

CONCEPT OF DIVISIBILITY IN SRIMAD BHAGAVADGITA

Prof.N.Kannan, Dr. B. Veera Kayathry Ms. K Bhuvanewari

Head of the Department, Researcher, Research Scholar,

Department of Oriental Studies and Research,

SASTRA Deemed to be University, Thanjavur, Tamilnadu.

Abstract: The glory of Gita is beyond praise and it is a treasure-house of knowledge of, not only philosophy and religion, but of several scientific concepts in capsule form. This research paper attempts to reveal one mathematical concept of divisibility interwoven in one of the important Stanzas of this Celestial Song ‘Śrīmad Bhagavadgītā’ as a sample using the Ancient Vedic Numerical Code (or Katapaya Coding).

Keywords: Śrīmad Bhagavadgītā, Carama Śloka divisibility by 11, Ancient Vedic Numerical Code.

I. INTRODUCTION:

गीतामाहात्म्यम् (Gita - Mahatmyam) declares that,

"सर्वोपनिषदो गावो दोग्धा गोपालनन्दनः।

पार्थो वत्सः सुधीर्भोक्ता दुग्धं गीतामृतं महत्॥"

"Sarvopaniṣado gāvo dogdhā gopālanandanah।

Pārtho vatsah sudhīrbhoktā dugdham gītāmṛtam mahat।।"

“The Upanishads are the cow; Sri Krishna is the milker; Arjuna is the calf; the one whose mind is clear is the drinker; the invaluable timeless Gita is the milk’. Such is the Glory of Śrīmad Bhagavadgītā, which on exploring never gets exhausted, but abounds in newer findings. The Divine Celestial Song stands as a reflector of our culture and mystic values. These values have been nourishing our society for a long time. Until today no other work has evolved to exceed the mightiness of this Divine scripture. Time enough has elapsed since its origin from Dvāpara-Yuga to submerge it in oblivion; but it contains a vital spark of Genius, of our Ancient Sages, that all criticisms are powerless to extinguish. The Mathematical study of this particular composition has somehow eluded the scrutiny of the commentators and interpreters of this work. This research paper attempts to reveal one mathematical concept of divisibility interwoven in one of the Stanzas of Śrīmad Bhagavadgītā of Sage Vedavyāsa incorporated in ‘Bhīshma Parva’ of Mahābhārat, as a sample using the Ancient Vedic Numerical Code (or Katapaya Coding).

II. VEDIC NUMERICAL CODE (KATAPAYA CODE)

In this system,

- the consonants (vyanjanas) beginning with **ka** (क), **ta** (ट), **pa** (प) and **ya** (य) referred the digits from 1 to 9 (i.e. letters from **ka** (क) to **jha** (झ), from **ta** (ट) to **dha** (ध), denote 1 to 9;
- pa** (प) to **ma** (म) stand for 1 to 5;
- letters from **ya** (य) to **ha** (ह) represent the digits 1 to 8;
- the nasals **ña** (ञ) and **na** (न) denote 0;
- in the case of conjunct consonants, the number denoted only by the last consonant is taken;
- the vowels following consonants have no value;
- the vowels not preceded by any consonant represent 0;
- the arrangement of the digits is from right to left as per the rule **ankānam vāmato gatiḥ** (अङ्कानाम् वामतो गतिः);
- the letter **la** (ळ), peculiar to the Dravidian languages, represent 9.

The rule is:

‘**kādi nava, ṭādi nava, pādi panca, yādyashtau**’

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

To make this more clear and understandable, the notation is given by the following table:

Table 1. Vedic Numerical Code (Katapayādi system)

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

Hence

- The Vowels are not included in the list.
- They are exempted because, only the consonants with vowels are assigned numbers.
- In conjunct consonants, the last consonant alone is to be coded.

Svāmī Śrī Vedānta Deśika applies this Vedic numerical code to reveal the algebraic concept of divisibility by eleven (11) in the following verse of his didactic lyric 'Subhāshitanīvi'.

Verse:

धर्मसेतुनिविष्टाना-
मचलानां गरीयसाम् ।
दक्षिणोत्तरवृत्तीनां
दृष्टिः पापनिवर्तनी ॥(Chap 6 Verse 4)

Transliteration of the verse:

Dharma setu nivishtānā
macalānām garīyasām
dakshinottara vṛttīnām
drishtiḥ pāpanivartanī ॥

One literary meaning of the verse:

The noble men always follow the path of Dharma; they are unbending and uncompromising in their adherence to principles; they are bent on removing the ignorance of ordinary human beings. The benign look of these great men will remove our sins.

Table.2 - Vedic Numerical Coding of the Verse 6-4 of the text

Line 1	9	5	7	6	0	4	1	0
Line 2	5	6	3	0	3	2	1	7
Line 3	8	0	5	6	2	4	6	0
Line 4	8	1	1	1	0	4	6	0

In this verse the word **pāpa** (पाप) is decoded as the number 11 using Vedic numerical code. When the poet says **pāpa nivartanī** (पापनिवर्तनी), he suggests the algebraic concept of 'divisibility by 11'. The following table is self-explanatory:

Table.3 - The words of the verse 6-4 of the text decoded with meaning

Line Number	Word	Decoded Number	Meaning of the word
2	Acalānām (अचलानां)	--	Of the constants (6 th case)
4	drishtiḥ (दृष्टिः)	18	Eighteen (digits)
4	pāpa (पाप)	11	The number 11
4	Nivartanī (निवर्तनी)	--	is divided exactly

Hence we get the following suggestion:

Acalānām drishtiḥ pāpanivartanī (अचलानां दृष्टिः पापनिवर्तनी) which means 'the 18-digit number is exactly divisible by 11'.

III. WORKING:

Take the middle 18 digits from the verse omitting the first 4 digits corresponding to the word **Dharma setu** (धर्मसेतु); the first four digits are omitted since the poet asks the reader to consider 'the banks of **Dharma** (धर्म)' only. Then we are left with $32 - 4 = 28$ digits only. Considering the middle 18 digits among these 28 digits we get the following number:

630321780562460811

A = Sum of the digits at odd places of the above number = 26

B = Sum of the digits at even places of the above number = 37

Using the criterion for divisibility by 11, we see that

$$|A - B| = |26 - 37| = 11 \text{ so the number is divisible by 11.}$$

The same concept of divisibility is found in his another Stotra work Sristuti as revealed below:

Extension of the above application of divisibility by 11 to Śrīmad Bhagavadgītā

Using the clue given in the above śloka, it is verified that the 32-digit number obtained by decoding the carama śloka of Bhagavad Gita is also divisible by 11 .

Carama Śloka:

सर्व धर्मान् परित्यज्य

मामेकम् शरणं ब्रज ।

अहं त्वा सर्व पापेभ्यो

मोक्षयिष्यामि माशुचः ॥

Transliteration:

Sarva dharmān parityajya

māmekam śaraṇam vraja ।

Aham tvā sarva pāpebhyo

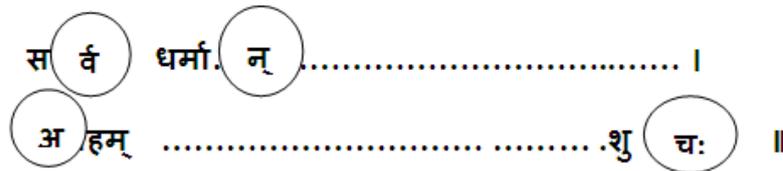
mokhsyishyāmi ma śucaḥ ॥

Table.4 - Vedic Numerical Coding of the carama śloka

Line 1	7	4	9	5	1	2	1	1
Line 2	5	5	1	5	2	5	2	8
Line 3	0	8	4	7	4	1	1	1
Line 4	5	0	1	1	5	5	5	6

The clue from the verse Dharma setu (धर्मसेतु) of Swāmi Śri Deśika:

The word **Dharma** occurs in the above carama śloka of Srimad Bhagavad Gita (Chap 18, verse 66). Following the clue given by Swāmi Śri Deśika in the verse **Dharma setu** (धर्मसेतु) (Chapter 6. Verse 4) we see the boundaries (banks) of the word Dharma in the śloka of Gita as marked below:



The letters अ, च, र and न are the four boundaries of the word Dharma and in Sanskrit there is no difference between the letters र and ल. Hence the clue **Acalānām** (अचलानां) is applied wonderfully to obtain the divisibility of the following 32 digit number by 11:

The number obtained by decoding the above carama śloka of Bhagavad Gita is as below:

7 4 9 5 1 2 1 1 5 5 1 5 2 5 2 8 0 8 4 7 4 1 1 1 5 0 1 1 5 5 5 6

A = Sum of the digits at odd places of the above number = 53

B = Sum of the digits at even places of the above number = 64

Using the criterion for divisibility by 11, we see that

$$|A - B| = |53 - 64| = 11 \text{ so the number is divisible by 11.}$$

IV. CONCLUSION:

This sample speaks volumes for the fact that all great sages of Ancient India were invariably well informed of all branches of knowledge that they immingled various subjects in one form of expression; the proverbial inadequacy of a brick to represent a building applies here in an unusual degree. This paper is only a ripple in the Great Ocean of Sanskrit works written by our sages and Rishis of yore.

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