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Some Simple Mathematical Models of Life

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The object of this paper is to introduce some simple mathematical models of life, which may form the basic of teaching of mathematics at all levels, so that the teaching of mathematics may be more interesting and relevant.

It is important to note that the mathematical models governing problems of life are not as exact as those that govern a mechanical system, and therefore it is reasonable not to have full confidance in any models without any verification.

In its simplest form mathematics may be defined as a logical study of space, arrangement, quantity and many related concepts. Literally speaking it has been defined as an abstract science, which investigates inductively - deductively the conclusions, implicit in the elementary conception of spatial and numerical relation. It has been also considered the science of logical thinking and systematic reasoning. Since its inferences, results and conclusions are based on a definite process of logical thinking and reasoning, it is also called the science of necessary conclusions. Whatever definition of mathematics may be taken into account the most important thing about mathematics is that "mathematics is the mirror in which human nature is reflected."

In this paper I would try to establish that mathematics is not merely an abstract but it is the science to express all phenomena of nature and life. In other words I would try to prove that mathematics is not only the backbone of science and technology but it is also "the Emperor of whole academic world."Most important thing about mathematics is that patterns of mathematical thinking are much the same as the fundamental patterns of all thinking. The foundation of good mathematical thinking establishes a good foundation for all thinking, therefore mathematical learning assumes great importance. The teaching of mathematics could be made more effective, useful and interesting if we always bear in mind these important aspects of the subjects. The important duty of a teacher is to create a situation in which students cultivate the faculty of learning based on mathematical modelling and it should be realized that any learning involves different thinking tendecies. Perhaps the greatest challenge today for us is to develop philosophies of teaching mathematics. These philosophies can grow out of experience, the assimilation of fresh and vital ideas, and from the improved personal ability and interest in the subject.

Since the dawn of civilization mathematics played a great role in the creation and development of science and technology, and also promoted the growth of our culture. Mathematics has been "the queen of all science" and "it is not only the science of all science but also the art of all arts." But it's a very sad state of affair that many students have great fear for mathematics. They find it very ugly and unpleasing. It has become a saying that "I have no head for mathematics." If we could change this attitude and create interest in mathematics, it would be a great achievement.

Now a teacher of mathematics has a great responsibility. It demands good training, sound knowledge, dedication and initiative to develop new methods of teaching mathematics. It is teaching which is responsible for joy, intellectual curiosity and creativity in learning. It is teaching which creates confidence in the subject and makes learning a pleasant, successful

and stimulating experience. Students enjoy mathematics taught to them by an interesting way and work with great interest and confidence. The object of this paper is to introduce a method of teaching mathematics, which is based on the philosophy that "Mathematics is a way of thinking about the problems of life and physical world."

Now, I would like to stress that mathematics is not merely an abstract but it is a way of thinking about problems of life. Generally teachers from primary level to University level have considered mathematics only as an abstract subject and because of this it has induced fear in young children and University students alike. We have to change this attitude and realize that teaching mathematics is not just imparting knowledge about facts. It should also develop the ability to do mathematics. Students should learn to think in a mathematical way about problems that either arise within the subject or outside it. It means that the students should be able to establish a link between problems of mathematics and daily life. This is only possible if they are taught to think in this way. To impart knowledge pf mathematics by this method is not very difficult but it demands practices, devotion and sound knowledge of literature, sociology, psychology and other aspects ℑ life. To make this aspect mote intelligible, I would like to illustrate this method by means of some examples which may form a basis of the study of mathematics as a way of thinking about the world.

Facing problems and solving them is a fundamental activity of human life. If we think seriously, we find that the problems of life are attacked and solved in the same way as the problems of mathematics. There are a good many idioms, proverbs, sayings and maxims which match with our procedure followed in solving a mathematical problem. The idioms, proverbs, sayings or maxims quoted will be put within brackets. If we want to solve a problem, first we should understand the problem (He who would understand well, must do well). If the start is good, there are better chances of a correct solution (What is well begun is half done). Yet it is not enough to understand the problem and start it well, we must also desire to solve it bravely (Where there is a will there is a way). If at first you don't succeed, try and try again, it is only by dint of hardwork solution is obtained (No pains, no gains). We should carry our plan step by step (Step after step the ladder is ascended). The obtained solution should be correct otherwise all labour is wasted (All's well that ends well).

As a student of ancient Indian literature, I am struck by the marvelous resemblance in the definition of the infinity and the definition of the God as given in a couplet of Upanishad, one of the most important books of Hindus on Spiritualism. The central idea of the couplet is as given below:-

> The God is infinite and this whole universe which is a creation of the God is perfect in itself. The perfect (Universe) has come out of the infinite (God) yet the infinite (God) remains as before.

To create a sense of humour, the teacher may say that a zero is more powerful than an atom bomb, because any number however great it may be, when multiplied by zero reduces to zero.

If we multiply any number greater than unity by itself again and again, the result increases and if we multiply any number less than unity by itself again and again, the result decreases. For example:

$$2^n = 2 \times 2 \times 2 \ldots\ldots\ldots\ldots n \text{ times}$$

$$(\frac{1}{2}) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \ldots\ldots\ldots\ldots n \text{ times}$$

This process is similar to the process of capitalistic society. In the capitalistc society the rich becomes richer and the poor poorer. In socialist society, we have

$$(1)^n = 1 \times 1 \times 1 \ldots\ldots\ldots\ldots n \text{ times } = 1$$

We know that the differentiation of a variable is either a variable or a constant, but the differentiation of a constant is zero. To explain this, we may say that one who is dynamical and adjusts himself according to the needs of our society lives happily in the society, but one who is rigid and does not like to adjust with the society cannot live in the society therefore he will perish.

Any finite number, when multiplied by zero the result is zero, and when any finite number is multiplied by infinity, the result is infinity. But when zero and infinity the result is indeterminate. Here zero and infinity may be considered very powerful. When a weak person conflicts with a powerful person he is bound to lose. But when two equally powerful persons conflict, the result is a draw.

A function is said to be continuous in a region if it is continuous at all points of the region. Similarly in a society a person is said to be absolutely good, if he is good to everyboby.

If a point (α, β) lies on $ax + by + c = 0$, then it must satisfy it. Similarly if a man belongs to a community he should satisfy the community. In other words, he should follow all rules and regulations of the community.

Sometimes, we resolve an algebraic function into partial functions and then integrate it. In the same way politicians always divide and rule.

We have

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

But for a practical purpose, we take only the first few terms. In life, though absolute idealism is considered a virture, it cannot be practised in daily life.

Sometimes a theorem of mathematics has certain necessary and sufficient conditions. These conditions have their own importance; as in life air is necessary but not sufficient.

We know that if $f(-x) = -f(x)$, the $f(x)$ is said to be odd, and if $(-x) = (x)$, then (x) is said to be even. In the sense of odd function $f(x)$, if we assign a negative value to x then $f(x)$ is positive, but if we assign a negative value to $x, f(x)$ is negative. But in the case of even function (x), whether we assign a positive value or a negative value to x, (x) always remains positive. So we can conclude that an odd function behaves as an opportunist and an even function behaves as a man of principle.

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