e-ISSN:2320-2459
p-ISSN:2347-2316

Pi Circumscription Theorem

Fernando Mancebo Rodriguez*

Independent Researcher, Journal of Pure and Applied Physics, Spain

Mini Review

Received date: 18/06/2021
Accepted date: 15/07/2021
Published date: 25/07/2021

***For Correspondence**

Independent Researcher, Journal of Pure and Applied Physics, Spain

E-mail: ferman25@hotmail.com, ferman30@yahoo.es

Keywords: Circumference, Circumscription theorem, Geometric figures, Algorithmic Pi.

ABSTRACT

This work proposes a new* mathematical adjustment for the number Pi, (the squaring Pi) consisting of a direct main formula and based mainly on the Pythagorean theorem from basic parameters of the circumference such as its radius or diameter, and using in parallel the sides and diagonals of the squares inscribed and circumscribed to the circumference. Therefore, obtaining Pi by direct formula of its construction parameters, as is done for any other geometric figure. (*Algorithmic Pi seems to be incorrect, just an approx. by series).

INTRODUCTION

The first question to be elucidated in this work will be the adjustment of the squaring Pi by means of the Pythagorean theorem, which although it can be studied from different points of view and aspects, here we treat it from the point of view and adjustment as a sequence, shown with the formula of **Figure 1** and **Figure 2.**

$$2n+1 = 2\sqrt{2}.10^n$$

Equality that converges for Pi at, n=8, value that is the sum of exponents to get $2\sqrt{2}$ by the Pythagorean Theorem: $2\sqrt{2} = \sqrt{1^2+1^2} + \sqrt{1^2+1^2}$ **(Figure 1)**

$\pi^{2n+1} = 2\sqrt{2}.10^n$, Which converges for Pi at n=8.

$$\pi^{17} = 2\sqrt{2}.10^8$$

Where, $Pi = \sqrt[17]{2\sqrt{2}.10^8} = 3.14159144414199....$

In this Pythagorean composition formula, the elements of curvature such as Pi are integrated and composed on the first member of the equation. On the other member of the equation we situate the elements of composition with a straight structure such as the circumscribed circumference plus the diameter of the circumference; as well as the diagonal of the circumscribed square=inscribed semi-square= $2\sqrt{2}$, which as we have seen looks like this:

- $\pi^{2n+1} = 2\sqrt{2}.10^n$, (straight parameters) to n power=(curved parameter Pi) to 2n+1 power.
- The exponent (n) that gives us the convergence is n=8, which means the sum of the exponents necessary to obtain $2\sqrt{2}(4.1^2)$ by the Pythagorean Theorem
- The base=10 is the sum or composition of rectilinear parameters: circumscribed square+diameter of the circumference

e-ISSN:2320-2459
p-ISSN:2347-2316

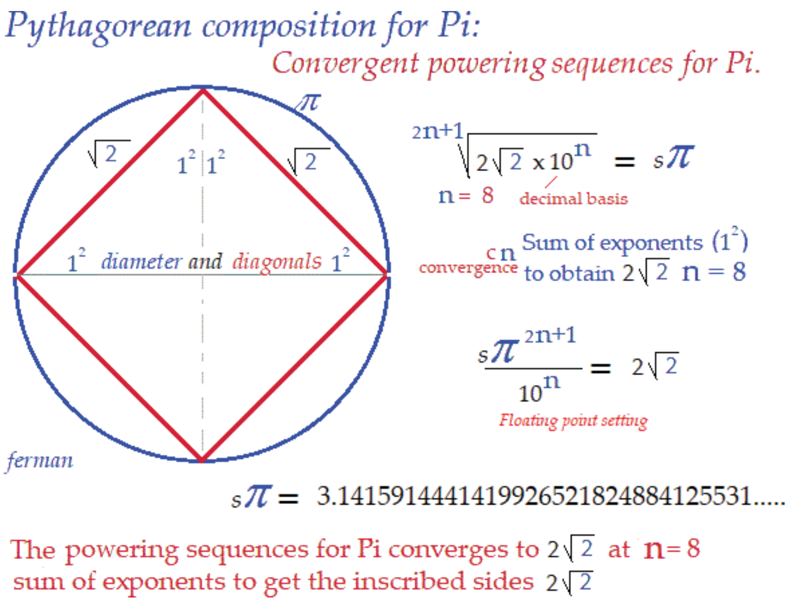

Figure 1. Squaring Pi: Pythagoras adjustment.

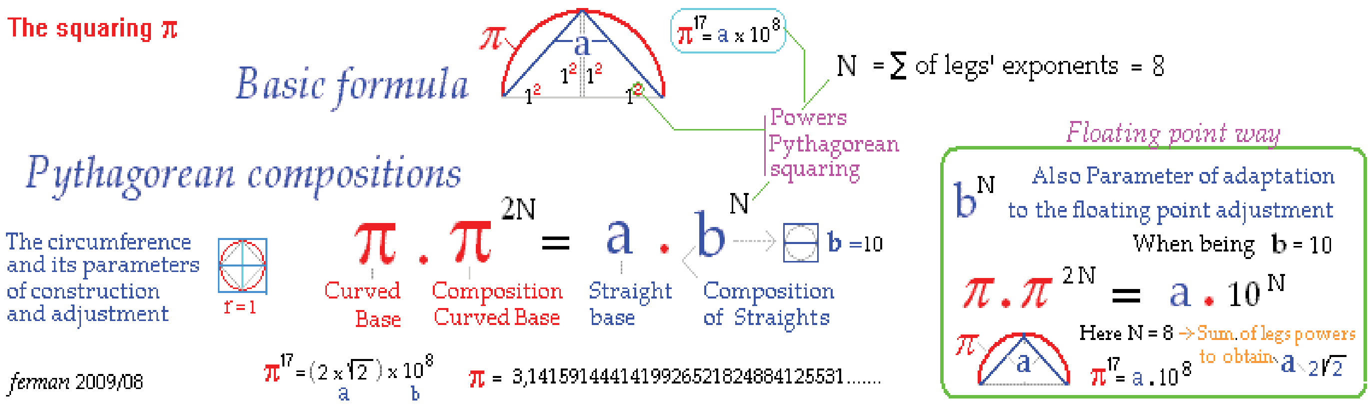

Figure 2. Pythagorean adjust for Pi.

- sPi, is the name we give to the special (and correct) number of Pi, to differentiate it from the current algorithmic Pi

SQUARING Pi DEMONSTRATION

To support and try to demonstrate the validity of this number Pi (and prove the inaccuracy of the current algorithmic Pi), this work includes the development and proposal of the Circumscription Theorem, which tells us that in the circumscription of regular geometric figures there is an integration of all the component parameters of these circumscribed figures, to form a new figure com-posed of those that are circumscribed, and with it the ability to make formulas and measurements of all these parameters in function of each other is born [1].

CIRCUMSCRIPTION THEOREM

In the circumscription of regular geometric figures, for all constructive parameter (or side), there will always be mathematical functions that give us the dimensions of these constructed figures and also the measures of any other parameter of construction, and vice versa. Logically, in successive circumscription among pairs (or more) of figures, also this circumscription theorem is follows, as it is showed in the drawing (successive circumscription of squares and circumferences) [2]. It must be this way, since when one figure is properly circumscribed over other, what we are actually building is a new figure composed of the previous two and that this union makes all its construction parameters totally related to each other, being able to measure them with common formulas for all of them [3]. If, for example, we inscribe-circumscribe a square inside of an octagon, immediately all the sides of the square can be measured based on the sides of the octagon, and vice versa, and we can therefore develop a connection and adjustment formula among all the parameters of this composite **Figure 3**.

Principle for the Measurement of Parameters of Regular Geometric Figures

For the measurement and exact adjustment of any regular geometric figure or of any of its construction parameters (side, angle, etc.), it will be done through the use of other parameters (already known) of the same through the appropriate mathematical functions. Any approximation method without the use of some of these construction parameters will never be exact.

e-ISSN:2320-2459
p-ISSN:2347-2316

If the measurement and fit is accurate, then we have used some construction parameter from this figure.

Therefore, and in the case of the number Pi, its accuracy will only be obtained if we use some of the construction parameters of the circumference, and therefore, the series currently used cannot give us the exact value of Pi **Figure 4**.

ACCURACY OF Pi

The accuracy value of Pi through the Circumscription theorem. Therefore and relating basic parameters of the circumference and the circumscribed square, there must be a direct and exact function of the parameter Pi (semi-circumference of r=1) that gives us for example, the diagonal of the circumscribed square, and vice versa.

$2\sqrt{2} = f(Pi)$ and vice versa $f(Pi) = 2\sqrt{2}$

But since here we are studying the number Pi, which is represented as a half circumference parameter of radius 1, we are going to build successive squares and circumscribed circumferences among them (see drawing), to check if this number Pi complies with the theorem above described [4].

CIRCUMSCRIPTION THEOREM

We see that any parameter (or complete figure) of the circumscribed squares is a function of any other interior or constructor parameter, also belonging to the squares. In this case, the main and simplest function relative to the square between parameters

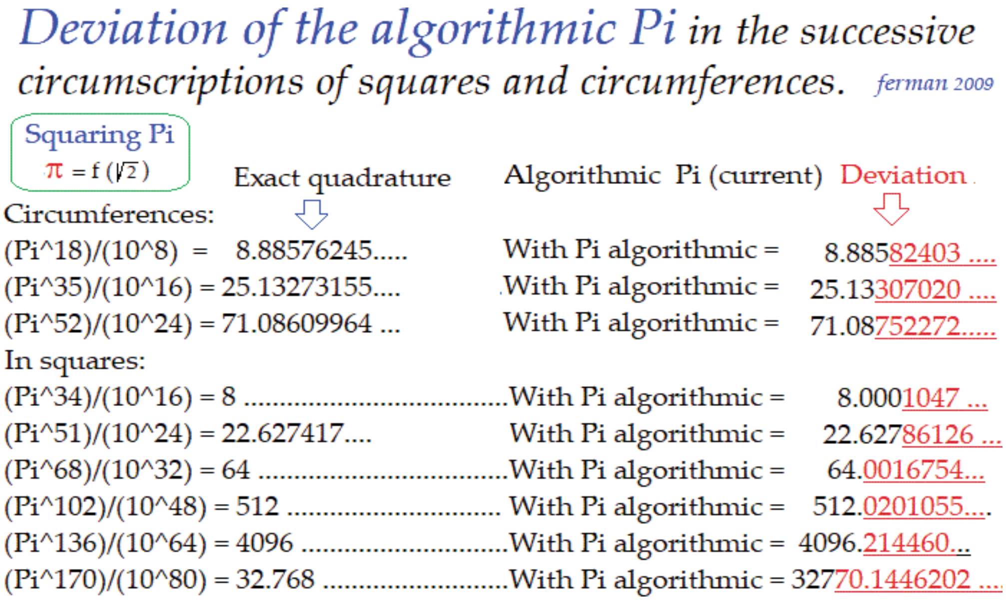

Figure 3. Circumscription theorem.

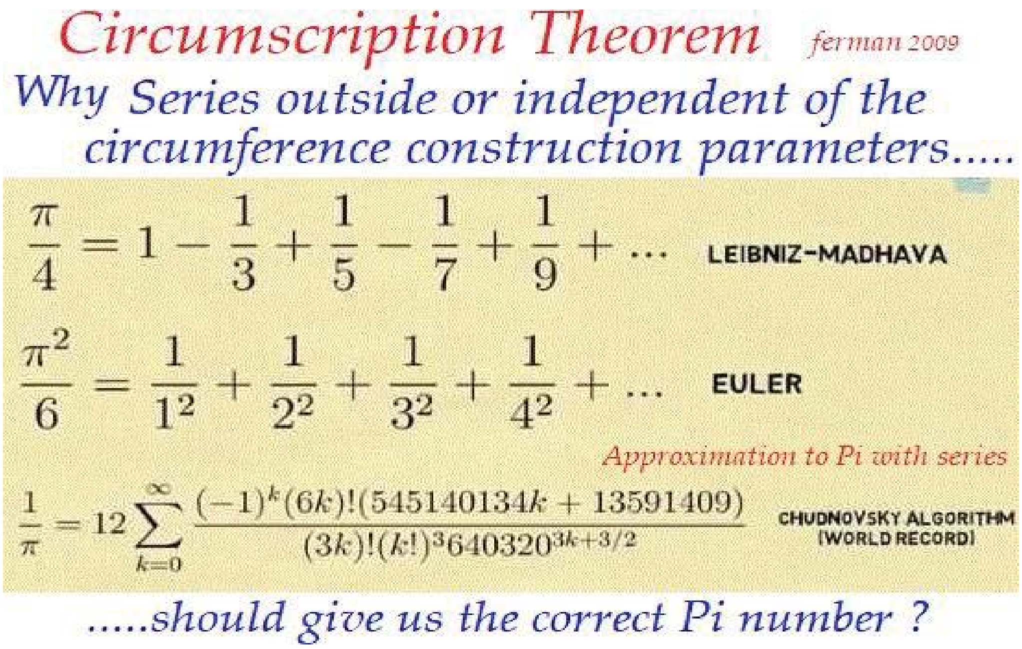

Figure 4. Series for Pi.

e-ISSN:2320-2459
p-ISSN:2347-2316

is $\sqrt{2}$, Then, given the first circumscribed square to the circumference unit that is 8, we have that the following squares are:

But, not only has this function ($\sqrt{2}$) helped us to relate circumscribed squares, but also to relate circumscribed circumferences. For example:

$$6.283182888..\sqrt{2}^{n} = 8.8857624554..;12.566365776..;17.7715249..;25.13273155..etc.$$

Algorithmic Pi is Lack of Accuracy

Of course, the circumference or its basic number Pi is also circumscribed and they have to meet the same requirements as a circumscribed mathematical function. But does it fulfill them? That is, there is a mathematical function of Pi that builds successive circumferences and squares circumscribed to any given circumference, and vice versa, there is a mathematical function of any parameter of the squares that give us the number Pi. The answer is that it must to exist, but it is not the current algorithmic Pi, but the squaring Pi that in this study it is exposed [5]. Of course, it is not as simple a function as the square one, but a more complex one involving slightly more complicated exponential functions, but logically and by the circumscription theorem, based on functions of the circumscribed squares, ($\sqrt{2}$). **Figure 5**, scheme of powers of Pi that gives us the exact value of the circumscribed squares and circumferences, given with the Squaring Pi, and the deviation that the Algorithmic Pi produces.

Pi as Function of the Circumference Diameter

And this exponential function is:

$$Pi = f(d) = f(\sqrt{2}) = \sqrt[17]{2\sqrt{2}.10^{8}} = 3.14159144414199....$$

Where (d) is the diameter of the circumference.

The exponent N=8 is equal to the number of powers used to obtain $2\times\sqrt{2}$ by the Pythagorean Theorem.

And the 17 root=2n + 1, necessary to the relation between the curve parameter (Pi, or semi circumference) and the straight parameters. Development is shown in **Figure 2**. (Pythagorean composition) Then algebraically, Pi is a direct function of the diameter of the circumference, just as it is geometrically. As we see in the figures, with this main function $(Pi^{17}/10^{8})^{n}$ we can construct all the circumferences and squares inscribed and circumscribed to the circumference; and also in successive circumscriptions, as in the **Figure 2**. If we make the adjustments we will see that the current algorithmic Pi does not fulfill this function required by the Theorem of the Circumscription of regular geometric figures, and where the successive applications of the algorithmic Pi is moving away in the accuracy of the successive circumscribed squares and circumferences [6]. Therefore, I understand that the algorithmic Pi cannot be the exact Pi, while the Squaring Pi seems to be.

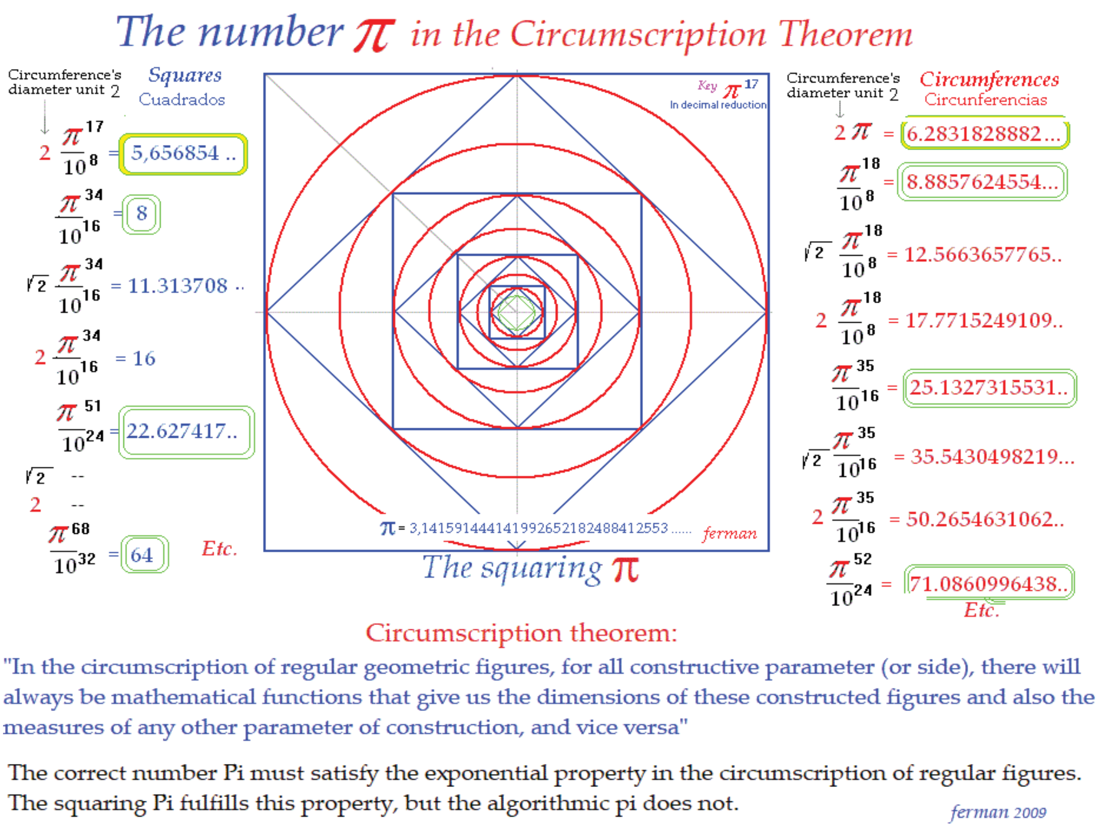

Figure 5. Deviation algorithm.

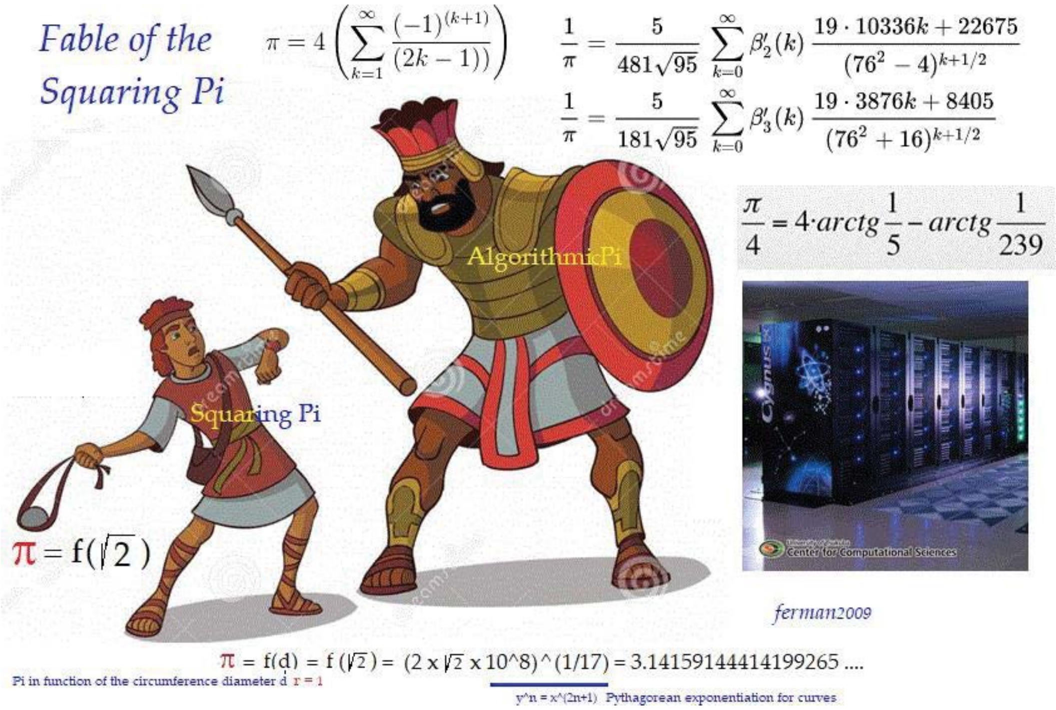

Figure 6. Fable for Pi.

SHORT SUMMARY

Summarizing, both the square root of 2 (2=diameter of the circumference of radius 1) and the number Pi, (semi-circumference of radius 1) are bases that with exponential functions of the same $\sqrt{2}^n$ and $f(Pi)^n$, they give us all the successively circumscribed circumferences and squares between them. Also being these base parameters functions one of the other, as it was put upper: $Pi = f(2\times\sqrt{2})$, and vice versa, $2\times\sqrt{2} = f(Pi)$.

$$Pi = f(d) = f(\sqrt{2}) = \sqrt[17]{2\sqrt{2}.10^8} = 3.14159144414199....$$

$$2\sqrt{2} = f(pi) = Pi^{17}/10^8 = 2.828427124746.....$$ **(Figure 6).**

CONCLUSION

The algorithmic Pi cannot be the correct value of Pi since it does not adapt mathematically to the Circumscription Theorem of regular geometric figures, and when this is applied, the algorithmic Pi gradually distances itself from the real value of the circumscribed geometric figures (successive circumscription of squares and circumferences). Also, it does not follow the geometric logic of geometric figures measurement based on its build parameters like all other regular geometric figures. In this sense, logic tells us that a principle of correspondence between geometry and its algebraic measurement has to be fulfilled.

If geometrically there is a structure and direct correspondence between diameter and circumference, a direct algebraic function must also accompany it that gives us one parameter as a function of the other, and vice versa. That is if the diameter or radius constructs the circumference, then functions of the diameter and radius must measure its constructed circumference” Pi=f(d) d=f(Pi), Where d is the circumference diameter.

REFERENCES

1. Niven I. A simple proof that Pi is irrational. Bull Amer Math Soc. 1947;53:509-636.
2. Schepler HC. The chronology of Pi. Math Mag. 1950;23:165-170.
3. Shanks D and Wrench JW. Calculation of pi to 100,000 Decimals. Math Comput. 1962;16:76-99.
4. Wagon S. Is Pi normal? The Math Intell. 1985;7:65-67.
5. Borwein JM, et al. Modular equations and approximations to Pi or how to compute one billion digits of Pi. Am Math Mon. 1989;96:201-219.
6. Delahaye JP. The fascinating number Pi (library for science), Paris, France. 1997.