Discovering the beauty of Pi

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Abstract: *Improvanising the mathematics for simplifying the concepts and reducing its complexity , thus determining the value of pi(3.14) popularly known as Archimedes' constant. The concept has been devised from the ratio of the circumference of a circle to its diameter was constant, several approximations are determined in time by the Babylonians , Egyptians, and even the Chinese. Thus , with the inspiration of Archimedes principle for approximating the value of the pi, lead to the motivation for the development of the concept into a new mould , the paper focuses on the findings of the value of the pi with the help of Newton Raphson Method.*

Keywords: *Archimedes constant, Newton Raphson method*

Introduction

Reflecting on the point of Archimedes principle and the computations which are revolutioned

[1]The number (pi) is defined as the ratio of circle circumference to its diameter. Thus , it is an irrational number and we commonly use 22/7 in our computaions , when dealt with decimal representations it keeps on iterating[1].

The key idea of the devised principle by Archimedes is:

[2]If an angle of a triangle be bisected and the straight line cutting the angle cut the base also, the segments of the base will have the same ratio as the remaining sides of the triangle; and, if the segments of the base have the same ratio as the remaining sides of the triangle, the straight line joined from the vertex to the point of section will bisect the angle of the triangle.[2]

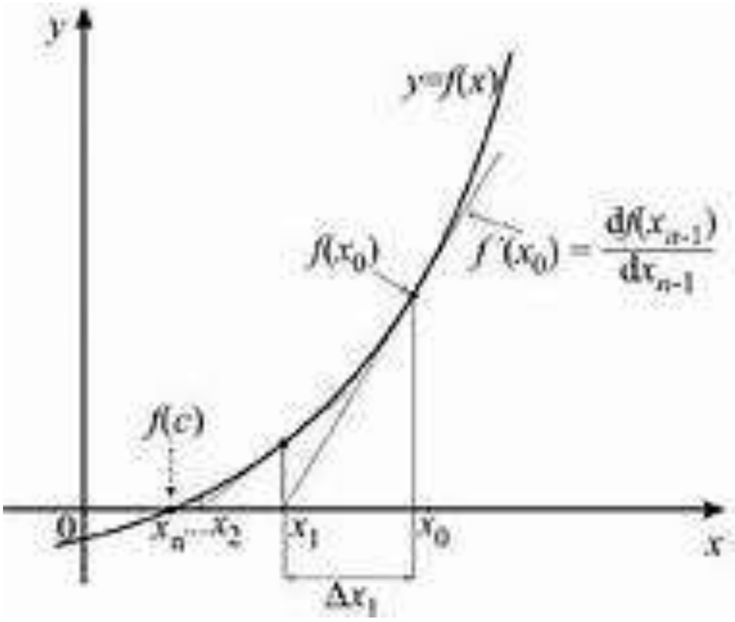
Concept

Devising the concept of Newton Rapson Method , which is one of the general computations for approximations.

Which is better approximation of roots of a real valued function

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

[1]When represented graphically, then to approximate the function by its tangent line using calculus, and finally to compute the x-intercept of this tangent line by elementary algebra. This x-intercept will typically be a better approximation to the original function's root than the first guess, and the method can be iterated[1].



Proof:

The another method for determining the value of pi which differentiates the concept from aryabhatt generated defination

"The value of pi is 3.14"

Taking two function

f(x) and g(x)

Where

f(x)= √10

g(x)=sin (theta)

Where theta is 0.020

The value of theta has been taken arbitrarily as per the convention of pi

So, f(x)=√10

Then, x=√10

x^2=10

x^2-10=0

So, the function is

f(x)=x^2-10=0

By using the newton raphson method of approximation

The root lies between 3.1 and 3.2

Where , a=3.1 and b=3.2

x1=a+b/2

By using this formula ,

At 7th approximation we get 3.1617

Which is equal to 6th approximation

That is , 3.1609

So, taking conversely up to 2 decimal places,

The x7=x6 are correct upto 2 decimal places

Then

Using g(x)=sin(theta)

Where theta=0.020

We get ,0.01999

So , the resultant function is

F= f(x)-g(x)

F=(x^2-10)-sin(theta)

F=3.16-0.01999

F=3.14001

When correcting upto 2 significant digits , as per the above convention of correcting upto 2 decimal places

We get , 3.14

Hence the value generated is 3.14

Which is equal to the resultant value of pi

Conclusion

Mathematics lies in the beauty to simplify the complicated concepts in the much efficient and normalized way . thus , this is a small initiative for devising the value of pi and thus making it more simpler than the proof devised by Archimedes principle, [4]the interesting point to note here is , we are not getting any significant pattern in the succeeding calculation of the next digits and though seamlessly to infinity[4].

References

[1] https://en.wikipedia.org/wiki/Newton%27s_method
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[4] https://www.livescience.com/34132-what-makes-pi-special.html