Pi circumscription theorem

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From work: Pi direct formula, fermancebo.com 2009

1   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)

2   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 fig. 1).

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

Equality that converges for x = Pi at n=8, value that is the sum of exponents to get 2.sqrt2 by the Pythagorean Theorem: $2\sqrt{2} = \sqrt{1^2 + 1^2} + \sqrt{1^2 + 1^2}$, (fig. 1.)

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

Which converges for Pi at $n = 8$.

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

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

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

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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.Sqrt2, which as we have seen looks like this:

$$\pi^{2n+1} = 2\sqrt{2} \cdot 10^n,$$

(straight paremeters) to n power = (curved parameter Pi) to 2n+1 power (fig. 2, structural geometry).
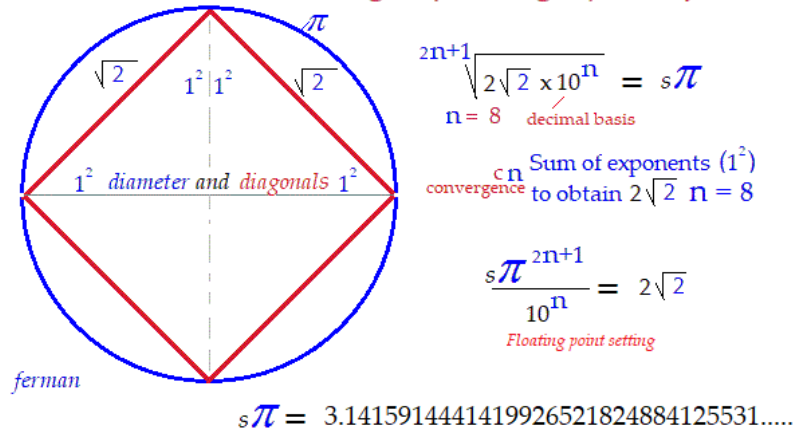
— The exponent (n) that gives us the convergence is n = 8, which means the sum of the exponents necessary to obtain $2.Sqrt2(4.1^2)$
by the Pythagorean theorem.

— The base = 10 is the sum or composition of rectilinear parameters: circumscribed square + diameter of the circumference.

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

Figure 1: Squaring Pi: Pythagoras adjustment

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
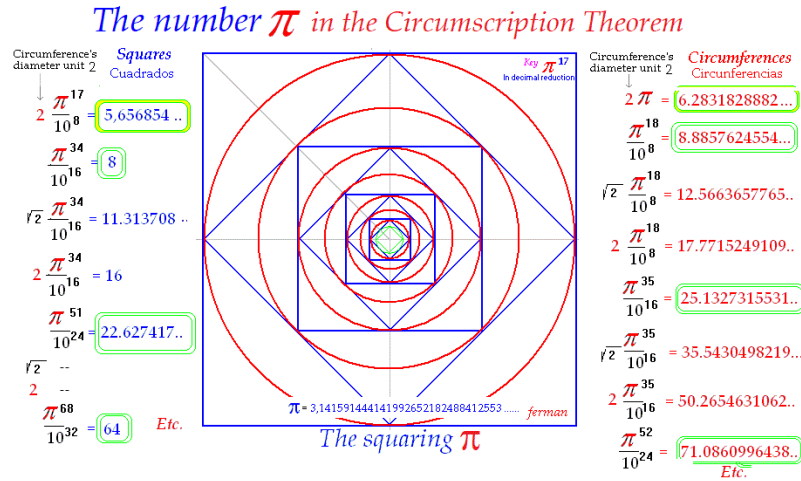
Figure 2: Geometric structure

component parameters of these circumscribed figures, to form a new figure composed 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.

3 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). 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. 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.

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The number π in the Circumscription Theorem

Squares / Cuadrados

Circumference's diameter unit 2

$$2\,\frac{\pi^{17}}{10^8} = 5{,}656854..$$

$$\frac{\pi^{34}}{10^{16}} = 8$$

$$\sqrt{2}\,\frac{\pi^{34}}{10^{16}} = 11.313708..$$

$$2\,\frac{\pi^{34}}{10^{16}} = 16$$

$$\frac{\pi^{51}}{10^{24}} = 22.627417..$$

$$\sqrt{2} \ \ --$$
$$2 \ \ --$$

$$\frac{\pi^{68}}{10^{32}} = 64 \qquad Etc.$$

Key π^{17} In decimal reduction

Circumferences / Circunferencias

Circumference's diameter unit 2

$$2\,\pi = 6.2831828882...$$

$$\frac{\pi^{18}}{10^8} = 8.8857624554...$$

$$\sqrt{2}\,\frac{\pi^{18}}{10^8} = 12.5663657765..$$

$$2\,\frac{\pi^{18}}{10^8} = 17.7715249109..$$

$$\frac{\pi^{35}}{10^{16}} = 25.1327315531..$$

$$\sqrt{2}\,\frac{\pi^{35}}{10^{16}} = 35.5430498219...$$

$$2\,\frac{\pi^{35}}{10^{16}} = 50.2654631062..$$

$$\frac{\pi^{52}}{10^{24}} = 71.0860996438..$$
$$Etc.$$

π = 3,14159144414199265218248841 2553 ..... *ferman*

The squaring π

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"

The correct number Pi must satisfy the exponential property in the circumscription of regular figures. The squaring Pi fulfills this property, but the algorithmic pi does not.

ferman 2009

Figure 3: Circumscription Theorem

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. 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 (fig.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.

$$2\sqrt{2} = f(Pi)$$

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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.

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 is Sqrt2, Then, given the first circumscribed square to the circumference unit that is 8, we have that the following squares are:

$$8\sqrt{2}^n = 11.313078...; 16; 22.627417...; 32, etc.$$

But, not only this function (Sqrt2) helps 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 lacks 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. 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, (Sqrt2).

Below page (figure 4), 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:

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

Deviation of the algorithmic Pi in the successive circumscriptions of squares and circumferences. *ferman 2009*

Squaring Pi
$\pi = f(\sqrt{2})$

Exact quadrature $\Downarrow$ Algorithmic Pi (current) Deviation $\Downarrow$

Circumferences:
(Pi^18)/(10^8) = 8.88576245.....   With Pi algorithmic =   8.88582403 .....
(Pi^35)/(10^16) = 25.13273155....   With Pi algorithmic = 25.13307020 ....
(Pi^52)/(10^24) = 71.08609964 ...   With Pi algorithmic = 71.08752272.....

In squares:
(Pi^34)/(10^16) = 8 ....With Pi algorithmic =   8.0001047 ...
(Pi^51)/(10^24) = 22.627417....   With Pi algorithmic = 22.62786126 ...
(Pi^68)/(10^32) = 64 ....With Pi algorithmic =   64.0016754...
(Pi^102)/(10^48) = 512 .... With Pi algorithmic = 512.0201055....
(Pi^136)/(10^64) = 4096 ....With Pi algorithmic = 4096.214460...
(Pi^170)/(10^80) = 32.768 ....With Pi algorithmic = 3270.1446202 ....

Figure 4: Deviation Algorithm

Where (d) is the diametre of the circumference.

The exponent N = 8 is equal to the number of powers used to obtain 2 x Sqrt2 by the Pythagorean Theorem.

And the 17 root. = 2n + 1, neccessary to the relation between the curve parametar (Pi, or semicircumference) and the straight parameters.

Development is shown in the diagram Fig. 6. (Pythatorean 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 3. 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.

Therefore, I understand that the algorithmic Pi cannot be the exact Pi, while the Squaring Pi seems to be.

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 $(Sqrt2)^n and (f(Pi))^n$
, 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 x Sqrt2), and vice versa, 2 x Sqrt2 = f(Pi).

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

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

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.

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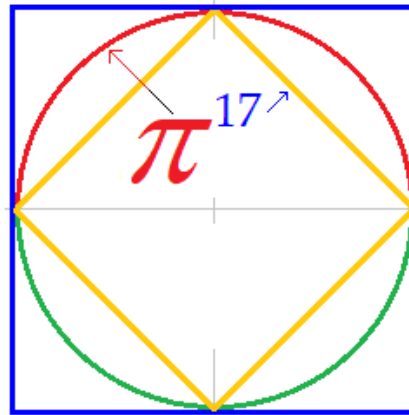Figure 5: Series for Pi

Figure 6: Pythagorean adjust for Pi

Figure 7: Fable for Pi

Logo for π $\Rightarrow$

π^{17^n}

Formula for
successive
circumsciption
of squares and
circumferences
amog them.

π^{17}

- 17 is the minimum exponent that squares the number Pi with the
parameters of the circumference such as radius, diameter, inscribed
and circumscribed squares, diagonals, etc.   *ferran 2009*
- Successive power (n) functions of this exponent give us all the
squares and circumferences circumscribed among them.

Figure 8: Logo for Pi