

DR. NARINDER PURI AND DR. MICHAEL WEINLESS ON VEDIC MATHEMATICS

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VEDIC MATHEMATICS

The Cosmic Software For The Cosmic Computer

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Introduction

Vedic Mathematics offers a new holistic approach to mathematics and to mathematics education. Its range extends from the most concrete values of numerical computation to the most abstract aspects of the dynamics of intelligence.

The computational methods of Vedic Mathematics have been found to be easier to learn, faster, and more enjoyable than conventional methods. The intrinsic flexibility of the Vedic system of calculation develops the students' creativity and clarity of mind.

The system of Vedic Mathematics is derived from the Vedic tradition or knowledge, recently revitalized and reinterpreted by Maharishi Mahesh Yogi in the form of a modern systematic science, known as Maharishi's Vedic Science. According to Maharishi, at its deepest level, Vedic Mathematics is the exploration and exposition of the self-interacting structure of pure consciousness, which is the orderly basis of all phenomena in nature. By connecting mathematics to its source in the field of pure consciousness, Vedic Mathematics has the potential to bring fulfillment to all areas of mathematics and to solve the current crisis in mathematics education.

The Sutras of Vedic Mathematics

All the computational methods of Vedic Mathematics are based on sixteen sutras (aphorisms) that are directly derived from the Atharv Ved, one of the primary texts of the ancient Vedic literature of India. This mental computational system was brought to light in recent times by the Shankaracharya of Puri, Swami Bharati Krishna Tirtha.

On one level, each sutra aphoristically describes the actual computational method to be used for the various types of mathematical problems. On a deeper level, however, each sutra may be seen as a refined formula for producing a high degree of coherence and order in brain functioning, facilitating the rapid and precise solution to the mathematical problem.

The coherently functioning brain, with its billions of neurons and interconnections is, in Maharishi's words, a "cosmic computer." Through proper programming it can accomplish anything. The sutras of Vedic Mathematics are the "cosmic software" that create the ability to compute most rapidly and precisely.

Applications to Mathematics Education

Vedic Mathematics offers a new approach to resolving the current crisis in mathematics education. It is not simply a collection of new computational techniques; rather it provides an entirely different approach to mathematical computation, based on pattern recognition.

The conventional methods of mathematical computation consist of rigid, sometimes monotonous procedures that are uniformly applied to all problems of a given type. The result is often boredom, strain, and a lack of enjoyment for both student and teacher.

By contrast, the techniques of Vedic Mathematics allow for constant expression of the student's creativity. First, for any type of problem, there are always several different approaches: at least one general technique, applicable to all cases, and also a number of special techniques, applicable to cases having a particular pattern. The general technique is always faster and easier than the conventional technique, while the techniques for special cases extraordinarily fast, yielding solutions to complex problems, often at the speed of just writing down the successive digits of the answer. Second, at each stage of a particular technique, there are usually options with regard to the next step. This flexibility in the method keeps the mind lively and alert and cultures the ability to quickly discover the path of least action on the way to the solution.

In addition, the techniques of Vedic Mathematics have been found to be easier to learn than conventional methods. Computational complexities are significantly reduced by using digits and their complements. And finally, unique, independent cross-checking methods make the system less prone to error.

In summary, then, the techniques of Vedic Mathematics not only provide a quick and accurate solution to the problem at hand, but also develop clarity of mind and intuition. In this way, Vedic Mathematics succeeds in fulfilling the two major goals of mathematics education: to teach students procedures for solving specific mathematics problems and to develop clear and logical thinking.

In teaching Vedic Mathematics, Dr. Puri has found that students derive great enjoyment from it, even if they previously disliked mathematics. The problem of “math anxiety,” which confronts mathematics educators around the world, simply does not arise. The Vedic mathematics research group in London has successfully applied Vedic Mathematics at both primary and secondary school levels. The Indian Ministry of Human Resource Development recently held a workshop on Vedic Mathematics at Rajasthan University, which was attended by mathematicians, educators, and government representatives. The workshop recommended that the government immediately introduce Vedic Mathematics into the educational curriculum of the nation.

Glimpses of Vedic Mathematics

The following elementary examples provide a glimpse of the speed and simplicity of the computations provided by Vedic Mathematics.

- $99976 \times 99998 = 99974|00048$

The answer is directly obtained in just one line using the *nikhilam* sutra.

- $374 - 253 + 254 - 433 + 327 = 374 + \overline{253} + 254 + \overline{433} + 327 = 269$

The answer is directly obtained by treating the numbers to be subtracted as consisting of negative digits, using the *vinculum* method.

- $252 \times 254 = \frac{1}{4} \times 256|008 = 64008$

The answer is directly obtained using the *anurupyena* upasutra.

- $9993^2 = 9986|0049$

The square is obtained directly by using the *yavadunam* sutra.

- $195^2 = 19 \times 20|25 = 38025$

The square is obtained using the *ekadhiken purvena* sutra.

- $988 \times 996 \times 995 = 979|128|\overline{240} = 979127760$
The product is obtained in one line using the *nikhilam* sutra.
- $1/39 = 0.\dot{0}25641$
The answer is obtained in just six seconds using the *ekadhika* sutra.
- $4 \text{ yd. } 1 \text{ ft. } \times 8 \text{ yd. } 2 \text{ ft. } = 32|16|2 = 37 \text{ sq. yds. } 56 \text{ sq. ft.}$
The answer is obtained using the *urdhava* sutra.
- $20289^2 = 203\overline{11}^2 = 4|0|_12|\overline{4}|5|\overline{6}|\overline{5}|2|1 = 4124\overline{565}21 = 411643521$
The result can be directly obtained by working from either left to right or right to left in four alternative ways using *dvandwa yoga*.

These examples provide just a glimpse of the most elementary applications of Vedic Mathematics. More sophisticated applications include computational aspects of linear algebra, curve fitting, evaluation of transcendental functions, solution of cubic and higher order algebraic equations, and the solution of certain types of nonlinear problems in analysis.

The Foundations of Vedic Mathematics

Computational techniques are just one aspect of the complete approach of Vedic Mathematics. Maharishi's Vedic Science locates the deepest value of Vedic Mathematics in the mathematical structure of consciousness itself. The founders of the Vedic tradition discovered the capability of the human mind to settle into a state of deep silence while remaining awake, and therein to experience a completely unified, simple, and unbounded state of awareness, called pure consciousness. In this experience, Maharishi explains, the conscious mind becomes identified with an infinite, all-pervading unified field, an eternal continuum underlying all existence.

By gaining familiarity with the silence of pure consciousness, one develops the ability to cognize within that silence an eternal and unmanifest "fabric" or "blueprint" of all the laws of nature; this fine fabric of activity is the Ved. The Vedic seers gave expression to the self-sufficient, infinitely dynamic, self-interacting qualities of this unified state of awareness; and they articulated the dynamics by which it sequentially gives rise, through its own self-interacting dynamics, to the field of space-time geometry, and subsequently to all the diverse forms and phenomena that constitute the universe. These expressions and articulations constitute the Vedic Literature.

At its most profound level, Vedic Mathematics is the mathematics of the Ved, the structure of pure knowledge; it reveals the precise mechanics by which the infinite, absolute reality of pure intelligence knows itself and thereby creates, from within itself, all

quantified values and relationships. On this basis, Vedic Mathematics is able to portray the quantification of all levels of intelligence (pure mathematics) and also to describe the dynamics of intelligence found in all levels of nature's functioning (applied mathematics).

Maharishi describes the Ved, within the field of pure consciousness, as existing on the level of undivided unity. Within this unity two values, existence and intelligence, can be located. It is the intelligence value that knows itself and thereby conceptually creates three values within itself—the knower, the process of knowing, and the known. Thus, one becomes two, and two becomes three. Through the further interaction of these three values, the infinite diversity of the universe is created from the sequential quantification of unity. This unfoldment is portrayed with perfect precision by Vedic Mathematics.

According to Vedic Science, all values of relationship and transformation, both abstract and concrete, are simply expressions of the self-interacting structure and dynamics of an underlying, totally unified field of pure intelligence. The unlimited variety of relationships and transformations, ranging from the most abstract areas of modern mathematics to the most concrete phenomena of nature, can thereby be described in terms of the inner relationships of pure consciousness. Vedic Mathematics provides this description.

This general principle is familiar to modern mathematicians. The unified foundation of modern mathematics is provided by set theory, the mathematics of the infinite. At the foundations of set theory are mathematical principles that directly describe the nature of an abstract, infinitely dynamic field of intelligence. All of mathematics is described as sequentially unfolding from the internal dynamics of this field of pure intelligence. For example, all sets are sequentially created from the unmanifest point value of the null set. This self-referral nature of the field of intelligence at the basis of set theory is expressed at a deeper level by the reflection principle, which underlies the mathematical description of the different quantified values of infinity provided by the theory of large cardinals.

In Vedic Mathematics, all the fundamental principles are derived from direct experience of the unmanifest source of orderliness within the unified field or pure consciousness. Vedic Mathematics is, therefore, the mathematics of the most fundamental structures of natural law. This is its unique stature and contribution to the field of knowledge.

Invitation to All Mathematicians

The computational applications of Vedic Mathematics are only the first step in an ongoing research program. All areas of modern mathematics, both pure and applied, fall within the scope of Vedic Mathematics. We are just beginning to tap the enormous potential, of this more fundamental and complete approach to knowledge,

By connecting mathematics to its source in the field of pure consciousness, Vedic Mathematics has the potential to bring fulfillment to all areas of mathematics. All mathematicians and mathematics educators are invited to join this research program, to apply the sutras of Vedic Mathematics to all areas of mathematics, and to enjoy the full creative expression of mathematics for the benefit of mankind.

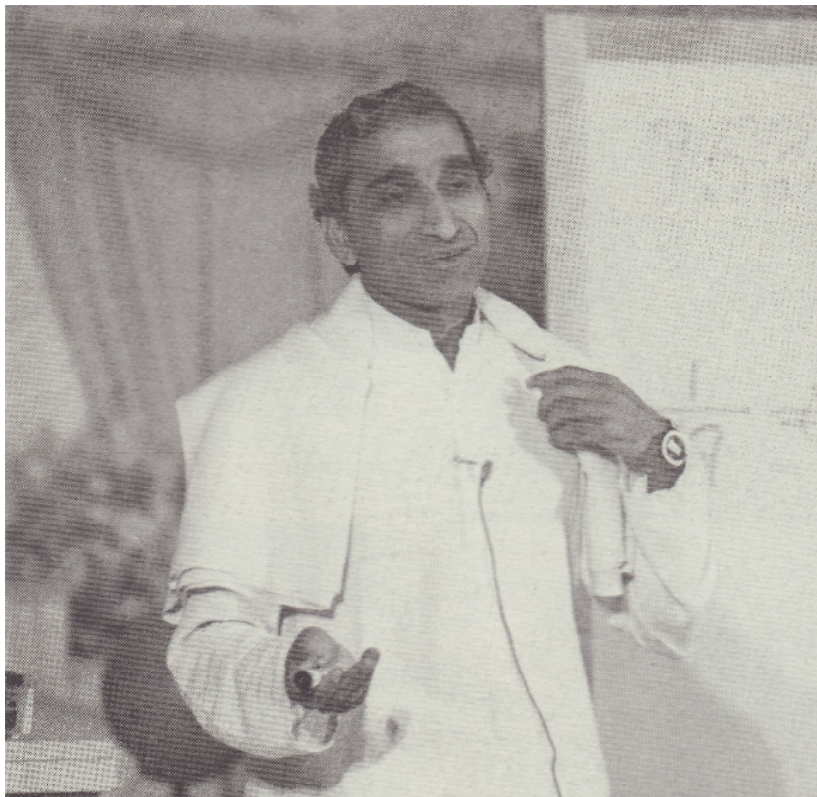
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VEDIC MATHEMATICS

Taking the Anxiety Out of Math

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“Vedic Mathematics makes math a playful subject—a subject to be learned with smiles,” said Dr. Narinder Puri, a professor at the University of Roorkee in Uttar Pradesh, India, and a leading expert in Vedic Mathematics. Dr. Puri has authored a book on the subject and along with several English and American mathematicians and mathematics teachers, is reforming mathematics education using the Vedic method.

“Mathematics doesn’t have to cause anxiety, but can be blissful and evolutionary,” said Dr. Narinder Puri during his April 14 presentation to over 1000 members of the MIU community.

Dr. Puri, Professor of Civil Engineering at the University of Roorkee, Uttar Pradesh, India, and a leading exponent of Vedic Mathematics, visited MIU as part of a world tour to introduce Vedic Mathematics to modern science based education.

“Mathematics education aims to culture clear and precise thinking,” says Dr. Puri. “But in the conventional approach to teaching basic math skills, calculations are often a strain. This results in ‘math anxiety’ among students and a shunning of the subject. Test scores have declined, and we are now talking about a ‘crisis’ in math education. Vedic Mathematics, by giving easy procedures in tune with natural law, makes the process of doing math enjoyable and enriching.”

The computational methods of Vedic Mathematics are based on sixteen sutras (aphorisms) that are directly derived from Atharva-Veda, one of the four main branches of ancient Vedic literature.

On one level, each sutra aphoristically describes the computational method to be used for various types of mathematical problems. On a deeper level, however, each sutra may be seen as a refined formula for producing a high degree of coherence and order in brain functioning, facilitating the rapid and precise solution to the mathematical problem.

MIU’s founder, Maharishi Mahesh Yogi, who recently met with Dr. Puri at the World Capital of the Age of Enlightenment in India, explained that Vedic Mathematics, through its sutras, helps to create a general state of awareness, which is then focused on a particular point (a specific problem). Cultivating the ability to maintain this wholeness while focusing on the parts of knowledge helps one to live more in accord with natural law.

According to Dr. Puri, this new approach is not just a collection of new teaching methods but rather an entirely different way of doing mathematics. The conventional methods of mathematical computation consist of rigid, sometimes monotonous procedures that are uniformly applied to all problems of a given type.

In contrast, the techniques of Vedic Mathematics allow for constant expression of a student’s creativity. At each stage, there are options with regard to the next step. This flexibility in the method keeps the mind lively and alert and cultures the ability to spontaneously discover the path of least action on the way to the solution.

Vedic Mathematics not only provides a quick and accurate solution to the problem at hand, but simultaneously develops clarity of mind and intuition, emphasizes Dr. Puri. In this way, Vedic Mathematics fulfills the two major goals of mathematics education: to teach students procedures for solving specific mathematical problems and to develop clear and logical thinking.

Students are also able to learn Vedic Mathematics computational methods four to five times faster than the conventional system. During his visit to MIU, Dr. Puri visited Maharishi School of the Age of Enlightenment (grades K–12), where he demonstrated the ease of mental calculation of large multiplication problems. He could write a one-line solution to the problems before the students could even enter the numbers into a calculator.

Accompanying Dr. Puri on his tour was Dr. Michael Weinless, Chairman of the Department of Mathematics at MIU and a distinguished mathematician and educator. Dr. Weinless explains that the basis of Vedic Mathematics, as described by Maharishi's Vedic Science, is in the mathematical structure of pure intelligence, which is the orderly basis of all phenomena in nature.

"Vedic Mathematics, at its most fundamental level, reveals the precise mechanics by which the infinite, absolute reality of pure intelligence knows itself and thereby creates, from within itself, all quantified values and relationships," states Dr. Weinless.

"All areas of modern mathematics, both pure and applied, fall within the scope of Vedic Mathematics. We are just beginning to tap the enormous potential of this more fundamental and complete approach to knowledge," Dr. Weinless points out.

MIU is launching a whole new phase of mathematics research which examines the application of this knowledge to all areas of science. The introduction of Vedic Mathematics not only influences the future of mathematics education, but current research indicates the principles of Vedic Mathematics can be applied not only to the basic areas of mathematics, including arithmetic, algebra, geometry, trigonometry, and calculus, but also to the most abstract areas of modern mathematics, including set theory and logic, the theory of computation, number theory, and differential equations.

Dr. Weinless notes that Vedic Mathematics, as an aspect of Maharishi's Vedic Science, is the latest development in Maharishi's Master Plan to Create Heaven on Earth. "Heaven on Earth means life without mistakes, where every thought and action is spontaneously in tune with natural law," Dr. Weinless states. "Vedic Mathematics will help education deliver this, bringing to every student the fruit of all knowledge—life in fulfillment and perfection." □

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VEDIC MATHEMATICS

“To Be Learned With Smiles”

Joel Hamilton and Eva Norlyk

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Dr. Michael Weinless with Dr. Narinder Puri, who taught one-day seminar on Vedic Mathematics to nearly 700 people in April.

“Does anyone have a calculator?” asks Dr. Puri. Everyone looks up at Dr. Puri, expert in Vedic Mathematics, and here to teach the basics of Vedic sutras of computation. Is he asking for a calculator?

“Yes,” continues Dr. Puri. “Does anyone have a calculator? I want to have a race.”

On the blackboard Dr. Puri whizzes through a multiplication problem of two nine-digit numbers. He works so quickly that a competing pocket size calculator is left far behind, spitting error messages.

“You see?” he says with a satisfied smile. “Vedic Math is *verry* easy!”

Dr. Narinder Puri, professor at the University of Roorkee, Uttar Pradesh, India, recently visited MIU to teach a seminar on the computational techniques of Vedic Mathematics. Nearly 700 people attended his one-day seminar in the Maharishi Patanjali Golden Dome of Pure Knowledge on Saturday, April 16. The seminar was part of a conference tour of universities throughout North America and Europe.

Based on 16 sutras derived from the Atharv Veda, the computational methods of Vedic Mathematics reportedly will enable students to breeze through complicated computations with the effortless speed of a supercomputer.

“Vedic Mathematics is easier to learn, faster to use, and less prone to error than conventional methods,” says Dr. Michael Weinless, Chairman of the Department of Mathematics at MIU. “Furthermore, the techniques of Vedic Math not only enable the student to solve specific mathematical problems, they also develop creativity, logical thinking, and intuition.”

According to Dr. Puri, Vedic Math is the math software for the “cosmic computer,” a way for the human nervous system to make use of the computing power of nature.

“Numbers are your friends,” he says. “Once they become your friends, you’ll love playing with them. Vedic Math makes mathematics a playful subject, to be learned with smiles.”

Many course panicipants seemed to harbor hopes that the sutras would be like magic words to make all math problems disappear, leaving only answers in their place. But the sutras’ magic was on a very practical, mechanical level. These 16 Sanskrit aphorisms, only 120 words in all (“so brief and crisp they are”), serve as mnemonic devices, each one bringing to mind a class of mathematical operations which can be applied in various situations.

Dr. Puri explained how Vedic Math, as much as possible, breaks up complex problems into simple short operations. A common device is to convert the larger digits, 6 to 9, into the smaller, easier-to-handle digits, 1 through 5. Dr. Puri calls the larger numbers “mischievous,” difficult to manipulate. Their complementary numbers are called vinculum numbers, and they require using as base a power of 10 (10, 100, 1000, etc.).

The reason for this is simple, according to Dr. Puri. “If you want to measure how tall a man is, you can use a ruler and start from his feet. But if he is a very tall man, it might be easier to start from the ceiling and measure down.”

The vinculum number is the base number plus or minus some quantity. For example, 9 becomes $10 - 1$, written in Vedic Math as $1\bar{1}$. This complementary number can then be handled in a host of ways to speed and simplify calculations.

Dr. Puri spent a good part of the Saturday workshop explaining the second sutra, *Nikhilam Navtashcaramam Dashata*. A simple translation of this is “All from 9 and last from 10,” although according to Dr. Puri the English translation captures none of the expansiveness and depth of the Sanskrit meaning. In India, Maharishi told him that he could derive all the sutras from this one.

Using the Nikhilam sutra, Dr. Puri showed simple steps to multiply large numbers and to speedily create multiplication tables. Later he demonstrated how another sutra, *Urdhave-Tiryagbhyam* (meaning “vertically and crosswise”), can also be used to multiply large numbers easily. A third sutra, translated as “By one more than the previous one,” Dr. Puri considers an “upa-sutra” (subordinate sutra, a corollary) to the Nikhilam sutra. He showed its use in writing the decimal equivalents of large awkward fractions such as $\frac{1}{13}$, $\frac{1}{7}$, and $\frac{1}{29}$.

“Vedic Math doesn’t want you to get bored and exhausted.” says Dr. Puri. “Effortless effort is the real content of Vedic Math.”

Dr. Puri first met Maharishi early this year at Maharishi Nagar. Maharishi was so taken with Dr. Puri and the potential of Vedic Math that he immediately suggested a world tour to promote it.

Vedic Mathematics is more than the computational techniques taught by Dr. Puri. Its range extends from the applied values of math to the most abstract aspects of the dynamics of pure intelligence. According to Maharishi’s Vedic Science, Vedic Mathematics, at its deepest level, reveals the mechanics by which pure consciousness knows itself. The infinite diversity of the universe emerges from the conceptual quantification of unity into the three values of knower, known, and process of knowing—rishi, devata, and chhandas.

“The expression of wholeness unfolding into quantified values can be analyzed in mathematical terms,” says Dr. Michael Weinless. “All relationships and transformations, from the most abstract areas of modern mathematics to the most concrete levels of nature’s functioning, can be described in terms of the inner dynamics of pure consciousness.

“In Vedic Mathematics all the fundamental principles of math are derived from the direct experience of the unmanifest source of orderliness within the unified field of pure consciousness. Vedic Mathematics is the mathematics of the most fundamental structures of natural law.”

Textbooks on Vedic Mathematics are being written and translated into 30 languages, and correspondence and video-taped courses are now available through a private organization in India. MIU’s departments of Mathematics and Continuing Education are planning more seminars and conferences.

Dr. Puri told a story of the monumental work of Swami Bharati Krishna Tirtha, the recent Shankaracharya of Puri, the easternmost of the four seats of the Shankaracharya tradition. The Shankaracharya had spent eight years distilling the essence of Vedic Mathematics from the Atharv Veda. His exposition and commentary on Vedic Math ran to 16 volumes.

When the work was done, the manuscripts were sent off to be edited and published. Somewhere along the way, the manuscripts were destroyed. The Shankaracharya's distraught assistants had to break the news to him.

"Swamiji! Something terrible has happened! Your precious work on Vedic Math has all been destroyed!"

"So it's lost?" said the Shankaracharya. "It doesn't matter."

"But the whole knowledge is lost!" said the breathless assistant, unconsolated.

"Why are you upset?" asked the Shankaracharya in reply. "The knowledge is never lost. The Vedas are always there. It just goes behind a curtain sometimes. It will come again."

The curtain's pleats are parting once again on Vedic Mathematics. □

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