N Kannan
Head of the Department,
Researcher, Department of
Oriental Studies and Research,
SASTRA Deemed to be
University, Thanjavur, Tamil
Nadu, India

KS Sundar
Head of the Department,
Researcher, Department of
Oriental Studies and Research,
SASTRA Deemed to be
University, Thanjavur, Tamil
Nadu, India

Mathematics in srirudram

N Kannan and KS Sundar

Abstract:

Śrī Rudram is recited in all *Śiva* temples without exemption; it is a part of all exiting *Vedas* in various forms. But *Śrī Rudra Pāṭha* available in *Taittirīya saṃhitā* (तैत्तिरीयसंहिता) of *Kṛṣṇa yajurveda* (कृष्णयजुर्वेदः) contains eleven *anuvākas* (or chapters) followed by *Camakaṃ* (चमकं) which also consists of eleven *anuvākas*. The number 'eleven' plays a significant role in the *Mantra*s of *Śrī Rudram* and its chanting by various methods known as *Rudraikādaśinī* (रुद्रैकादशिनी), *Laghurudraṃ* (लघुरुद्रं), *Mahārudraṃ* (महारुद्रं), *Atirudraṃ* (अतिरुद्रं). Great Sages of yore of our *Puṇyabhūmi* have skillfully concealed several Mathematical facts in the Vedic mantras; here is an attempt to bring out the significance of 'eleven' associated with *Śrī Rudram* revealing the concept of divisibility concealed in a couple of *mantras* of it, using *Kaṭapaya saṃkhyā paddhati*.

Keyword: *Śrī Rudram*, divisibility, *Kaṭapaya saṃkhyā paddhati,* Vedic Numerical Code

Introduction

A well-known dictum in Upaniṣad affirms that there is no God greater than Lord *Śiva*:

Mantra

एको हि रुद्रो न द्वितीयाय तस्थुर्य इमांल्लोकानीशत ईशनीभिः।

प्रत्यङ्जनांस्तिष्ठति सञ्चुकोचान्तकाले संसृज्य विश्वा भुवनानि गोपाः॥ (श्वेताश्वतरोपनिषत् तृतीयोऽध्यायः Mantra २)

Transliteration:

eko hi rudro na dvitīyāya tasthurya imāṃllokānīśata īśanībhiḥ |
pratyañjanāṃstiṣṭhati sañcukocāntakāle saṃsṛjya viśvā bhuvanāni gopāḥ ||
(*Śvetāśvataropaniṣat tṛtīyo'dhyāyaḥ* Mantra 2)

Meaning

He who protects and controls the worlds by His own powers, He - *Rudra* - is indeed one only. There is no one beside Him who can make Him the second. O men, He is present inside the hearts of all beings. After projecting and maintaining all the worlds, He finally withdraws them into Himself. (*Śvetāśvataropaniṣat tṛtīyo'dhyāyaḥ* Mantra 2)

It is said that रुतं संसारदुःखं द्रावयतीति रुद्रः (*Rutaṃ saṃsāraduḥkhaṃ drāvayatīti rudraḥ*). To please this Deity *Śrī Rudra* the main prayer in *Veda* is *Sri Rudram,* containing eleven *Anuvākas*. This portion is available in all existing branches of the four *Vedas Ṛgveda, Śuklayajurveda, Kṛṣṇayajurve, Sāmaveda* and *Atharvaveda.*

It is seen with crystal clarity that the number 'ELEVEN' plays a very important role in all the factors connected with *Śrī Rudram.* In the first *Anuvāka*, *Śrī Rudra* is asked to avert his fierce appearance and to please keep his powerful weapons at bay. Having been pacified, *Rudra* is requested to destroy the sins of his devotees.

Apart from being a hymn devoted Lord *Śiva*, *Śrī Rudram* also contains hidden secrets in coded format. For example, this paper attempts to bring out the significance of 'eleven' associated

Corresponding Author:
N Kannan
Head of the Department,
Researcher, Department of
Oriental Studies and Research,
SASTRA Deemed to be
University, Thanjavur, Tamil
Nadu, India

with *Śrī Rudram* revealing one concept of algebra hidden in One *mantra* of the first *anuvāka*, using *Kaṭapaya saṃkhyā paddhati*.

Kaṭapaya saṃkhyā paddhati (Vedic Numerical code)

In this system,

I. 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 ṭa (ट) to dha (ध), denote 1 to 9;

II. pa (प) to ma (म) stand for 1 to 5;

III. letters from ya (य) to ha (ह) represent the digits 1 to 8;

IV. the nasals ña (ञ) and na (न) denote 0;

V. in the case of conjunct consonants, the number denoted only by the last consonant is taken;

VI. the vowels following consonants have no value;

VII. the vowels not preceded by any consonant represent 0;

VIII. the arrangement of the digits is from right to left as per the rule ankānam vāmato gatiḥ (अङ्कानाम् वामतो गतिः);

IX. The letter ḷa (ಟ), peculiar to the Dravidian languages, represent 9.

The rule is:
'kādi nava, ṭādi nava, pādi panca, yādyashtau'

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 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
Ṭādinava	ट	ठ	ड	ढ	ण	त	थ	द	ध	न
	ṭa	ṭha	ḍa	ḍha	ṇa	ta	tha	da	dha	na
Pādipañca	प	फ	ब	भ	म					
	pa	pha	ba	bha	ma					
Yādyashtau	य	र	ल	व	श	ष	स	ह	ಟ	क्ष
	ya	ra	la	va	śa	sha	sa	ha	ḷa	ksha

Hence

a) The Vowels are not included in the list.

b) They are exempted because, only the consonants with vowels are assigned numbers.

c) In conjunct consonants, the last consonant alone is to be coded.

A couple of Mantras of *Sri Rudram*

The second and third *Mantras* taken together of *Śrī Rudram* which is a part of *Taittirīya saṃhitā* (तैत्तिरीयसंहिता) of *Kṛṣṇa yajurveda* (कृष्णयजुर्वेदः) are as below:

Mantra:

यात इषुः शिवतमा
शिवं बभूव ते धनुः ।
शिवा शरव्या या तव
तया नो रुद्र मृडय ॥ (श्रीरुद्रम् 1 - 2)

या ते रुद्र शिवा तनू-
रघोराऽपापकाशिनी ।
तया नस्तनुवा शन्तमया
गिरिशंताभिचाकशीहि ॥ (श्रीरुद्रम् 1 - 3)

Transliteration:

yā tava iṣuḥ śivatamā
śivaṁ babhūva te dhanuḥ ɪ
śivā śaravyā yā tava
tayā no rudra mṛḍayā ɪɪ (Śrī Rudram 1 - 2)

yā te rudra śivā tanū-

raghorā'pāpakāśinī |
tayā nastanuvā śantamayā
giriśantābhicākaśīhi || (Śrī Rudram 1 - 3)

Meaning:

Bless us with happiness our Lord,
With that arrow of thine, which is holy,
With that bow of thine, which is begetter of good,
With that quiver of thine, which is sweet. (*Śrī Rudram* 1 - 2)

Oh Rudra, who showers happiness on us from the Mount,

With your aspect which is peaceful,
Which is giver of good always,
And that, which is bereft of sin,
And which is the road to salvation,
And which takes us to taller heights,
Reveal to us the principle of the soul. (*Śrī Rudram* 1 - 3)

Since we are going to deal with only the mathematical aspects of the *mantras*, an elaborate explanation of the above *mantras* is not presented here.

Table 2: Vedic Numerical Coding of the Verse Śrī Rudram 1 - 2 & 3

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

The word *pāpa* (पाप) is decoded as the number 11 using Vedic numerical code. When *Śrī Rudra svarūpa* is described as *apāpakasini* (अपापकाशिनी), meaning 'remover of Sins' in the sixth line of the above couple of *mantras,* the mathematical concept of 'divisibility by 11' is suggested as an indication.

Working

The 68-digit number obtained by decoding the couple of *mantras* in the reverse order is as below

85164652315654060160511124206452261013522016461125450964434556456061

Here the digit '0' is introduced in the middle to segregate the two *mantras*.
A = Sum of the digits at odd places of the above number = 61 + 55 = 116
B = Sum of the digits at even places of the above number = 55 + 61 = 116
Using the criterion for divisibility by 11, we see that
| A - B |=| 116 - 116|= 0.
Hence, the 68-digit number obtained by decoding the couple of *mantras* is exactly divisible by 11.

Conclusion
The Great scientist *Count* is true in his following remark: "If it be true that the Hindus more than 3000 B.C according to Bailley's calculation, had attained so high a degree of mathematical learning, how many centuries earlier must be the commencement of their culture have been, since the human mind advances only step by step the path of science."

References
1. Dr. Balachandra Rao S. Indian Mathematics and Astronomy, Bhavan's Gandhi Centre of Science & Human Values, Bangalore, 2005.
2. Tattiriya samhita. Edited by R.Krishnamoorthy Sastri and R.Ganesha Dravid, Sri Narasimha Priya Trust, Chennai.
3. https://sanskritdocuments.org/doc_veda/rudra.html
4. https://www.anantaajournal.com/archives/?year=2021&vol=7&issue=1&part=C
5. https://shaivam.org/scripture/English-Translation/1431/rudram-english-translation