

IAVM

**2nd International
Vedic Mathematics
Conference
Programme**

Department of Sanskrit
St Stephen's College, Delhi

27th - 29th December 2017



Institute for the Advancement of Vedic Mathematics

in collaboration with

Department of Sanskrit, St Stephen's College

University of Delhi

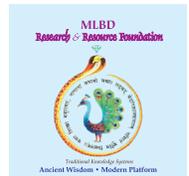
Presents

2nd International Vedic Mathematics Conference

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Introduction

The organisers would like to extend a very warm welcome to all delegates at this 2nd International Vedic Mathematics Conference. With many of the world's foremost authorities on Vedic Maths, together with enthusiasts, educationalists, teachers, parents and children, this conference promises to be a truly fascinating and inspiring event. We hope you will enjoy the presentations, activities and discussions on offer and that you find them valuable and rewarding.

There has been an ongoing groundswell of interest in, and development of, Vedic Mathematics based on the sutras propounded by Sankaracarya Sri Bharati Krishna Tirtha. This Vedic Maths is profound, unifying, flexible, fast and fun. Education departments across India are seeking to find how the system can be integrated into the curriculum and those gathering here have the opportunity to participate in this far-reaching approach to mathematics.

We would like to thank Tata Trusts for its generous allocation of funds for sponsoring the conference. This was brought about through the determined efforts and help of Shruti Dutta. We are indebted to her wonderful support.

We extend our thanks to the Sanskrit Department of St Stephen's College for hosting the event. In particular we wish to thank Dr Pankaj Mishra for his vision and implementation in enabling the conference to be held at the college. He has worked tirelessly in arranging and managing all the required logistics.

We would also like to thank Kuldeep Singh, founder of Mind Mantras, for his determined and undinting support in promoting the conference and for managing the logistics of published material. Without his sustained contribution this conference would not take place.

Sita Giri, of Rubrix Educational Foundation, has also provided extremely significant support, particularly in securing sponsorship from Tata Trusts. We are greatly indebted to her assistance and help.

Our thanks also go to Rajendra Jain, of MLBD Research and Resource Foundation, for assistance in networking and promotion.

Thanks also go to the presenters who have worked hard to produce papers and presentations on their latest researches and projects. Several have come from overseas, including from the UK, USA, Nepal and South Africa. Many have also come from distant parts of India such as Bangalore, Nagpur, Kerala and Chandigar. More than 20 original research papers will be presented at the conference and themed along the lines of Mathematics based on the sutras, Vedic Maths in Education and History of Maths in India. There will also be workshops for teachers, children and parents.

We would also like to thank Naveen Bhargava, Marianne Fletcher, P.Devaraj, Jayanthi Saravanan, Prabhu Muthuslevi, Usha Sundhar and Kenneth Williams for running the workshops.

Finally, we must also thank you, the delegates, for your enthusiasm and participation. We sincerely hope that you will find the presentations and workshops interesting and enjoyable.

Swati Dave
Conference Director

James Glover
Chair IAVM



Welcome!

नमस्ते

Congratulations to the Department of Sanskrit at St Stephen's College and the Institute for the Advancement of Vedic Mathematics who have worked hard, behind the scenes, to make this Second International Vedic Mathematics Conference a reality. I am very happy to write this short note and, as host of the Conference, I welcome each and every delegate to this occasion for exchange and advancement of knowledge.

Humility is the best road to wisdom. Educational institutions should particularly be aware that there are several roads to gain knowledge. Alternate sources and streams of knowledge, once despised and looked down upon, are now established schools of education. Several examples of this are available in the fields of medicine, social and pure sciences, not to forget the Arts and Literature. It is only through the sharing of ideas and by being receptive to other streams of knowledge that we can, together, push the boundaries of human empowerment.

I wish all delegates a fruitful and beneficial time of sharing of ideas and am happy to welcome, once again, all the delegates to St Stephen's College.

Professor John Varghese
Principal, St Stephen's College
University of Delhi

December, 2017



About Vedic Mathematics

Shankaracarya Sri Bharati Krishna Tirtha, established sixteen sutras and a similar number of sub-sutras which, he claimed, govern and are applicable to, every aspect of mathematics. He also described several fast and easy methods for calculations and algebraic manipulations leading to the solutions of equations. His book, Vedic Mathematics, was published posthumously in 1965. It is an illustrative volume.

Since then there has been a significant amount of research into the applications and extensions of the mathematics he set out. There are four aspects worthy of mention. The first, and perhaps the most important, is that the approach highlights one's personal experience of mathematical thinking. This is because the sutras succinctly describe the natural mental processes that take place when working through any given problem. It is a common feature of the human intellect to find the path of least action. Vedic mathematics provides an orientation that aspires to this. It shows that mathematical problems can usually be solved in many different ways. The art of the solver is to find the easiest or most satisfying path. Fast methods of calculation and algebraic manipulation form only one part of Vedic mathematics. A more meaningful quality is that the sutras provide a substratum for mathematical thinking that unify diverse topics. This is achieved by seeing the same thought pattern or mental process again and again in apparently different areas of the subject.

The second is that the system of Vedic mathematics leads to new ways of learning and developing mathematics. Examples can be seen in Kenneth William's developments in Pythagorean triples, Trigonometry and in his approach to Calculus, in James Glover's work on Coordinate Geometry and Binomial expansions and in Marianne Fletcher's research in finding prime numbers by applying Vedic maths techniques to binary arithmetic. Related to this is the third aspect where "least action" methods are applied to dealing with practical problems such as in engineering. For example, several papers at this conference show how Vedic maths techniques are applied in speeding up computer processing.

The fourth aspect is the development in education. Research shows that using Vedic mathematics in education improves exam results, deepens the understanding of mathematical relationships and provides greater enjoyment of the subject.

It should be pointed out that the name 'Vedic' was explained by the Shankaracarya in the preface of his book as well as in his lectures. He explained that the Vedas are ancient texts that aspire to contain all necessary knowledge, both spiritual and practical. He went on to describe the derivational meaning of "Veda" as knowledge resulting from reasonings or based on "true-realisation by means of actual visualisation". In this sense it follows that Veda is not limited to ancient texts. The Shankaracarya's epithet on this is, "Whatever is consistent with right reasoning should be accepted, even though it comes from a boy or even from a parrot; and whatever is inconsistent therewith ought to be rejected, although emanating from an old man or even from the great sage Sri Shuka himself".

He goes on to say, "we are called upon to enter on such a quest by divesting our minds of all preconceived notions, keeping our minds ever open and, in all humility, welcoming the light of knowledge from whatever direction it may be forthcoming."

PROGRAMME
DAY 1 27th Dec

10.00 - 11.00

Inauguration

Vedic Chanting	Students of St Stephen's College
Introduction	Swati Dave - IAVM
Speech	Principal - St Stephen's College
Speech	James Glover - IAVM
Speech	Chief Guest

11.00 - 11.30

Refreshments

11.30 - 13.00

Papers

Implementing Vedic Maths into the Binary Number System	Kuldeep Singh
Squaring Devices used to Demonstrate Versatility of the Sutras	James Glover
Vedic Maths – A Merit in management of competitive Examinations	Shastri, Hankey

13.00 - 14.00

Lunch

14.00 - 15.30

Papers

Solution of Right-Angled Triangles using Vertically and Crosswise	Kenneth Williams
A Prime Number Investigation using Binary Strings Generated by using the Ekadhikena Sutra	Marianne Fletcher
Ethnomathematics – An effective pedagogical tool to enrich math teaching	Swati Dave

15.30 - 16.00

Tea Break

16.00 - 17.00

Papers

Calculating Compound Interest Mentally	Kuldeep Singh
Finding Cube Roots: Nepali and Vedic Method	Jayanta Acharya
Origin of 360 degrees	P. Devaraj

PROGRAMME

DAY 2 28th Dec

Presentations will run in parallel with Teacher Workshops

09.00 - 09.20

Introduction

09.30 - 11.00

Papers

Vedic Mathematics methods to Reduce Math Anxiety – A Randomized Control Trial

Shastri, Hankey, Sharma, Patra

Square Roots in Mathematics

Krishna Kanta Parajuli

A Fuzzy Model for Analysing Vedic Mathematics

Ravi K M, R.G.Shivakumar

11.00 - 11.30

Refreshments

11.30 - 13.00

Papers

Innovative Method of Multiplication (Advancement of Ekadhikena Purvena Sutra)

Shashikant.G. Chitnis

The Third Diagonal

Prof.A.Vyawahare, G.Ghormade

A Comparative Study on Teachers' Consciousness Towards Vedic Mathematics in District Mohali and Barnala (Punjab)

Sukhwinder Kaur, Pooja Rani

13.00 - 14.00

Lunch

14.00 - 15.30

Papers

Comparative study of adders used in designing High speed Vedic Multipliers for VLSI applications

Dr Raghavendra Prasad

Optimization of Total Reversible Logic Implementation Cost using Vedic mathematics

Dr S Praveen

Indispensability of Numbers and Numerals of Indian Intellectual Traditions and their Scientific Role

Dr Daya Shankar Tiwary

15.30 - 16.00

Tea Break

16.00 - 17.00

Papers

Comparing Conventional Iterative Methods to the Vedic Method of Determining Roots of Cubic and Quartic Equations

Rick Blum

Vedic Maths methods on Cognitive skills - RCT

Dr Bhawna Sharma

Design and implementation of 64-bit Vedic Multiplier for DSP Application

AP Chavan, Divya H, A.Prathibha

TEACHER WORKSHOPS

DAY 2 - 28th December

09.00 - 09.30	Introduction	Swati Dave
09.30 - 10.00	What is Vedic Mathematics	James Glover
	Primary	Secondary
10.00 - 10.45	All from 9 and - the last from 10 Application to money problems	Multiplication near base numbers
10.45 - 11.30	Doubling, Halving, Using Proportionately	Fast Calculations

11.30 - 12.00 Refreshments

	Primary	Secondary
12.00 - 13.00	Numbers in Nature	Introducing Calculus - A New Approach

13.00 - 14.00 Lunch

	Primary	Secondary
14.00 - 14.45	Fast Calculations	Coordinate Geometry
14.45 - 15.30	Vinculums	Rationals Rock!

15.30 - 16.00 Tea Break

	Primary	Secondary
16.00 - 17.00	Vertically and Crosswise Multiplication	Vinculums

STUDENTS WORKSHOPS
DAY 3 - 29th December

09.00 - 09.30	Introduction	Swati Dave
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09.30 - 10.00	What is Vedic Mathematics	James Glover
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Primary

Secondary

10.00 - 11.00	Easy Subtraction	
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	Multiplication near base numbers	
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11.00 - 11.30	Doubling, Halving, Using Proportionately	
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	Fast Calculations	
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11.30 - 12.00	Refreshments	
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Primary

Secondary

12.00 - 13.00	Numbers in Nature	
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	An Introduction to Calculus	
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13.00 - 14.00	Lunch	
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Primary

Secondary

14.00 - 14.45	Fast Calculations	
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	Using VM in Competitive Exams	
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14.45 - 15.30	Vinculums	
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	Rationals Rock!	
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15.30 - 16.00	Tea Break	
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Primary

Secondary

16.00 - 17.00	Multiplication of Two-Digit Numbers	
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	Vinculums	
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16.00 - 17.00	<p style="color: red; margin: 0;">Special Workshop for University Students</p> <p style="margin: 0;">Identification of Prime Numbers using the Ekadhikena Sutra</p> <p style="margin: 0;">Conducted by Marianne Fletcher</p>	
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Papers

IMPLEMENTING VEDIC MATHS INTO THE BINARY NUMBER SYSTEM

Kuldeep Singh

Abstract

We will understand the benefits of implementing Vedic Maths into the Binary System. In today's digital life binary number calculations are present in almost every electronic device we use. By applying the methods of Vedic Maths we can reach much faster processing speeds. This paper explores various Vedic calculating procedures as applied to base-2 arithmetic.

CALCULATING COMPOUND INTEREST MENTALLY

Kuldeep Singh

Abstract

Calculating compound interest is a topic which takes much time to compute, especially if we need to find the amount for multiple years. Conventional methods require paper and pen to achieve complex calculations, but, using a Vedic method, we can calculate compound interest mentally very easily. We will explore the method and the logic behind it.

Founder – Mind Mantras, New Delhi, India

Teaching Vedic Maths since 2008. Started Mind Mantras in 2007

Trained more than 6000 students and more than 150 teachers.

Working on two books on Vedic Maths. one is on “Tables up to 99 in 2 hrs” and other one is on mental maths using “Vilokanam” (Mere Observation)”.



VEDIC MATHS DEVICES FOR SQUARING

James Glover

Abstract

Not only does each of the Vedic Maths sutras have multifarious applications but also many individual processes have various techniques, each governed by a different sutra. This is a hallmark of the incredible flexibility of the system. This paper explores various methods of squaring using as many of the sixteen sutras as possible. There are two approaches to this investigation. The first is to see how the Vedic methods are applied to squaring and the second is to take existing methods and see which sutras apply. The result is a wide range of techniques, some of which are universal whilst others depend on particular circumstances and produce special-case formulae. This paper also discusses the benefits of multi-approach solutions to problems.

Founder and Chair, Institute for the Advancement of Vedic Mathematics (IAVM).

James has researched and taught VM for over 35 years and has led international teacher-training programmes, public courses and lectures on the subject. He has written five books and has published numerous papers and articles promoting the Vedic system. He has a long experience of curriculum design for Maths in schools.



VEDIC MATHS - A MERIT IN MANAGEMENT OF COMPETITIVE EXAMINATIONS

Vasanth Shastri, Prof. Alex Hankey

Abstract

Stepping into the prestigious colleges which offer applied science courses after the training in 10+2 education system is a dream of many students in India. Students aiming at Banking, Engineering, Business, Management programs, Administration, Hotel Management, Military, Railways, and Police etc. write different competitive entrance Examinations. Quantitative Aptitude and skills in basic high school Mathematics play a major role in such a time bounded pressurized situations. Arriving at the right answers in limited time is crucial to achieve higher ranks in any of the entrance exams to the above mentioned careers or courses. Vedic maths methods can be a tool for a student to manage time in such a scenario. Basic mathematical operations, squaring, cubing and some fundamental eliminations techniques in calculus, coordinate Geometry and Algebra etc. appear in life deciding competitive exams. Illustrative examples from the different examinations and courses are taken here to compare Vedic Maths and existing conventional mathematics methods. How can Vedic Maths be a possible tool in deciding ones dreams and careers, is discussed. The links between Vedic Maths and an effective management of Entrance Exams are established. Thus pattern finding skills taught by Vedic Maths methods can be a potential teaching aid to nourish the numerical mental ability and other skills in every student who is aspiring for high percentile in competitive Examinations.



Vasant V Shastri is pursuing his PhD in Yoga from S-VYASA University, Bengaluru, India. His topic of interest for his PhD is 'Evaluation of Vedic Mathematics and Yogic Breathing Module in the management of Mathematics anxiety and cognitive Skills in School Children'. He completed his Master degree in Mathematical Sciences, from Bangalore University in year 2006. He has three research publications on Vedic Mathematics. He is Head of Mathematics Department Sri Sai Angels Pre University College Chikkamagaluru, Karnataka.



Professor Hankey is distinguished Professor of Yoga and Physical Science, SVYASA, Bangalore, India. He has lectured extensively on the relationship between Vedic Science and Modern Science in the USA & UK, Western Europe, India, Eastern Europe and S.E. Asia. Over 90 research articles, including 2 Physics Review letters, 2 Physics letters, 7 Physics Review articles and numerous articles in Complementary Medicine Journals.

SOLUTION OF RIGHT-ANGLED TRIANGLES USING VERTICALLY AND CROSSWISE

Kenneth Williams

Abstract

This paper shows how the Vertically and Crosswise Sutra of Vedic Mathematics¹ can be used to approximate sides and angles (in degree measure) of right-angled triangles without resorting to a calculator, tables etc.

Knowing just one triangle, with sides 3, 4, and 5 units (and angles 37° , 53° and 90° , to the nearest degree), and knowing how to handle triangles with a small angle, we can estimate sides and angles of any other triangle. And knowing more such 'Pythagorean Triples' like 3,4,5 we can improve accuracy as far as required.



Kenneth Williams is a qualified and experienced maths teacher who has been studying, researching and teaching Vedic Mathematics since 1971, founded the Vedic Mathematics Academy in 1998, published several articles, written several books, created DVDs, and has been invited to many countries to give seminars and courses. He gives online courses, including teacher training. Research includes developing Tirthaji's material, left-to-right calculating, Astronomy, applications of Triples, extension of Tirthaji's 'Crowning Gem', Calculus.

A PRIME NUMBER INVESTIGATION USING BINARY STRINGS GENERATED BY USING THE EKADHIKENA SUTRA

Marianne Fletcher

Abstract

The Ekadhikena Purvena Sutra can be employed to calculate the number of digits before recurrence in the perfectly recurring decimal string for a rational number $1/N$ - where N ends on the digits 1,3, 7 or 9. The number of digits x in one recurring cycle of the string can consequently be used to determine the primality of N . This test is an application of Fermat's Little Theorem.

In his book, "Vedic Mathematics" Sri Tirthaji gives examples of the working of the Ekadhikena Purvena sutra in base 10, with the result that decimal strings are calculated. This paper discusses the results obtained when the Ekadhikena Purvena sutra is applied to binary numbers (i.e. base 2), with the resultant generation of a recurring binary string for each $1/N$. It was found that, when the computation is done in binary, a typical home computer can generate all the digits in the cyclic string related to $1/N$ at a rate several orders of magnitude higher than when the sutra is applied to decimal numbers. Such an application of this Vedic mathematical sutra thus hugely increases the speed at which the number N can be confirmed prime or not.

Keywords: Vedic Mathematics, Ekadhikena Purvena Sutra, Binary Strings, Prime Number, Increased Speed.



Marianne Fletcher has taught mathematics, physics and chemistry at both high school and tertiary level for over 30 years. She obtained her master's degree in physics at the University of Pretoria in South Africa. She helped start two new schools, and has presented many mathematics and chemistry workshops throughout South Africa, for the Science Unlimited programme. She has done presentations at various science festivals and teacher's workshops, and has published one book called "the Mole Whole". Marianne has had an interest in Vedic mathematics for many years, and has recently written several papers on the subject.

ETHNOMATHEMATICS - AN EFFECTIVE PEDAGOGICAL TOOL TO ENRICH MATH TEACHING

Swati Dave

Abstract

Ethnomathematics, the term first introduced by the Brazilian educator and mathematician Ubiratan D'Ambrosio, is used to express the relationship between culture and mathematics. The underlying principle of ethnomathematics is recognizing that different modes of thoughts may lead to different forms of mathematics. Ethnomathematics can be used as an effective teaching tool by teachers not only to enhance the mathematical understandings of students but also to reconstruct the relationship between culture and mathematics. The possibility for alternatives allows students to appreciate mathematical ideas from different cultures across different time periods and gives them a better perspective of the historical and scientific evolution of mathematics. Ethnomathematics encourages students to learn to appreciate the achievements of their own and other cultures.



Educator and Founder, The Institute for the Advancement of Vedic Mathematics (IAVM) (USA)

Swati is an Educator and a Project Management consultant with over 25 years of experience in the fields of education, teaching/training, and project management. She has over 5 years of experience in conducting Vedic Maths workshops for students, teachers, and enthusiasts in Boston (USA), and in India.

DESIGN AND IMPLEMENTATION OF 64-BIT VEDIC MULTIPLIER FOR DSP APPLICATION

Arunkumar P Chavan, Divya H, A Prathibha

Abstract

Multiplication is a very important operation in many DSP applications. This paper states the implementation of high-speed 64 x 64 bit Vedic multiplier using the Urdhva-Tiryagbhyam sutra and Karatsuba sutra multiplication algorithm. The basic building block of multiplier is Adder, most of the DSP applications demands for faster adder for arithmetic computation. Multipliers are designed using different adders as Carry select adders, Carry save adders, and Manchester adders. The paper compares performance of 64 x 64 bit Vedic multiplier (Urdhva-Tiryagbhyam sutra and Karatsuba sutra) using three different adders carry select adder, carry save adder and Manchester adder. The proposed algorithm is developed using verilog HDL. Implementation has been done using Xilinx14.6, Spartan6 FPGA.



Arunkumar P Chavan has authored more than 16 Papers in various domains of Analog VLSI and Digital VLSI. With a vision to continuously enhance technical and teaching skills, he is extremely interested in research with an extra interest in low power VLSI, Analog VLSI, Digital VLSI and applications of Vedic Mathematics in DSP Applications.

FINDING CUBE ROOTS: NEPALI AND VEDIC METHODS

Jayanta Acharya

Abstract

Bhaskaracharya is an Indian Mathematician. He claims that squares, square roots, cubes and cube roots cannot be found by using unitary method. But in Bakyaktachandrika, which is the first printed mathematics book in Nepal, the writer of the book, Gopal Padey (1847-1920), has given a new method of finding the cube root of numbers by using unitary method. He has given many examples. For children, finding a cube root is difficult but if there are some methods or formula for it they can solve the problems in less time. There is a sutra Vilokanam in Vedic Mathematics for finding cube root of numbers. In my paper, I want to compare two method by giving examples.

Keywords: Cube root, Bakyaktachandrika, Vedic Mathematics, Unitary method.



Associate Professor, Nepal Sanskrit University, Kathmandu, Nepal

Dr. Jayant Acharya is a teacher course in ancient mathematics at the University. He has been teaching and practising Vedic Mathematics in Nepal since 1990. Dr. Acharya got the Vedic Mathematics education from his father Professor Sambaraj Acharya. He is a recipient of University Chancellor gold medal, Mahendra Vidya Bhushan-Kha, Lilaballav Panta Gold medal, Maharshi Kashyap Gold medal and Ambikalok Puraskar.

THE ORIGIN OF DIVIDING A CIRCLE INTO 360 PARTS

P.Devaraj

Abstract

Circle is a fundamental geometrical shape and commonly seen in Nature. Naturally, the angular division of a circle into 360 degrees is also important and forms the basis of angular measurement. The history of the 360 degree division is so ancient that it is difficult to discover the real origin. This paper seeks to uncover some of the ancient references. It is possible that 360 relates to the Sun's circuit, when observed from Earth. In this study we explore various measurements and systems used by ancient civilizations to calculate the time taken by sun to complete its circuit – the year. In the Rig veda - the oldest Vedic text, there are clear references (1.164.48) to a chakra or wheel of 360 spokes placed in the sky. "Twelve are its fellies. The wheel is one. It has three naves. Who has understood it?" It is these hymns, of the great Rishi Dirghatamas, that clearly show the ancient Indians dividing the year into twelve rasis (months), consisting of 30 days each, forming the 360 days - the number of spokes in this chakra (Wheel). Dirghatamas also prepared a table for dividing these 360 parts further into small parts known as talpara, vikala (second), kala (minute), bhaga(degree) and more.

Key words: Circle, Degrees, Rig Veda, Dirghatamas.



P.Devaraj is a certified Vedic Maths Trainer of Ramanujasarani. He was trained by IISER-(Indian Institute of Science Education and Research), Pune, in Science communication. He studies and promotes ancient Indian mathematics.

Devaraj regularly publishes article in journals and periodicals. He conduct regular training programs for School/college students to nurture maths talent and develop quantitative aptitude. He also conducts Teachers workshops on how to make maths class more joyful.

VEDIC MATHEMATICS METHODS ON MATH ANXIETY - RTC

Vasanth V Shastri, Prof.Alex Hankey, Dr Bhawna Sharma

Abstract

High School students lose interest in mathematics because of laborious simplification methods. They develop anxiety and try to avoid maths related courses in higher studies. Such anxiety caused by Mathematics can be measured using the Mathematics Anxiety Rating Scale Revised. The root cause for Math anxiety lies in teaching methodology. Poor presentation of numerical calculations, generalized algebraic expressions and their simplification methods irritate children. They are exposed to theoretical mathematics for the first time in school through Arithmetic and then slowly learn Geometry, Algebra, and Coordinate Geometry etc. Accuracy in arriving at the final answer is crucial for students facing time-bounded entrance examinations for various technological courses. Stress and anxiety developed in the process of maths learning and teaching due to poor maths performance may lead to serious student behavioral problems. Creating interest in basic mathematics is now, as always, the need of the time. Patterns of mental activity demonstrated in Vedic Mathematics methods both address the issue of Math Anxiety and effectively reduce it. The study conducted at Chikkamagaluru, India, reported here, included 170 students randomly assigned to three groups given 15 days workshops on Vedic Mathematics, Yoga Pranayama and Conventional Mathematics, respectively. MARS-R results before and after the workshops were analyzed using SPSS-19. Significant improvements in the Vedic Maths group ($p < 0.01$) compared to other two groups show that maths taught in this way can reduce Math Anxiety in school children. Thus VM methods can be an effective teaching aid to manage Math Anxiety showing new insight.

SQUARE ROOTS IN VEDIC MATHEMATICS

Krishna Kanta Parajuli

Abstract

This paper specially concentrates only to find the square roots of perfect square numbers as well as imperfect by the Vedic sutra Vilokanam - By Observation . Generally, extracting the square root of a number is considered a tedious job. There are two methods taught in our present-day classroom by conventional approach to find square roots, which are lengthy and time consuming. But, the Vedic Sutra Vilokanam helps us to find square root of such numbers with a little practice. The technique mentioned for extracting square root for imperfect square numbers does not belong solely to Vedic Mathematics written by Swami Bharati Krishna Tirthaji Maharaja. Mathematicians have been using it as a part of their general practice. Wherever, the technique for calculating square roots are described in Vedic Mathematics is difficult. Though, the methods discussed, and organisation of the content of the paper here are intended to show the Vedic Mathematics is extremely refined and efficient mathematical system by comparison with the conventional system.



Krishna Kanta Parajuli is an Associate Professor of Mathematics in Nepal Sanskrit University(NSU), Nepal. He has been teaching various Mathematical subjects at Bachelor level under NSU for about 20 years. He received his MA(Mathematics) from Tribhuvan University in Nepal. He has published several research papers related to Vedic Mathematics founded by Bharati Krishna Tirthaji in reputed national journals. He is the author of the books entitled Business Mathematics, Basic Mathematics, Business Statistics for Bachelor level under the curriculum of TU. Now, he is a Research Scholar of the topics related to Vedic Mathematics under the research center of NSU.

A FUZZY MODEL FOR ANALYSING VEDIC MATHEMATICS

Ravi K M, Raghavendra Prasad S G, Shivakumar N

Abstract

The Vedas are considered divine in origin and are assumed to be revelation from God. The argument that Vedas means all knowledge and hence the fallacy of claiming even 20th century inventions to belong to the Vedas clearly reveals that there is a hidden agenda in presenting such a relic upon a subject of such a recent origin. The analysis of its mathematical content and hidden motives are of high interest. This paper presents a systematic analysis in this regard by using fuzzy models like fuzzy cognitive maps, fuzzy relational maps (even by using newly constructed fuzzy dynamical system as that can be analyze multi-experts opinion at a time using a single model). The issue of Vedic mathematics involves religious politics, caste supremacy, apart from elementary arithmetic. So we cannot use simple statistics for this analysis. In this work, a linguistic questionnaire was used for data collection; experts filled in these questionnaires: these aided for constructing fuzzy model to analyse the problem of handling opinion of multi-experts. Finally, observations from the study have been given.



Ravi K M is an Assistant Professor at the Department of Mathematics, R V college of Engineering, Bangalore. He has 14 years of teaching and 11 years of research experience, published several articles in reputed journals. He has been invited for giving special lectures on applications of Mathematics in Engineering at many Engineering colleges. His research includes fuzzy automata, pattern recognition, extensions of fuzzy automata, vedic mathematics and fuzzy graph theory.

INNOVATIVE METHOD OF MULTIPLICATION

(Advancement of Ekadhiken Purven Sutra)

S.G. Chitnis

Abstract

The general method for multiplication in Vedic Mathematics is the Urdhva Tiryagbhyam sutra. A special method for multiplication is the Nikhilam Navatsacharamam Dasath sutra which deals with base and sub-base of numbers. The next super special methods of multiplication are the Nikhilam corollary Ekadhikena Purvena and the sub-corollary Antyayora Dasakepi. These two corollaries are used as special methods when two numbers to be multiplied have digits sum at unit place as ten and a common digit in the tens place. This is the minimum condition required for multiplication of these special methods.

Now the question is can we use this super special methodology to multiply any two numbers which do not follow the conditions? The answer to this question is YES.

The aim of this paper is to transform the methodology of these special sutras and subsutras into a general method, thus making special methods as a part of modern mathematics teaching without any specific conditions. This innovative method of multiplication will help mathematics learners think differently and help them to explore and expand the range of applications.



Shashikant Chitnis is a retired teacher of Physics and Mathematics for high school students. For last ten years, he is practicing Vedic mathematics and conducting workshops in schools and universities in Indore. He is also a trainer for certificate course in Vedic Mathematics at Indore centre of Atal Bihari Hindi Vishwavidyalaya Bhopal.

THE THIRD DIAGONAL

Prof. Anant Vyavhare, Mrs Geeta Ghormade

Abstract

The concept of third diagonal of a cyclic quadrilateral was floated by an Indian mathematician, Narayan Pandit, in the 14 th century in his text Ganit Kaumudi - Full moon night of mathematics.

This paper is intends to explain the concept of third diagonal. Many properties of a cyclic quadrilateral can be proved easily using the concept of third diagonal. In addition, some new properties are also derived.



Anant is visiting professor for PG and PhD students in Nagpur University.

He has published 28 research papers in national and international conferences and has visited 5 foreign Universities as a visiting professor. He is presently working on popularising Vedic Mathematics and conducts certificate and diploma courses run jointly by Shiksha Sankruti Utthan Nyas and Kavi Kulguru Kalidas Sanskrit University.



Geeta Ghormade is Academic Head of Resource Center for Meghe Group of Schools, Atrey Layout. She has twenty years experience teaching mathematics from primary through to college level. In 2008 and 2009 she achieved three professional awards for teaching. She has published numerous papers and articles relating to mathematics, technology and teaching.

A COMPARATIVE STUDY ON TEACHERS CONSCIOUSNESS TOWARDS VEDIC

MATHEMATICS Sukhwinder Kaur, Pooja Rani

Abstract

Mathematics is considered to be a tricky subject that leaves a scary impression on the mind of children. Some children, who are good in mathematics, lag behind owing to their sluggish speed in calculations. Improvement of speed and confidence of students with mathematics can be improved with the help of Vedic mathematics. The system is a holistic mental approach. The methods can assist the students to perk up their calculations and speed. In the present scenario, Vedic mathematics is becoming popular among students but are our teachers aware of Vedic mathematics and its benefits? The present study aims to find out how aware mathematics teachers are in respect of Vedic mathematics and how far they are using it in normal classroom teaching. The researches interviewed 120 teachers from the District of Mohali and Barnala (Punjab) who were selected through purposive sampling technique.



Sukhwinder Kaur is a native of Chandigarh. She is a Research Scholar and currently pursuing her Ph.D from the Department of Community Education and Disability Studies, Panjab University, Chandigarh. She is JRF qualified in Education and UGC-NET qualified in Political Science. She has five years of teaching Experience.



Pooja Rani is a native of Barnala (Punjab). She is a Research Scholar and currently pursuing her Ph.D from the Department of Community Education and Disability Studies, Panjab University, Chandigarh. She is NET qualified in Education. She has three years of teaching Experience.

COMPARITIVE STUDY OF ADDERS USED IN DESIGNING HIGH SPEED VEDIC MULTI-PLIERS FOR VLSI APPLICATIONS

S G Raghavendra Prasad, Ravi K M, Yadunandan S G , Jitendranath Mungara

Abstract

Fast and low power consuming systems are the need of the current technology. Design and development of low power Microcontroller applications and Digital Signal Processors (DSP) which work at a very high speed is a challenging task. The speed of Digital Signal Processors is directly dependent on the speed of multiplier. In many real-time applications for achieving the required performance, maintaining higher throughput in arithmetic operations plays an important role. The performance of the multiplier depends on the adder used in logic circuits. Vedic Mathematics provides one of the fastest multiplier algorithms. This paper presents a comparative study of Vedic multiplier based on different adders.



Raghavendra Prasad is an Assistant Professor at the Dept. of Information Science and Engineering, R V College Of Engineering, Bangalore. He has authored over 15 technical papers in various domains of Computer Science and Mathematics. With a vision to continuously enhance technical and teaching skills, he is extremely interested in research with an extra interest in applications of Vedic Mathematics in Computer Science.

OPTIMIZATION OF TOTAL REVERSIBLE LOGIC IMPLEMENTATION COST USING VEDIC MATHEMATICS

S. Praveen, Sunil Chavan, Vaishnavi Kumbarger, Anusha Mahale

Abstract

In every operation of Arithmetic Logic Unit (ALU), a bit lost is a piece of information lost which dissipates power. Recovery of this information is difficult. Reversible logic addresses recovery of bits lost by reconstructing the inputs from the gate outputs and reduces power dissipation. Theoretically, reversible logic consumes less power which has already been proven using Vedic mathematics. Multiplication in ALU has more computations and these consume more power. Area optimization in multipliers can be achieved by implementing a Vedic method, with reversible logic, and uses the Urdhva-Tiryagbhyam sutra which has a carry-save feature. This makes the system more efficient. This paper proposes to reduce total reversible logic implementation costs (TRLIC), including a number of gates, quantum cost, constant inputs and garbage output, using reversible logic circuits in existing designs like 2x2 Vedic multipliers and other combinational circuits by using the Urdhva-Tiryagbhyam sutra. This logic can be used in DSP computations, effective ALU designs and cryptographic algorithms.



Assistant Professor, Dept. of ECE., R.V. College of Engineering

INDISPENSIBILITY OF NUMBERS AND NUMERALS OF INDIAN INTELLECTUAL TRADITIONS AND THEIR SCIENTIFIC ROLE

Dr Daya Shankar Tiwari

Abstract

The Science of Mathematics with all its branches such as Arithmetic, Algebra, Geometry and Trigonometry etc. was so well developed in ancient India that modern scholars are increasingly interested in discovering the knowledge of ancient India with its unique distinction of combining the three concepts of the decimal system, place value and a computational zero (Śūnya). The first literary evidence of Mathematics is mentioned in the Vedas. We find clear description of numeral system, decimal system, place value and zero in the Vedas, Brāhmana Granthas and the magnum opus - the Rāmāyana and the Mahābhārata, Vedāṅgās, Śulbasutras, Aryabhatīyam, Līlāvātī, Bījaganitam, etc. In the Yajurveda (17.2), the powers of 10 from 10^0 to 10^{12} is listed. Taittirīya Samhitā (7.2.11-20) also mentions this list of numerals. we also find the series of Arithmetic Progressions and Geometric Progressions.

This research paper is aimed at determining the mathematical facts, with examples and proofs, from ancient Sanskrit texts as mentioned above with scientific approach.



Dr Daya Tiwari is an Associate Professor at the Department of Sanskrit, University of Delhi. He has prepared 5 volumes for NCERT, New Delhi, on Mathematics, Medical Science, Agricultural Science, Environmental Science and Architectural Science in Sanskrit Literature. His specializations are Poetics, Science and Mathematics. Dr Tiwari has presented 16 research papers at national and international conferences.

COMPARING CONVENTIONAL ITERATIVE METHODS TO THE VEDIC METHOD OF DETERMINING ROOTS OF CUBIC AND QUARTIC EQUATIONS

Richard Blum

Abstract

Determining the roots of polynomial equations is fundamental with iterative methods available to do the tedious calculations. These iterative methods include the Bisection Method, the Regula-Falsi Method, the Newton-Raphson Method, the Secant Method and Halley's Method to name a few. The purpose of this paper is to compare how effective these methods are when compared to the Vedic Method. This comparison will be made on the basis of the number of calculations necessary to produce real roots to 4 decimal places for both simple and more complicated Cubic and Quartic equations using the above stated methods and comparing these results to that of the Vedic approach.



Richard Blum is a Pension Actuary practising in the United States. For the last 30 years, Richard has been teaching Vedic Mathematics to various and diverse groups both nationally and internationally. Richard wrote a book entitled "Math is Not a Four Letter Word – An Introduction to the Study of Vedic Mathematics."

VEDIC MATHS METHODS ON COGNITIVE SKILLS - RCT

Dr Bhawna Sharma, Vasanth Shastri, Prof.Alex Hankey

Abstract

Working memory capacity is directly related to cognitive skills of the child. Healthy cognitive development is the deciding factor for the child's educational growth. Pattern recognition and its intelligent usage are the keys of Vedic Mathematical methods. This uniqueness may be a new possibility in the management of cognitive skills of the school-going child. The present study aims to find whether Vedic Mathematics can be a tool to enhance the cognitive skills of the student. A randomized control study was conducted at Sri Sai Angels PU College, Chikkamagaluru, India. Two classes, totaling 170 students studying in 12th Standard, were randomly assigned to two groups, a Vedic Mathematics group and a control group. The intervention took place over 15 days, with 30 minutes of daily instruction in Vedic Mathematics for first group consisting 80 students and 30 minutes ordinary class work for the control group, consisting 90 students. A cognitive assessment questionnaire was used to measure the cognitive ability of the child before and after the workshop. This 40-item instrument measures self-defeating and self-enhancing cognitions associated with test-anxiety. Exclusion criteria was a major psychological problem. Calculus, Coordinate Geometry, basics of Algebra, etc., were taught using Vedic Mathematics methods for the first group whereas the second followed conventional mathematics methods. Statistical analysis was done using SPSS software. It was a two-group pre-post control design. The experimental group improved on different subscales of the test, $p < .05$. The control group showed no improvements. The possible working memory enhancement could be the reason for improvement in the Vedic Mathematics group. The conclusion is that 11th and 12th Class cognitive skills greatly improved by introducing a Vedic Mathematics module as a teaching aid.



Bhawna Sharma completed her PhD in Yoga in 2014 from S-VYASA University, Bengaluru, India. Her topic for PhD was 'Understanding Type 2 Diabetes at the Pranamaya Kosa Level'. Her areas of research interest are subtle energy, yoga and education. She has six research papers in international and national journals, including 3 papers on Vedic Maths. Presently she is working as Lecturer in Biology at Sri Sai Angels Pre University College, Chikkamagaluru, Karnataka.



APPEAL

The Institute for the Advancement of Vedic Mathematics is a UK based charity established to promote, disseminate, research and support the system of Vedic Mathematics internationally. The trustees and members are among the world's leading authorities on Vedic Mathematics and have come together to offer services, host conferences and forums, and to take a lead on the integration of Vedic Mathematics into education through teacher training and the provision of resources.

We commenced our journey in early 2016 and we were conferred the status of registered charity in the UK. Recently, our main focus has been in organising the 2nd International Vedic Mathematics Conference at St Stephen's College, Delhi (27th – 29th December, 2017). However, as we look back from where we started, we see that we have achieved a great deal in a short span of two years.

We continue to expand our programs and offerings to the community.

Future roadmap:

1. Conduct Level I, II, and III (Bronze, Silver, and Gold) examinations for students
2. Create downloadable practice worksheets
3. Map the Conventional Math and Vedic Maths curriculum to identify gaps (if any)
4. Support and assist any individual, school or organization with resources and scholarship to teach or promote Vedic Maths
5. Create online resources
6. Continue with our series of free monthly webinars.
7. Conduct conferences on Vedic Mathematics

We hope that you will be able to volunteer to be a part in one or more of the above exciting initiatives and experience first-hand the pride we take in supporting the cause of Vedic Maths. If you are interested, please email us at instituteavm@gmail.com or fill out the form enclosed in your brochure.

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We thank you in advance for your support!

With kind regards, IAVM Team



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