' to 'ञ' as well as the consonants from 'ट' to 'ध' are all assigned the numbers from 1 to 9 respectively.
- The consonants from 'प' to 'म' are assigned the numbers from 1 to 5 respectively.
- The consonants from 'य' to 'ह' are assigned the numbers from 1 to 8 respectively.
- f. 'ज्ञ', 'न' and 'क्ष' are assigned the number 0.
- After the assignment, we have to read the digits from right to left, as mentioned by the rule अङ्कानाम् वामतो गतिः (aṅkānām vāmato gatiḥ).
- If there are conjunct consonants, we've to consider the number corresponding to the consonant that comes last.

The main rule of Kaṭapaya saṅkhyā is:

कादि नव टादि नव पादि पञ्च याद्यष्टौ ।

kādi nava ṭādi nava pādi pañca yādyasṭau |

- Starting from 'क' and next 8 consonants, are assigned the numbers 1 to 9. It's the meaning of कादि नव |
- Starting from 'ट' and next 8 consonants, are assigned the numbers 1 to 9. It's the meaning of टादि नव |
- Starting from 'प' and next 4 consonants, are assigned the numbers 1 to 5. It's the meaning of पादि पञ्च |
- Starting from 'य' and next 7 consonants, are assigned the numbers 1 to 8. It's the meaning of याद्यष्टौ |
- 'क्ष' will be assigned to number 0.

Now, we recall the definition of a Narcissistic number:

Narcissistic Number

It is a number that is the sum of its own digits each raised to

the power of the number of digits.

N → Natural number

Let the function 'F' be defined as

F: N → N with

$$F_b(n) = \sum_{i=0}^{k-1} d_i^k$$

where,

k → No. of digits in the number 'n'

d₀, d₁, d₂, d₃, ... → Respective digits of the number 'n' taken in order from left to right.

If F(n) = n, then, the number 'n' is a k-Narcissistic number.

Examples

a. $153 = 1^3 + 5^3 + 3^3$

Here, n = 153; d₀ = 1, d₁ = 5, d₂ = 3; k = 3

$$F(n) = F(153) = (d_0)^3 + (d_1)^3 + (d_2)^3 = 1^3 + 5^3 + 3^3 = 153$$

F(n) = n. So, n = 153 is a 3-Narcissistic number.

Similarly,

b. $370 = 3^3 + 7^3 + 0^3$

c. $9474 = 9^4 + 4^4 + 7^4 + 4^4$

d. $54748 = 5^5 + 4^5 + 7^5 + 4^5 + 8^5$

The Finding

In the verse, we consider the last line:

आसं सतामष्टभुजं प्रपद्ये

This line contains eleven syllables. Omitting the first two and the last two syllables symmetrically, we are left with the middle seven syllables, as below:

Using Kaṭapaya saṅkhyā coding system, it is decoded as:

स → 7

ता → 6

म → 5

ष्ट → 1

भु → 4

जं → 8

प्र → 2

Thus, the number obtained in direct order is:

7 6 5 1 4 8 2

If we calculate the sum of the individual digits of the above numbers, with each digit raised to the power '8', we get,
 $7^8 + 6^8 + 5^8 + 1^8 + 4^8 + 8^8 + 2^8 = 24678051$.

This is nothing but the rearrangement of the seven digits of the above number. Remarkably, the poet, स्वामी श्री वेदान्त देशिक (Svāmī Śrī Vedānta Deśika) has included an 'अनुस्वार (anusvāra)' which looks like '0', after the letter 'ज'. After the inclusion of 0, the number is 24678051. which is an 8-Narcissistic number. Wonderfully and intentionally, the poet has included only the syllables which result in an 8-Narcissistic number.

We raise each digit to the power eight, intuitively, as suggested by the heading of the poem, श्री अष्टभुजाष्टकम् (Śrī

Aṣṭabhujāṣṭakam). In the third line, the poet has mentioned the word विज्ञान (vijñāna) which means Science, suggesting us that a scientific fact is embedded in the verse.

Result

The opening verse of the poem, श्री अष्टभुजाष्टकम् (Śrī Aṣṭabhujāṣṭakam) of स्वामी श्री वेदान्त देशिक (Svāmī Śrī Vedānta Deśika) wonderfully contains an 8-Narcissistic number in the last line.

Conclusion

Thus, several Mathematical concepts have been embedded in the verse of स्वामी श्री वेदान्त देशिक (Svāmī Śrī Vedānta Deśika), revealing his mastery of all arts. Truly, the title “सर्वतन्त्र स्वतन्त्र” (Sarvatantra Svatantra) is very much meaningful to the great poet.

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