

Text Book

Algebra

By

Dr. Rupnathji

महादेवं महात्मानं महाद्यैवानं परब्रह्मिणम्

महापरमात्मैवं देवं सर्वशाय नमो नमः

(Dr. Rupak Nath)

ACHARYA PATANJALI (200 BCE)



FATHER OF YOGA

Text Book

Geometry

By

Dr. Rupnathji

(Dr. Rupak Nath)

The Science of Yoga is one of several unique contributions of India to the world. It seeks to discover and realize the ultimate reality through yogic practice. Acharya Patanjali, the founder, hailed from the district of Gomti in present day Uttar Pradesh. He prescribed the control of prana (life breath) as the means to control the body and soul. This subsequently rewards one with good health and inner happiness. Acharya Patanjali's 84 yogic postures effectively enhance the efficiency of the respiratory, circulatory, nervous, digestive and endocrine systems and many other organs of the body. Yoga has eight limbs where Acharya Patanjali shows the attainment of the ultimate bliss of God in samadhi through the disciplines of: yama, niyama, pranayama, pratyahar, dhyana and dharna. The Science of Yoga has gained popularity because of its scientific approach and benefits. Yoga has now secured place as one of six philosophies in the modern philosophical system. Acharya Patanjali will forever be remembered and revered as a pioneer of the science of self-discipline, tapas and self-realization.

Advanced

Dark Energy
Accelerated Expansion

Afterglow Light
Pattern
380,000 yrs

Dark Ages

Development of
Galaxies, Planets, etc

Guide Book

Inflation

Quantum
Fluctuations

Algebra

By

Dr. Rupnathji

(Dr. Rupak Nath)

1st Star
about 400 million yrs

Big Bang Expansion

37 million years

WMAP



Can you multiply
Advanced
Guide Book
998 x 997

Numerical Analysis **in five seconds** **?**

By
Dr.Rupnathji
(Dr.Rupak Nath)

If not
Learn

Fast Vedic Maths

**Advanced
Guide Book
Graph Theory
By
Dr. Rupnathji
(Dr. Rupak Nath)**

Can you solve?

$$9999999998 \times 9999999996 = ?$$

OR

$$\sqrt[3]{580093704} = ?$$

Without pen, paper or calculator
and in less than 10 seconds

Our Students can do it !

By
Dr. Rupnathji

Learn How
(Dr. Rupak Nath)





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Calculus

By

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(Dr. Rupak Nath)

Vedic Mathematics Sanskrit Text And Equivalent

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Pronunciation	Ancient Sanskrit
Ekadhikena Purvena (Also a second corollary of Nikhilam)	एकाधिकेन पूर्वेन
Nikhilam Navatascaramam Dasatah	निरखिलं नवतसकामं दशतः
Urdhva-tiryagbhyam (Urdhva-Tiryak)	ऊर्ध्वतिर्यग्भ्यामं
Paravartya Yojayet	परावर्त्य योजयेत्
Sunyam Samyasamuccaye (Sunyam Samuccaya)	शून्यं साम्यसमुच्चये
(Anurupye) Sunyamanyat (Sunyam-Anyat)	आनुरूप्ये शून्यं अन्यत्
Sankalana-vyavakalanabhyam (Also a corollary)	संकलन व्यवकलनाभ्यां
Puranapuranaabhyam (Purana-Apunabhyam)	पूरणापूरणाभ्यां
Calana-kalanabhyam (Calana-kalana)	चलनकलनाभ्याम्
Yavadunam	यवदुनं
Vyastisamastih	व्यस्तिसमास्तिह
Sesanyankena Caramena (Sesani Ankena Caramena)	शेषान्यकेन चरमेण
Sopantyadvayamantyam	सोपान्तद्वयमन्त्यम्
Ekanyunena Purvena (Also a third corollary of Nikhilam)	एकन्युनेन पूर्वेन
Gunitasamuccayah (Gunita-Samuccaya)	गुणितसमुच्चयः
Gunakasamuccayah	गुणकसमुच्चयः

Statistics

By



Dr. Rupnathji
(Dr. Rupak Nath)

Meaning
By one more than the one before.
All from 9 and the last from 10.
Vertically and Cross-wise
Transpose and Apply
If the Samuccaya is the Same it is Zero
If One is in Ratio the Other is Zero
By Addition and by Subtraction
By the Completion or Non-Completion
Differential Calculus
By the Deficiency
Specific and General
The Remainders by the Last Digit
The Ultimate and Twice the Penultimate
By One Less than the One Before
The Product of the Sum
All the Multipliers



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$$9 \times 9 + 7 = 88$$

$$98 \times 9 + 6 = 888$$

$$987 \times 9 + 5 = 8888$$

Trigonometry

$$9876 \times 9 + 4 = 88888$$

$$98765 \times 9 + 3 = 888888$$

By

Dr. Rupnathji

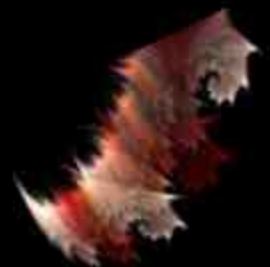
$$987654 \times 9 + 2 = 8888888$$

$$9876543 \times 9 + 1 = 88888888$$

(Dr. Rupak Nath)

$$98765432 \times 9 + 0 = 888888888$$

Brilliant, isn't it?



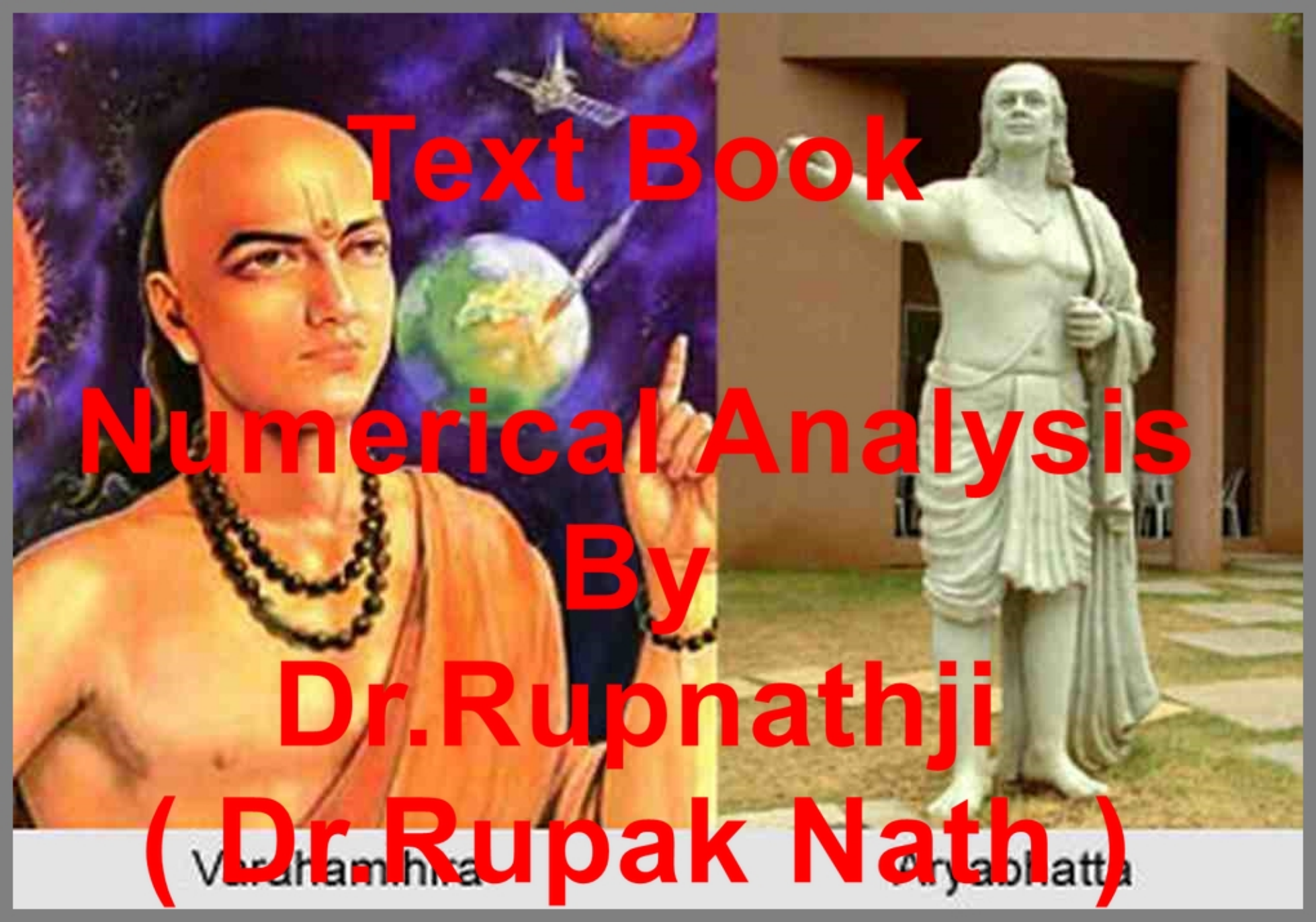
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Topology

By

Dr. Rupnathji

(Dr. Rupak Nath)



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Numerical Analysis

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(Dr. Rupak Nath)

Vishrambhia

Aryabhata

**Advanced
Guide Book**

Geometry

By

**Dr. Rupnathji
(Dr. Rupak Nath)**

GEOMETRY
ALGEBRA
UNIVERSITY
GUIDE BOOK
TOPOLOGY
TRIGONOMETRY

MATHEMATICS
Algebra
By

ANALYSIS
GRAPH THEORY

Dr. Rupnathji
(Dr. Rupak Nath)

FRACTALS

OPTIMIZATION

CALCULUS

STATISTICS

नमो भौतगणाधीशाम् रमायनामरस्वतीम्
University

Guide Book

श्रीलक्ष्मीम् गणिताम् दुर्गाम् जीवबीजवरप्रदाम् ।

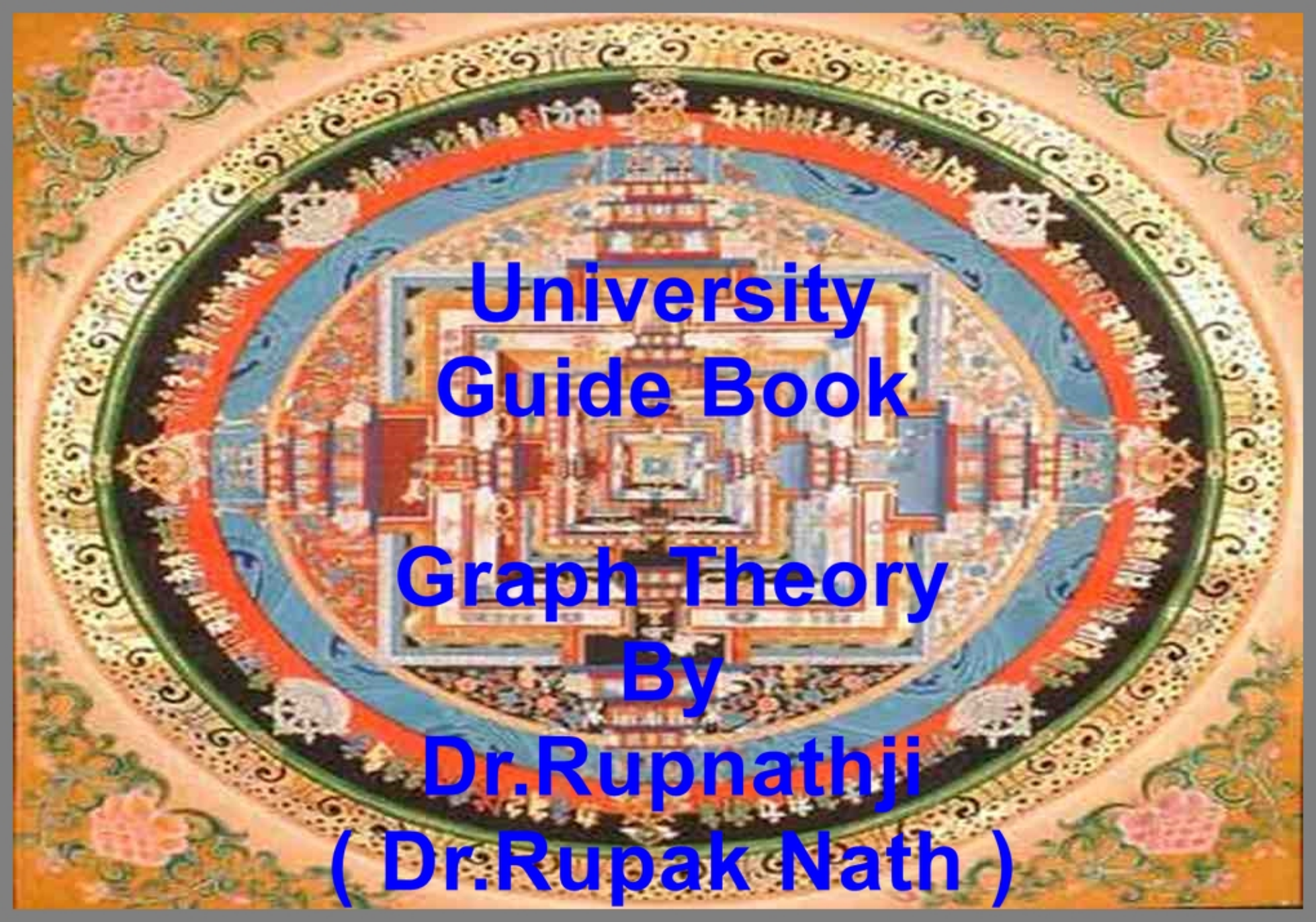
Numerical Analysis

वैद्यनाथशिवम् ब्रह्म विश्वयन्त्रसमुद्भवम्
By

Dr. Rupnathji

(Dr. Rupak Nath)

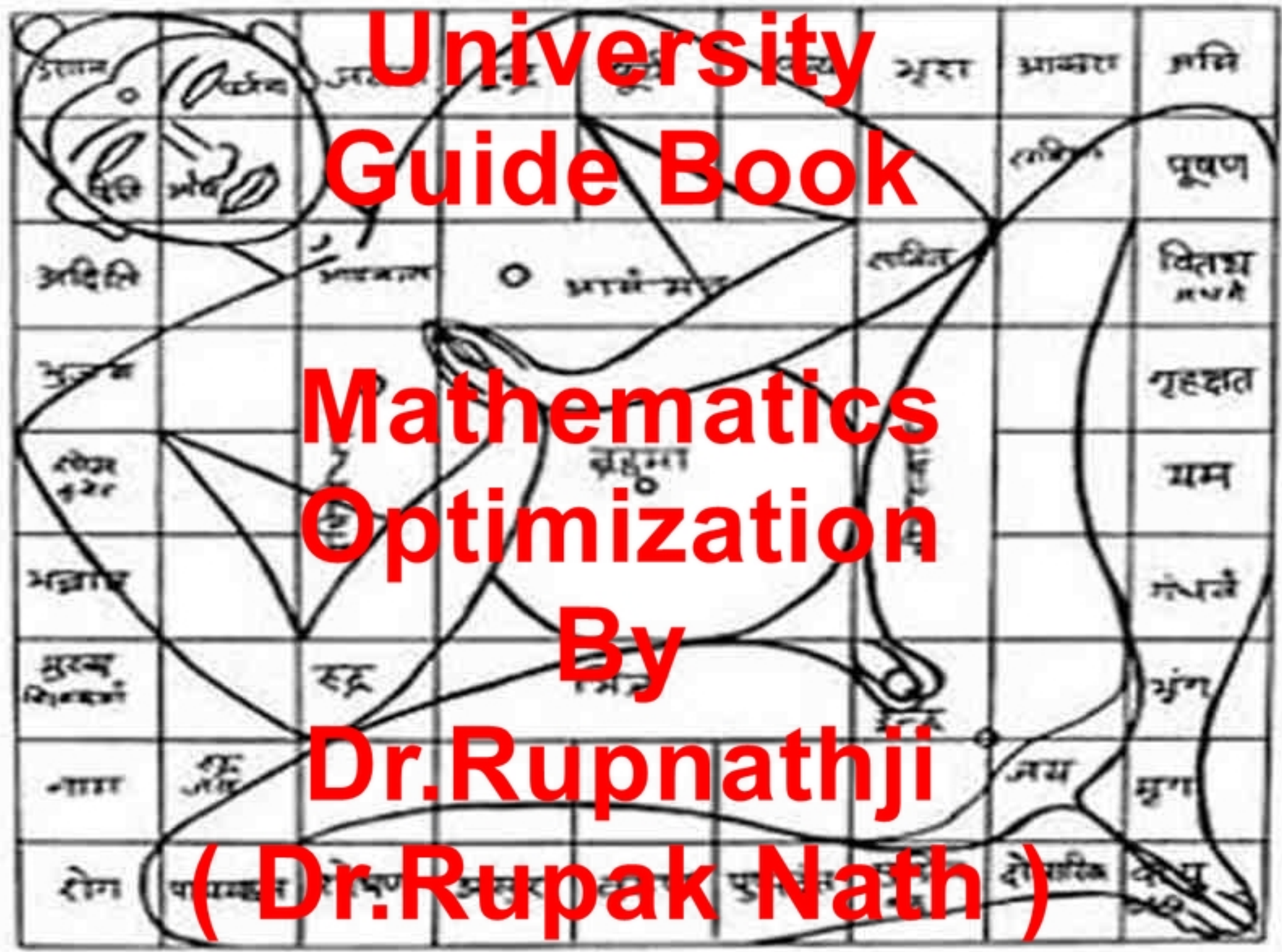
हरिम् विद्यासमावेष्टम् लोकसंग्रहकारकम् ॥



**University
Guide Book
Graph Theory
By
Dr.Rupnathji
(Dr.Rupak Nath)**

East

पूर्व-दिक्कन्द



University Guide Book

Mathematics Optimization

By

Dr. Rupnathji

(Dr. Rupak Nath)

उत्तर
North

दक्षिण
South

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Calculus
By

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(Dr. Rupak Nath)



ABHANGA



SAMABHANGA



SAMABHANGA



ATIBHANGA



TRIBHANGA

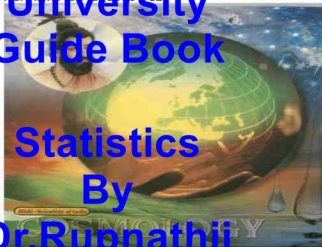
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Statistics
By

Dr. Rupnathji

Dr. Rupnathji
(FATHER OF COSMOLOGY)

Celebrated as the founder of Sankhya philosophy, Acharya Kapil is believed to have been born in 3000 BCE to the illustrious sage Kardam and Devhuti. He gifted the world with the Sankhya School of Thought. His pioneering work threw light on the nature and principles of the ultimate Soul (Purusha), primal matter (Prakruti) and creation. His concept of transformation of energy and profound commentaries on atma, non-atma and the subtle elements of the cosmos places him in an elite class of master achievers - incomparable to the discoveries of other cosmologists. On his assertion that Prakruti, with the inspiration of Purusha, is the mother of cosmic creation and all energies, he contributed a new chapter in the science of cosmology. Because of his extrasensory observations and revelations on the secrets of creation, he is recognized and saluted as the Father of Cosmology.



University Guide Book

happiness = $\frac{\text{needs}}{\text{capability}}$
Mathematics
Fractals

By

Dr.Rupnathji
(Dr.Rupak Nath)

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Trigonometry

By

Dr. Rupnathji
(Dr. Rupak Nath)

"A human being
is a part of the whole
called by us universe,

a part limited in time and space.

He experiences himself,
his thoughts and feelings
as something separated from the rest,
a kind of optical delusion
of his consciousness.

This delusion is
a kind of prison for us,
restricting us to
our personal desires
and to affection for
a few persons nearest to us.

Our task must be
to free ourselves from this prison
by widening our circle of compassion
to enhance all living creatures
and the whole of nature in its beauty."

--ALBERT EINSTEIN

NW

University

NE

Granary Toilets Animals Garage Guests	Treasury Study- room	Pooja Verandah Portico
Children- Study	Court- yard	Dining Study- room Children Bath
Bedroom Dressing Store	Bedroom Dining	Kitchen Garage

SW

S

SE

Topology By

Dr. Rupnathji (Dr. Rupak Nath)

Vedic Maths

Text Book

Graph Theory

By

Dr. Rupnathji

(Dr. Rupak Nath)

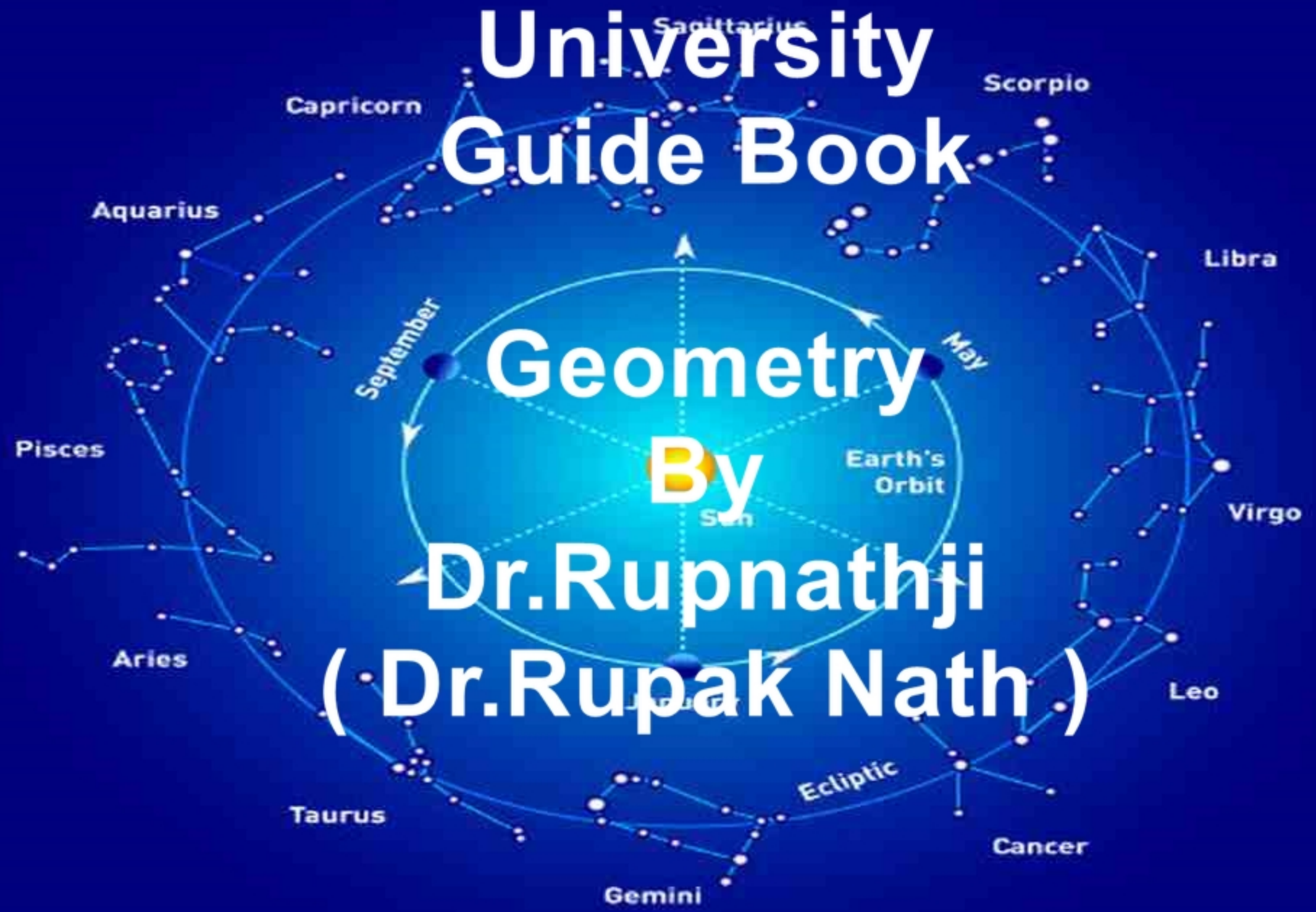


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Geometry

By

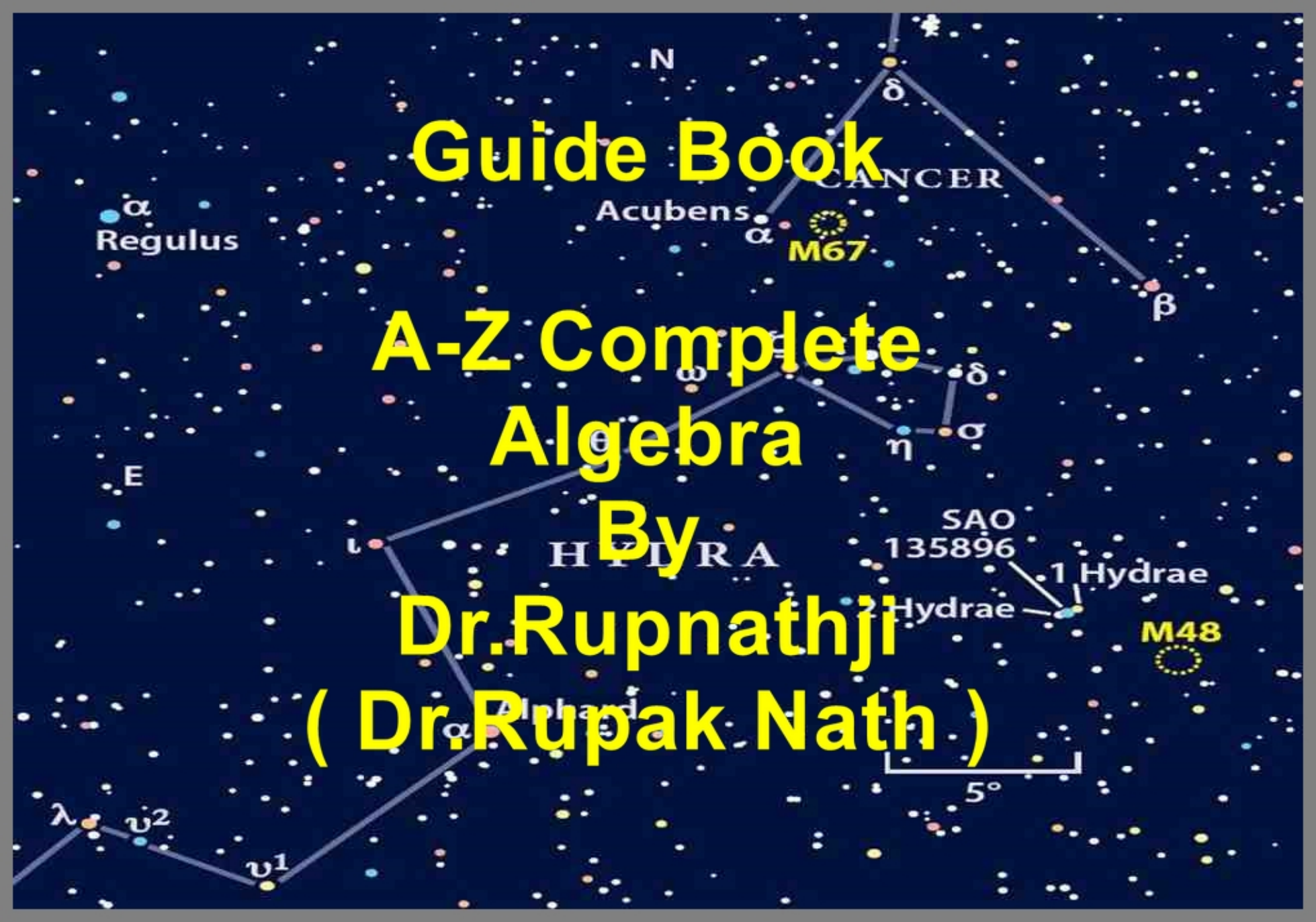
Dr. Rupnathji
(Dr. Rupa Nath)



Guide Book

A-Z Complete Algebra

By
Dr. Rupnathji
(Dr. Rupak Nath)



Minor Siddhis (some are common to major and minor siddhis)

1. Ability to apprehend Siddhas.
2. absence of passion or Raga.
3. acquisition of desired objects.
4. alchemy.
5. Clairaudience.
6. clairvoyance.
7. control of mind.
8. Death upon demand.
9. Destroy diseases and miseries and control desires.
10. Divining a hidden treasure
11. Jump like a frog.
12. Karmic dissolution by multiple birth in multiple bodies in one lifetime.
13. Knowledge of his past life.
14. Knowledge of past, present and future.
15. knowledge of stars and planets.
16. levitation
17. mastery of the elements and Prana.
18. metamorphosis.
19. migration and animation of a dead body and transplanting his soul, migration into another living body
20. move to any place of his liking.
21. omnipotence and omniscience.
22. prophecy.
23. sporting with the gods.
24. tolerance of heat and cold.
25. tolerance of hunger and thirst
26. transcend dualities like pain and pleasure.
27. Prapti.
28. touch distant objects.
29. predict future.
30. conversant with animal talk.

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A-Z Complete

Numerical

Analysis

By

Dr. Rupnathji

(Dr. Rupak Nath)

A satellite is shown in orbit around the Earth. The Earth is partially obscured by a glowing blue grid that represents a graph or network structure. The background is a dark starry space. The text is overlaid on this scene.

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A-Z Complete Graph Theory

By

Dr. Rupnathji

(Dr. Rupak Nath)

Accelerated Expansion of the Universe

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A-Z Complete Mathematics Optimization

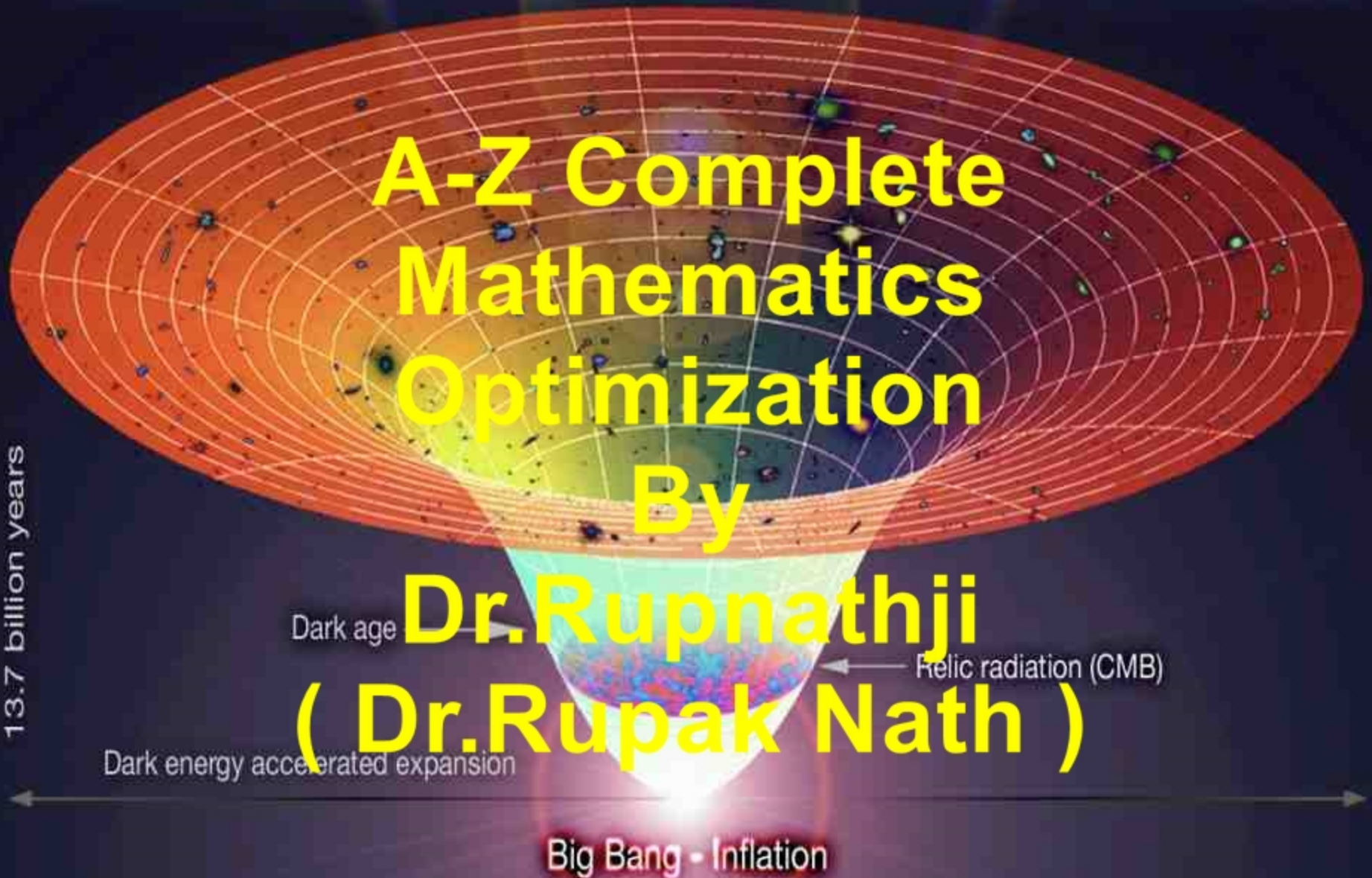
By

Dark age **Dr. Rupnathji**
Relic radiation (CMB)
(Dr. Rupak Nath)

Dark energy accelerated expansion

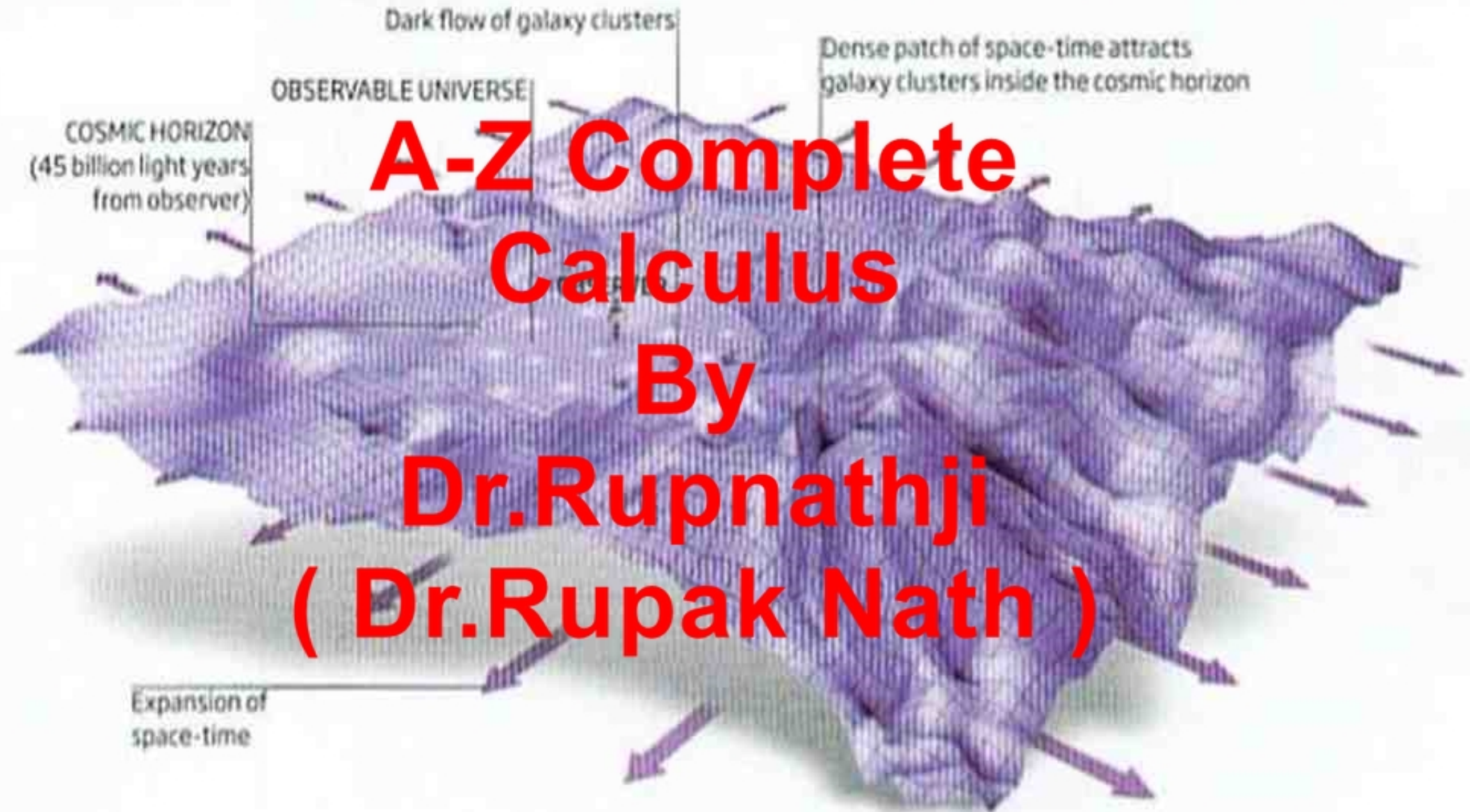
Big Bang - Inflation

13.7 billion years



Edge of the universe

The "dark flow" of wayward galaxy clusters that appear to be pulled in one direction could give us our first hint of something beyond the cosmic horizon, which normally marks the limit of the observable universe









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A-Z Complete Calculus By Dr. Rupnathji (Dr. Rupak Nath)

The Human body Vs the Universe

All the energies in the human body are a true incarnation of the energies working in the universe i.e. whatsoever we see in this universe at macrocosm level is present in the human body at microcosm level and performs the same functions

Guide Book

Energies at Microcosm Level i.e. Human Body	Functions	Energies at Macrocosm Level i.e. Universe	Functions
Vata (Kinetic Energy) 	Movements	Wind (Wind Energy) 	Motion
Pitta (Thermal Energy) 	Heat Regulation	Sun (Solar Energy) 	Temperature control
Kapha (Potential Energy) 	Strength	Moon (Lunar Energy) 	Nutrition

A-Z Complete
Statistics

By

Dr. Rupnathji

(Dr. Rupak Nath)

THE HISTORY AND FATE OF THE UNIVERSE

Four eras and eight major stages in the evolution of the universe

Guide Book

A-Z Complete Mathematics Fractals

By

Dr. Rupnathji

(Dr. Rupak Nath)

The Big Bang and Expanding Universe

Space is expanding from an initial moment called the Big Bang. As it expands, the universe becomes less dense and cools. All distant galaxies are moving apart from each other and away from us. On large scales, the universe looks the same in all directions and in all parts of space. There is no center. Our current understanding of the early universe is based on the Big Bang model. We are continuing to learn from astronomical observations and from particle-accelerator experiments.

History of the Universe

Four major eras in the expansion history.

Era 1 - Acceleration: Inflation Speeds Expansion

Observations seem to imply that the very early universe underwent an extremely rapid, accelerating expansion, called inflation, in a few fractions of a second. Inflation expanded each part of space by a factor of at least 10²⁵. Before inflation, the portion of the universe visible to us today was a smooth patch much smaller than a proton. As inflation ended, the visible universe had grown (only approximately) to the size of a hair.

Era 2-3 - Deceleration: Expansion Slows and Structure Forms

After inflation, the universe was a soup of fundamental particles called a quark-gluon plasma. Photons and fast-moving particles, particularly called neutrinos, gradually lost energy (cooled) as the universe expanded. Eventually, slow-moving matter clumps together, over millions of years, to form stars and larger structures. Our first, larger and larger structures grow from galaxies to clusters of galaxies to superclusters.

Era 4 - Acceleration: Dark Energy Speeds Expansion

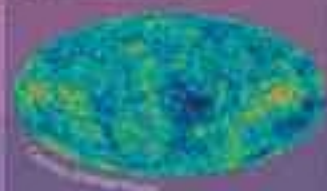
Astronomers had assumed that the current universe is dominated by matter, which would cause deceleration and might even reverse the expansion. In 1999, when observations showed that the expansion of the universe is now accelerating, they called the "Accelerating Universe" phase. This implies the existence of a mysterious new form of energy, called dark energy.

Cosmology and Relics of History

Cosmology is the study of the universe as a whole. As an interdisciplinary scientific field, it draws on the tools of physics. We can look back in time by tracing the light back. Since light travels at a finite speed c , the time we are looking back is $t = d/c$, where d is the distance. The lines of sight discovered on Earth are applied to the early universe and tested by observing relics.

A Hubble from the Early Universe

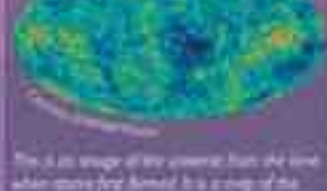
The Cosmic Microwave Background (CMB) is a universal bath of lightwaves glowing from the hot, dense early universe. To one part in 100,000, the CMB is the same in color where you look. The remaining tiny variations in the density of matter-energy (shown in light and dark) are seeds that later form galaxies and larger cosmic structures.



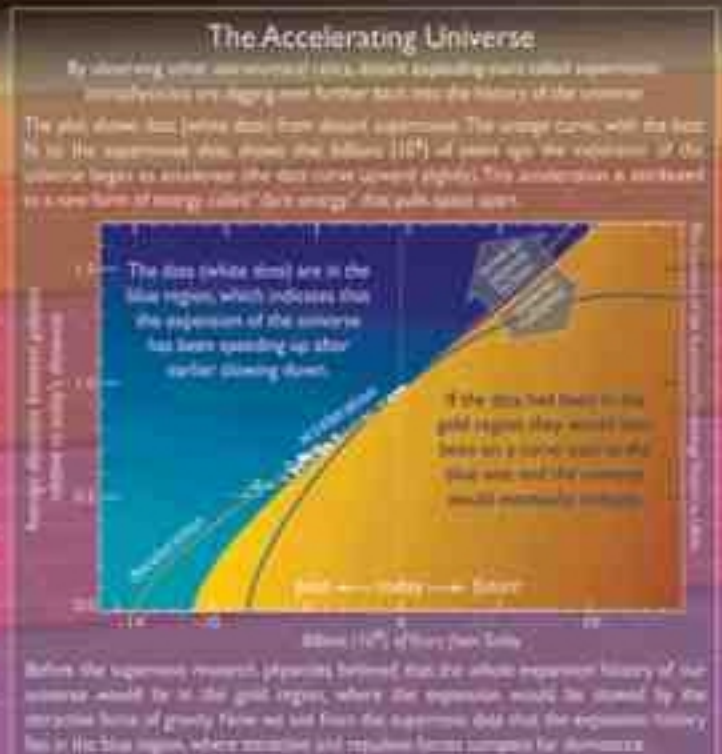
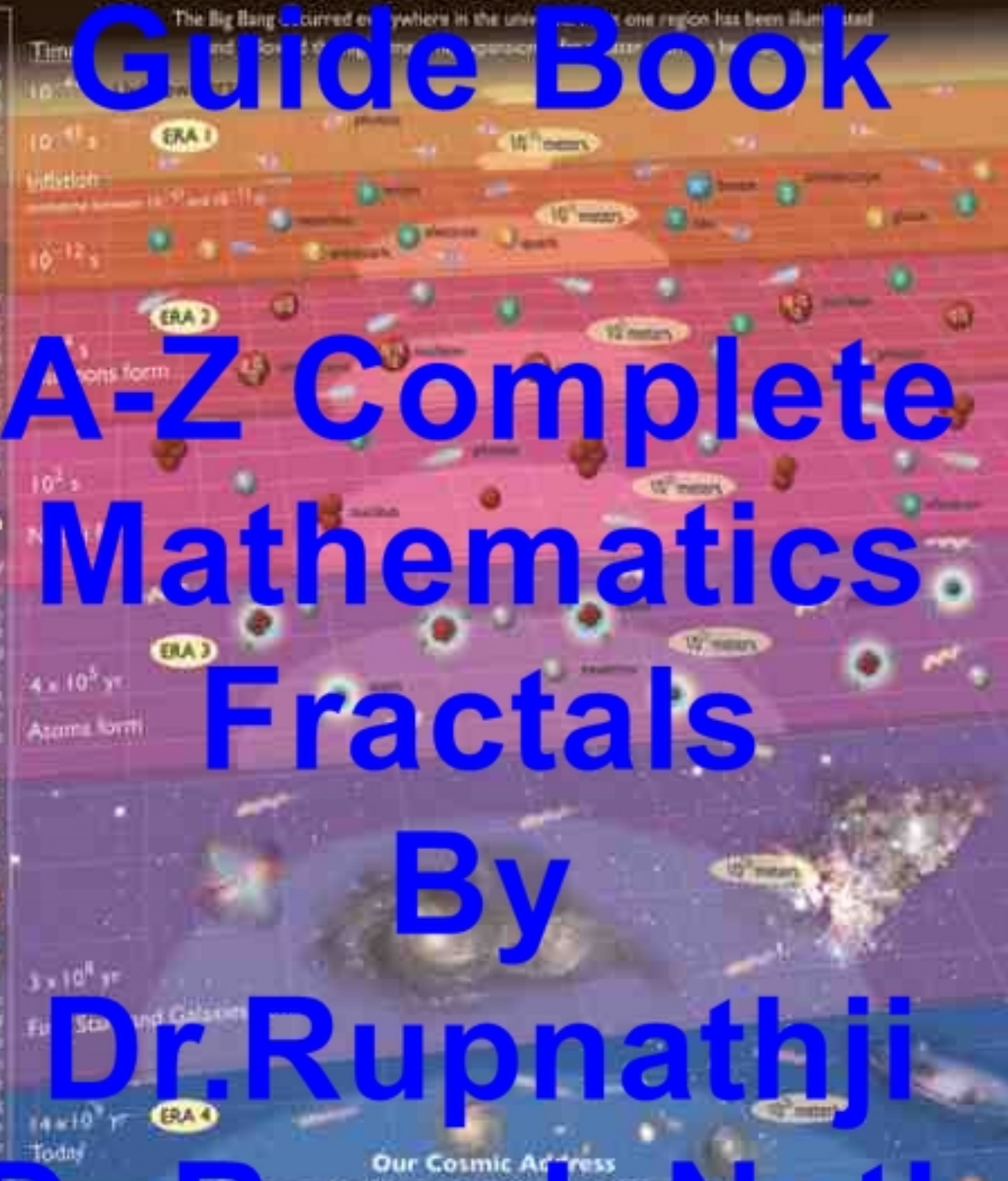
This is an image of the universe from 400,000 years after the Big Bang. It's a map of the entire sky showing the Cosmic Microwave Background (CMB) light with the visible part subtracted.

Age of the Universe

Studying the cosmic microwave background, the expansion of the universe, and the life cycles of stars leads to a remarkable agreement that the age of the universe is about 14 billion years (1.4×10^{10} years).



Timeline of major events in the early universe: recombination, photon decoupling, and formation of the first stars.



Learn more at UniverseAdventure.org and at CPEPweb.org



The whole
universe
is within us

Embrace
Transcend
Shine through

Guide Book

**A-Z Complete
Trigonometry**

By

Dr.Rupnathji

(Dr.Rupak Nath)

A human silhouette is centered, with a vertical column of seven colored chakras (violet, indigo, light blue, green, yellow, orange, red) running through the torso. Above the crown chakra, a series of smaller, glowing symbols are visible. The figure is surrounded by a complex, blue, grid-like energy field that forms a torus shape around the body. The background is a dark, starry space.

Guide Book

**A-Z Complete
Topology**

UNIVERSE

universe: poem or song
verse: poem or song

godself sings one song

Dr. Rupnathji
with his disciples

(**Dr. Rupak Nath**)
a sounds, one symphony
all beings, one actor

○ microcosm

hear with god's ear

see with god's eye

Sutra or Theorem	Translation
एकाधिकेन पूर्वेन	By one more than the one before.
निखिलं नवतश्चरमं दशतः	All from 9 and the last from 10.
लघ्वर्धतिर्यग्भ्याम्	Vertically and Cross-wise
परावर्त्य योजयेत्	Transpose and Apply
शून्यं साम्यसमुच्चये	If the Samuccaya is the Same it is Zero
आनुरूप्ये शून्यं शेषतः	If One is in Ratio the Other is Zero
संकलन व्यवकलनाभ्यां	By Addition and by Subtraction
पूरणापूरणाभ्यां	By the Completion or Non-Completion
चलनकलनाभ्याम्	Differential Calculus
यावदूनं	By the Deficiency
व्यष्टिसमष्टिः	Specific and General
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एकन्यूनेन पूर्वेन	By One Less than the One Before
गुणितसमुच्चयः	The Product of the Sum
गुणकसमुच्चयः	All the Multipliers

Text Book

Mathematics Optimization

By

Dr.Rupnathji

(Dr.Rupak Nath)

One is only micrometers wide. The other is billions of light-years across. One shows neurons in a mouse brain. The other is a simulated image of the universe. Together they suggest the surprisingly similar patterns found in vastly different natural phenomena. *DAVID CONSTANTINE*

Brain Guide Book

The Universe

A-Z Complete Geometry By Dr. Rupnathji (Dr. Rupak Nath)

Mark Miller

Virgo Connection

Mark Miller, a doctoral student at Brandeis University, is researching how particular types of neurons in the brain are connected to one another. By staining thin slices of a mouse's brain, he can identify the connections visually. The image above shows three neuron cells on the left (two red and one yellow) and their connections.

An international group of astrophysicists used a computer simulation last year to recreate how the universe grew and evolved. The simulation image above is a snapshot of the present universe that features a large cluster of galaxies (bright yellow) surrounded by thousands of stars, galaxies and dark matter (web).

Guide Book

Algebra

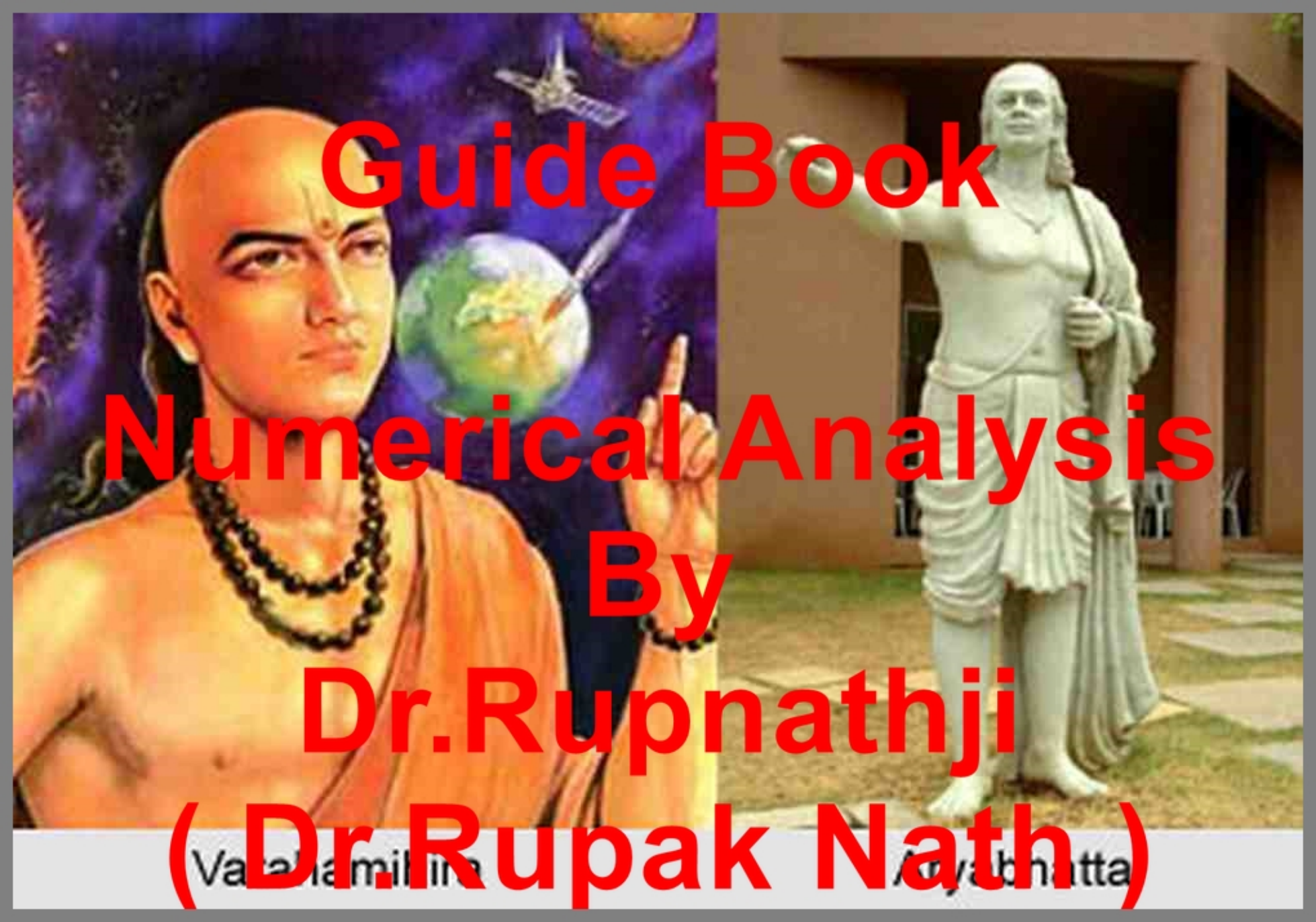
By

Dr. Rupnathji

महादेवं महात्मानं महाध्यानं पश्याणम्

महापाशुरं देवं मन्त्रशयं जगो नमः

(Dr. Rupak Nath)



Guide Book

Numerical Analysis

By

Dr. Rupnathji

(Dr. Rupak Nath)

Vaishali

Arora

वेदिकी भाषा
Guide Books

Graph Theory

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Sutra or Theorem	Translation
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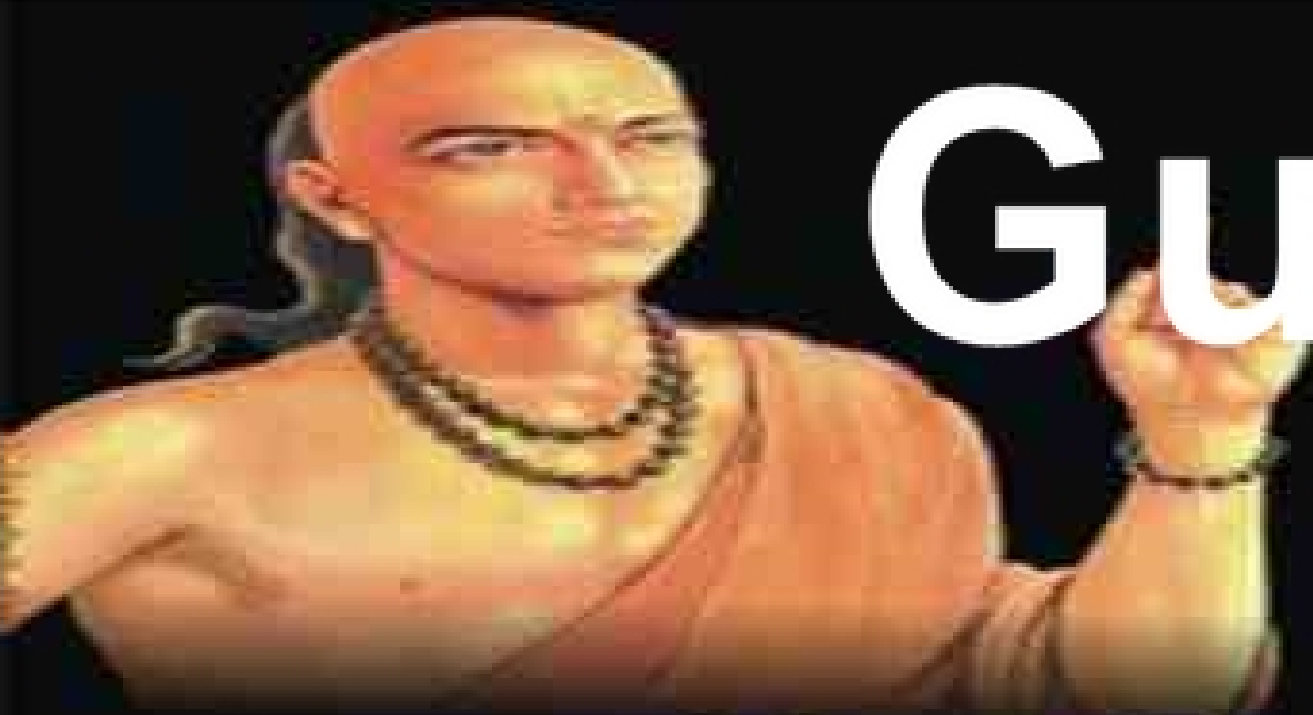
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Mathematics Optimization

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(Dr.Rupak Nath)



Guide Book

भास्कराचार्य
Bhaskaracharya

(ई. 1114 से ई. 1185)
(1114 A.D. to 1185 A.D.)

Calculus

By

$$\begin{aligned} \text{ज्या (क + ख)} &= \text{ज्या क कोज्या ख} + \text{कोज्या क ज्या ख} \\ \text{ज्या (क - ख)} &= \text{ज्या क कोज्या ख} - \text{कोज्या क ज्या ख} \end{aligned}$$

Dr. Rupnathji

(Dr. Rupak Nath)

$$\begin{aligned} \sin (A + B) &= \sin A \cdot \cos B + \cos A \cdot \sin B \\ &\& \\ \sin (A - B) &= \sin A \cdot \cos B - \cos A \cdot \sin B \end{aligned}$$

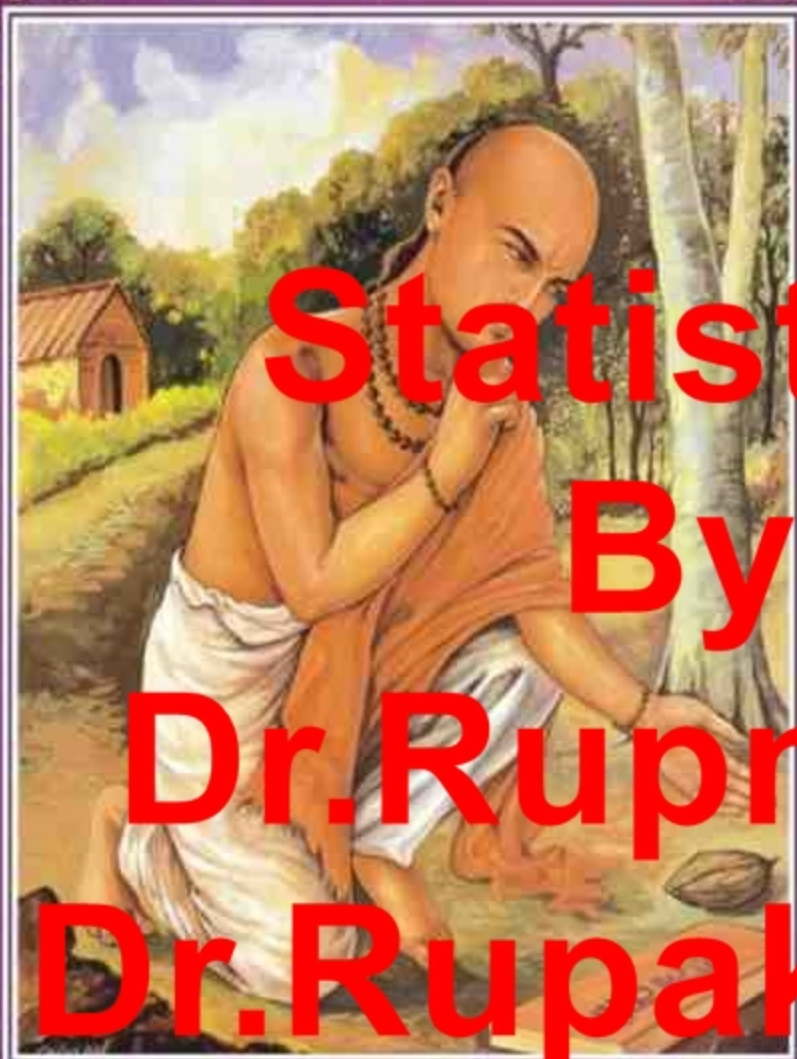
भास्कराचार्य जो भास्कर द्वितीय के नाम से भी जाने जाते हैं एक प्रसिद्ध भारतीय खगोलविद् एवं गणितज्ञ थे। उनका जन्म कर्नाटक के बीजापुर जिले में हुआ था। वह उज्जैन की खगोलीय वेदशाला, जो कि प्राचीन भारत का खगोलविज्ञान एवं गणित के क्षेत्र में प्रमुख केन्द्र था, के प्रमुख थे। 12 वीं शताब्दी में भास्कराचार्य ने गणित और खगोल विज्ञान के क्षेत्र में अत्यन्त महत्वपूर्ण योगदान दिये। उनके प्रमुख कार्य इस प्रकार हैं:- लीलावती (अंकगणित), बीजगणित और सिद्धान्त शिरोमणि। सिद्धान्त शिरोमणि के दो भाग हैं, महत्त्वपूर्ण भाग (यहाँ का गणित) एवं गोलाध्याय (भूगोल)।

भास्कराचार्य ने कई खगोलीय मापों का सही रूप में ज्ञान प्राप्त किया। उन्होंने सिद्ध किया कि सिडेरल (Sidereal) वर्ष का समय (पृथ्वी का सूर्य के चारों तरफ घूमने में लगने वाला समय) 365,2588 दिन है। यह समय तथा भास्कराचार्य की गणना में मात्र 4 मिनट का अन्तर है। यह गणना उनके द्वारा बिना किसी यंत्र की सहायता से की गयी। गणित के क्षेत्र में उनके द्वारा दिये गये महत्वपूर्ण योगदानों में निम्न सम्मिलित हैं:- शून्य के नियमों को बताना (जिसमें 0 से भाग देना भी सम्मिलित है), गोलीय त्रिकोणमिति की खोज, महत्वपूर्ण त्रिकोणमिति सूत्रों की खोज, जैसे:

Bhaskaracharya also known as Bhaskara II was a famous Indian Astronomer & Mathematician. He was born in Bijapur district of Karnataka. He was head of astronomical observatory at Ujjain, the leading mathematical centre of ancient India. Bhaskara's works represent a significant contribution to mathematics & astronomical knowledge in the 12th century. His major works are Līlāvati (related to Algebra) & Siddhanta Shiromani which consists of two parts, Goladhyaaya (Spherics) & Bijaganita (mathematics of the planets).

Bhaskara accurately calculated many astronomical quantities, including for example: the length of the sidereal year, the time that is required for the earth to orbit the sun, as 365,2588 days. The modern accepted measurement is 365,2596 days, a difference of just one minute. This result was achieved by naked eye observations only. Amongst his other contributions in the field of mathematics, he discovered the concept of Zero (0), discovered spherical trigonometry along with other important trigonometric results like

Guide Book



Statistics

By

Dr. Rupnathji

(Dr. Rupak Nath)

भास्कराचार्य का जन्म वि.सं. 1114 में हुआ था। कुछ लोग आपका जन्मस्थान कर्नाटक का बीजापुर मानते हैं तथा कुछ लोग बिज्जदित नामक स्थान पर आपका जन्म महाराष्ट्र का जलगांव नामक जिला है मानते हैं। भास्कराचार्य का पिता का नाम महेश्वर था। वे गणित के प्रकांड पंडित थे। गुरुत्वार्थ के सिद्धान्त का सार यह है कि पृथ्वी अपनी आकर्षण शक्ति के कारण प्रत्येक वस्तु को अपनी ओर खींचती है। इस सिद्धान्त को खोजने का श्रेय आधुनिक वैज्ञानिक न्यूटन को दिया जाता है। न्यूटन ने इस सिद्धान्त का प्रतिपादन सन 1668 में किया था। परन्तु भास्कराचार्य ने उनसे भी 500 वर्ष पूर्व इस सिद्धान्त का प्रतिपादन किया है।

भास्कराचार्य की ख्याति एक महान् गणितज्ञ और स्वगोल वैज्ञानिक के रूप में हुई थी। आपका मुख्य ग्रन्थ 'लीलावती' गणित के क्षेत्र में एक महान् सिद्धि मानी जाती है। लीलावती आपकी पुत्री का नाम था, जिसे आप अत्यधिक चाहते थे। इसलिए आपने इस ग्रन्थ को अपनी पुत्री का नाम दिया है। लीलावती छन्दों में लिखित पद्यात्मक ग्रन्थ है। पद्य में होने से उसे पढ़ना और स्मरण रखने में अनुकूलता होती है। इस ग्रन्थ की लोकप्रियता एवं उसके महत्त्व का अनुमान इस बात से हो सकता है कि

अनेक विदेशी भाषाओं में इसका अनुवाद हो चुका है। लीलावती में भास्कराचार्य ने दश गुणोत्तर प्रणाली का प्रयोग किया है। उसमें गणित की सामान्य विधियों को मनोरंजक रूप में समझाया गया है। जोरु, घटाना, गुणा, भाग, वर्गमूल आदि के अलावा इस ग्रन्थ में अनेक उपयोगी प्रश्नों का भी समाधान किया गया है।

आपके लिखे हुए दो ग्रन्थ विशेष प्रसिद्ध हुए। प्रथम है 'सिद्धान्त शिरोमणि' तथा द्वितीय है 'सूर्यसिद्धान्त' सिद्धान्त शिरोमणि चार विभागों में है। ये चार विभाग—

1. लीलावती,
2. बीजगणित,
3. गणिताध्याय,

जो अध्याय नाम से भी जानते हैं। भास्कराचार्य के साथ-साथ एक महान् ज्योतिषी भी थे। इस मानते हैं कि उनसे समय में दूरबीन की खोज नहीं हुई थी, पुनरपि यह खोज आप के अग्रजान, उनकी स्थिति का परिज्ञान उन्होंने कैसे किया होगा यह आपका विषय है। तारामंडल के अम्बास में आप भोजन या विश्राम को भी मूल जानते थे।

भास्कराचार्य एक महान् स्वगोलशास्त्री भी थे। स्वगोल विज्ञान के क्षेत्र में आपके प्रसिद्ध ग्रन्थ 'सिद्धान्त शिरोमणि' है। इस ग्रन्थ में ज्यातिष् सम्बन्धी भास्कराचार्य की ख्याति के लिए अनेक कार्यो का वर्णन है। गणित और ज्योतिष के अलावा आपने जो कठिन कार्य भास्कराचार्य ने करते हुए ऐसे महत्त्वपूर्ण ग्रन्थों की रचना की जो आज भी विश्वप्रसिद्ध हुए।

Science & Hinduism: amazing facts about our Ancestors

Guide Book

Oh, Hindus! wake up: This is Your Great, Glorious History

ARYABHATT (476 CE) MASTER ASTRONOMER AND MATHEMATICIAN



Mathematics
Fractals
By

Born in 476 CE in Kusumpur (Bihar), Aryabhata's intellectual brilliance remapped the boundaries of mathematics and astronomy. In 499 CE, at the age of 23, he wrote a text on astronomy and an algebraic treatise on mathematics called 'Aryabhatiyam.' He formulated the principles of calculating the motion of planets and the time of eclipses. Aryabhata was the first to proclaim that the earth is round, it rotates on its axis, orbits the sun and is suspended in space - 100 years before Copernicus published his heliocentric theory. He is also acknowledged for calculating π (Pi) to four decimal places, 3.1416 and the sine table in trigonometry. Centuries later, in 825 CE, the Arab mathematician, Mohammed Ibrahima Musa credited the value of Pi to the Indians, 'This value has been given by the Hindus.' And above all, his most spectacular contribution was the concept of zero without which modern computer technology would have been non-existent. Aryabhata was a colossus in the field

of mathematics.

BHASKARACHARYA (1114-1185 CE) GIGANT IN ALGEBRA



Dr. Rupnathji
(Dr. Rupak Nath)

Born in the obscure village of Vijadit (Jalgaon) in Maharashtra, Bhaskaracharya's work in Algebra, Arithmetic and Geometry was a major leap to a new era of mathematical discovery. His renowned mathematical works 'Lilavati' and 'Bijaganita' are considered to be unparalleled and a memorial to his profound intelligence. Its translation in several languages of the world bear testimony to its eminence. In his treatise ' Siddhant Shiromani ' he writes on planetary positions, eclipses, cosmography, mathematical techniques and astronomical equipment. In the ' Surya Siddhant ' he makes a note on the force of gravity: ' Objects fall on earth due to a force of attraction by the earth. Therefore, the earth, planets, constellations, moon, and sun are held in orbit due to this attraction.' Bhaskaracharya was the first to discover gravity, 500

for young mathematicians

Guide Book

GENIUS

Vedic Mathematics

Vedic Maths
The Miracle of Mental Calculations

for young mathematicians

Trigonometry

Can you multiply mentally in less than
5 seconds without pen and paper

By
9999999999 \times 564524368 ?

And how much time does it take you to

Find the Cube Root of
3463512697 ?

(Dr. Rupak Nath)

The multiplication answer is
564524367435475632

(Home Calculator doesn't show this answer)

Sanskrit Sloka or Sutra

Meaning

एकाधिकेन पूर्वो

By one more than the one before.

निखिलं नवदशमपर्यन्तः

All from 9 and the last from 10.

ऋध्वंतिर्यग्भ्यामं

Vertically and Cross-wise

परावर्त्य योजयेत्

Transpose and Apply

शून्यं साम्यसमुच्चये

If the Samuccaya is the Same it is Zero

आनुरूप्ये शून्यं अन्यतः

If One is in Ratio the Other is Zero

संकलन व्यवकलनाभ्याम्

By Addition and by Subtraction

पूरणापूरणाभ्यां

By the Completion or Non-Completion

चलनकलनाभ्याम्

Differential Calculus

यावद्दूनं

By the Deficiency

व्यपिनामष्टिः

Specific and General

शेषाण्यङ्गैश्चर्येण

The Remainder is by the Last Digit

सोपान्त्यद्वयमन्त्यं

The Ultimate and twice the Penultimate

एकन्पूर्वो भवेत्

By One Less than the One Before

गुणितसमुच्चयः

The Product of the Sums

गुणकसमुच्चयः

All the Multipliers

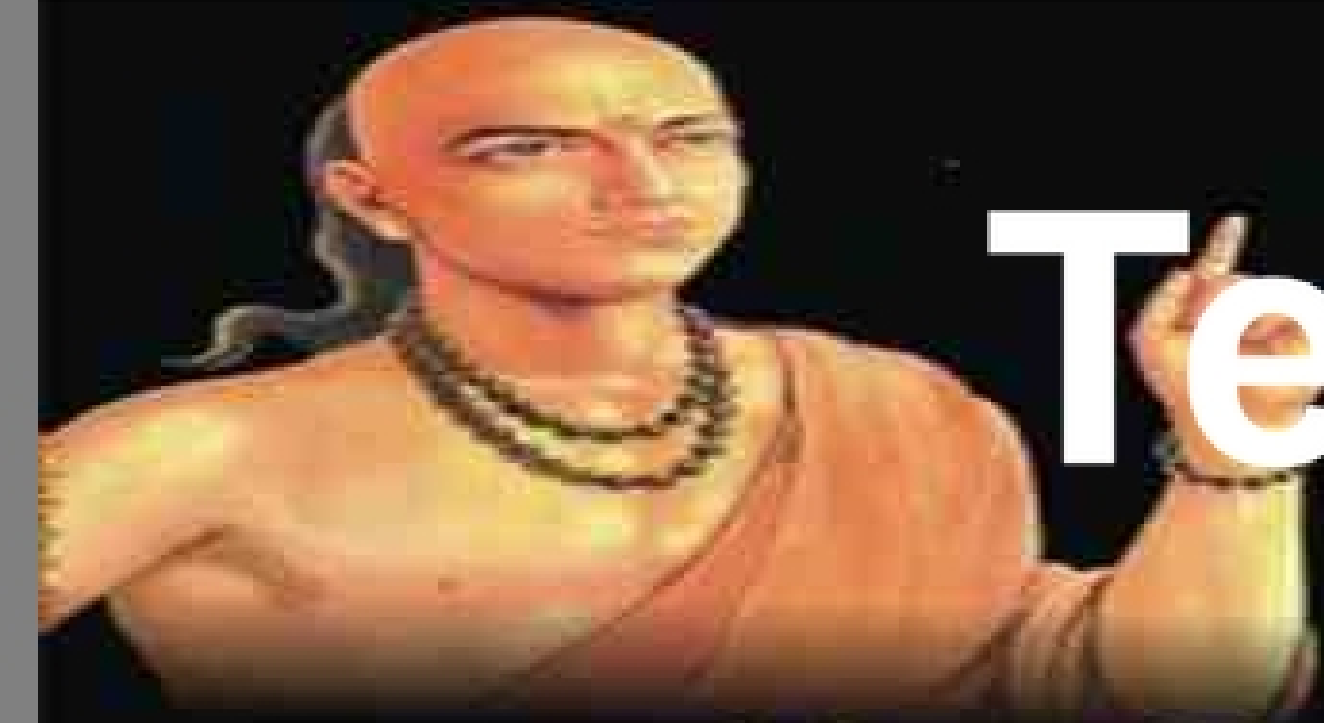
Guide Book

Topology

By

Dr. Rupnathji

(Dr. Rupak Nath)



Text Book

भास्कराचार्य
Bhaskaracharya
(ई. 1114 से ई. 1185)
(1114 A.D. to 1185 A.D.)

भास्कराचार्य जो भास्कर द्वितीय के नाम से भी जाने जाते हैं एक प्रसिद्ध भारतीय खगोलविद् एवं गणितज्ञ थे। उनका जन्म कर्नाटक के बीजापुर जिले में हुआ था। वह उज्जैन की खगोलीय वेदशाला, जो कि प्राचीन भारत का खगोलविज्ञान एवं गणित के क्षेत्र में प्रमुख केन्द्र था, के प्रमुख थे। 12 वीं शताब्दी में भास्कराचार्य ने गणित और खगोल विज्ञान के क्षेत्र में अत्यन्त महत्वपूर्ण योगदान दिये। उनके प्रमुख कार्य इस प्रकार हैं:- लीलावती (अंकगणित), बीजगणित और सिद्धान्त शिरोमणी। सिद्धान्त शिरोमणी के दो भाग हैं, ग्रहगणितोपध्याय (ग्रहों का गणित) एवं गोलाध्याय (भूगोल)।

भास्कराचार्य ने कई खगोलीय मापों की शुद्ध गणना की। उदाहरणतः उन्होंने सांपातिक (Sidereal) वर्ष का समय (पृथ्वी का सूर्य के धारों तरफ एक बार लपकने में लगने वाला समय) का अंश 365, 2596 दिन बताया, जो आधुनिक गणना के अनुसार 365, 2596 दिन है। यह समय तथा भास्कराचार्य की गणना में केवल एक दिन का अंतर है। यह गणना उनके द्वारा बिना किसी यंत्र की सहायता से की गयी। उनके द्वारा निकाले गये खगोलीय योगदानों में निम्न सम्मिलित हैं:- शून्य के नियमों को बताना (जिसमें 0 से भाग देना भी सम्मिलित है), गोलीय त्रिकोणमिति की खोज, महत्वपूर्ण त्रिकोणमिति सूत्रों की खोज, जैसे:

$$\begin{aligned} \text{ज्या (क + ख)} &= \text{ज्या क कोज्या ख} + \text{कोज्या क ज्या ख} \\ \text{ज्या (क - ख)} &= \text{ज्या क कोज्या ख} - \text{कोज्या क ज्या ख} \end{aligned}$$

Bhaskaracharya also known as Bhaskara II was a famous Indian Astronomer & Mathematician. He was born in Bijapur district of Karnataka. He was head of astronomical observatory at Ujjain, the leading mathematical centre of ancient India. Bhaskara's works represent a significant contribution to mathematical & astronomical knowledge in the 12th century. His major works are Lilavati (related to Arithmetic), Bijaganita (Algebra) & Siddhanta Shiromani which consists of two parts, Grahaganta (the planets) & Grahalaganta (mathematics of the planets).

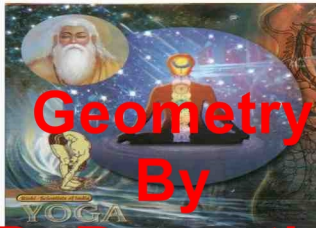
Bhaskara accurately calculated many astronomical quantities including for example: the length of the sidereal year, the time that is required for the earth to orbit the sun, as 365,2588 days. The modern accepted measurement is 365,2596 days, a difference of just one minute. This result was achieved by naked eyes observations only. Among a number contributions in the field of mathematics he defined rules of Zero (including division by Zero), discovered spherical trigonometry along with other interesting trigonometrical results like:-

$$\begin{aligned} \sin(A+B) &= \sin A \cos B + \cos A \sin B \\ \sin(A-B) &= \sin A \cos B - \cos A \sin B \end{aligned}$$

By
Dr. Rupnathji
(Dr. Rupak Nath)

CHITRY PATTANJALI (2010) CE

Guide Book



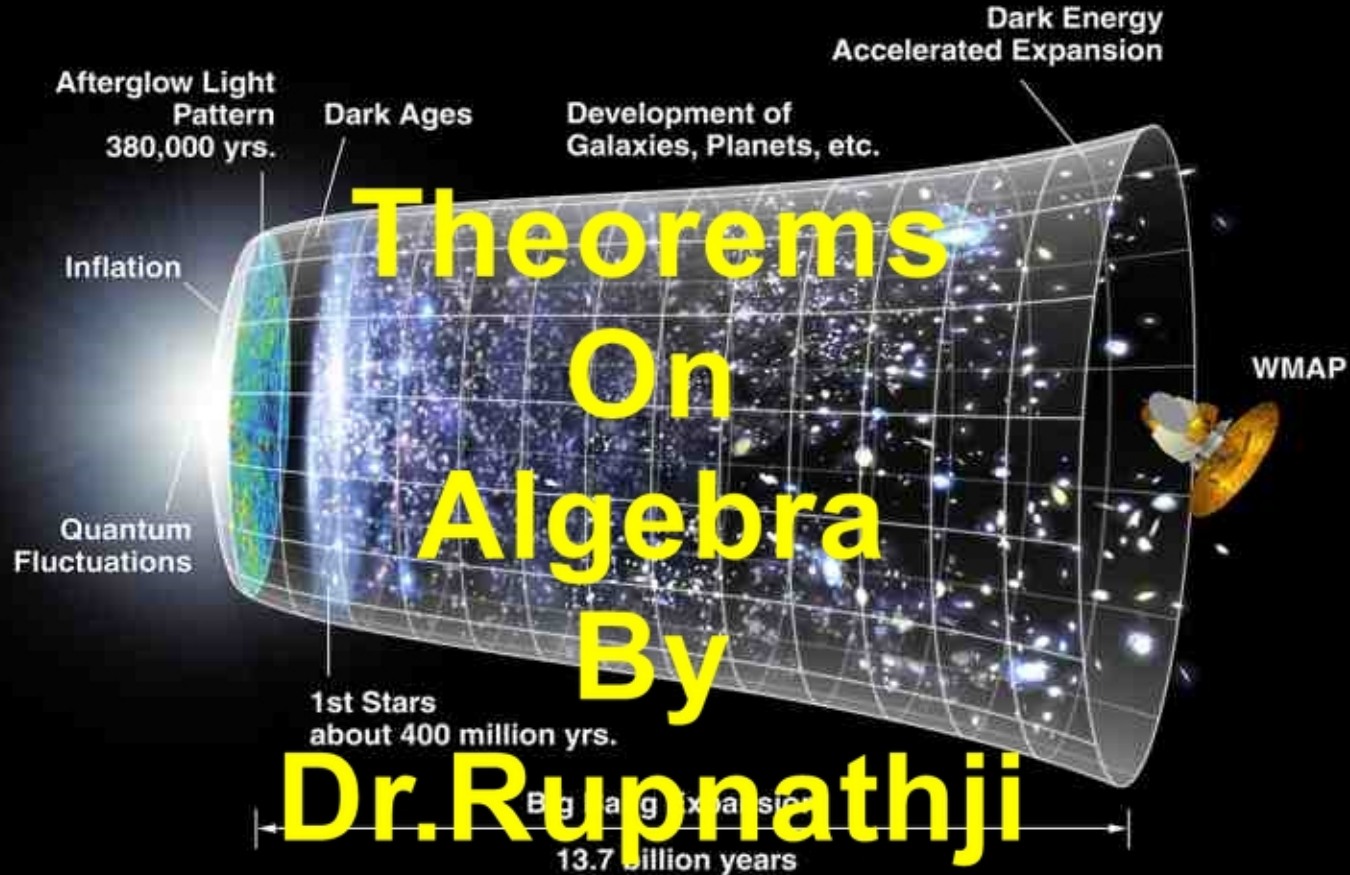
Geometry By

Dr. Rupnathji

Dr. Rupak Nath

The Science of Yoga is one of several significant contributions of India to the world. It seeks to discover and realize the Ultimate Reality through yogic practices. Acharya Patanjali, the founder, hailed from the district of Gonda (Ganara) in Uttar Pradesh. He prescribed the control of prana (life breath) as the means to control the body, mind and soul. This subsequently rewards one with good health and inner happiness. Acharya Patanjali's 84 yogic postures effectively enhance the efficiency of the respiratory, circulatory, nervous, digestive and endocrine systems and repair the organs of the body. Yoga has eight limbs where Acharya Patanjali shays in a firm belief in the ultimate benefit of total insamahi through the disciplines of: yam, niyam, asan, pranayam, pratyahar, dhyam and dharna. The science of Yoga has gained popularity because of its scientific approach and benefits. Yoga also holds the honored place as one of six philosophies in the Indian philosophical system. Acharya Patanjali will forever be remembered and revered as a pioneer in the science of self-discipline, happiness and self-realization.

Text Book



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Text Book

Can you multiply

$$998 \times 997$$

Theorems

On

Numerical Analysis

in five seconds

?

By

Dr. Rupnathji

(Dr. Rupak Nath)

If not

Learn

Fast Vedic Maths

Text Book

Theorems

On

Graph Theory

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Can you solve?

$$9999999998 \times 9999999996 = ?$$

OR

$$\sqrt[3]{580093704} = ?$$

Without pen, paper or calculator
and in less than 10 seconds

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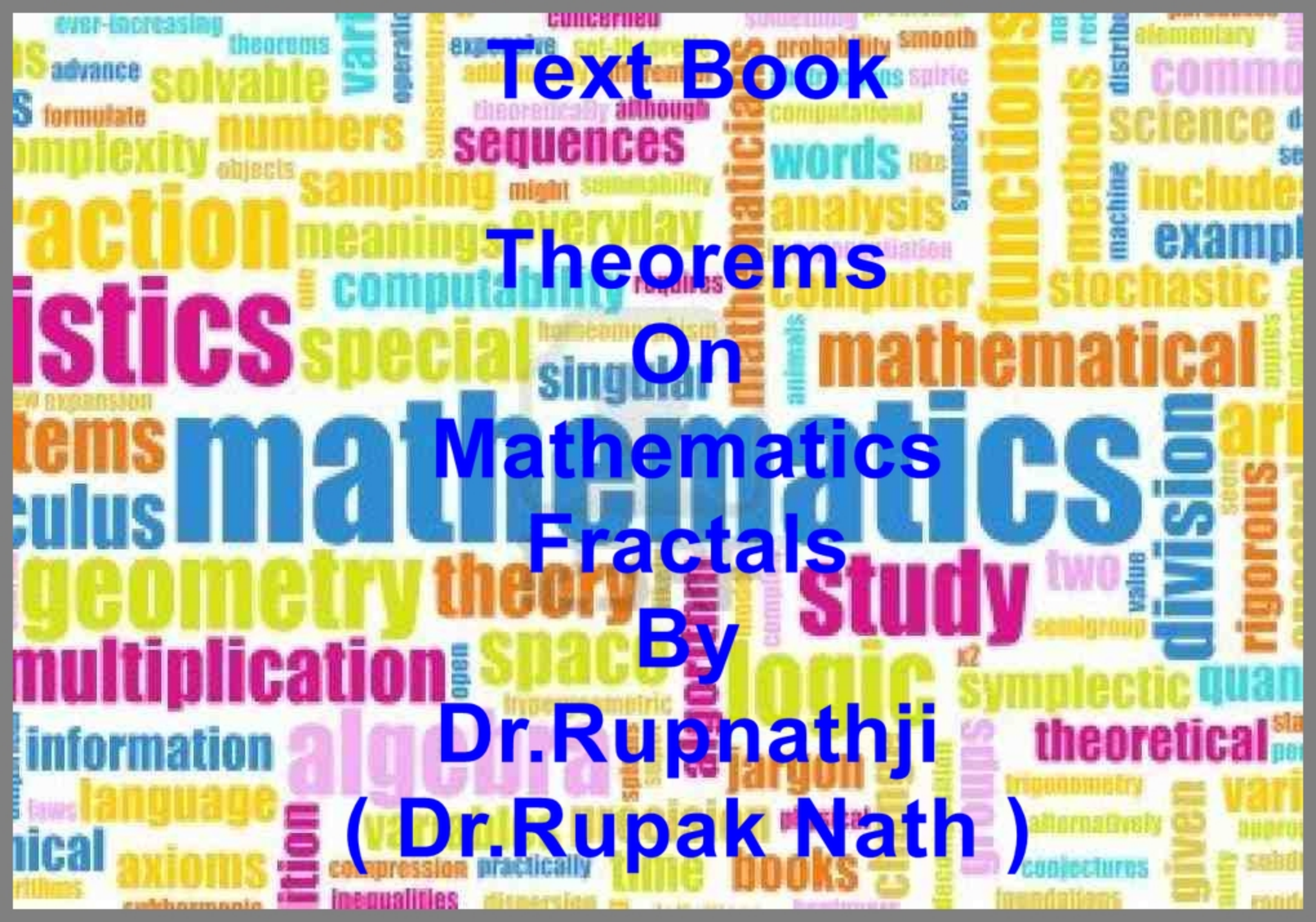
Dr. Rupnathji

(Dr. Rupak Nath)

Pronunciation	Sanskrit Text
Ekadhikena Purvena (Also a second corollary of Nikhilam)	एकाधिकेन पूर्वेन
Nikhilam Navatascaramam Dasatah	निखिलं नवतश्चरमं दशतः
Urdhva-tiryagbhyam (Urdhva-Tiryak)	ऊर्ध्वतिर्यग्भ्यामं
Paravartya Yojayet	परवर्त्या योजयेत्
Sunyam Samyasamuccaye (Sunyam Samuccaya)	शून्य साम्यसमुच्चय
(Anurupye) Sunyamanyat (Sunyam-Anyat)	आनुरूप्ये शून्यं अन्यत्
Sankalana-vyavakalanabhyam (Also a corollary)	संकलन व्यवकलनाभ्यां
Puranapuranaabhyam (Purana-Apunabhyam)	पुराणापुराणाभ्यां
Calana-kalanabhyam (Calana-kalana)	चलनकलनाभ्याम्
Yavadunam	यावदूनं
Vyastisamastih	व्यष्टिसमस्तः
Sesanyankena Caramena (Sesani Ankena Caramena)	शेषान्यङ्केन चरमेण
Sopantyadvayamantyam	सोपान्तद्वयान्त्यं
Ekanyunena Purvena (Also a third corollary of Nikhilam)	एकन्युनेन पूर्वेन
Gunitasamuccaya (Gunita-Samuccaya)	गुणकसमुच्चयः
Gunakasamuccayah	गुणकसमुच्चयः

Meaning
By one more than the one before.
All from 9 and the last from 10.
Vertically and Cross-wise
Transpose and Apply
If the Samuccaya is the Same it is Zero
If One is in Ratio the Other is Zero
By Addition and by Subtraction
By the Completion or Non-Completion
Differential Calculus
By the Deficiency
Specific and General
The Remainders by the Last Digit
The Ultimate and Twice the Penultimate
By One Less than the One Before
The Product of the Sum
All the Multipliers





Text Book
Theorems
On
Mathematics
Fractals
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(Dr.Rupak Nath)



Text Book

$$9 \times 9 + 7 = 88$$

$$98 \times 9 + 6 = 888$$

Theorems

$$987 \times 9 + 5 = 8888$$

$$9876 \times 9 + 4 = 88888$$

$$98765 \times 9 + 3 = 888888$$

Trigonometry

$$987654 \times 9 + 2 = 8888888$$

By

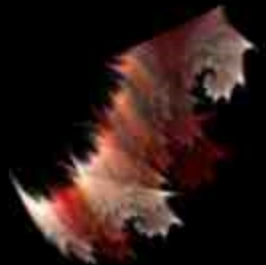
$$9876543 \times 9 + 1 = 88888888$$

Dr. Rupnathji

$$98765432 \times 9 + 0 = 888888888$$

(Dr. Rupak Nath)

Brilliant, isn't it?



Text Book

Theorems

On

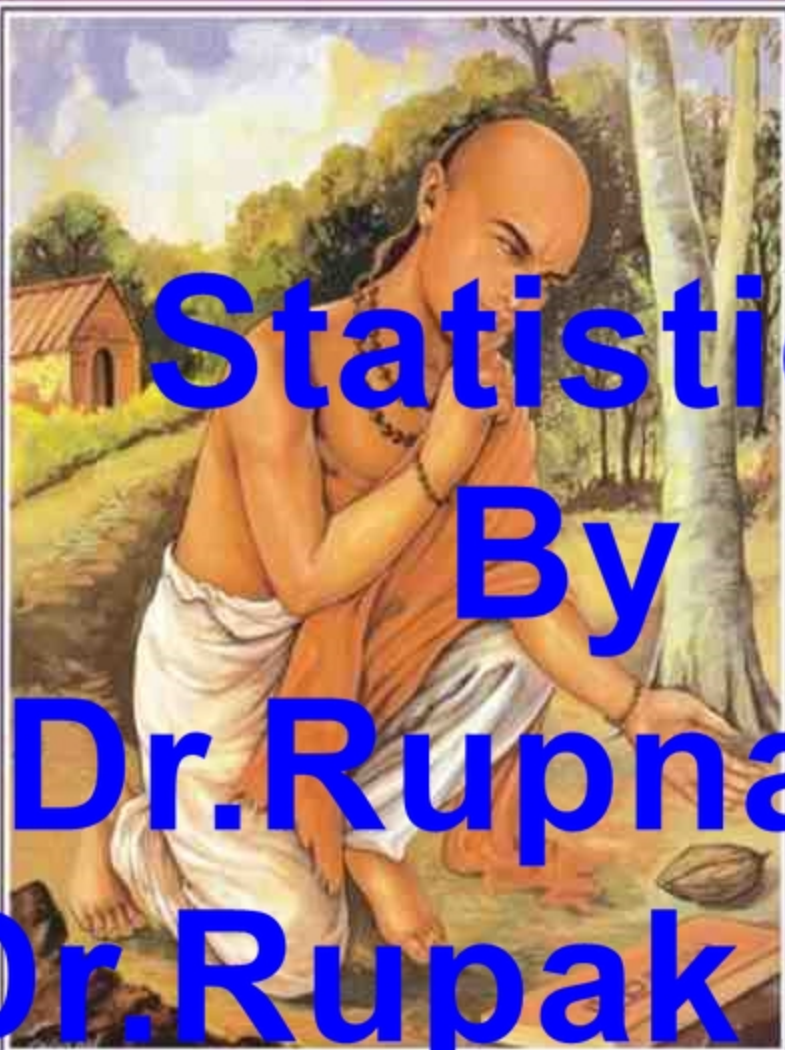
Topology

By

Dr. Rupnathji

(Dr. Rupak Nath)

Text Book



Statistics

By

Dr. Rupnathji

(Dr. Rupak Nath)

भास्कराचार्य का जन्म वि.सं. 1114 में हुआ था। कुछ लोग आपका जन्मस्थान कर्नाटक का बीजापुर मानते हैं तथा कुछ लोग बिज्जदित नामक जिले में वर्तमान में महाराष्ट्र का जलगांव नामक जिला है मानते हैं। भास्कराचार्य के पिता का नाम महेश्वर था। वे गणित के प्रकांड पंडित थे। भास्कराचार्य के सिद्धान्त का सार यह है कि पृथ्वी अपनी आकर्षण शक्ति के कारण प्रत्येक वस्तु को अपनी ओर खींचती है। इस सिद्धान्त को खोजने का श्रेय आधुनिक वैज्ञानिक न्यूटन को दिया जाता है। न्यूटन ने इस सिद्धान्त का प्रतिपादन सन 1668 में किया था। परन्तु भास्कराचार्य ने उनसे भी 500 वर्ष पूर्व इस सिद्धान्त का प्रतिपादन किया है।

भास्कराचार्य की ख्याति एक महान् गणितज्ञ और खगोल वैज्ञानिक के रूप में हुई थी। आपका मुख्य ग्रन्थ 'लीलावती' गणित के क्षेत्र में एक महान् सिद्धि मानी जाती है। लीलावती आपकी पुत्री का नाम था, जिसे आप अत्यधिक चाहते थे। इसलिए आपने इस ग्रन्थ को अपनी पुत्री का नाम दिया है। लीलावती छन्दों में लिखित पद्यात्मक ग्रन्थ है। पद्य में होने से इसे पढ़ने और स्मरण रखने में अनुकूलता होती है। इस ग्रन्थ की लोकप्रियता एवं उसके महत्त्व का अनुमान इस बात से हो सकता है कि अनेक विदेशी भाषाओं में इसका अनुवाद हो चुका है। लीलावती में भास्कराचार्य ने दश गुणोत्तर प्रणाली का प्रयोग किया है। उसमें गणित की सामान्य विधियों को मनोरंजक रूप में समझाया गया है। जोरु, घटाना, गुणा, भाग, वर्गमूल आदि के अलावा इस ग्रन्थ में अनेक उपयोगी प्रश्नों का भी समाधान किया गया है।

आपके लिखे हुए दो ग्रन्थ विशेष प्रसिद्ध हुए। प्रथम है 'सिद्धान्त शिरोमणि' तथा द्वितीय है 'सूर्यसिद्धान्त' सिद्धान्त शिरोमणि चार विभागों में है। ये चार विभाग—

1. लीलावती,
2. बीजगणित,
3. गणिताध्याय,
4. गोलागणित नाम से जाने जाते हैं।

भास्कराचार्य गणितज्ञ होने के साथ-साथ एक महान् ज्योतिषी भी थे। उनका जन्म ही उनके समय में दूरबीन की खोज नहीं हुई थी, पुनरपि यह, तंत्र आदि का अध्ययन, उनकी स्थिति का परिज्ञान उन्होंने कैसे किया होगा यह आश्चर्य का विषय है। तारामंडल के अन्वय में आप गोजन या विभाग को भी मूल जाते थे।

भास्कराचार्य एक महान् खगोलशास्त्री भी थे। खगोल विज्ञान के क्षेत्र में आपका प्रतिपादन अत्यन्त कुतूहलजनक है। इस ग्रन्थ में ज्यातिष सम्बन्धी सारांशिक और गणितयुक्त कार्यों का वर्णन है। गणित और खगोल के क्षेत्र में अनेक शोध करने का कठिन कार्य भास्कराचार्य ने करके हुए ऐसे महत्त्वपूर्ण ग्रन्थों की रचना की जो बाद में विश्वप्रसिद्ध हुए।

Text Book

**Theorems
On**

**Geometry
By**

Dr. Rupnathji

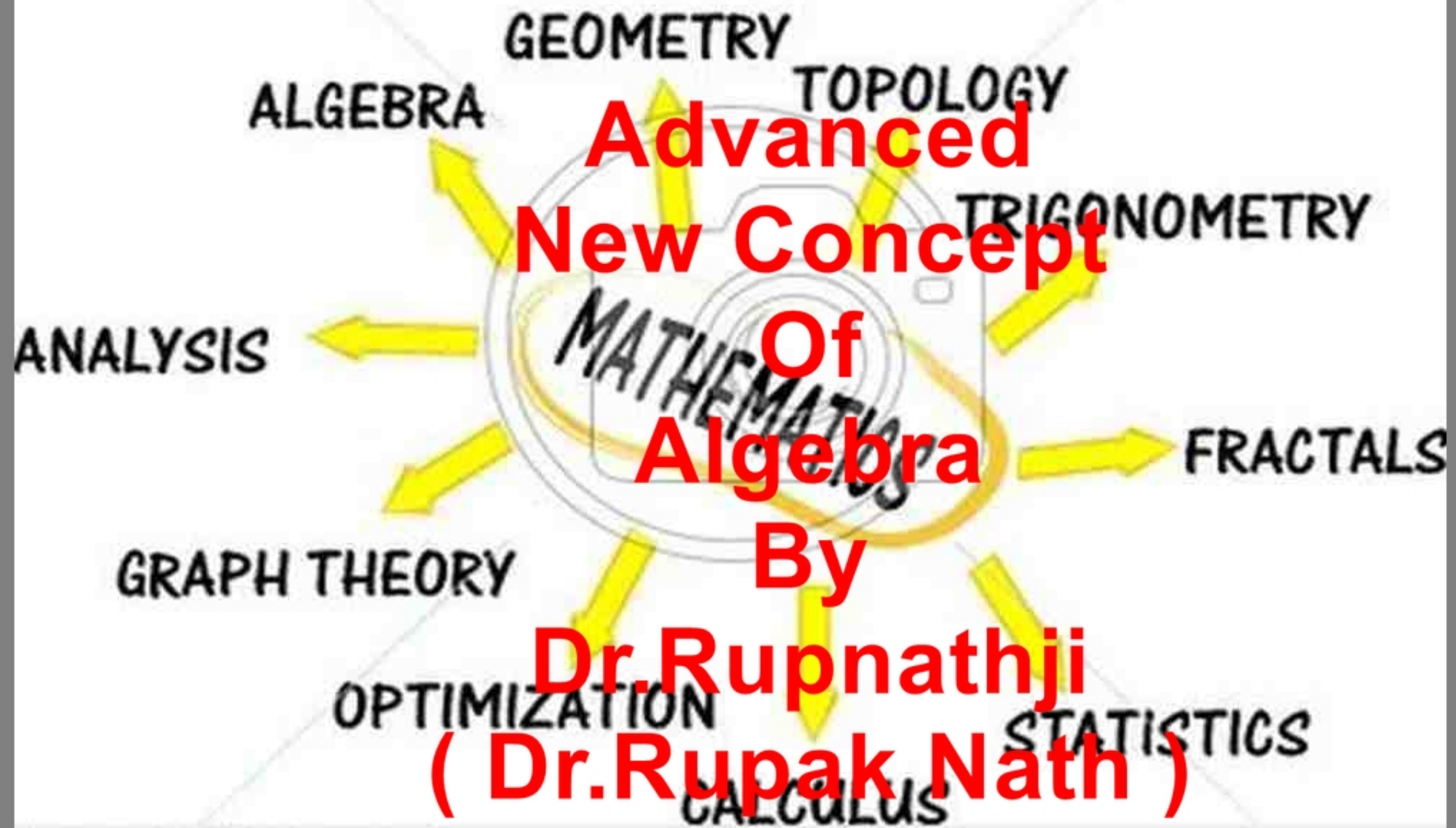
(Dr. Rupak Nath)

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Advanced New Concept

Of Algebra By

Dr. Rupnathji
(Dr. Rupak Nath)



Guide Book

नमो भौतगणाधीशम् रसायनसरस्वतीम्

Advanced

New Concept

श्रीलक्ष्मीम् गणिताम् **Of** दुर्गाम् जीवबीजवरप्रदाम् ।

Numerical

Analysis

वैद्यनाथशिवम् ब्रह्मं **By** विश्वयन्त्रसमुद्भवम्

Dr.Rupnathji

(Dr.Rupak Nath)

हरिम् विद्यासमावेष्टम् लोकसंग्रहकारकम् ॥

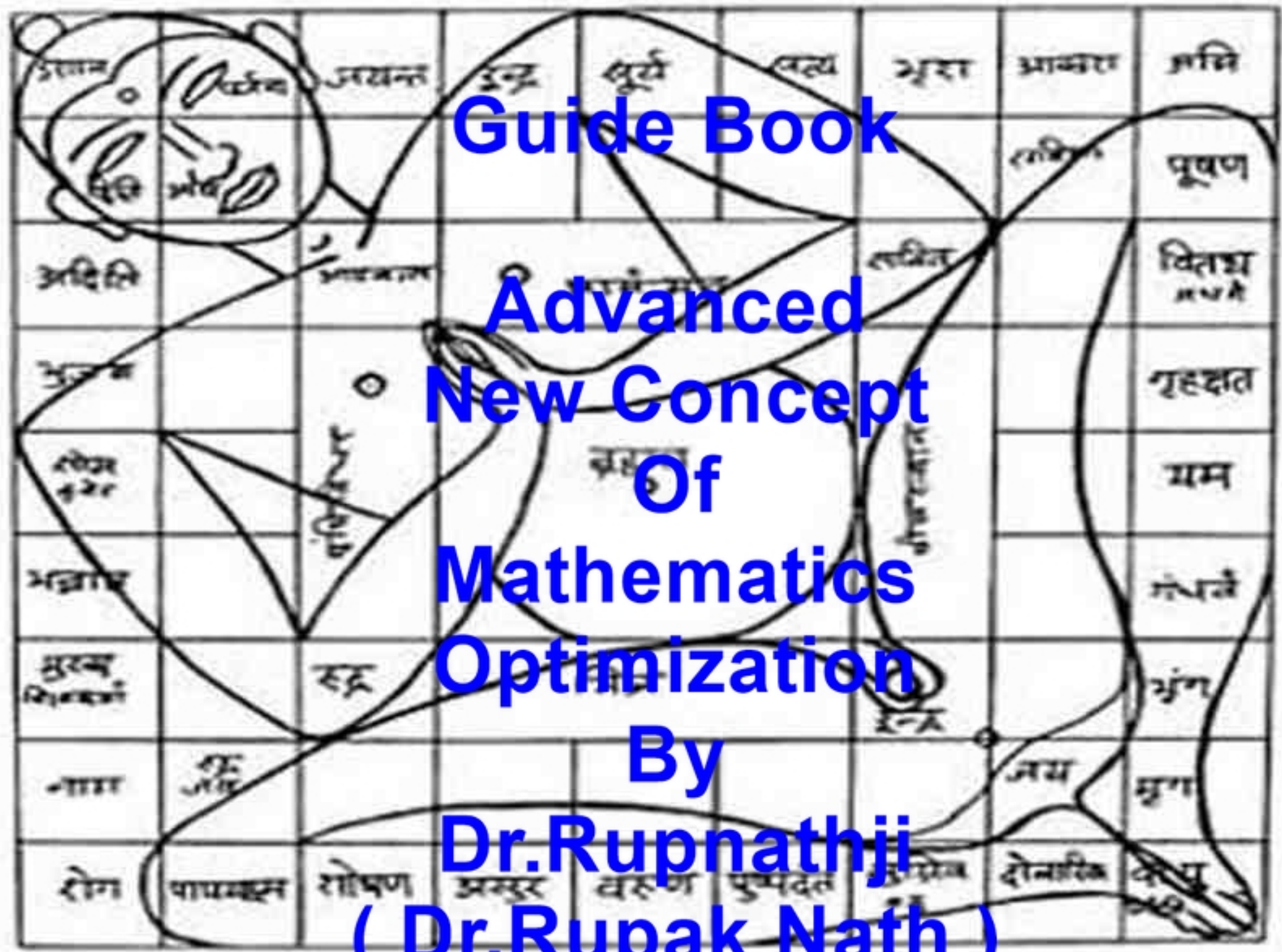


Guide Book

**Advanced
New Concept
Of
Graph Theory
By**

**Dr.Rupnathji
(Dr.Rupak Nath)**

East
पूर्व-दिक्कन्द



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**Advanced
New Concept
Of
Mathematics
Optimization**

**By
Dr.Rupnathji
(Dr.Rupak Nath)**

उत्तर
North

दक्षिण
South

पश्चिम
West

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(Dr.Rupak Nath)



ABHANGA



SAMABHANGA



SAMABHANGA



ATIBHANGA

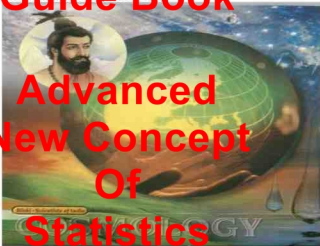


TRIBHANGA

Guide Book

ACHARYA KAPIL - 3000 BCE

Advanced New Concept Of Statistics



By
FATHER OF COSMOLOGY

Celebrated as the founder of Sankhya philosophy, Acharya Kapil is believed to have been born in 3000 BC to the illustrious sage Kardam and Devhuti. He gifted the world with the Sankhya School of thought. His pioneering work threw light on the nature and principles of the ultimate Soul (Purusha) and matter (Prakriti) and creation. His concept of transformation of energy and profound commentaries on atma, non-atma and the subtle elements of the cosmos places him in an elite class of master achievers - incomparable to the discoveries of other cosmologists. On his assertion that Prakriti with the inspiration of Purusha, is the mother of cosmic creation and all energies, he contributed a new chapter in the science of cosmology. Because of his extrasensory observations and revelations on the secrets of creation, he is recognized and saluted as the father of Cosmology.

**Dr. Rupnathji
Dr. Rupak Nath)**

Guide Book

Advanced

New Concept

***happiness* of = $\frac{\text{needs}}{\text{capability}}$**

Mathematics

Fractals

By

Dr.Rupnathji

(Dr.Rupak Nath)



Guide Book
Advanced
New Concept
Of
Trigonometry
By
Dr.Rupnathji
(Dr.Rupak Nath)

"A human being
is a part of the whole
called by us universe,

a part limited in time and space.

He experiences himself,
his thoughts and feelings
as something separated from the rest,
a kind of optical delusion
of his consciousness.

This delusion is
a kind of prison for us,
restricting us to
our personal desires
and to affection for
a few persons nearest to us.

Our task must be
to free ourselves from this prison
by widening our circle of compassion
to enhance all living creatures
and the whole of nature in its beauty."

--ALBERT EINSTEIN

NW

Guide Book

NE

Granary Toilets Animals Garage Guests	Treasury Study- room	Pooja Verandah Portico
Children- Study	Court- yard	Dining Study- room Children Bath
Bedroom Dressing Store	Bedroom Dining	Kitchen Garage

SW

Dr. Rupnathji

SE

(Dr. Rupak Nath)

Science & Hinduism: amazing facts about our Ancestors

Text Book

Oh, Hindus! wake up: This Is Your Great, Glorious History

ARYABHATT (476 CE) MASTER ASTRONOMER AND MATHEMATICIAN



Mathematics Fractals By

Born in 476 CE in Kusumpur (Bihar), Aryabhata's intellectual brilliance remapped the boundaries of mathematics and astronomy. In 499 CE, at the age of 23, he wrote a text on astronomy and mathematics called 'Aryabhatiyam.' He formulated hypotheses calculating the motion of planets and the time of eclipses. Aryabhata was the first to proclaim that the earth is round, it rotates on its axis, orbits the sun and is suspended in space - 1000 years before Copernicus published his heliocentric theory. He is also acknowledged for calculating π (Pi) to four decimal places: 3.1416 and the sine table in trigonometry. Centuries later, in 825 CE, the Arab mathematician, Mohammed Ibrahima Musa credited the value of Pi to the Indians, 'This value has been given by the Hindus.' And above all, his most spectacular contribution was the concept of zero without which modern computer technology would have been non-existent. Aryabhata was a colossus in the field

of mathematics.

Dr. Rupnathji

BHASKARACHARYA (1114-1185 CE) GENIUS IN ALGEBRA



(Dr. Rupak Nath)

Born in the obscure village of Vijjadit (Jalgaon) in Maharashtra, Bhaskaracharya's work in Algebra, Arithmetic and Geometry catapulted him to fame and immortality. His renowned mathematical works called 'Lilavati' and 'Bijaganita' are considered to be unparalleled and a memorial to his profound intelligence. Its translation in several languages of the world bear testimony to its eminence. In his treatise ' Siddhant Shiromani ' he writes on planetary positions, eclipses, cosmography, mathematical techniques and astronomical equipment. In the ' Surya Siddhant ' he makes a note on the force of gravity: 'Objects fall on earth due to a force of attraction by the earth. Therefore, the earth, planets, constellations, moon, and sun are held in orbit due to this attraction.' Bhaskaracharya was the first to discover gravity, 500

Guide Book

Advanced New Concept

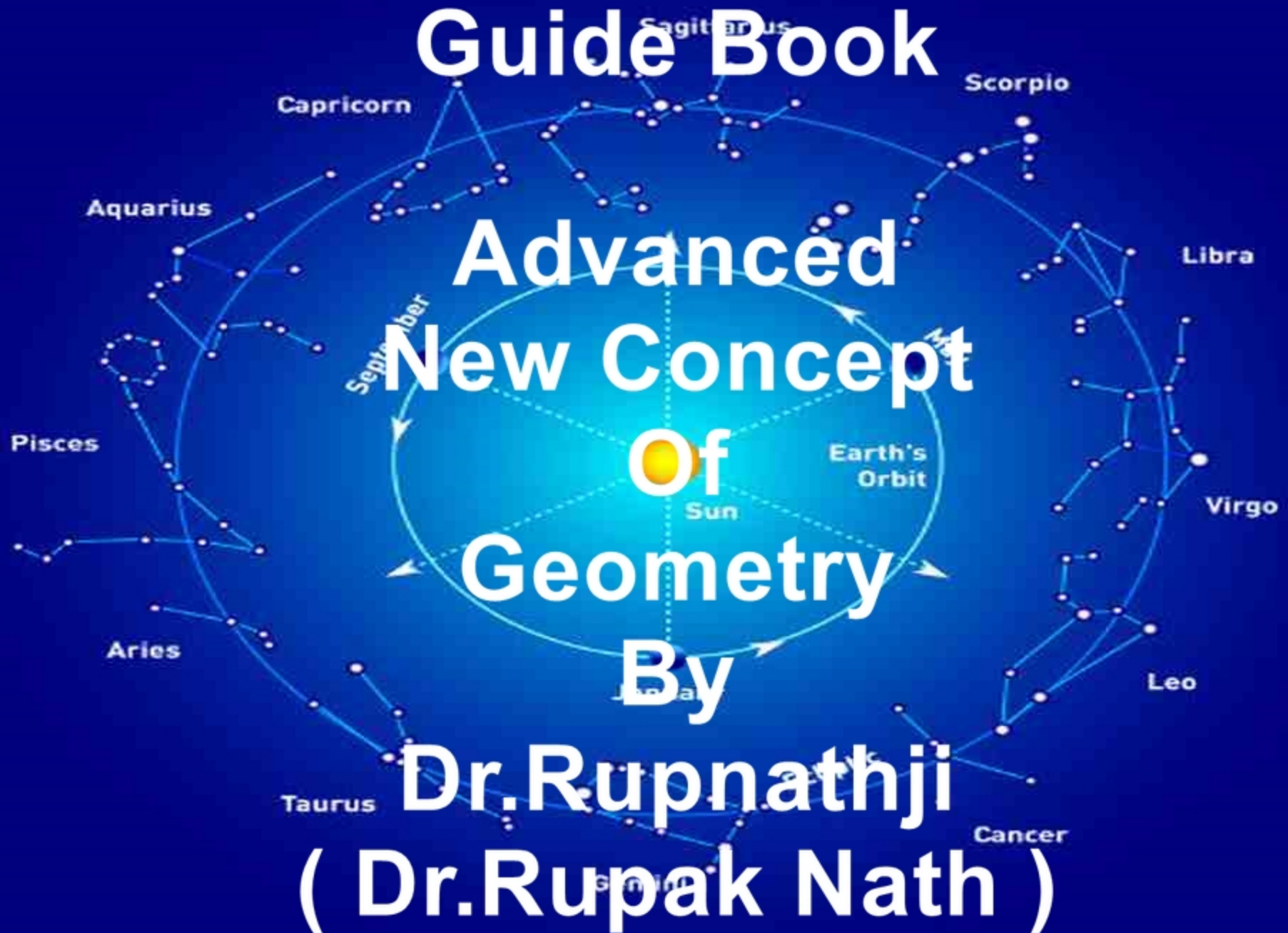


Of Geometry

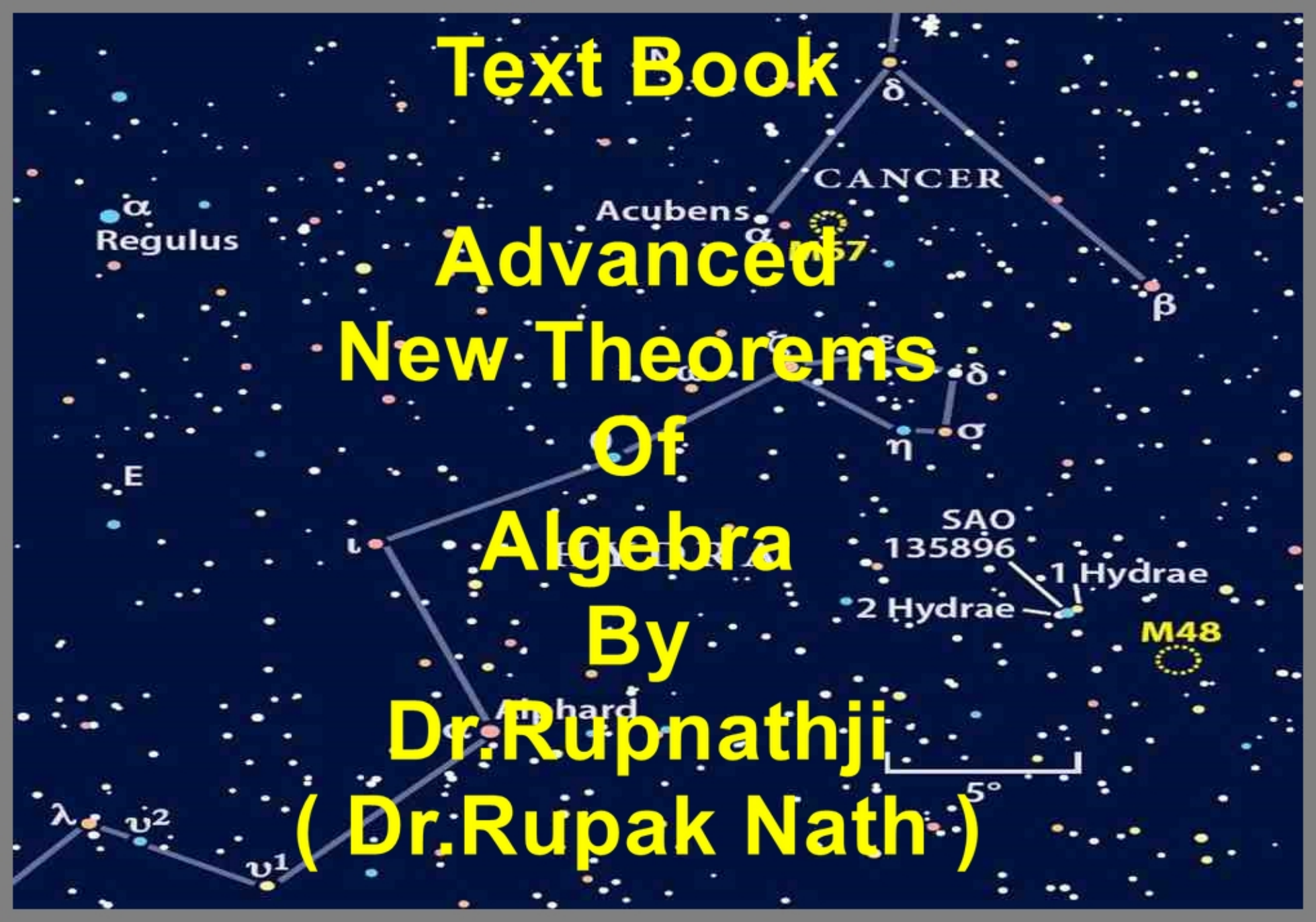
By

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(Dr. Rupak Nath)



Text Book
Advanced
New Theorems
Of
Algebra
By
Dr. Rupnathji
(Dr. Rupak Nath)



Minor Siddhis (some are common to major and minor siddhis)

1. Ability to apprehend Siddhas.
2. absence of passion or Raga.
3. acquisition of desired objects.
4. alchemy.
5. Clairaudience.
6. clairvoyance.
7. control of mind.
8. Death upon demand
9. Destroy diseases and miseries and control desires
10. Divining a hidden treasure
11. Jump like a frog.
12. Karmic dissolution by multiple births in multiple bodies in one lifetime.
13. Knowledge of his past life.
14. Knowledge of past, present and future
15. knowledge of stars and planets.

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Advanced

New Theorems

Of

Numerical Analysis

By

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(Dr. Rupak Nath)

16. levitation

17. mastery of the elements and Prana.

18. metamorphosis.

19. migration and animation of a dead body and transplanting his soul, migration into another living body

20. move to any place of his liking.

21. omnipotence and omniscience.

22. prophecy.

23. sporting with the gods.

24. tolerance of heat and cold.

25. tolerance of hunger and thirst

26. transcend dualities like pain and pleasure.

27. Prapti.

28. touch distant objects.

29. predict future.

30. conversant with animal talk.

The background of the image features a satellite in orbit around the Earth. A grid of light blue lines is superimposed over the scene, creating a perspective effect. A bright star is visible in the upper left corner, with a thin white line extending from it towards the satellite. The text is centered and written in a bold, yellow font.

Text Book

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New Theorems**

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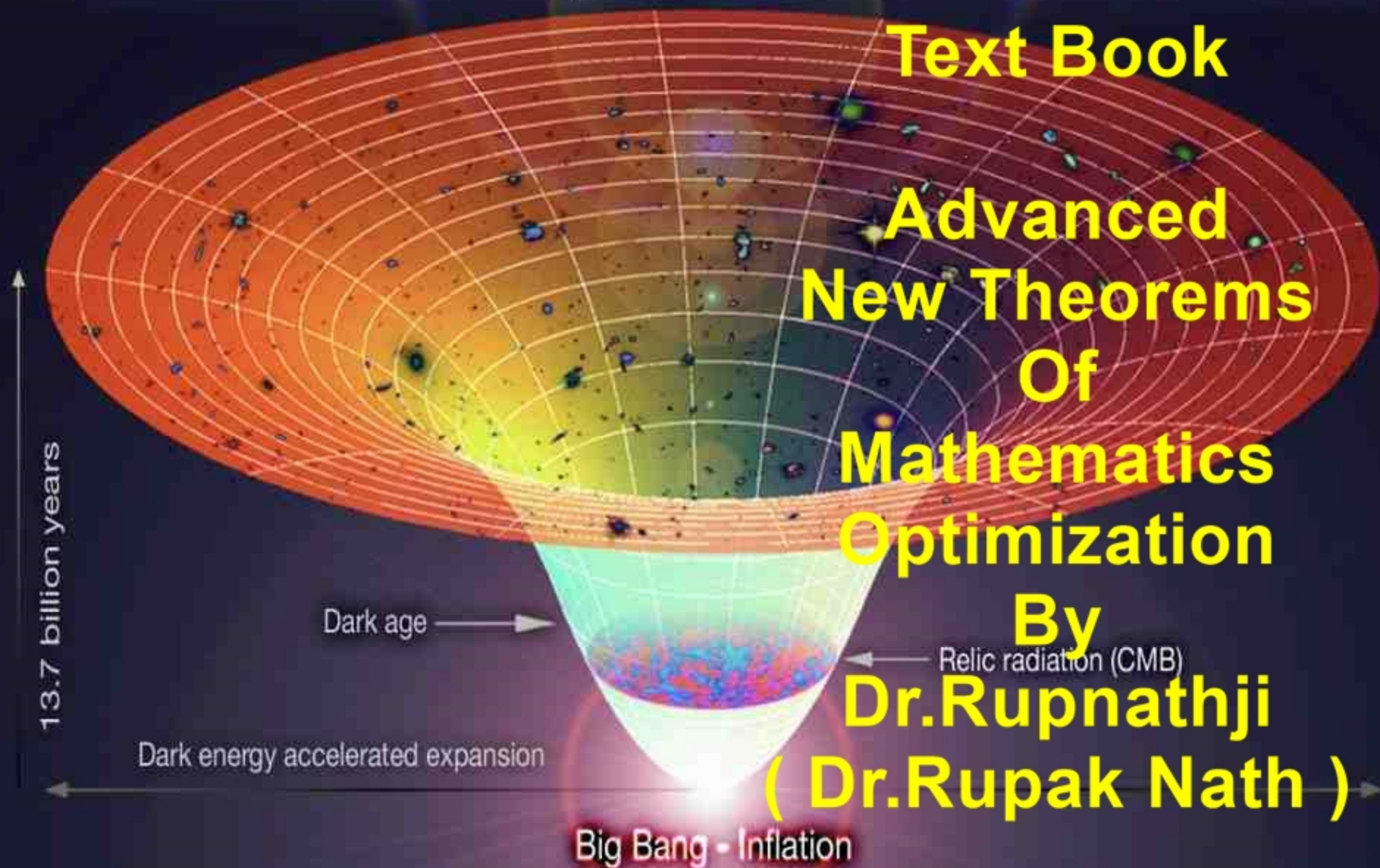
Accelerated Expansion of the Universe

Text Book

**Advanced
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Of
Mathematics
Optimization**

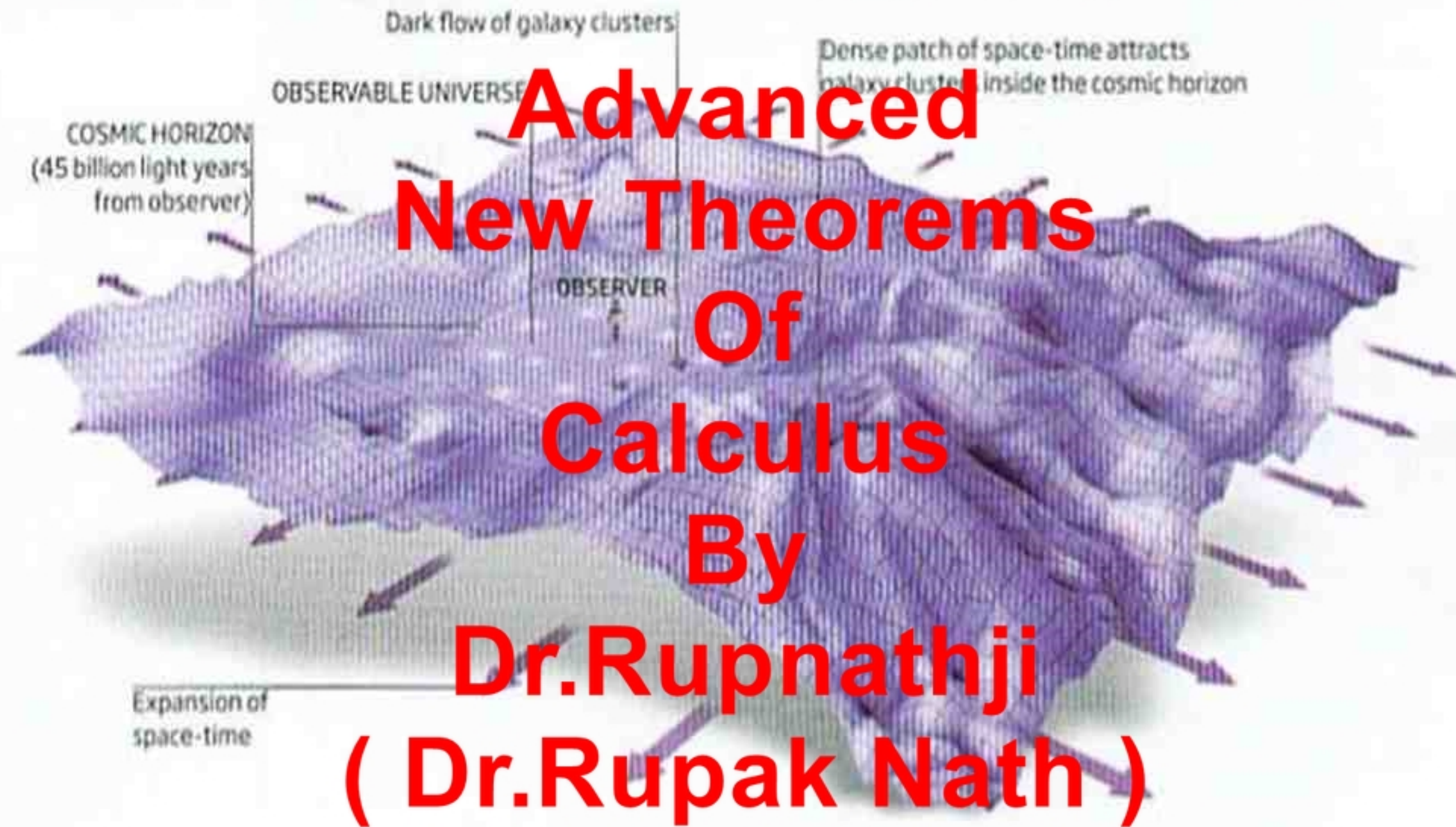
By

**Dr. Rupnathji
(Dr. Rupak Nath)**



Edge of the universe

The "dark flow" of wayward galaxy clusters that appear to be pulled in one direction could give us our first hint of something beyond the cosmic horizon, which normally marks the limit of the observable universe









The Human Body Vs the Universe

All the energies in the human body are a true incarnation of the energies working in the universe i.e. whatsoever we see in this universe at macrocosm level is present in the human body at microcosm level and performs the same functions

Advanced New Theorems Of Statistics

By
Dr. Rupnathji
(Dr. Rupak Nath)

Energies at Microcosm Level i.e. Human Body	Functions	Energies at Macrocosm Level i.e. Universe	Functions
Vata (Kinetic Energy) 	Movements	Wind (Wind Energy) 	Motion
Pitta (Thermal Energy) 	Heat Regulation	Sun (Solar Energy) 	Temperature control
Kapha (Potential Energy) 	Strength	Moon (Lunar Energy) 	Nutrition

THE HISTORY AND FATE OF THE UNIVERSE

Four eras and eight major stages in the evolution of the universe

Text Book

Advanced New Theorems Of Mathematics

Fractals By Dr. Rupnathji

(Dr. Rupak Nath)

The Big Bang and Expanding Universe

Space is expanding from an initial moment called the Big Bang. As it expands, the universe becomes less dense and cools. All distant galaxies are moving apart from each other and away from us. On large scales, the universe looks the same in all directions and in all parts of space. There is no center. Our current understanding of the early universe is based on the Big Bang model. We are continuing to learn from astronomical observations and from particle-accelerator experiments.

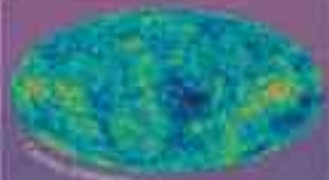
History of the Universe

Cosmology and Relics of History

Cosmology is the study of the universe as a whole. As an interdisciplinary scientific field, it draws on the tools of physics. We can look back in time by looking at light. Since light travels at a finite speed c , the time t we are looking back is $t = d/c$, where d is the distance. The laws of physics discovered on Earth are applied to the early universe with caution by observing relics.

A Hint from the Early Universe

The Cosmic Microwave Background (CMB) is a universal bath of lightness glowing from the hot, dense early universe. To one part in 100,000, the CMB is the same in every direction you look. The remaining tiny variations in the density of matter-energy (shown in Figure) are seeds that later form galaxies and larger cosmic structures.



This is an image of the universe from 400,000 years after the Big Bang. It is a map of the entire sky showing CMB light with the random pattern subtracted.

Age of the Universe

Studying the cosmic microwave background, the expansion of the universe, and the life cycles of stars leads to a reasonable agreement that the age of the universe is about 14 billion years (1.4×10^{10} years).

Four major eras in the expansion history:

Era 1 - Acceleration: Inflation Speeds Expansion

Observations seem to imply that the very early universe underwent an extremely rapid, accelerating expansion, called inflation, in a few fractions of a second. Inflation expanded each part of space by a factor of at least 10^{25} . Before inflation, the portion of the universe visible to us today was a smooth patch much smaller than a grain of sand. As inflation ended, the visible universe had grown (only approximately) to the size of a golf ball.

Era 2-3 - Deceleration: Expansion Slows and Structure Forms

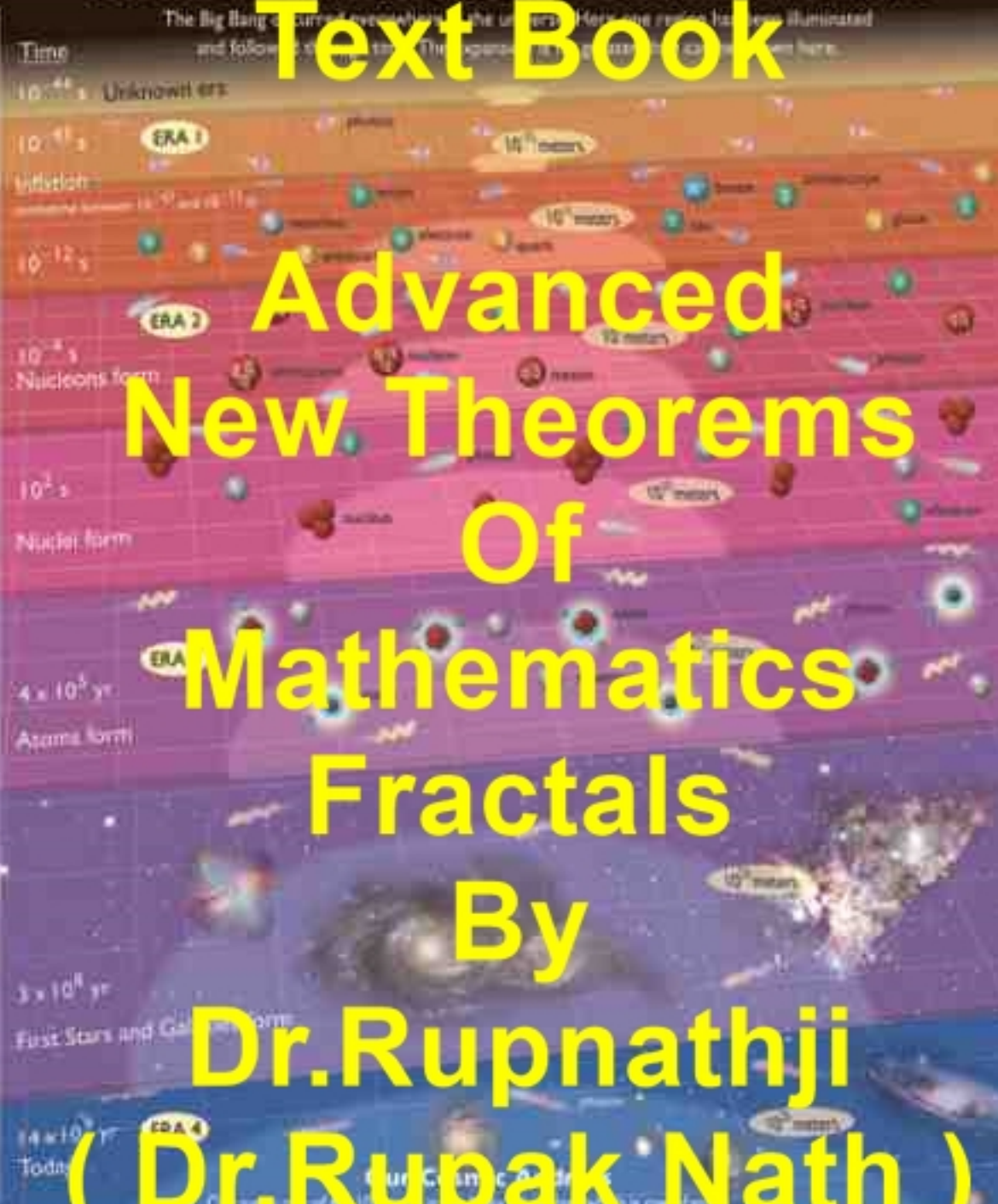
After inflation, the universe was a soup of fundamental particles called a quark-gluon plasma. Photons and free-moving particles, particularly called neutrinos, gradually lost energy (cooled) as the universe expanded. Eventually, slow-moving matter clumped together, over millions of years, to form stars and larger structures. Our first, larger and larger structures grew from gas clouds to clusters of galaxies to superclusters.

Clusters of matter clumped in the early universe and eventually formed galaxies and clusters of galaxies.



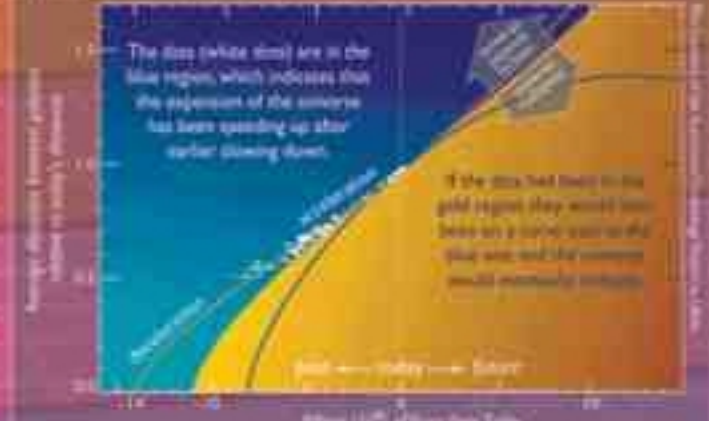
Era 4 - Acceleration: Dark Energy Speeds Expansion

Astronomers had assumed that the current universe is dominated by matter, which would cause deceleration and might even reverse the expansion. In 1999, when observations showed that the expansion of the universe is now accelerating, the "Accelerating Universe" paradigm was born. This implies the existence of a mysterious new form of energy, called dark energy.



The Accelerating Universe

By observing what astronomical objects, distant exploding stars called supernovae, cosmologists are digging ever further back into the history of the universe. The plot shows how (white dots) from distant supernovae. The orange curve, with its kink in the uppermost dot, shows the billions (10⁹) of years ago the maximum of the universe began to accelerate (the dot curve upward slightly). This acceleration is attributed to a new form of energy called "dark energy" that pulls space apart.



Before the supernovae research, physicists believed that the whole expansion history of the universe would be in the red region, where the expansion would be slowed by the attractive force of gravity. Now we see from the supernovae data that the expansion history lies in the blue region, where attractive and repulsive forces compete for dominance.

The Fate of the Universe

Whether the expansion of the universe will speed up, slow down, or even possibly reverse and collapse depends, according to gravitation theory, on the amount and types of matter and energy in it.

The ordinary matter - atoms and nuclei - that formed in the early universe can account for the visible mass in galaxies and clusters. But the amount of ordinary matter is a tiny fraction of the total mass needed to bind a galaxy or cluster together gravitationally, and explain its rotational motions. So an extraordinary type of matter, not made of atoms or nuclei, must exist. It is called dark matter because it is not directly visible.

Even stranger, recent observations of supernovae in distant galaxies show that the expansion of the universe is now accelerating. An exotic dark energy may be causing this acceleration through a cosmic repulsion that overweighs the pull of gravity. See the notes.



The nature of dark energy and dark matter are two of the great unsolved puzzles in cosmology and particle physics. Perhaps dark energy is the cosmological constant, introduced by Albert Einstein in 1917. Perhaps both are new forms of particle physics, tied to the very earliest moments of the universe and having to do with the nature of physics and spacetime itself.

Not all answers in science are known yet! High research and experiments under way in cosmology, particle physics, and nuclear physics, may be the first generation to learn what most of the universe is made of and what is the fate of the universe.

Learn more at UniverseAdventure.org and at CPEPweb.org



©2008 Cosmology Project. CPEP is a non-profit organization of scientists, educators, and students. See www.cpepweb.org. See also www.cpepweb.org. This chart has been made possible by the generous support of: U.S. Department of Energy, U.S. National Science Foundation, Lawrence Berkeley National Laboratory, SNAP-SuperNova/Acceleration Probe, CERCA-Cornell Western Reserve University, Physics department of NASA.

The whole
universe
is within us

Embrace
Transcend
Shine through

Text Book

**Advanced
New Theorems**

Of

Trigonometry

By

Dr.Rupnathji

(Dr.Rupak Nath)

A human silhouette is centered in the image, with seven glowing chakras (violet, indigo, light blue, green, yellow, orange, red) aligned vertically along its spine. The silhouette is surrounded by a complex, blue, grid-like energy field that forms a torus shape around it. The background is a dark, starry space with a faint blue glow.

Text Book

**Advanced
New Theorems
Of
UNIVERSE
Topology**

verse joined, song
godself sings one song
moment by moment
with infinite variations

all counts, one symphony
all vibrations, one
all beings, one actor

**By
Dr. Rupnathji
(Dr. Rupak Nath)**

Our eyes don't
see with god's eye
see with god's eye

...for young mathematicians

GENIUS

Vedic Mathematics

Vedic Maths

The Miracle of Mental Calculations

...for young mathematicians

Trigonometry

Can you multiply mentally in less than 5 seconds without pen and paper

By

9999999999 x 564524368 ?

And how much time does it take you to

Find the Cube root of

3463512697 ?

(Dr. Rupak Nath)

The multiplication answer is

564524367435475632

(Home Calculator doesn't show this answer)

One is only micrometers wide. The other is billions of light-years across. One shows neurons in a mouse brain. The other is a simulated image of the universe. Together they suggest the surprisingly similar patterns found in vastly different natural phenomena. *DAVID CONSTANTINE*

Brain Cells

Text Book

The Universe

Advanced New Theorems Of Geometry By

Dr. Rupnathji

(Dr. Rupak Nath)

Mark Miller, a doctoral student at Brandeis University, is researching how particular types of neurons in the brain are connected to one another. By staining thin slices of a mouse's brain, he can identify the connections visually. The image above shows three neuron cells on the left (two red and one yellow) and their connections.

An international group of astrophysicists used a computer simulation last year to recreate how the universe grew and evolved. The simulation image above is a snapshot of the present universe that features a large cluster of galaxies (bright yellow) surrounded by thousands of stars, galaxies and dark matter (web).

Virgo Connection

Sanskrit Sloka or Sutra

Meaning

एकाधिकेन पूर्वोत्तरेण

By One more than the one before.

निखिलं नवतश्चरम् दशतः

All from 9 and the last from 10.

ऊर्ध्वतिर्यग्भ्यामं

Vertically and Cross-wise

परावर्त्य योजयेत्

Transpose and Apply

शून्यं साम्यसमुच्चये

If the Samuccaya is the Same it is Zero

आनुरूप्ये शून्यं अन्यत्

If One is in Ratio the Other is Zero

संकलन व्यवकलनभ्याम्

By Addition and by Subtraction

पूरणापूरणाभ्यां

By the Completion or Non-Completion

चलनकलनाभ्याम्

Differential Calculus

यावद्दूनं

By the Deficiency

व्यष्टिसमष्टिः

Specific and General

शेषाण्यङ्केन परमेष्ठेन

The Remainder by the Last Digit

सोपान्त्यदयमन्त्यं

The Ultimate and Twice the Penultimate

एवन्नेनेन पूर्वोत्तरेण

By One Less than the one Before

गुणितसमुच्चयः

The Product of the Sums

गुणकसमुच्चयः

All the Multipliers

Text Book

Topology

By

Dr. Rupnathji

(Dr. Rupak Nath)