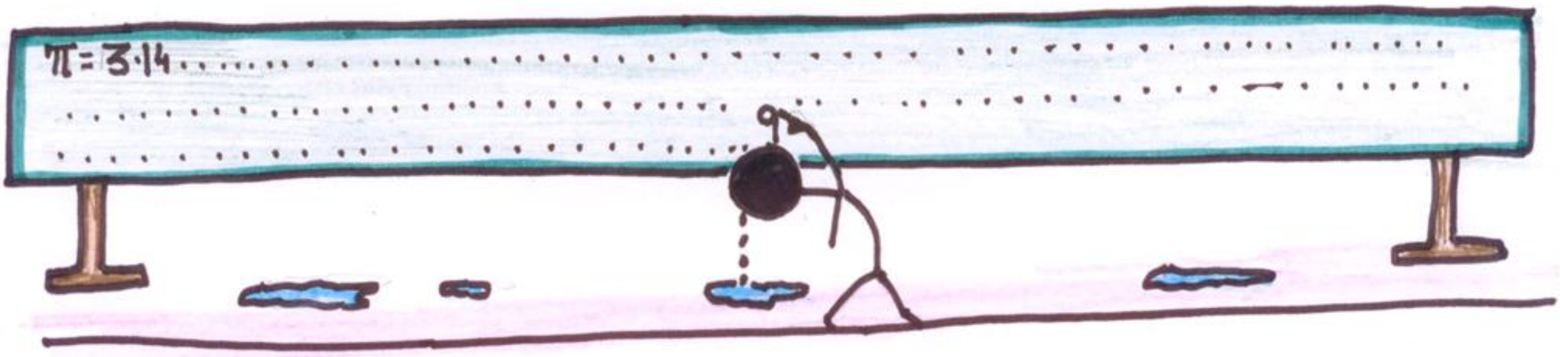

– Gaurav Dhariwal

The world of science is full of many mysterious constants whose values and applications we know, but their significance and origin is still ambiguous. Pi is one of such constants. Another reason for choosing pi is its presence in our institute's logo.

The symbol, π, is the sixteenth Greek alphabet. It is an irrational, non-repeating, non-terminating number. The value of pi can be calculated up to any number of decimal places. The most recent (2005) attempt of approximating the value of pi was made at the Information Technology Centre at Tokyo University by Professor Yasumasa Kanada, who calculated the value of pi upto 1.24 trillion (10^{11}) decimal places.

Many early attempts were made to approximate the value of pi. One of them was by John Wallis, professor of Mathematics at Cambridge, who gave a product series known as Wallis formula which converges to π/2 . The value of π can be obtained from the subsequent series by just multiplying the series with 2.

The Wallis series:

$$\frac{\pi}{2} \approx \left(\frac{2\times2}{1\times3}\right) \times \left(\frac{4\times4}{3\times5}\right) \times \left(\frac{6\times6}{5\times7}\right) \times \dots \left(\frac{2n\times2n}{(2n-1)\times(2n+1)}\right) \dots$$

Generally, we come across pi in mathematics, but where has it come from to mathematics? It was the great Swiss mathematician Leonard Euler who introduced π as the ratio of the circumference of a circle to its diameter and this ratio was always found to be constant.

A big problem that mathematicians faced while dealing with π was to approximate its value. Many ways are known to get closer and closer to the actual value of π, and one of them is with the help of a novel series given by Leibniz. This series involves alternate addition and subtraction of odd unit fractions which can be approximated as the value of $\frac{\pi}{4}$.

$$\frac{\pi}{4} \approx 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} \ldots.$$

Or,

$$\pi \approx 4 \times \left(\sum\left(\frac{(-1)^{i+1}}{2i-1}\right)\right),$$

where 'i' goes from 1 to infinity.

But even if we go up to one lac terms in this series, we will be able to obtain the value of pi with only a six place accuracy after the decimal .

Euler gave a better series for deriving the value of π. He proposed:

$$\pi = \text{sqrt}\left[6 \times \left(\sum\left(\frac{1}{i^2}\right)\right)\right],$$

where 'i' goes from 1 to infinity. This series provided a better, faster and more accurate way to derive the value of π. By taking 10^8 terms into consideration we can get accuracy up to eight decimal places.

The genius Indian mathematician, Ramanujan, also made significant contributions to the value of π but unfortunately, he did not make it clear in his text the way he reached his result.

There are lots of pi enthusiasts all over the world who work to obtain more and more significant figures for the value of π. In the United States pi enthusiasts celebrate March 14 (π =3.14) as 'Pi day ', and coincidentally Albert Einstein was also born on March 14.

To conclude, I would like to tell you a sentence from which you can get the digits for the first fourteen decimal places of pi (3.14159265358979). The sentence is

"How I want a drink, alcoholic of course, after the heavy lectures involving quantum mechanics"[1]

Here the number of letters in each word gives you the corresponding digit.

Reference:

- Alfred S Posamentier, Ingmar Lehmann, "π—A Biography of the World's Most Mysterious Number"