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Constructing mathematical formulas in a simple way, such as Neper or generalized numbers, or representations of incomensurabilities, a possible path in mathematics and differential calculus and algebra.

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Summary:

The article is based on presenting some types of formulas that determine the meeting of numbers, in this case relating roots, such as the square root of 2($\sqrt{2}$), or $\sqrt{3}$ or infinite, $\sqrt{z}$, with $z \in$ □ , in this case the integers, but can be extended □ ,□ ,□ *and* □ . Through its complement, increment, iterating the number in the sequence 4,5,6,7,8,9..., or infinite numbers belonging to □ , in summation form. Presenting a program that calculates for all roots and other programs with different possibilities and calculations and their appropriate formulas and their appropriate relationships presented and as is, this shows the possibility of building programming for the study and finding of metrics for the different areas of science and mathematics how to find formulas, to expose the analogy for a possible abstraction, Euler's Neper number is a good starting point, so right at the beginning the article was already published prematurely, critical suggestions, just get in touch contact, as the bulk of the theory is under work. With this we represent incommensurability through mathematical metrics, creating formula patterns.

Keywords: Formulas, Mathematics Metrics, Representation of Incomensurabilities.

Introduction:

Initially, the idea was to work with the construction of roots and their understanding, my work focused on number theory, starting from the incommensurability and commensurability of irrational and rational numbers, this article is a brief appendix to my study of the aforementioned issue, Coming to this “observation appendix” published here, it is worth making an analogy with Euler's Neper number for better abstraction. Neper's number, which is usually represented by the letter e, owes its name to the Scottish mathematicianJohn Neper(1550-1617) and the designation and to the Swiss mathematicianLeonhard Euler(1707-1783). It is thought that the choice of symbol may be due to the fact that it is the first letter of the word "exponential".inNeper is a constant that appears in several scientific applications. Its value is found, for example, when calculating the limit of succession $\left(1+\frac{1}{x}\right)^{x}$. The value of this limit is an irrational number (it is also transcendent, since it is not a solution to any algebraic equation of rational coefficients). Neper's number, written to ten decimal places, is e = 2.7182818285 (the last decimal place results from rounding).

In Nature, the Neper number appears, for example, associated with radioactive disintegration. A radioactive substance disintegrates spontaneously according to a law of exponential decrease given by the expression m = m0e-kt, where m0 is the initial mass, k is a positive constant that depends on the substance in question, and t is the time in years. The number e also has practical importance in other areas such as economics, engineering, biology or sociology, for example.[1][2]

Relevant fact of the article for the study of the construction of mathematical formulas. A fact that must be considered is exposed in chapter 7 of the book Ian Stewart, the greatest mathematical problems, just to keep in mind, Fermat's Last Theorem, or simply in mathematical algebra which are algebraic rings, of which the ring consists , ring of algebraic integers for the polynomial $x^2 - 15$. In it, the number 10 has two different factorizations.[4]

$$10 = 2 \times 5 = \left(5 + \sqrt{15}\right) \times \left(5 + \sqrt{15}\right)$$

All four factors $2, 5, \left(5 + \sqrt{15}\right)$ e $\left(5 + \sqrt{15}\right)$ primes can be proven, that is, they do not have their own divisors, prove:

We present the standard:

$$N\left(a + b\sqrt{15}\right) = a^2 - 15b^2$$

Which has the delightful property:

$$N(xy) = N(x)N(y)$$

Then

$$N(2) = 4N(5) = 25N\left(5 + \sqrt{15}\right) = 10N\left(5 - \sqrt{15}\right) = 10$$

Any proper divisor of one of these four numbers must have norm 2 or 5 (proper divisors of their norms). But the equations $a^2 - 15b^2 = 2$ It is $a^2 - 15b^2 = 5$ There are no complete solutions. Therefore, there are no proper divisors.[4] Liouville, Kummer and Lame extended algebraic rings.

Finishing with Plato, who was dualist in two aspects: he believed that the human being is made up of body and soul and that the world is made up of two realities, particular objects and ideas. Let's call these distinct realities the world of ideas and the sensible world. The first, naturally, because it is composed of ideas and the second because we know particular objects through sensation. In other words, we know these objects through vision, taste, smell, hearing or touch.[4][5]

Development:

The first formula found as an example consists of the program below, only the calculation of the square root, and subsequently the increment “pp”, which finds the form of integers, approximate, given the historical mathematical context it is a fact to note that an analysis needs to be expanded, as it covers numbers, sums, productions and the like, in the context of Gauss, Euler and Legendre, as well as the abstract algebra of Galois and the Logical Mathematics of Kurt Godel, concomitantly with the mathematics of number theories that developed from Alan Turing and Von Neumann. Then given the program:

The program consists of calculating:

$$a(i,j)=(i)^{\frac{1}{j}}$$

Which is the different roots, and the increment that generates the formula:

$$r(i,o)=a(i,j)+pp$$

```
!!!STARTING THE PROGRAM
ROOT FORMULA PROGRAM
IMPLICIT NONE
!!!DEFINING THE VARIABLES AND THEIR PRECISIONS
REAL*4 a,b,c,d,e,f,g,p,zz
DOUBLE PRECISION u,w ,rr,t,pp ,tt
integer i,j,h,hh,k,kk ,q ,r ,z , jj, o ,ii ,zzz
!!!DEFINING THE DIMENSIONS
dimension a(1000,1000),b(1000,1000), c(10000,10000), d(10000,10000), rr(10000,10000), t(10000,10000)
dimension e(10000,10000),f(10000,10000),g(1000,1000),w(1000,1000),u(1000,1000)
!!!SAVING THE FILES
open (369, FILE='formula.txt',Status='replace')
open (936, FILE='formulaA.txt',Status='replace')
!!!LOOP TO CALCULATE THE SQUARE ROOT, SIMPLE
do j=1,100
!!! PRINT J IS THE SCORE OF THE TIE PROGRAM
print*, j
do i=1,100
p=j
a(i,j)=i**(1/p)
!!!RETURN FROM SAVING VARIABLE CALCULATIONS
WRITE(369,*) '****************************************'
WRITE(369,*) i,j , a(i,j)
WRITE(369,*) '****************************************'
pp=0
from o=1,10000 !!! Or any value you want to measure
tt=o
!!!INCREMENT AND RETURN OF SAFETY
```

rr(i,o)=a(i,j)+pp
WRITE(936,*) '**'
WRITE(936,*) i,j , a(i,j),rr(i,o),o
WRITE(936,*) a(i,j),pp ,o
WRITE(936,*) '**'
pp=1.0/tt+pp
!!!FINISHING
end of
end of
enddo
pause
END PROGRAM

NOTE: SQUARE ROOTS HAVE BEEN ADDRESSED BELOW, THE PROGRAM EXTENDS AND GENERALIZES TO INFINITE ROOTS, WHICH ONLY DEPENDS ON THE JEI PARAMETER OF THE INITIAL LOOPS.

The output is nothing more than just the WRITE(936,*) file, in which I made a selection:

i j a(i,j) r(i,o) o
a(i,j) pp o
****
2 2 1.4142135 3.4975468715031939
1.4142135 2.0833333333333330 5(AQUI É A VARIAVEL o QUE É O INCREMENTO)
****
****
****
****
2 2 1.4142135 4.0070706810270034
1.4142135 2.5928571428571425 8
****
****
****
****
2 2 1.4142135 4.9619531953135425
1.4142135 3.5477396571436821 20
****
****
2 2 1.4142135 5.0119531953135432
1.4142135 3.5977396571436819 21
****
****
2 2 1.4142135 5.0595722429325907
1.4142135 3.6453587047627294 22
****

****
2 2 1.4142135 5.9896439319141281
1.4142135 4.5754303937442673 55
****
****
2 2 1.4142135 6.0078257500959467
1.4142135 4.5936122119260858 56
****
****
2 2 1.4142135 6.0256828929530899
1.4142135 4.6114693547832291 57
****
****
2 2 1.4142135 6.0432267526022123
1.4142135 4.6290132144323515 58
****
****
2 2 1.4142135 6.9987274601470748
1.4142135 5.5845139219772140 150
****
****
2 2 1.4142135 7.0053941268137416
1.4142135 5.5911805886438808 151
****
****
2 2 1.4142135 7.0120166433700328
1.4142135 5.5978031052001720 152
****
****
2 2 1.4142135 7.0185955907384541
1.4142135 5.6043820525685932 153
****
****
2 2 1.4142135 7.0251315384508723
1.4142135 5.6109180002810115 154
****
****
****
****
2 2 1.4142135 8.0063663548382547
1.4142135 6.5921528166683938 410
****
****
2 2 1.4142135 8.0088053792284981
1.4142135 6.5945918410586373 411
****
****
2 2 1.4142135 8.0112384692528291

1.4142135		6.5970249310829683	412	
*************************************				
*************************************				
2	2	1.4142135	8.0136656537188493	
1.4142135		6.5994521155489876	413	
*************************************				
*************************************				
2	2	1.4142135	8.0160869612249019	
1.4142135		6.6018734230550411	414	
*************************************				

It can be summarized in the formulas:

$$4=\left(\sqrt{2}+\sum_{x=1}^{7=8-1}\frac{1}{x}\right)$$

$$5=\left(\sqrt{2}+\sum_{x=1}^{20=21-1}\frac{1}{x}\right)$$

$$6=\left(\sqrt{2}+\sum_{x=1}^{55=56-1}\frac{1}{x}\right) \quad 55=\frac{20}{7}\times 20\approx 57$$

$$7=\left(\sqrt{2}+\sum_{x=1}^{150}\frac{1}{x}\right) \quad 150=\frac{55}{20}\times 55\approx 151$$

$$8=\left(\sqrt{2}+\sum_{x=1}^{409}\frac{1}{x}\right) \quad 409=\frac{150}{55}\times 150\approx 409$$

Which is the fraction relationship, that is, there is a fractional relationship for the sum indices, which can be extended even to a product, which was Leonard Euler's approach, in relation to Riemann's Zeta function. Thus we notice a fractional relationship related to the square root in question and the number of increments necessary for the calculation. It is noted that as do o=1,10000!!! Or any value you want to measure, The**output of the file i=2 and j=2, OR, i=4 and j=4, is in the file out_41 and out_122 which will require PowerShell. (In this case ReadCount 100000). For the case**do o=1,1000!!! Or any value you want to measure**the output i=4 and j=4 is in the file out_13, which is the square root of 1.41.** Given that the formulas are equal to a number with a slight deviation, there may be a factor for generalizing a general formula. And they show succession relationships analogous to Lucas and Fibonacci sequences, which is why there is great interest in analyzing the distribution of prime numbers.

Due to the limit conditions imposed on the loops, it is probably necessary to split the filename.txt files. For this, it is necessary, on Windows, to use PowerShell with the following command, changing the name of the filename.txt file, to the name of the file that you will output the OPEN command of the FORTRAN program algorithm:

```
$i=0; Get-Content d:\temp\teste.txt -ReadCount 100000 | %{$i++; $_ | Out-File d:\temp\out_$i.txt
```

ReadCount 100000, is the generated file, for example with 100 lines, just a note, it is necessary to access the appropriate folder in Windows using the cd command, and the dir command, may be necessary to list the files and directories that are present in the corresponding folder.

Fact to note is that if pp=0 we have the situation above, if pp=1 there is a small change in precision in the table below:

i j a(i,j) r(i,o) o
a(i,j) pp o
****
****
2 2 1.4142135 2.4142135381698608 1
1.4142135 1.0000000000000000 1
****
****
2 2 1.4142135 3.4142135381698608 2
1.4142135 2.0000000000000000 2
****
****
2 2 1.4142135 3.9142135381698608 3
1.4142135 2.5000000000000000 3
****
****
2 2 1.4142135 4.2475468715031948 4
1.4142135 2.8333333333333335 4
****
****
2 2 1.4142135 4.4975468715031948 5
1.4142135 3.0833333333333335 5
****
****
2 2 1.4142135 4.6975468715031941 6

1.4142135 3.2833333333333337 6
****
****
2 2 1.4142135 4.8642135381698610 7
1.4142135 3.4500000000000002 7
****
****
2 2 1.4142135 5.0070706810270043 8
1.4142135 3.5928571428571430 8
****
****

This does not mean that it is less precise, as only the precision of 4 changes, however 5 is exactly at 8, that is, the formula should be analyzed starting from 5, just a question of approach to the variable pp=0 or pp= 1, or another value, highlighting that the increment is from the beginning of the numbering. The root exit is in the appendix.

It is only necessary to analyze the best selection of the end of the increment. This formula is for the square root of 2. For the square root of 3, just note that to find the file below just search for the indices i=3 and j=2, or i=9 and j=4:

i j a(i,j) r(i,o) o
a(i,j) pp o
****
****
3 2 1.7320508 4.0153841098149616
1.7320508 2.2833333333333332 6
****
****
3 2 1.7320508 4.9836131030439557
1.7320508 3.2515623265623268 15
****
****
3 2 1.7320508 5.0502797697106221
1.7320508 3.3182289932289937 16
****
****
9 4 1.7320508 5.9855938154180039
1.7320508 4.2535430389363755 40
****
****
3 2 1.7320508 6.0105938154180043
1.7320508 4.2785430389363759 41
****
****
3 2 1.7320508 6.0349840593204434

1.7320508 4.3029332828388149 42
****
****
3 2 1.7320508 6.0587935831299671
1.7320508 4.3267428066483387 43
****
****
3 2 1.7320508 6.9774151000563096
1.7320508 5.2453643235746812 107
****
****
3 2 1.7320508 6.9867608944488326
1.7320508 5.2547101179672042 108
****
****
3 2 1.7320508 6.9960201537080922
1.7320508 5.2639693772264637 109
****
****
3 2 1.7320508 7.0051944656346974
1.7320508 5.2731436891530690 110
****
****
3 2 1.7320508 7.0142853747256062
1.7320508 5.2822345982439778 111
****
****
3 2 1.7320508 7.9911445643463859
1.7320508 6.2590937878647575 294
****
****
3 2 1.7320508 7.9945459248906037
1.7320508 6.2624951484089753 295
****
****
3 2 1.7320508 7.9979357553990784
1.7320508 6.2658849789174500 296
****
****
3 2 1.7320508 8.0013141337774556
1.7320508 6.2692633572958281 297
****
****
3 2 1.7320508 8.0046811371444591
1.7320508 6.2726303606628315 298
****
****

$$4=\sqrt{3}+\sum_{x=1}^{5}\frac{1}{x}$$

$$5=\sqrt{3}+\sum_{x=1}^{15}\frac{1}{x}$$

$$6=\sqrt{3}+\sum_{x=1}^{40}\frac{1}{x} \qquad 40=\frac{15}{5}\times 15\approx 45$$

$$7=\sqrt{3}+\sum_{x=1}^{109}\frac{1}{x} \qquad 109=\frac{40}{15}\times 40\approx 107$$

$$8=\sqrt{3}+\sum_{x=1}^{296}\frac{1}{x} \qquad 296=\frac{109}{40}\times 109\approx 297$$

Note that the patterns fit infinitely as summation formulas, as the numbers increase the square root factors increase, as the square root value is greater the final summation factor decreases. And they show succession relationships analogous to Lucas and Fibonacci sequences, which is why there is great interest in analyzing the distribution of prime numbers. Emphasizing that $\sqrt{4}=2$, we would have:

****
****
4 2 2.0000000 2.0000000000000000
2.0000000 1
****
****
4 2 2.0000000 3.0000000000000000
2.0000000 1.0000000000000000 2
****
****
4 2 2.0000000 5.0198773448773446
2.0000000 3.0198773448773446 12
****

****
4 2 2.0000000 5.9949871309203910
2.0000000 3.9949871309203906 31
****
****
4 2 2.0000000 6.0272451954365200
2.0000000 4.0272451954365200 32
****
****
4 2 2.0000000 6.9900200799090815
2.0000000 4.9900200799090815 83
****
****
4 2 2.0000000 7.0020682726801660
2.0000000 5.0020682726801660 84
****
****

In other words, the same pattern is repeated for formulas, showing that both real, rational and irrational numbers the formula and the program extend.

Is for $\sqrt{11}$, in output oct_45, for do o=1,10000:

i j a(i,j) r(i,o) o
a(i,j) pp o
****
****
11 2 3.3166249 6.0344820226941787
3.3166249 2.7178571428571425 9
****
****
11 2 3.3166249 6.9619835845997660
3.3166249 3.6453587047627294 22
****
****
11 2 3.3166249 7.0074381300543109
3.3166249 3.6908132502172748 23
****
****
11 2 3.3166249 7.9964952927887722
3.3166249 4.6798704129517361 61
****
****
11 2 3.3166249 8.0128887354117229
3.3166249 4.6962638555746867 62
****

****

$$6=\sqrt{11}+\sum_{x=1}^{8}\frac{1}{x}$$

$$7=\sqrt{11}+\sum_{x=1}^{22}\frac{1}{x}$$

$$8=\sqrt{11}+\sum_{x=1}^{60}\frac{1}{x} \qquad 60=\frac{22}{8}\times 22\approx 60$$

Note that the indices approach and decrease as the whole number increases, for example, the numbers 8 and 7.

To diversify, as an example, another program for analysis, of the types that can be addressed for the study of relationships and creation of mathematical metrics, in the appendix and if necessary, the truncation of values [6].

The program consists of calculating:

$$a(i,j)=(i)^{\frac{1}{j}}$$

Which is the different roots, and the increment that generates the formula:

$$r(i,o)=a(i,j)+pp,\ where\ \ pp=kk*\left(\frac{1}{tt}\right)+pp$$

!!!STARTING THE PROGRAM
ROOT FORMULA PROGRAM
IMPLICIT NONE
!!!DEFINING THE VARIABLES AND THEIR PRECISIONS
REAL*4 a,b,c,d,e,f,g,p,zz
DOUBLE PRECISION u,w ,rr,t,pp ,tt

```
integer i,j,h,hh,k,kk ,q ,r ,z , jj, o ,ii ,zzz
!!!DEFINING THE DIMENSIONS
dimension a(1000,1000),b(1000,1000), c(10000,10000), d(10000,10000), rr(10000,10000), t(10000,10000)
dimension e(10000,10000),f(10000,10000),g(1000,1000),w(1000,1000),u(1000,1000)
!!!SAVING THE FILES
open (369, FILE='formula.txt',Status='replace')
open (936, FILE='formulaA.txt',Status='replace')
!!!LOOP TO CALCULATE THE SQUARE ROOT, SIMPLE
do j=1,100
!!! PRINT J IS THE SCORE OF THE TIE PROGRAM
print*, j
do i=1,100
p=j
a(i,j)=i**(1/p)
!!!RETURN FROM SAVING VARIABLE CALCULATIONS
WRITE(369,*) '****************************************'
WRITE(369,*) i,j , a(i,j)
WRITE(369,*) '****************************************'
of kk=1,20
pp=00!!! Or any value you want to measure
do o=1, 1000
tt=o
!!!INCREMENT AND RETURN OF SAFETY
rr(i,o)=a(i,j)+pp
WRITE(936,*) '****************************************'
WRITE(936,*) i,j , a(i,j),rr(i,o),o
WRITE(936,*) a(i,j),pp ,o ,kk
WRITE(936,*) '****************************************'
pp=kk*(1.0/tt)+pp
!!!FINISHING
enddo
end of
end of
enddo
pause
END PROGRAM
```


The output for the square root of 2 is:

```
 i            j      a(i,j)                    r(i,o)                  o
   a(i,j)                   pp                                   o       kk
 **************************************
  **************************************
           2            2   1.4142135        5.0808802048365269                4
   1.4142135        3.6666666666666665                4            2
  **************************************
  **************************************
           2            2   1.4142135        5.9808802048365273                6
```

1.4142135	4.5666666666666664	6	2	
*************************************				
*************************************				
2	2	1.4142135	7.0721500461063682	10
1.4142135	5.6579365079365074	10	2	
*************************************				
*************************************				
2	2	1.4142135	8.0506715246278482	16
1.4142135	6.6364579864579873	16	2	
*************************************				
*************************************				
2	2	1.4142135	9.0461298936768735	26
1.4142135	7.6319163555070135	26	2	
*************************************				
*************************************				

Therefore, the metric of the formulas becomes:

$$5 = \left(\sqrt{2} + \sum_{x=1}^{3} \frac{1}{x} \right)$$

$$6 = \left(\sqrt{2} + \sum_{x=1}^{5} \frac{1}{x} \right)$$

$$7 = \left(\sqrt{2} + \sum_{x=1}^{9} \frac{1}{x} \right) \qquad 9 = \frac{5}{3} \times 5 \approx 8$$

$$8 = \left(\sqrt{2} + \sum_{x=1}^{15} \frac{1}{x} \right) \qquad 15 = \frac{9}{5} \times 9 \approx 16$$

$$9 = \left(\sqrt{2} + \sum_{x=1}^{25} \frac{1}{x} \right) \qquad 25 = \frac{15}{9} \times 15 \approx 25$$

It is noted that with the multiplication of only one factor, for example, the variable, kk=2, the final index of the sum, which was in the parameter pp with a normal increment, for example, in 8, drops from 409 to 15, emphasizing that with the increase of the variable kk, which in the first presentation, we considered kk=1, the neutral element of the multiplication, as the parameter kk increases the smaller numbers disappear, as in kk=2, we will not have the approximate precision of 4, and so onwards for larger kk, seen with the decrease in the final summation sigma index. It should be noted that this can extend to the study of the behavior of various types of numbers such as remarkable products, compounds, primes, as well as the opportune algebra in its diversity of numbers for analysis and study.

Conclusion:

It is concluded that in an easy and simple way you can find the first starting point of a formula, the big question would be the generalization of the situation, but the intention of the article showed how there is a possibility of finding patterns in algebra and mathematical sciences, in simple computational resolutions, such as Fortran or Matlab, a few minutes of reasoning in the output of a few minutes or hours of compiling the program deduces some parameterization of nature, which is described through mathematical formulas, which can represent some representation in the natural sciences, for example Neper's number represented, therefore, how Neper's number has come a long way in Differential Calculus in its analysis, the same applies to the rest in which it is intended to be studied. Given that the formulas are equal to a number with a slight deviation, there may be a factor for generalizing a general formula. And they show succession relationships analogous to Lucas and Fibonacci sequences, which is why there is great interest in analyzing the distribution of prime numbers.

Appendix:

Root exit:

And, the exit from the roots to emphasize the generalization of the program and the formula:

****
****
1 2 1.0000000
****
****
2 2 1.4142135
****
****
3 2 1.7320508
****
****
4 2 2.0000000
****
****
5 2 2.2360680
****
****
6 2 2.4494898
****

****
7 2 2.6457512
****
****
8 2 2.8284271
****
****
9 2 3.0000000
****
****
10 2 3.1622777
****
****
11 2 3.3166249
****
****
1 3 1.0000000
****
****
2 3 1.2599211
****
****
3 3 1.4422495
****
****
4 3 1.5874010
****
****
5 3 1.7099760
****
****
6 3 1.8171207
****
****
7 3 1.9129312
****
****
8 3 2.0000000
****
****
9 3 2.0800838
****
****
10 3 2.1544347
****
****
11 3 2.2239802
****

****

Program option:

ROOT PROGRAM
IMPLICIT NONE
REAL*4 a,b,c,d,e,f,g,p,zz
DOUBLE PRECISION u,w ,rr,t,pp ,tt
integer i,j,h,hh,k,kk ,q ,r ,z , jj, o
dimension a(1000,1000),b(1000,1000), c(10000,10000), d(10000,10000), rr(10000,10000), t(10000,10000)
dimension e(10000,10000),f(10000,10000),g(1000,1000),w(1000,1000),u(1000,1000)
open (369, FILE='saida77.txt',Status='replace')
open (368, FILE='saida777.txt',Status='replace')
do j=1,100
print*, j
do i=1,100
p=j
a(i,j)=i**(1/p)
WRITE(369,*) '**************************************'
WRITE(369,*) i, z,j , a(i,j)
WRITE(369,*) '**************************************'
pp=0
do o=1, 1000
tt=o
rr(i,o)=a(i,j)+pp
WRITE(368,*) '**************************************'
WRITE(368,*) i,j,z , a(i,j),rr(i,o),pp,o
WRITE(368,*) '**************************************'
!!!WHAT IS IT DIFFERENT BECAUSE IT IS NOT INCREMENTAL AND IS A DIRECT DIVISION
pp=1.0/tt
enddo
enddo
enddo
pause
END PROGRAM

The output is for square root of 2, for example i=8 and j=6, which is the same as i=2 and j=2:

****
****
8 6 1.4142135 1.4142135381698608 1
****
****
8 6 1.4142135 2.4142135381698608 1.0000000000000000 2
****
****

8 6 1.4142135 1.9142135381698608 0.50000000000000000 3
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8 6 1.4142135 1.7475468715031941 0.33333333333333331 4
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8 6 1.4142135 1.6642135381698608 0.25000000000000000 5
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8 6 1.4142135 1.6142135381698608 0.20000000000000001 6
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8 6 1.4142135 1.5808802048365276 0.16666666666666666 7
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8 6 1.4142135 1.5570706810270036 0.14285714285714285 8
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8 6 1.4142135 1.5392135381698608 0.12500000000000000 9
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8 6 1.4142135 1.5253246492809720 0.11111111111111110 10
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8 6 1.4142135 1.5142135381698609 0.10000000000000001 11
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8 6 1.4142135 1.5051226290789517 9.0909090909090116E-002 12
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8 6 1.4142135 1.4975468715031941 8.3333333333333287E-002 13
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8 6 1.4142135 1.4911366150929377 7.6923076923076927E-002 14
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8 6 1.4142135 1.4856421095984322 7.1428571428571425E-002 15
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8 6 1.4142135 1.4808802048365275 6.6666666666666657E-002 16
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8 6 1.4142135 1.4767135381698608 6.2500000000000000E-002 17
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8 6 1.4142135 1.4730370675816256 5.8823529411764705E-002 18
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8 6 1.4142135 1.4697690937254164 5.55555555555555525E-002 19
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8 6 1.4142135 1.4668451171172292 5.26315789473684181E-002 20
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8 6 1.4142135 1.4642135381698609 5.00000000000000028E-002 21
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8 6 1.4142135 1.4618325857889085 4.76190476190476164E-002 22
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8 6 1.4142135 1.4596680836244063 4.54545454545454558E-002 23
****
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8 6 1.4142135 1.4576917990394260 4.34782608695652162E-00224
8 6 1.4142135 1.4350468715031941 2.08333333333333322E-00249
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****
8 6 1.4142135 1.4346217014351670 2.04081632653061208E-002 50
****
****
8 6 1.4142135 1.4342135381698609 2.00000000000000004E-002 51
****
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8 6 1.4142135 1.4338213813071157 1.96078431372549017E-00252
8 6 1.4142135 1.4308802048365274 1.66666666666666664E-00261
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8 6 1.4142135 1.4306069807928117 1.63934426229508205E-002 62
****
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8 6 1.4142135 1.4303425704279253 1.61290322580645157E-002 63
****
****
8 6 1.4142135 1.4300865540428767 1.58730158730158721E-002 64
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8 6 1.4142135 1.4298385381698608 1.56250000000000000E-002 65
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It stabilizes at approximately 1.425, it is noted that in this example in the first values we have the chance of finding fractions, on a simple scientific calculator, or simply by placing a command loop with truncation in which the terms are equal, [6], and as examples we can make programs like this:

Another option:

```
ROOT PROGRAM
IMPLICIT NONE
REAL*4 a,b,c,d,e,f,g,p,zz
DOUBLE PRECISION u,w ,rr,t,pp ,tt
integer i,j,h,hh,k,kk ,q ,r ,z , jj, o
dimension a(1000,1000),b(1000,1000), c(10000,10000), d(10000,10000), rr(10000,10000), t(10000,10000)
dimension e(10000,10000),f(10000,10000),g(1000,1000),w(1000,1000),u(1000,1000)
open (369, FILE='final.txt',Status='replace')
open (368, FILE='finalcc.txt',Status='replace')
do j=1,100
print*, j
do i=1,100
p=j
a(i,j)=i**(1/p)
WRITE(369,*) '****************************************'
WRITE(369,*) i, z,j , a(i,j)
WRITE(369,*) '****************************************'
pp=0
do o=1, 10000
do kk=1,100
tt=o
rr(i,o)=a(i,j)+pp
WRITE(368,*) '****************************************'
WRITE(368,*) i,j,z , a(i,j),rr(i,o),pp,o
WRITE(368,*) '****************************************'
!!!It only changes here by multiplying the variable kk
pp=kk*(1.0/tt)
enddo
enddo
enddo
enddo
pause
END PROGRAM
```

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[3]Ian Stewart,The greatest math problems of all time– Rio de Janeiro: Zahar, 2014. (3. Puzzle of Pi, page 58), Chapter 7, Fermat's Last Theorem, page 145, for theoretical reference.

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[5]Plato.The Republic.São Paulo, Editora Scipione, 2002.

[6]
globalscientificjournal.com/researchpaper/In_Search_of_Series_to_Calculate_the_Number_Pi_and_its_Most_Exact_Value_and_With_the_Largest_Number_of_Decimal_Places_.pdf

Theory For the construction of numbers and incommensurability, there are several and variable references in mathematics:

[7] BOYER, CB (1996). History of Mathematics. Edgard Blücher publisher. [Sl: sn]

[8] ROQUE, Tatiana. History of mathematics: a critical view, undoing myths and legends. Rio de Janeiro: Zahar, 2012.