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Vedic Mathematics and the Mathematics of Vedic Period – An Analysis and Application

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The Founder of Vedic Mathematics, Jagadguru Swami Bharti Krishna Tirthji, was born in 1884. He was an exceptionally brilliant student and right from childhood and always secured first place in all his classes throughout his education. His childhood name was Venkatraman. He was a student of National College, Trichenapalli, Church Missionary Society College and Hindu College, Thinnavelli. He was highly learned person in Science, Mathematics, Sanskrit and Philosophy. After winning highest honour in B.A., he appeared for M.A. of the American College from Bombay centre in 1903. He passes M.A. in 7 subjects simultaneously securing highest marks in all. This is world record of his academic brilliance. He served at National College, Rajmahendri, as Principal for sometime. Even though he was an expert personality in many fields, his prime interest was in Philosophy. He was initiated by Sharadapeeth Swami Trivikram Tirth into the order of Sanyasa on 4th July 1919. Thereafter Saraswati Venkatraman was called as "Swami Bharati Krishna Tirht". It is said that Swamiji discovered this vedic formulae between 1911-1918 in the forest of Shringeri (Karnatak). Swamiji did not discover the formulae of Vedic Mathematics by deduction but he discovered them out of deep meditation. It is said that he had practiced meditation in deep silence around the forest.

Vedic Mathematics is a collective name given to a set of sixteen mathematical formulae and each formula deals with a different branch of Mathematics. These sixteen formulae can be used to solve problems ranging from arithmetic to algebra to geometry to conics to calculus. The formulae are completed themselves and applicable to virtually any kind of mathematical problems. Complex mathematical questions which otherwise take numerous steps to solve can be solved with the help of a few steps and in some cases without any intermediate steps at all and these systems are so simple that even people with an average knowledge of mathematics can easily understand them.

The World Vedic.

It is important to note that the word ‘Vedic’ is used as an adjective in connection with the Vedas. We all know that out of four Vedas “Atharvaveda’ dealt with subjects of architecture, engineering and general Mathematics. However, according to historians, what we generally call Vedic Mathematics in pursuance with the findings of Swamiji is not mentioned anywhere in the Vedas. Then the obvious question arises : Why is the word Vedic used to describe this discovery when it has no direct relation with the vedic ? In fact, the use of the word vedic as an adjective to the systems of Swamiji has aroused a certain amount of controversy. However, the followers and disciples of Swamiji have strong arguments. According to Swamiji, the word Veda means the fountainhead and illimitable storehouse of all knowledge. Thus the word vedic was used by Swamiji as an adjective to his discovery. Sometime in 1950 when Swamiji visited Lucknow to give a black-board demonstration of the sixteen formulae of his Vedic Mathematics at the Lucknow university. After demonstration when Swamiji was requested to point out the places where the sixteen formulae belongs in the appendix of Atharvaveda. He replied off hand, without even touching the book of Atharvaveda. Thus it is evident that the sixteen formulae in Vedic Mathematics are his own composition and have nothing to do with the Mathematics of Vedic period.

What is Vedic Mathematics ?

Vedic Mathematics is the study of mathematical relationship in keeping with the vedic tradition of intuitive thinking. In other words, Vedic Mathematics is an approach which exploits both halves of the brain by using the pattern recognition capabilities of one and the analytical capabilities of the other. This definition takes into account the aspect of “Darsana” which is inspired pattern recognition through which these sixteen formulae have reached us. This definition also implies a secular meaning of Vedic Mathematics, i.e. Vedic that which is spoken. This must not be taken to have any pre-conceived religious overtones.

What is in Vedic Mathematics :

Let us now examine briefly the contents of the part of Swamiji's book which demonstrates the sixteen formulae. These are divided into 40 chapters which run as follows :

Ch 1 deals with the conversion of vulgar fractions into decimal or recurring decimal fractions.

Ch 2 and 3 deals with methods of multiplications and Ch 4 to 6 and 27 with methods of division. All these methods are quite different from the traditional Hindu methods.

Ch 7 to 9 deal with factorization of algebraic expressions, a topic which was never included in any work on Hindu Algebra.

Ch. 10 deals with the H.C.F. of algebraic expressions. This topic also doesn't find place in Hindu works on algebra.

Ch. 11 to 14 and 16 deal with the various kinds of simple equations. These are similar to those occurring in modern works on algebra.

Ch. 1 and 20-21 deal with the various types of simultaneous algebraic equations. These works do not occur in ancient Hindu works on algebra.

Ch. 17, 18, 19 deal with quadratic equations, cubic equations and biquadratic equations.

Ch. 22 deals with successive differentiation, which covers the theorems of Leibnitz, Taylor and Maclaurin. These work do not occur in Hindu Algebra.

Ch. 23, 24 deal with partial fractions and integration by partial fractions which are the part of Modern Mathematics.

Ch. 25 deals with Vedic numerical code which covers expressing numbers by means of letters of the Sanskrit alphabet. This part has not been used anywhere in Ancient Mathematics or Hindu Mathematics.

Ch. 26 deals with recurring decimals, Ch. 28 with the so called auxiliary fractions.

Ch. 29-30 deal with divisibility. These topics do not find place in Hindu works on Algebra.

Ch. 31 deals with sum and difference of squares.

Ch. 32 to 36 deal with squaring and cubing, square-root and cube-root.

Ch. 37 deals with Pythagoras theorem.

Ch. 38 to 39 deal with analytical conics.

Ch. 40 deals with miscellaneous method.

It is to be noted that none of the method is described in vedic period.

Mathematics of Vedic Period -

Let us now say a few words regarding the Mathematics which was known in the Vedic period, i.e., during the period ranging from 2500 B.C. to 500 B.C. Regarding Mathematics of this period is based on the religious works of this period. The religious works of the Buddhists and the Jainas and the Aryabhatta give some idea of the development of the Mathematics from 500 B.C. to A.D. 500. A study of vedic works reveals that by 500 B.C the Hindus were well-versed in the use of numbers. They knew all the fundamental operations of arithmetic viz., addition, subtraction, multiplication, division, squaring, cubing, square-root and cube-root. They were also well versed in the use of fractional numbers and surds, mensuration and construction of simple geometric figures and could solve some algebraic problems also. In arithmetic, they were masters of numbers and could use large numbers. They had developed an extremely scientific numeral terminology based on the scale of 10. The following list indicates about the knowledge of mathematics in vedic period :

Scientific numeral terminology based on the scale of 10.
Classification of numbers in even and odd pair.
Series or progressions of numbers.
Method of summing a series.
Squaring method.
Programme for the propagation of Vedic Mathematics.

A multilevel programme for the propagation of Vedic Mathematics should be prepared at National level in the following points :

At the Academic level.
At the Research level.
Application in Computers.

(1) At the Academic Level :

Inclusion of Vedic Mathematics in the curriculum right from the first standard. This will undoubtedly change the present attitude of students towards Mathematics. They will find it an easy and interesting subject, as well as do the calculations knowingly, as against done mechanically now-a-days.

Vedic Mathematics is being taught at the school of Economic Sciences, London, St. James School, St. Vedas School, Mary Ward Centre, London, School of Philosophy, Australia and several other institutions in U.S.A., Holland and places. A number of advance countries like U.S.A., Britain, Austria, Germany, France, Sweedon etc. have been introduced upto 10+2 school level courses.

(2) At the Research Level.

Vedic Mathematics, owing to its multi-choice facility, provides wonderful opportunities for the development of the innovative and research facility of young students. Many researchers has successfully extended the Vedic Mathematics to cubing, to find any power of a given number even beyond computer capability. Further the Urdhva method of solving linear simultaneously equation can be used for solving even 8 or 10 unknowns using the Pivoting techniques.

The Phythagorean triples which are based on the theorem of phythagoras, when combined with the vedic system of Mathematics are of great practical use. They link the two main branches of Mathematics, number and geometry. They have useful applications in trigonometry, co-ordinate geometry etc. and form a unique thread through many areas of Mathematics. The British Mathematician Kenneth Williams in his book 'Triples' has shown very interesting applications of Vedic Mathematics and Triples in solving problems with great speed, problems of trigonometry transformations in a plane: 2D & 3D co-ordinate geometry, 3D transformations, solutions of plane and spherical triangles and prediction of planetary positions.

1. In Bhaskaracarya's Lilawati one of the methods of multiplication used the deviation of the numbers from the base which is very close to the Nikhilam method of Vedic Mathematics.
2. The alpha numeric coding system is based on the verse called "Katadi Sutra" in ancient Phalita Jyotisa – Predictive Astrology.
3. One of the application is in the field of matrices of (size 8×12) 96 elements giving the relative weightage, due to the inner-planetary

positions, has been codified in a simple four line Sanskrit verse. All the 96 elements of this matrix can be obtained at any time by simple decoding the verse.

4. Decoding of Gayatri Mantra – Decoding can be used in the first part of "Sataksara Gayatri Mantra", the first part has 24 letters. The numerical values of this adds up to the auspicious number 108. Many persons are using the Vedic addition process with slight variations.

It is interesting to speculate as to why the Indians found it worthwhile to pursue studies into unambiguous coding of natural language into semantic elements. It is tempting to think of them as computer scientists. Let us not forget that among the great accomplishments of the Indian thinkers were the invention of zero, and of the binary number system a thousand years before the West re-invented them. Their analysis of language (Sanskrit) casts doubt on the humanistic distinctions between natural and artificial intelligence, and may throw light on how research in artificial intelligence may finally solve the natural language understanding and machine translation problems.

The above citation is from Dr. R. Briggs of NASA, California. Knowledge representation in Sanskrit and Artificial Intelligence. AI Magazine – an official publication of the American Association for Artificial Intelligence, Vol. 6, No. 1, Spring 1985.

Application of Vedic Mathematics in Various Branches of Mathematics. The formulae of Vedic Mathematics covers the topics of various branches of Mathematics such as :-

Co-ordinate Geometry
Simultaneous Linear Equations
Non-Linear Differential Equation
Integro-Differential equations.
Plane and spherical trigonometry.
Transcendental equations.
Kepler's equations.
Partial fraction.

Co-ordinate Geometry -

The formula of Vedic Mathematics cover the topics of Geometry too. Let us have book at an example from co-ordinate geometry. We will find the equation of a straight line passing through two points where co-ordinates are known.

Exp. – Find the equation of a straight line passing through the points (7, 5) and (2, -8). There are two approaches of solving the questions through the traditional methods. The first approach is using the formula y = mx + c. The second approach is using the formula

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$$

Traditional Method one :- In this method we take the general equation y = mx + c. On substituting the above values, we have :

7m + c = 5; and -2m + c = -8.

Next, we solve the equations simultaneously

7m + c = 5 (1)

-2m + c= -8 (2)

Therefore, 5m =13, $m = \frac{13}{5}$

We now substitute the value of 'm' in equation (1), we have

$7 \times \frac{13}{5} + c = 5 \quad c = \frac{-66}{5}$

Put the values of m and C in the original equations

y = mx + c, we have

$y = \frac{13}{5}x - \frac{66}{5}$

$\therefore$ 13x – 5y = 66

which in required equation of straight line.

Traditional Method Two :

Let us have a look at the second traditional method using the formula

$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$

On substituting the value (7, 5) and (2, -8), we have

$$y - 5 = \frac{-8-5}{2-7}(x-7)$$

$$\therefore (y-5) = \frac{-13}{-5}(x-7)$$

$\therefore$ 13x - 5y = 66

We can use any of the two methods mentioned above to find the equation of the straight line. However, these methods are lengthy, tiring and cumbersome also there are high chances of making errors in working with the complicated steps.

Vedic Mathematics on the other hand, offers such a simple solution that you will be amazed to see how easy it is to get the answer. The Vedic mental method of solving such problems is as follows :

"Put the difference of y co-ordinates as the x co-efficient and. Put the difference of x co-ordinate as y –coefficient."

Vedic Mathematics Method :-

The given co-ordinates are (7, 5) and (2, -8) therefore, our x co-efficient in 5-(-8)=13 and our y co-efficient is 7-2=5 we have the answers 13 and 5 with us. Thus, the L.H.S. is 13x-5y.

Next, the R.H.S. can be easily obtained by substituting the values of x and y of any co-ordinate in the L.H.S., for example

13 (7) – 5 (5) = 66, thus our find equations becomes

13x – 5y = 66

An alternate way of obtaining the R.H.S.

"Product of the means minus the product of the extremes."

therefore, we have

(2, -8) and (7, 5)

= (5 $\times$ 2)- (-8 $\times$ 7)

= 66.

Thus, the technique can be easily verified. One can see from the examples mentioned above, the simplicity and straight – forwardness of the Vedic Mathematics approach. Problems on geometry which take 5 to 7 steps can be solved mentally just by looking at them.

Simultaneous Linear Equation.

For three equations in three unknowns we can use the partitioning technique and complete the 6 cofactors of two portions (written outside) using Urdhva Sutra. Further, the four 3×3 determinante are computed mentally by using Urdhva, extending them by using the appropriate column. In the third step the values of the unknown variables are obtained directly. The working is shown below :

Exp.

	xD	yD	zD		D	
-8	1x	-2y	+3z	=	-8	-5
14	2x	-3y	+z	=	1	-17
13	3x	+2y	-z	=	3	4

$zD = 8\times13 - 14\times1 - 8\times3 = 66$ etc.

$\therefore$ D=33; xD = 33; -yD = -33; zD = 66

where x = y = 1 ; z = 2

This method can be further extended the solve for four unknowns.

(iii) Non Linear Differential equations :

This method of series solutions of differential equations is well known. This When combined with the Vedic Mathematics gives a powerful approach. The procedures can be used to handle a wide range of problems, particularly those where the boundary conditions are given at the origin, or at a single point.

Exp (2) Solve $2y + (y')^2 = 13 + 18x + 6x^2$

where y (1) = 6

Solution : The boundary conditions not being given at the origin, we have a choice between expanding y as a power series in (x-1) or changing to a new independent various z = x-1. Both approaches amount to the same thing. Thus, we have

$2y + (y')^2 = 37+30(x-1) + 6(x-1)^2$

where y(1) = 6

The solution now proceeds :

6 5 1 0 0

$y = A + B(x-1) + c(x-1)^2 + D(x-1)^3 + E(x-1)^4+F(x-1)^5+\ldots$

$y' = B + 2c(x-1) + 3D(x-1)^2 + 4E(x-1)^3 + 5f(x-1)^4 + 66(x-1)^6 \ldots$

5 2 0 0

We first find A = 6, Then $B^2 = 25$

This leads to two solutions, one with B = +5(given above) and one with B= -5 and one with B = -5

$\therefore$ i.e., The two solutions are :

$y = 6 + 5(x-1) + (x-1)^2 \rightarrow$ (Exact Solutions)

$y = 6 - 5(x-1) - 2(x-1)^2 - 0.2(x-1)^3 - 0.11(x-1)^4$.

Exp.2:- Solve $y + 2y' y'' = \exp(n) \cos 2x \ldots$

Where $y(0)=1$ and $y'(0)= 1$, $y''(0)= 0$,

Solve :- A power series expansion for exp(x) cos 2x can be obtained form Maclaurin's theorem. Alternatively as shown below, write down the expansion for exp(n) and below it write the expansions for cos 2x, keeping like powers in the same column :

$$y + 2yy'' = \left(1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \frac{x^5}{5!} + \frac{x^6}{6!} + \ldots\right) \text{times}$$

$$\left(1 + 0 - \frac{4x^2}{2!} + 0 + 16\frac{x^2}{4!} + 0 + \ldots \frac{64}{6!}x^6 + \ldots\right)$$

The R.H.S. coefficients of the successive powers of x can now be worked out as needed, using the vertically and cross – wise procedure, i.e. the solution is

$$y = 1 + x - \frac{1}{8}x^4 - \frac{11}{240}x^5 - \frac{7}{840}x^6 \ldots$$

(iv) Integro-Differential Equations –

Sol : Solve

$$y^2 + 2\left(\frac{dy}{dx}\right)^2 + y\int_0^x y\,dx = 4 + 4x + 60x^2 + 8x^3 + 9x^4 + 3x^5$$

When $y(0) = 2$, $y'(0) = 0$

Assume $y = a^2 + bx_0 + cx^2 + dx^3 + ex^4 + fx^5 + gx^6 + \ldots$

$\therefore y' = b_0 + 2cx + 3dx^2 + 4ex^3 + 5fx^4 + 6gx^5 + 7hx^7 \ldots$

and $\int_0^x y\,dx = 0 + \frac{a}{2} + \frac{b}{2}x^2 + \frac{c}{3}x^3 + \frac{d}{4}x^4 + \frac{e}{5}x^5 + \frac{f}{6}x^6 + \ldots$

Boundary condition lead to a = 2 and b = 0 as shown above. Succeeding steps involve the solution of simple equation, and

$y = 2\text{-}3x^2$ is one solution Ans.

Plane and spherical Trigonometry :

The Pythagorean triples which are based on the theorem of Pythagoras, when combined with the Vedic system of mathematic are of great use. They link the two main branches of mathematics, number and geometry. They have useful application in trigonometry, co-ordinate geometry etc. We are going to study a method by which we can form triplets out of a given value.

We will divide our study into two parts. In the first part, we will express the square of a number as the sum of two released numbers. In the second part, we will express a given number as the difference of two squared numbers. The first part is further divide into two cases – the first case dealing with odd numbers and the second dealing with even numbers.

Expressing the square of a number as the sum of two squared numbers.

Expulsing a given number as a difference of two squares.

(i) Case I : Odd numbers

(ii) Case II : Even Numbers

Case I : Odd numbers :-

Rule :- The square of an odd number is also odd. This square is the sum of the two consecutive middle digits.

Exp. (a) $3^2 = 9 = 4+5$

(b) $5^2 = 25 = 12+13$

(c) $9^2 = 81 = 40+41$

We see that the square of 3 (odd) is a (odd), which is the sum of two consecutive numbers, viz. 4 and 5. Similarly, 25 is the sum of two consecutive numbers. 12 and 13.

But how do we find consecutive numbers ? The answer is very simple. To find the consecutive numbers, just divide the square by 2 and round if off.

In the first exp. The square of 3 is 9. When 9 is divided by 2 the answer is 4.5 where 4.5 is rounded off to its next higher and lower numbers we have 4 and 5. Thus (3-4-5) form a triplet where the square of the highest the number is equal to the sum of the square of the other two numbers.

Case II :- Even Numbers :- The square of an even numbers is an even number. Therefore we cannot have two middle digits on dividing it by 2. Thus we divide the even numbers by 2, 4, 8, 16 etc. (powers of 2) until we get an odd number. Once we get an odd number we continue the procedure as done in the case of odd numbers. If you have divided the even numbers by 2, 4, 8 etc. the final answer will have to be multiplied by the same number to get the triplet.

Exp. 1 : One value of Pythagorean triplet is 6; find the other two values. We divide 6 by 2 to get an odd number 3. Next we follow the same procedure as in odd number case to form a triplet (3, 4, 5). Now, Since we have divided the number by 2, we multiply all the values of (3-4-5) by 2 to form triplet (6-8-10).

Thus the other two values are 8 and 10.

Ex. 2 :- One value of a triplet is 20 ; find the other two value.

We divide 20 by 4 to get an odd number 5. Next we follow the same procedure as explained before to form a triplet (5-12-13). Now, Since we have divided the number by 4, we multiply all value of the triplet (5-12-13) by 4 and make it (20-48-52).

Thus the other two value are 48 and 52.

Expressing a given number as a difference of two squares.

We express a given number n as a product of two numbers ‘a’ and ‘b’ then express it as :

$$n=\left[\frac{(a+b)}{2}\right]^2-\left[\frac{(a-b)}{2}\right]^2$$

Exp. Express 15 as a difference of two squared numbers. We know that 15=5×3, Thus the value of ‘a’ in 5 and b is 3 thus

$$15=\left[\frac{(5+3)}{2}\right]^2-\left[\frac{(5-3)}{2}\right]^2=\left(\frac{8}{2}\right)^2-\left(\frac{2}{2}\right)^2$$

$= (4)^2 - (1)^2$

or $\left(\sqrt{15}\right)^2 + 1^2 = 4^2$

from the above,, it can be proved that if one side of the triangle is $\sqrt{15}$ then the other side is 1 unit and the hypotenuse is 4 units.

Transcedental Equations.

The method described in the computations of trigonometric functions can be applied to the solution of transcedental equations.

Exp. $x + \sin x = 1$

$$x+x-\frac{x^3}{3!}+\frac{x^5}{5!}-\ldots=1$$

$$x+0.5+\frac{x^3}{12}-\frac{x^5}{240}+\frac{x^7}{2.7!}\ldots$$

0.5	0.5						
$x^3/12$	12				$1_3\ 1_1$	1_2	2_2
$-x^5/240$	12					$\bar{1}_1\ \bar{5}_1$	
x	=	0.5		1 1	0	3	
$(x^2$	=	$3_{\bar{5}}$	$\bar{4}_0$	1	1_2	$1_1)$	

The method is quick and efficient if x is small, and can be extended to any number of decimal places.

Kepler's Equation.

This is an equation of great importance in positional astronomy. The equation is $M = E - e \sin E$ where M, E are the means and eccentric anomalies respectively of a planet in its orbit, and e is the eccentricity of the of the orbit. We shall make M = 0.30303 radius e = 0.016722 which is the eccentricity of the earth's orbit, we want to find E.

Exp. $0.30303 = E - 0.16722 \text{ Sin } E$

$$E = 0.30303 + 0.016722\left(E - \frac{E^3}{3} + \frac{E5}{5} - \ldots\right)$$

M	0	3	0	3	0	3	0	0	1	
eE		$1_{\bar{4}}^{\bar{5}}$	3^2	$\bar{6}^{\bar{5}}$	$1^2\ 1^1$	$\bar{3}$		2		
$-eE^3/3!$ 3		6						$\bar{1}_{\bar{1}}2_{\bar{1}}\bar{1}_3\bar{5}_0$		
$eE^5/5!$		2							4_0	
E	= 5		0.	3	1	$\bar{2}$	1	0	1	0

$$\left(E^2 = .1_1 0\frac{\bar{5}}{4}\bar{1}^{\bar{1}_2}\frac{3}{4}\right)$$

where e = 0.16722 = $0.02\bar{3}\bar{3}22$

Bring 0.3 into the answers.

Row 2 : We multiply e and E ; $E:CP\begin{bmatrix}2\\3\end{bmatrix}$ = 6 = 1$\bar{4}$

Bring 1 into the answers.

Row 2 : $E:CP\begin{bmatrix}2 & \bar{3}\\3 & 1\end{bmatrix} = \bar{7},\bar{7} + \bar{4}\ \bar{0} = \bar{5}_2$

Bring down $\bar{2}$ into the answer etc.

At present, in the current mathematics, we have only the trial and error method available.

Partial Fraction

Partial Fraction plays an important role in integration. Partial fractions involve decomposing the denometer into irreducible factors. Here we are concerned mainly with the case when the factors are all linear and unrepeated. The current method is very laborious but with the help of 'Paravartya Sutra' The procedure is very easy and is well known as 'Mental oneline' answer process. Suppose we have to convert $E=\dfrac{3x^2+12x+11}{(x+1)(x+2)(x+3)}$ into

Partial Fraction

Let $\dfrac{3x^2+12x+11}{(x+1)(x+2)(x+3)}=\dfrac{A}{(x+1)}+\dfrac{B}{(x+2)}+\dfrac{C}{(x+3)}$

The current method leads to three simultaneous equations in three unknowns A, B and C. Whose solutions yields the required results In the Vedic Systems. However for getting the value of A.

We equate its denominator to zero and this get the paravarty value of A (i.e. -1)

And we mentally substitute the value -1 in the E but without the factor which is in the denominator of A. on the R.H.S.

We put this result down as the value of A similarly for B and C.

All this work can be done mentally and all the laborious work of deriving and solving three simultaneous equations is totally avoided by this method.

For $A=\dfrac{3x^2+12x+11}{(x+2)(x+3)}=\dfrac{3(-1)^2+12(-1)+11}{(-1+2)(-1+3)}=1$

by the same way we can calculate B and C.

Conclusion

The essence of the Vedic system is that it is simple, direct, one-line and mental. The Vedic Sutras are applicable to a wide variety of problems. They are very easy to understand and a delight to use. The Vedic approach has many special methods - indeed many more than conventional method. This large flexibility of methods finds itself reflected in the mind, when approaching a problem from the Vedic view point. Vedic maths is perfectly adapted to oral teaching and mental calculation. Though Vedic maths, of course, demand regular practice of simple problems. Even a little exposure of the Vedic maths approach, coupled with some practice, clearly shows that we are dealing with an entirely new and direct way of thinking. The age and qualifications are no barrier in this process, also with the least efforts, Vedic approach provides a corrective methodology to the problem of mental slavery to calculators.

Intution plays an important role in vedic mathematics. One of the great scientists, Einstein admitted that intution plays its part in momentous discoveries. Even the Ramanujan, The mathematical genius who has left behind about 4000 mathematical formulae, admitted that this is due to intution he made the solutions of many mathematical challenging problems.

In conclusion I would like to point out that we have a long way to go and it is most important that we take up the opportunity offered by this international conference to define our focus so that energies are not dissipated. As far as the introduction of Vedic Maths at school level is concerned it can be brought about slowly by increasing the level of recognition in the general environment of Vedic Maths, and then introducing courses at appropriate levels of Vedic Maths. As a first step, the examination boards of different states and the centre may allow the solution of examination papers using Mathematics. Teachers of school, college and University should be trained to trained others. Syllabus at different levels should be introduced in school syllabus. The mathematics department of every university in our country should have compulsory course on the 'History of Mathematics.' It is really surprising that a county with such a rich inheritance, has almost no centre for History of Mathematics' whereas in Moscow there is a large centre exclusively developed to the "History of Science". It has separate Departments of History of Mathematics, Physics, Chemistry etc.

It is an irony of the situation that such treasure of knowledge remained hidden for a quite a long time as the political upheavals roughly stopped the academic activity.

In general, I would like to emphasize that we must try to inculcate the spirit of Vedic – Mathematics.

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