New mathematical connections between the possible developments and solutions of Ramanujan's equations and various parameters of Particle Physics and Cosmology. XI

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Abstract

In this research thesis, we have analyzed further Ramanujan formulas and described further possible mathematical connections with some parameters of Particle Physics and Cosmology

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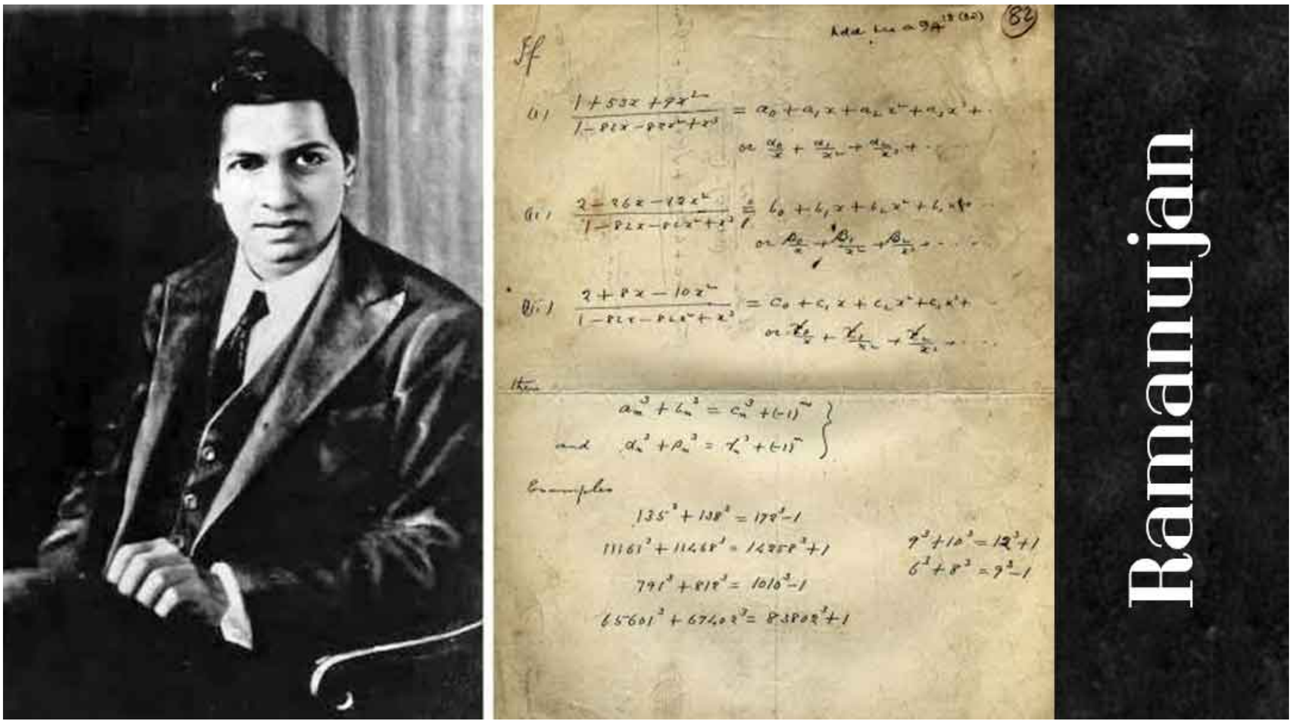


https://myindiafacts.online/30-ramanujan-random-facts-mathematical-genius/

Summary

In this research thesis, we have analyzed the possible and new connections between different formulas of Ramanujan's mathematics and some formulas concerning particle physics and cosmology. In the course of the discussion we describe and highlight the connections between some developments of Ramanujan equations and particles type solutions such as the mass of the Higgs boson, and the masses of other baryons and mesons. Moreover solutions of Ramanujan equations, connected with the masses of the π mesons (139.57 and 134.9766 MeV) have been described and highlighted. Furthermore, we have obtained also the values of some black hole entropies and the value of the Cosmological Constant.

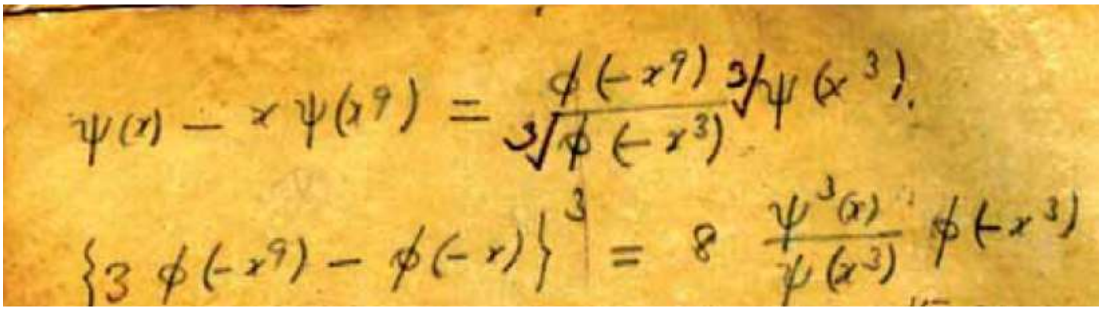
Is our opinion, that the possible connections between the mathematical developments of some Rogers-Ramanujan continued fractions, the value of the dilaton and that of "the dilaton mass calculated as a type of Higgs boson that is equal about to 125 GeV", the Higgs boson mass itself and the like-particle solutions (masses), are fundamental.

All the results of the most important connections are highlighted in blue throughout the drafting of the paper

From:

MANUSCRIPT BOOK 1 OF SRINIVASA RAMANUJAN

We have from the following functions:



$$\psi(x) - x\psi(x^9) = \frac{\phi(-x^9)}{\sqrt[3]{\phi(-x^3)}}\sqrt[3]{\psi(x^3)}$$

$$\{3\phi(-x^9) - \phi(-x)\}^3 = 8\frac{\psi^3(x)}{\psi(x^3)}\phi(-x^3)$$

That:

$$\frac{\phi(-x^9)}{\sqrt[3]{\phi(-x^3)}}\sqrt[3]{\psi(x^3)}$$

$$8\frac{\psi^3(x)}{\psi(x^3)}\phi(-x^3)$$

From the sum, we obtain:

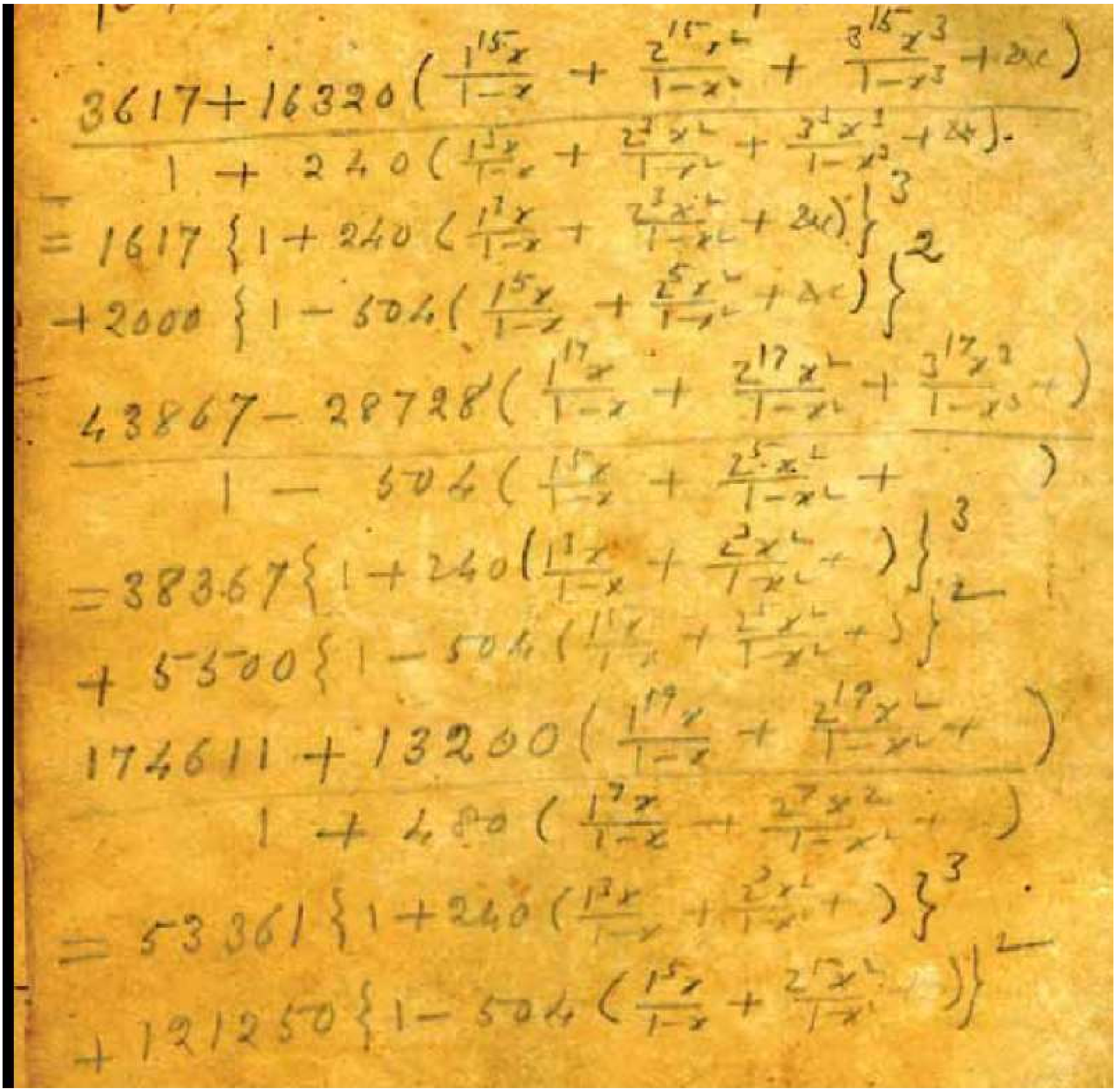
$$\frac{\phi(-x^9)}{\sqrt[3]{\phi(-x^3)}}\sqrt[3]{\psi(x^3)} + 8\frac{\psi^3(x)}{\psi(x^3)}\phi(-x^3) = -2.554635593828305*10^{15}$$

that Ramanujan has developed, as follows:

(-44370261693823-1074049339325573-1436215992808909) =

$= -2.554635593828305*10^{15}$

Indeed:



$$\frac{3617+16320\left(\frac{1^{15}x}{1-x}+\frac{2^{15}x^2}{1-x^2}+\frac{3^{15}x^3}{1-x^3}+\&c\right)}{1+240\left(\frac{1^3x}{1-x}+\frac{2^3x^2}{1-x^2}+\frac{3^3x^3}{1-x^3}+\&c\right)}$$

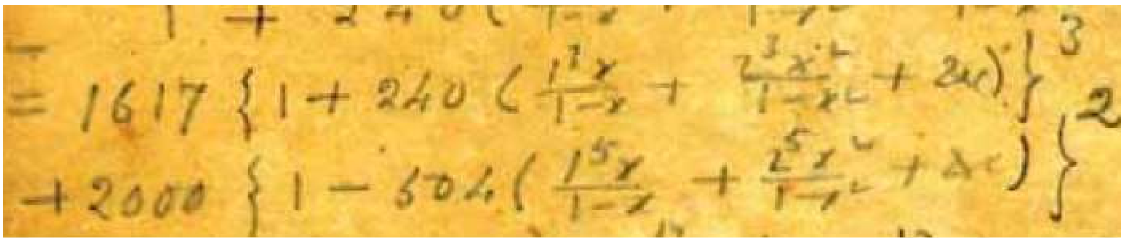
$$=1617\left\{1+240\left(\frac{1^3x}{1-x}+\frac{2^3x^2}{1-x^2}+\&c\right)\right\}^3+2000\left\{1-504\left(\frac{1^5x}{1-x}+\frac{2^5x^2}{1-x^2}+\&c\right)\right\}^2$$

$$\frac{43867-28728\left(\frac{1^{17}x}{1-x}+\frac{2^{17}x^2}{1-x^2}+\frac{3^{17}x^3}{1-x^3}+\right)}{1-504\left(\frac{1^5x}{1-x}+\frac{2^5x^2}{1-x^2}+\right)}$$

$$=38367\left\{1+240\left(\frac{1^3x}{1-x}+\frac{2^3x^2}{1-x^2}+\right)\right\}^3+5500\left\{1-504\left(\frac{1^5x}{1-x}+\frac{2^5x^2}{1-x^2}+\right)\right\}^2$$

$$\frac{174611+13200\left(\frac{1^{19}x}{1-x}+\frac{2^{19}x^2}{1-x^2}+\right)}{1+480\left(\frac{1^7x}{1-x}+\frac{2^7x^2}{1-x^2}+\right)}$$

$$=53361\left\{1+240\left(\frac{1^3x}{1-x}+\frac{2^3x^2}{1-x^2}+\right)\right\}^3+121250\left\{1-504\left(\frac{1^5x}{1-x}+\frac{2^5x^2}{1-x^2}+\right)\right\}^2$$



$$=1617\left\{1+240\left(\frac{1^3x}{1-x}+\frac{2^3x^2}{1-x^2}+\&c\right)\right\}^3+2000\left\{1-504\left(\frac{1^5x}{1-x}+\frac{2^5x^2}{1-x^2}+\&c\right)\right\}^2$$

For x = 2, we obtain:

1617(((1+240*((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)))))^3+2000(((1-504*((1^5*2)/(1-2)+(2^5*2^2)/(1-2^2)))))^2

Input:

$$1617\left(1+240\left(\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}\right)\right)^3+2000\left(1-504\left(\frac{1^5\times 2}{1-2}+\frac{2^5\times 2^2}{1-2^2}\right)\right)^2$$

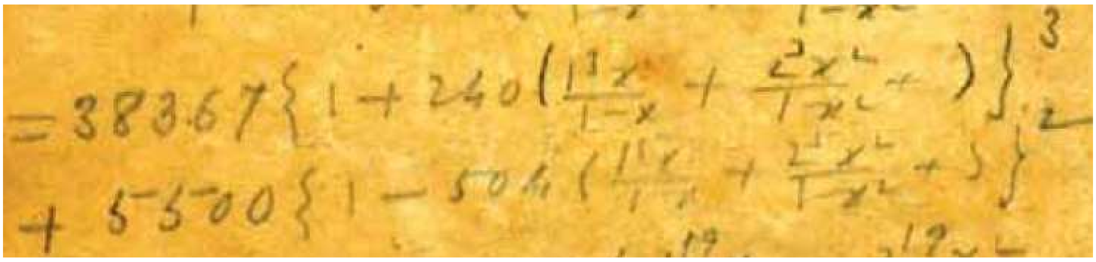
Result:

$-44\,370\,261\,693\,823$

Result:

$-4.4370261693823\times 10^{13}$

$-4.4370261693823*10^{13}$



38367(((1+240*((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)))))^3+5500(((1-504*((1^5*2)/(1-2)+(2^5*2^2)/(1-2^2)))))^2

Input:

$$38\,367\left(1+240\left(\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}\right)\right)^3+5500\left(1-504\left(\frac{1^5\times 2}{1-2}+\frac{2^5\times 2^2}{1-2^2}\right)\right)^2$$

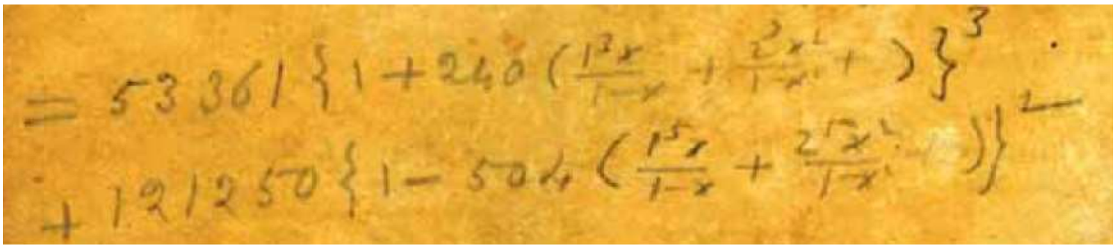
Result:

$-1\,074\,049\,339\,325\,573$

Result:

$-1.074049339325573\times 10^{15}$

$-1.074049339325573*10^{15}$



53361(((1+240*((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)))))^3+121250(((1-504*((1^5*2)/(1-2)+(2^5*2^2)/(1-2^2)))))^2

Input:

$$53\,361\left(1+240\left(\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}\right)\right)^3+121\,250\left(1-504\left(\frac{1^5\times 2}{1-2}+\frac{2^5\times 2^2}{1-2^2}\right)\right)^2$$

Result:

$-1\,436\,215\,992\,808\,909$

Result:

$-1.436215992808909\times 10^{15}$

$-1.436215992808909*10^{15}$

From the sum of the results

-44370261693823-1074049339325573-1436215992808909

we obtain:

(-44370261693823-1074049339325573-1436215992808909)

Input:

$-44\,370\,261\,693\,823-1\,074\,049\,339\,325\,573-1\,436\,215\,992\,808\,909$

Result:

$-2\,554\,635\,593\,828\,305$

Result:

$-2.554635593828305\times 10^{15}$

$-2.554635593828305*10^{15}$

From the division, we obtain:

(-1074049339325573-1436215992808909)/-44370261693823

Input:

$$-\frac{-1\,074\,049\,339\,325\,573 - 1\,436\,215\,992\,808\,909}{44\,370\,261\,693\,823}$$

Exact result:

$$\frac{193\,097\,333\,241\,114}{3\,413\,097\,053\,371}$$

Decimal approximation:

56.575400646869483075320982318124522303168096352847730243 87...

56.575400646...

Now, we have that:

1/2(1074049339325573*44370261693823)/1436215992808909

Input:

$$\frac{1}{2}\times\frac{1\,074\,049\,339\,325\,573\times 44\,370\,261\,693\,823}{1\,436\,215\,992\,808\,909}$$

Exact result:

$$\frac{3\,665\,834\,635\,227\,182\,518\,726\,156\,583}{220\,956\,306\,585\,986}$$

Decimal approximation:

$1.6590767160568050198003976042541379627949369851143603... \times 10^{13}$

$1.659076716...*10^{13}$

1/(5.391247e-44/1.616255e-35)

Where $5.391247*10^{-44}$ and $1.616255*10^{-35}$ are respectively the Planck time and the Planck length

Input interpretation:

$$\frac{1}{\frac{5.391247\times 10^{-44}}{1.616255\times 10^{-35}}}$$

Result:

$2.9979242279198115018658948477040654972773460388663327 7... \times 10^{8}$

$2.9979242279…*10^{8}$

299792422.79 a value practically equal to the speed of light c

We have that, from the above expressions:

((((-44370261693823-(((1617(((1+240*((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)))))^3)))))))/((((((1-504*((1^5*2)/(1-2)+(2^5*2^2)/(1-2^2)))))^2)))

Input:

$$\frac{-44\,370\,261\,693\,823 - 1617\left(1 + 240\left(\frac{1^3\times 2}{1-2} + \frac{2^3\times 2^2}{1-2^2}\right)\right)^3}{\left(1 - 504\left(\frac{1^5\times 2}{1-2} + \frac{2^5\times 2^2}{1-2^2}\right)\right)^2}$$

Result:

2000

2000

And:

((((-1436215992808909-(((121250(((1-504*((1^5*2)/(1-2)+(2^5*2^2)/(1-2^2)))))^2)))))))/((((((1+240*((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)))))^3)))

Input:

$$\frac{-1\,436\,215\,992\,808\,909 - 121\,250\left(1 - 504\left(\frac{1^5\times 2}{1-2} + \frac{2^5\times 2^2}{1-2^2}\right)\right)^2}{\left(1 + 240\left(\frac{1^3\times 2}{1-2} + \frac{2^3\times 2^2}{1-2^2}\right)\right)^3}$$

Result:

53 361

53361

Thence:

(((1/(5.391247e-44/1.616255e-35))))*(53361+2000-21)

Where 21 is a Fibonacci number

Input interpretation:

$$\frac{1}{\frac{5.391247\times 10^{-44}}{1.616255\times 10^{-35}}}\,(53\,361 + 2000 - 21)$$

Result:

$1.659051267730823685132586208719429846193283297908628 5\ldots \times 10^{13}$

$1.65905126773\ldots * 10^{13}$

Inserting the value of c (speed of light), we obtain:

(299792458)*(53361+2000-21)

Input:

$299\,792\,458\,(53\,361 + 2000 - 21)$

Result:

$16\,590\,514\,625\,720$

Scientific notation:

$1.659051462572 \times 10^{13}$

$1.659051462572*10^{13}$

x*(53361+2000-21) = 1.659051462572e+13

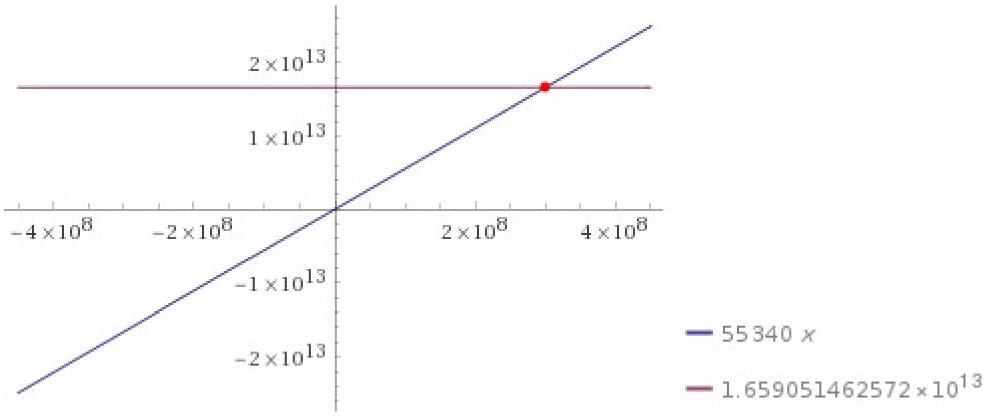
Input interpretation:

$x\,(53\,361 + 2000 - 21) = 1.659051462572 \times 10^{13}$

Result:

$55\,340\,x = 1.659051462572 \times 10^{13}$

Plot:



Alternate form:

$55\,340\,x - 1.659051462572 \times 10^{13} = 0$

Solution:

$x = 299\,792\,458$

Integer solution:

$x = 299\,792\,458$

299792458

Without the number 21, we obtain:

(299792458)*(53361+2000)

Input:

$299\,792\,458\,(53\,361+2000)$

Result:

$16\,596\,810\,267\,338$

Scientific notation:

$1.6596810267338\times 10^{13}$

$1.6596810267338*10^{13}$

And:

x*(53361+2000) = 1.659051462572e+13

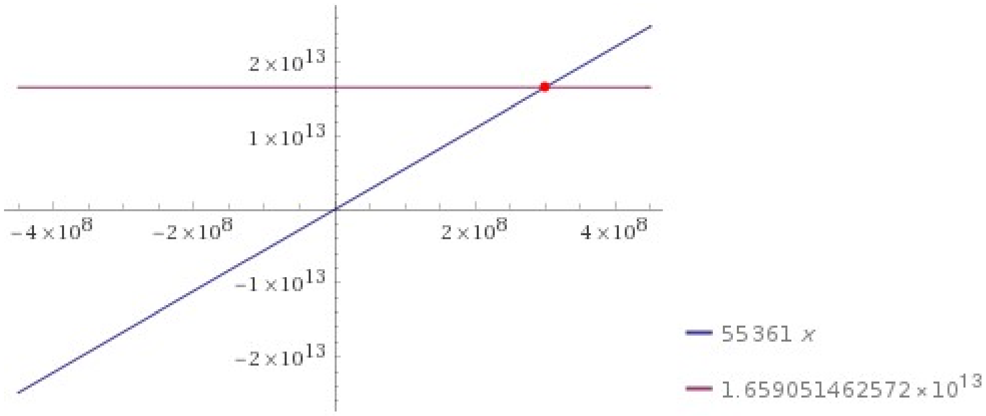
Input interpretation:

$x\,(53\,361+2000)=1.659051462572\times 10^{13}$

Result:

$55\,361\,x=1.659051462572\times 10^{13}$

Plot:



Alternate form:

$55\,361\,x-1.659051462572\times 10^{13}=0$

Solution:

$x\approx 2.99678738204\times 10^{8}$

Decimal form:

299678738.204

299678738.204

1729*((((1.659051462572e+13)/(53361+2000-21))))^2

Input interpretation:

$$1729\left(\frac{1.659051462572\times 10^{13}}{53361+2000-21}\right)^2$$

Result:

155394770403595769956

Scientific notation:

$1.55394770403595769956\times 10^{20}$

$1.55394770403595769956*10^{20}$

From $E = mc^2$ and the mass value 1732, we obtain:

1732 MeV * (299792458)^2

Where 1732 MeV is the mass of scalar meson $f_0(1710)$ (see http://pdg.lbl.gov/2019/listings/rpp2019-list-f0-1710.pdf)

Input interpretation:

1732 MeV (megaelectronvolts) $\times 299792458^2$

Result:

1.557×10^{20} MeV (megaelectronvolts)

$1.557*10^{20}$ MeV

Unit conversions:

1.557×10^{26} eV (electronvolts)

24.94 MJ (megajoules)

0.02494 GJ (gigajoules)

2.494×10^{7} J (joules)

Interpretations:

energy

kinetic energy

Without the number 21, we obtain a result very near to the previous:

1729*((((1.659051462572e+13)/(53361+2000))))^2

Input interpretation:

$$1729\left(\frac{1.659051462572\times 10^{13}}{53361+2000}\right)^2$$

Result:

$1.552769014615917869817992757998565890049839239243028 7... \times 10^{20}$

$1.5527690146...*10^{20}$

From the previous sum

(-44370261693823-1074049339325573-1436215992808909)

We obtain:

(((1/(- (-44370261693823-1074049339325573-1436215992808909)))))^1/3072

Input:

$$\sqrt[3072]{-\frac{1}{-44\,370\,261\,693\,823-1\,074\,049\,339\,325\,573-1\,436\,215\,992\,808\,909}}$$

Result:

$$\frac{1}{\sqrt[3072]{2\,554\,635\,593\,828\,305}}$$

Decimal approximation:

0.988518026436679916778108195329724141209400946748107546203...

0.988518026436679..... result very near the dilaton value **0.989117352243** = $\boldsymbol{\phi}$

1/24*log base 0.9885180264366 79(((1/(-(-44370261693823-1074049339325573-1436215992808909)))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{24}\log_{0.988518026436679}\left(-\frac{1}{-44\,370\,261\,693\,823-1\,074\,049\,339\,325\,573-1\,436\,215\,992\,808\,909}\right)-\pi+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

125.4764413351...

125.4764413…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternative representation:

$$\frac{1}{24}\log_{0.98851802643667900000}\left(-\frac{1}{-44\,370\,261\,693\,823-1\,074\,049\,339\,325\,573-1\,436\,215\,992\,808\,909}\right)-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{1}{2\,554\,635\,593\,828\,305}\right)}{24\log(0.98851802643667900000)}$$

$\log(x)$ is the natural logarithm

Series representations:

$$\frac{1}{24}\log_{0.98851802643667900000}\left(-\frac{1}{-44\,370\,261\,693\,823-1\,074\,049\,339\,325\,573-1\,436\,215\,992\,808\,909}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{2\,554\,635\,593\,828\,304}{2\,554\,635\,593\,828\,305}\right)^k}{k}}{24\log(0.98851802643667900000)}$$

$$\frac{1}{24}\log_{0.988518026436679000}\left(-\frac{1}{-44\,370\,261\,693\,823-1\,074\,049\,339\,325\,573-1\,436\,215\,992\,808\,909}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-1.00000000000000000\,\pi-$$

$$3.6080433956438380\log\left(\frac{1}{2\,554\,635\,593\,828\,305}\right)-$$

$$\frac{1}{24}\log\left(\frac{1}{2\,554\,635\,593\,828\,305}\right)\sum_{k=0}^{\infty}(-0.011481973563321000)^k\,G(k)$$

$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2\,(1+k)\,(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

1/24*log base 0.9885180264366790(((1/(-(-44370261693823-1074049339325573-1436215992808909)))))+11+1/golden ratio

where 11 is a Lucas number

Input interpretation:

$$\frac{1}{24}\log_{0.988518026436679}\left(-\frac{1}{-44\,370\,261\,693\,823-1\,074\,049\,339\,325\,573-1\,436\,215\,992\,808\,909}\right)+11+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

139.6180339887...

139.61803398… result practically equal to the rest mass of Pion meson 139.57

Alternative representation:

$$\frac{1}{24}\log_{0.98851802643667900000}\left(-\frac{1}{-44370261693823-1074049339325573-1436215992808909}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{\log\left(\frac{1}{2554635593828305}\right)}{24\log(0.98851802643667900000)}$$

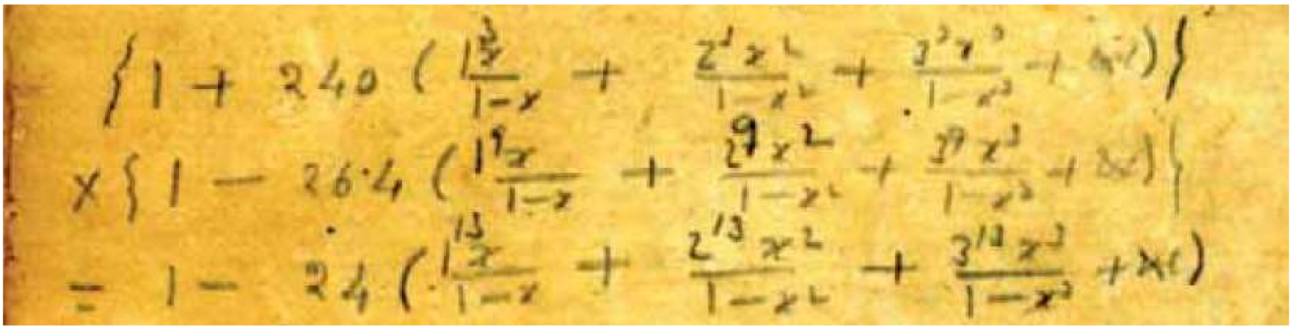
Series representations:

$$\frac{1}{24}\log_{0.98851802643667900000}\left(-\frac{1}{-44370261693823-1074049339325573-1436215992808909}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{2554635593828304}{2554635593828305}\right)^k}{k}}{24\log(0.98851802643667900000)}$$

$$\frac{1}{24}\log_{0.98851802643667900000}\left(-\frac{1}{-44370261693823-1074049339325573-1436215992808909}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-3.6080433956438380\log\left(\frac{1}{2554635593828305}\right)-\frac{1}{24}\log\left(\frac{1}{2554635593828305}\right)\sum_{k=0}^{\infty}(-0.0114819735633210000)^k\,G(k)$$

$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Page 243



(((1-24*((1^13*2)/(1-2)+(2^13*2^2)/(1-2^2)+(3^13*2^3)/(1-2^3)))))

Input:

$$1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)$$

Exact result:

$$\frac{307945367}{7}$$

Decimal approximation:

$4.399219528571428571428571428571428571428571428571428571428571428571428571428571428571428571... \times 10^7$

$4.399219528...*10^7$

Input interpretation:

$4.399219528571428571428571428571428571428571428571428571428571428571428571428571428571428571 \times 10^7$

Decimal form:

43992195.2857142857142857142857142857142857142857142857

43992195.285714...

(((1/(((1-24*((1^13*2)/(1-2)+(2^13*2^2)/(1-2^2)+(3^13*2^3)/(1-2^3))))))))^1/1536

Input:

$$\sqrt[1536]{\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}}$$

Result:

$$\sqrt[1536]{\frac{7}{307945367}}$$

Decimal approximation:

0.988607370490733838321385831723713082410073338229205311334...

0.98860737049…. result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$

Alternate form:

$$\frac{\sqrt[1536]{7}\ 307945367^{1535/1536}}{307945367}$$

And:

1/12 log base 0.98860737049 (((1/(((1-24*((1^13*2)/(1-2)+(2^13*2^2)/(1-2^2)+(3^13*2^3)/(1-2^3)))))))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{12}\log_{0.98860737049}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)-\pi+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

125.476441...

125.476441... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternative representation:

$$\frac{1}{12}\log_{0.988607370490000}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{1}{1-24\left(-2\times 1^{13}+-\frac{4\times 2^{13}}{3}+-\frac{8\times 3^{13}}{7}\right)}\right)}{12\log(0.988607370490000)}$$

Series representations:

$$\frac{1}{12}\log_{0.988607370490000}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{307945360}{307945367}\right)^k}{k}}{12\log(0.988607370490000)}$$

$$\frac{1}{12}\log_{0.988607370490000}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-1.0000000000000\,\pi-7.273004038651\log\left(\frac{7}{307945367}\right)-$$
$$\frac{1}{12}\log\left(\frac{7}{307945367}\right)\sum_{k=0}^{\infty}(-0.011392629510000)^k\,G(k)$$
$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

1/12 log base 0.98860737049 (((1/(((1-24*((1^13*2)/(1-2)+(2^13*2^2)/(1-2^2)+(3^13*2^3)/(1-2^3)))))))+11+1/golden ratio

Where 11 is a Lucas number

Input interpretation:

$$\frac{1}{12}\log_{0.98860737049}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)+11+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

139.618034...

139.618034… result practically equal to the rest mass of Pion meson 139.57

Alternative representation:

$$\frac{1}{12}\log_{0.988607370490000}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{\log\left(\frac{1}{1-24\left(-2\times 1^{13}+-\frac{4\times 2^{13}}{3}+-\frac{8\times 3^{13}}{7}\right)}\right)}{12\log(0.988607370490000)}$$

Series representations:

$$\frac{1}{12}\log_{0.988607370490000}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{307945360}{307945367}\right)^k}{k}}{12\log(0.988607370490000)}$$

$$\frac{1}{12}\log_{0.988607370490000}\left(\frac{1}{1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-7.273004038651\log\left(\frac{7}{307945367}\right)-\frac{1}{12}\log\left(\frac{7}{307945367}\right)\sum_{k=0}^{\infty}(-0.011392629510000)^k G(k)$$

$$\text{for}\left(G(0)=0 \text{ and } G(k)=\frac{(-1)^{1+k}k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}G(-j+k)}{1+j}\right)$$

Now, we have that:

7(43992195.2857142857)

Where 7 is a Lucas number

Input interpretation:

$7\times 4.39921952857142857\times 10^7$

Result:

$3.07945366999999999\times 10^8$

3.07945366999999999 × 10^8 m/s

Input interpretation:

$3.07945367000000000\times 10^8$ m/s (meters per second)

Unit conversions:

307 945.367 km/s (kilometers per second)

$6.88854167412312097\times 10^8$ mph (miles per hour)

191 348.37983675336 mi/s (miles per second)

1.02719517713817871 c (speed of light)

Note that:

From:

THE SCIENTIFIC PAPERS OF

JAMES CLERK MAXWELL

EDITED BY W. D. NIVEN, M.A., F.R.S.

TWO VOLUMES BOUND AS ONE

This Dover edition, first published in 1965, is an unabridged and unaltered republication of the work first published by Cambridge University Press in 1890. This edition is published by special arrangement with Cambridge University Press.
The work was originally published in two separate volumes, but is now published in two volumes bound as one.

PROP. XVI.—To find the rate of propagation of transverse vibrations through the elastic medium of which the cells are composed, on the supposition that its elasticity is due entirely to forces acting between pairs of particles.

By the ordinary method of investigation we know that

$$V=\sqrt{\frac{m}{\rho}} \qquad (132),$$

where m is the coefficient of transverse elasticity, and ρ is the density. By referring to the equations of Part I., it will be seen that if ρ is the density of the matter of the vortices, and μ is the "coefficient of magnetic induction,"

$$\mu=\pi\rho \qquad (133);$$

whence $$\pi m=V^2\mu \qquad (134);$$

and by (108), $$E=V\sqrt{\mu} \qquad (135).$$

In air or vacuum $\mu=1$, and therefore

$$\left.\begin{aligned} V&=E\\ &=310{,}740{,}000{,}000 \text{ millimetres per second}\\ &=193{,}088 \text{ miles per second}\end{aligned}\right\} \qquad (136).$$

* *Abhandlungen der König..Sächsischen Gesellschaft*, Vol. III. (1857), p. 260.

63—2

The value of c (speed of light) for (136) is 310740000 m/s, very near to the result of Ramanujan formula multiplied by 7, that is 307945367, thence in the range of measurements.

From $E = mc^2$ and the mass of scalar meson $f_0(1710)$, that we put equal to 1729 (in the range of this meson), we obtain:

1729*[7*(((1-24*((1^13*2)/(1-2)+(2^13*2^2)/(1-2^2)+(3^13*2^3)/(1-2^3)))))]^2

Input:

$$1729\left(7\left(1-24\left(\frac{1^{13}\times 2}{1-2}+\frac{2^{13}\times 2^2}{1-2^2}+\frac{3^{13}\times 2^3}{1-2^3}\right)\right)\right)^2$$

Result:

163 961 673 519 146 147 281

Scientific notation:

$1.63961673519146147281\times 10^{20}$

$1.63961673519146147281*10^{20}$

Note that, from c^2, we can to obtain the Hardy-Ramanujan number, that coincide with the mass of the above scalar meson. Indeed:

x*[307945367]^2 = 1.63961673519146147281e+20

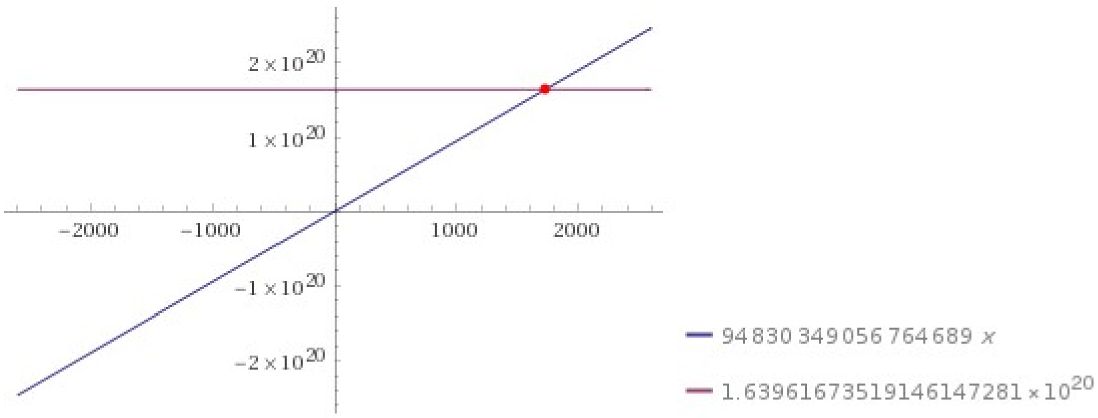
Input interpretation:

$x\times 307\,945\,367^2 = 1.63961673519146147281\times 10^{20}$

Result:

$94\,830\,349\,056\,764\,689\,x = 1.63961673519146147281\times 10^{20}$

Plot:



Alternate form:

$94\,830\,349\,056\,764\,689\,x - 1.63961673519146147281\times 10^{20} = 0$

Solution:

$x = 1729$

Integer solution:

$x = 1729$

1729

This result is very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

And:

x*[307945367]^2 = 1.64493e+20

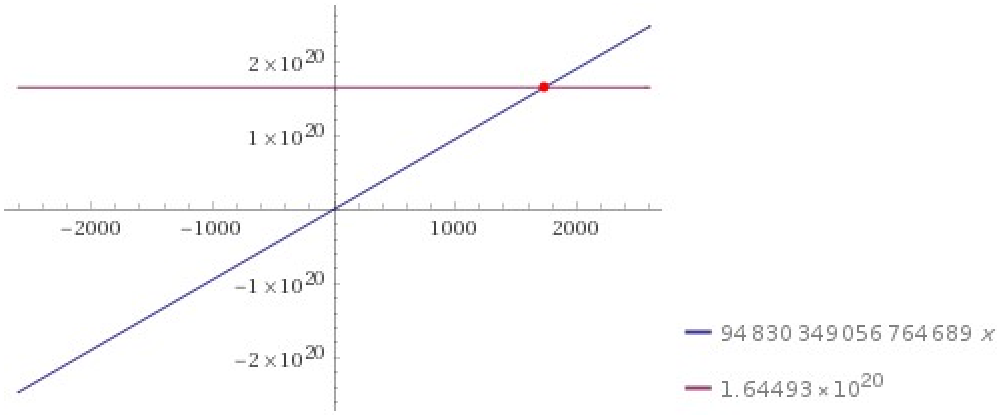
where $1.64493*10^{20}$ is a multiple of $\zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

$x \times 307945367^2 = 1.64493 \times 10^{20}$

Result:

$94830349056764689\, x = 1.64493 \times 10^{20}$

Plot:



Alternate form:

$94830349056764689\, x - 1.64493 \times 10^{20} = 0$

Solution:

$x \approx 1734.6$

1734.6

While with the multiple of the golden ratio, we obtain:

x*[307945367]^2 = golden ratio *10^20

Input:

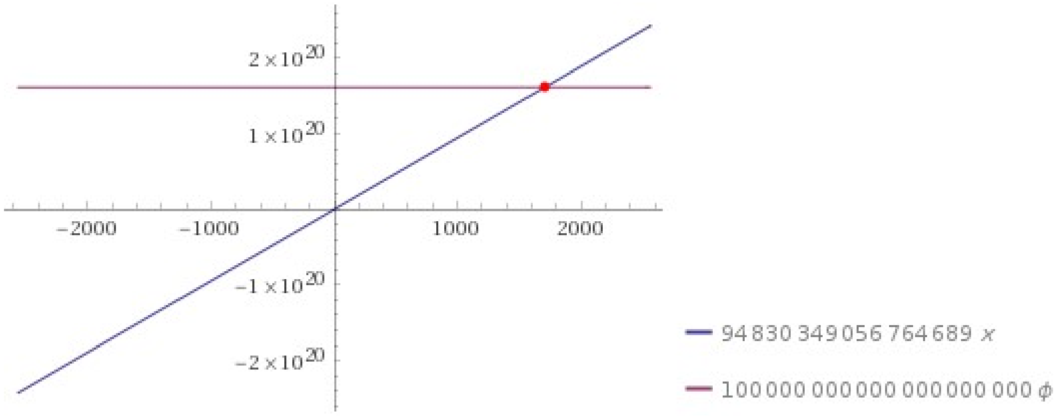
$$x \times 307945367^2 = \phi \times 10^{20}$$

ϕ is the golden ratio

Exact result:

$$94830349056764689\, x = 100000000000000000000\, \phi$$

Plot:



Alternate forms:

$$94830349056764689\, x - 100000000000000000000\, \phi = 0$$

$$94830349056764689\, x = 50000000000000000000 \left(1+\sqrt{5}\right)$$

$$94830349056764689\, x = 50000000000000000000 + 50000000000000000000\sqrt{5}$$

Solution:

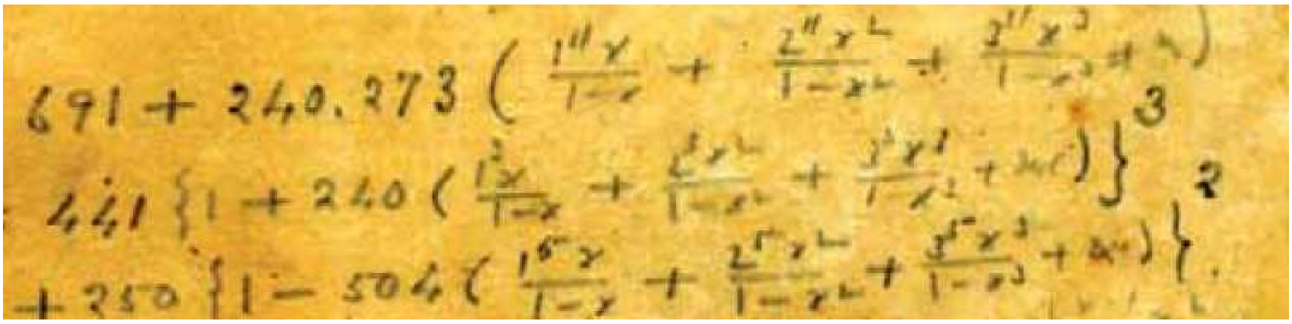
$$x = \frac{50000000000000000000}{94830349056764689} + \frac{50000000000000000000\sqrt{5}}{94830349056764689}$$

$$x \approx 1706.2$$

1706.2

All the three results obtained are in the range of the candidate “glueball” scalar meson $f_0(1710)$ mass.

Now, we have that:



441(((1+240*((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)+(3^3*2^3)/(1-2^3)))^3+250(((1-504*((1^5*2)/(1-2)+(2^5*2^2)/(1-2^2)+(3^5*2^3)/(1-2^3)))))^2

441(((1+240*((2)/(1-2)+(8*4)/(1-4)+(27*8)/(1-8)))))^3+250(((1-504*((2)/(1-2)+(32*4)/(1-4)+(243*8)/(1-8)))))^2

Input:

$$441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2$$

Exact result:

$$-\frac{3471236827803323}{7}$$

Decimal approximation:

$$-4.958909754004747142857142857142857142857142857142857... \times 10^{14}$$

-4.958909754004747...*10^{14}

And:

1/2*ln-[441(((1+240*((2)/(1-2)+(8*4)/(1-4)+(27*8)/(1-8)))))^3+250(((1-504*((2)/(1-2)+(32*4)/(1-4)+(243*8)/(1-8)))))^2]

Input:

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{1}{2}\log\left(\frac{3471236827803323}{7}\right)$$

Decimal approximation:

16.918688605415949033986850208850735986492474685791110075 42...

16.9186886…. result very near to the black hole entropy 16.8741

Property:

$\frac{1}{2}\log\left(\frac{3471236827803323}{7}\right)$ is a transcendental number

Alternate forms:

$$\frac{\log(3471236827803323)}{2}-\frac{\log(7)}{2}$$

$$\frac{1}{2}(-\log(7)+\log(191)+\log(18174014805253))$$

$$-\frac{\log(7)}{2}+\frac{\log(191)}{2}+\frac{\log(18174014805253)}{2}$$

Alternative representations:

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)=\frac{1}{2}\log_e\left(-441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3-250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2\right)$$

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)=\frac{1}{2}\log(a)\log_a\left(-441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3-250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2\right)$$

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)=-\frac{1}{2}\operatorname{Li}_1\left(1+441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3+250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2\right)$$

Series representations:

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)=\frac{1}{2}\log\left(\frac{3471236827803316}{7}\right)-\frac{1}{2}\sum_{k=1}^{\infty}\frac{\left(-\frac{7}{3471236827803316}\right)^k}{k}$$

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)=i\pi\left\lfloor\frac{\arg\left(\frac{3471236827803323}{7}-x\right)}{2\pi}\right\rfloor+\frac{\log(x)}{2}-\frac{1}{2}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{3471236827803323}{7}-x\right)^k x^{-k}}{k}$$

for $x<0$

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)=i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\frac{\log(z_0)}{2}-\frac{1}{2}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{3471236827803323}{7}-z_0\right)^k z_0^{-k}}{k}$$

Integral representations:

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)=\frac{1}{2}\int_1^{\frac{3471236827803323}{7}}\frac{1}{t}\,dt$$

$$\frac{1}{2}\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)=-\frac{i}{4\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{7}{3471236827803316}\right)^s\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds$$

for $-1<\gamma<0$

4*ln-[441(((1+240*((2)/(1-2)+(8*4)/(1-4)+(27*8)/(1-8)))))^3+250(((1-504*((2)/(1-2)+(32*4)/(1-4)+(243*8)/(1-8)))))^2]+4

Where 4 is a Lucas number

Input:

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)+4$$

log(x) is the natural logarithm

Exact result:

$$4+4\log\left(\frac{3471236827803323}{7}\right)$$

Decimal approximation:

139.349508843327592271894801670805887891939797486328880603...

139.3495088…. result practically equal to the rest mass of Pion meson 139.57

Property:

$4+4\log\left(\frac{3471236827803323}{7}\right)$ is a transcendental number

Alternate forms:

$$4\left(1+\log\left(\frac{3471236827803323}{7}\right)\right)$$

$$4-4\log(7)+4\log(3471236827803323)$$

$$-4(-1+\log(7)-\log(191)-\log(18174014805253))$$

Alternative representations:

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)+4=4+4\log_e\left(-441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3-250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2\right)$$

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\right)+4=4+4\log(a)\log_a\left(-441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3-250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2\right)$$

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)+4=4-4\,\text{Li}_1\left(1+441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3+250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2\right)$$

Series representations:

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)+4=4+4\log\left(\frac{3471236827803316}{7}\right)-4\sum_{k=1}^{\infty}\frac{\left(-\frac{7}{3471236827803316}\right)^k}{k}$$

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)+4=4+8i\pi\left\lfloor\frac{\arg\left(\frac{3471236827803323}{7}-x\right)}{2\pi}\right\rfloor+4\log(x)-4\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{3471236827803323}{7}-x\right)^k x^{-k}}{k}\quad\text{for } x<0$$

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)+4=4+8i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+4\log(z_0)-4\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{3471236827803323}{7}-z_0\right)^k z_0^{-k}}{k}$$

Integral representations:

$$4\log\left(-\left(441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)\right)+4=4+4\int_1^{\frac{3471236827803323}{7}}\frac{1}{t}\,dt$$

$$4 \log\left(-\left(441 \left(1 + 240 \left(\frac{2}{1-2} + \frac{8 \times 4}{1-4} + \frac{27 \times 8}{1-8}\right)\right)^3 + 250 \left(1 - 504 \left(\frac{2}{1-2} + \frac{32 \times 4}{1-4} + \frac{243 \times 8}{1-8}\right)\right)^2\right)\right) + 4 = 4 - \frac{2 i}{\pi} \int_{-i \infty + \gamma}^{i \infty + \gamma} \frac{\left(\frac{7}{3\,471\,236\,827\,803\,316}\right)^s \Gamma(-s)^2 \Gamma(1+s)}{\Gamma(1-s)} \, ds \text{ for } -1 < \gamma < 0$$

$\Gamma(x)$ is the gamma function

[-441(((1+240*((2)/(1-2)+(8*4)/(1-4)+(27*8)/(1-8)))))^3+250(((1-504*((2)/(1-2)+(32*4)/(1-4)+(243*8)/(1-8)))))^2]^1/(golden ratio)^3 +18+golden ratio

Where 18 is a Lucas number

Input:

$$\sqrt[\phi^3]{-441 \left(1 + 240 \left(\frac{2}{1-2} + \frac{8 \times 4}{1-4} + \frac{27 \times 8}{1-8}\right)\right)^3 + 250 \left(1 - 504 \left(\frac{2}{1-2} + \frac{32 \times 4}{1-4} + \frac{243 \times 8}{1-8}\right)\right)^2} + 18 + \phi$$

ϕ is the golden ratio

Exact result:

$$\sqrt[\phi^3]{\frac{3\,563\,637\,091\,566\,823}{7}} + \phi + 18$$

Decimal approximation:

2983.107943240931709838762167692741622705597155152719109613...

2983.1079432…. result very near to the rest mass of Charmed eta meson 2980.3

Alternate forms:

$$\left(\frac{3\,563\,637\,091\,566\,823}{7}\right)^{\sqrt{5}-2} + \frac{1}{2}\left(37 + \sqrt{5}\right)$$

$$\frac{1}{2}\left(37 + \sqrt{5} + 2\left(\frac{3\,563\,637\,091\,566\,823}{7}\right)^{8/\left(1+\sqrt{5}\right)^3}\right)$$

$$18 + \left(\frac{3\,563\,637\,091\,566\,823}{7}\right)^{8/\left(1+\sqrt{5}\right)^3} + \frac{1}{2}\left(1 + \sqrt{5}\right)$$

Alternative representations:

$$\sqrt[\phi^3]{-441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2}+18+\phi = 18+\sqrt[(2\sin(54°))^3]{-441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3+250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2}+2\sin(54°)$$

$$\sqrt[\phi^3]{-441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2}+18+\phi = 18-2\cos(216°)+\sqrt[(-2\cos(216°))^3]{-441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3+250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2}$$

$$\sqrt[\phi^3]{-441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2}+18+\phi = 18+\sqrt[(-2\sin(666°))^3]{-441\left(1+240\left(-\frac{38}{3}+-\frac{216}{7}\right)\right)^3+250\left(1-504\left(-\frac{134}{3}+-\frac{1944}{7}\right)\right)^2}-2\sin(666°)$$

[-441(((1+240*((2)/(1-2)+(8*4)/(1-4)+(27*8)/(1-8)))))^3+250(((1-504*((2)/(1-2)+(32*4)/(1-4)+(243*8)/(1-8)))))^2]^1/(55+13)

Input:

$$\left(-441\left(1+240\left(\frac{2}{1-2}+\frac{8\times 4}{1-4}+\frac{27\times 8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times 4}{1-4}+\frac{243\times 8}{1-8}\right)\right)^2\right)^\wedge\left(\frac{1}{55+13}\right)$$

Result:

$$\sqrt[68]{\frac{3563637091566823}{7}}$$

Decimal approximation:

1.645418604084905536458275746617261174178983415175093464460...

$1.645418604084.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

Alternate form:

$$\frac{1}{7}\sqrt[68]{3563637091566823}\ 7^{67/68}$$

-(29-2)/10^3+[-441(((1+240*((2)/(1-2)+(8*4)/(1-4)+(27*8)/(1-8)))))^3+250(((1-504*((2)/(1-2)+(32*4)/(1-4)+(243*8)/(1-8)))))^2]^1/(55+13)

Where 2 and 29 are Lucas numbers and 55 and 13 are Fibonacci numbers

Input:

$$-\frac{29-2}{10^3}+\left(-441\left(1+240\left(\frac{2}{1-2}+\frac{8\times4}{1-4}+\frac{27\times8}{1-8}\right)\right)^3+250\left(1-504\left(\frac{2}{1-2}+\frac{32\times4}{1-4}+\frac{243\times8}{1-8}\right)\right)^2\right)\wedge\left(\frac{1}{55+13}\right)$$

Result:

$$\sqrt[68]{\frac{3563637091566823}{7}}-\frac{27}{1000}$$

Decimal approximation:

1.618418604084905536458275746617261174178983415175093464460...

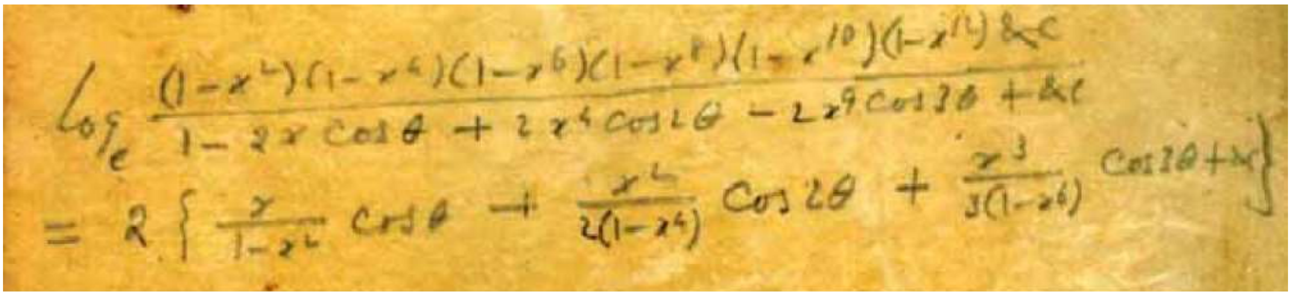
1.6184186040849.... result that is a very good approximation to the value of the golden ratio 1,618033988749...

Alternate forms:

$$\frac{1000\times7^{67/68}\sqrt[68]{3563637091566823}-189}{7000}$$

$$\frac{1000\sqrt[68]{\frac{3563637091566823}{7}}-27}{1000}$$

Page 247



$$\log_e \frac{(1-x^2)(1-x^4)(1-x^6)(1-x^8)(1-x^{10})(1-x^{12})\,\&c}{1-2x\cos\theta+2x^4\cos 2\theta-2x^9\cos 3\theta+\&c}$$
$$= 2\left\{\frac{x}{1-x^2}\cos\theta+\frac{x^2}{2(1-x^4)}\cos 2\theta+\frac{x^3}{3(1-x^6)}\cos 3\theta+\&c\right\}$$

For x = 2 and θ = π, we obtain:

2((((2/(1-4)*cos(Pi)+ 2^2/(2*(1-2^4))*cos(2Pi) + 2^3/(3*(1-2^6))*cos(3Pi))))

Input:

$$2\left(\frac{2}{1-4}\cos(\pi)+\frac{2^2}{2(1-2^4)}\cos(2\pi)+\frac{2^3}{3(1-2^6)}\cos(3\pi)\right)$$

Exact result:

$$\frac{1088}{945}$$

Decimal approximation:

1.151322751322751322751322751322751322751322751322751322751...

1.15132275132275…

Repeating decimal:

$1.1\overline{513227}$ (period 6)

Alternative representations:

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=2\left(-\frac{2}{3}\cosh(i\pi)+\frac{4\cosh(2i\pi)}{2(1-2^4)}+\frac{8\cosh(3i\pi)}{3(1-2^6)}\right)$$

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$
$$2\left(-\frac{2}{3}\cosh(-i\pi)+\frac{4\cosh(-2i\pi)}{2(1-2^4)}+\frac{8\cosh(-3i\pi)}{3(1-2^6)}\right)$$

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$
$$2\left(-\frac{2}{3\sec(\pi)}+\frac{4}{(2(1-2^4))\sec(2\pi)}+\frac{8}{(3(1-2^6))\sec(3\pi)}\right)$$

Series representations:

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=\sum_{k=0}^{\infty}-\frac{4(-1)^k\left(315+63\times 4^k+20\times 9^k\right)\pi^{2k}}{945\,(2k)!}$$

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$
$$\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{1-2k}\left(315+7\times 3^{3+2k}+4\times 25^{1+k}\right)\pi^{1+2k}}{945\,(1+2k)!}$$

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$
$$\sum_{k=0}^{\infty}-\frac{4\cos\left(\frac{k\pi}{2}+z_0\right)\left(315(\pi-z_0)^k+63(2\pi-z_0)^k+20(3\pi-z_0)^k\right)}{945\,k!}$$

Integral representations:

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$
$$-\frac{1592}{945}+\int_0^1\frac{4}{315}\,\pi\,(105\sin(\pi t)+42\sin(2\pi t)+20\sin(3\pi t))\,dt$$

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$
$$\int_{\frac{\pi}{2}}^{3\pi}\left(\frac{16\sin(t)}{189}+\frac{4}{75}\left(5\sin\left(\frac{1}{5}(2\pi+t)\right)+3\sin\left(\frac{1}{5}(\pi+3t)\right)\right)\right)dt$$

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$
$$\int_{-i\infty+\gamma}^{i\infty+\gamma}-\frac{2e^{-(9\pi^2)/(4s)+s}\left(20+63e^{(5\pi^2)/(4s)}+315e^{(2\pi^2)/s}\right)\sqrt{\pi}}{945\,i\pi\sqrt{s}}\,ds\quad\text{for }\gamma>0$$

$$2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2(1-2^4)}+\frac{\cos(3\pi)\,2^3}{3(1-2^6)}\right)=$$

$$\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(-\frac{2\,\pi^{-1-2s}\,\Gamma(s)\sqrt{\pi}}{15\,i\,\Gamma\left(\frac{1}{2}-s\right)}-\frac{2^{1+2s}\,\pi^{-1-2s}\,\Gamma(s)\sqrt{\pi}}{3\,i\,\Gamma\left(\frac{1}{2}-s\right)}-\frac{2^{3+2s}\times 3^{-3-2s}\,\pi^{-1-2s}\,\Gamma(s)\sqrt{\pi}}{7\,i\,\Gamma\left(\frac{1}{2}-s\right)}\right)ds \quad \text{for } 0<\gamma<\frac{1}{2}$$

And:

1/10^52 * [-(8/175))+ 2((((2/(1-4)*cos(Pi)+ 2^2/(2*(1-2^4))*cos(2Pi) + 2^3/(3*(1-2^6))*cos(3Pi))))]

Input:

$$\frac{1}{10^{52}}\left(-\frac{8}{175}+2\left(\frac{2}{1-4}\cos(\pi)+\frac{2^2}{2(1-2^4)}\cos(2\pi)+\frac{2^3}{3(1-2^6)}\cos(3\pi)\right)\right)$$

Exact result:

$$\frac{653}{5\,906\,250\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Decimal approximation:

$$1.105608465608465608465608465608465608465608465608465608465656... \times 10^{-52}$$

$1.10560846....*10^{-52}$

Alternative representations:

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}}=\frac{-\frac{8}{175}+2\left(-\frac{2}{3}\cosh(i\pi)+\frac{4\cosh(2i\pi)}{2(1-2^4)}+\frac{8\cosh(3i\pi)}{3(1-2^6)}\right)}{10^{52}}$$

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}}=\frac{-\frac{8}{175}+2\left(-\frac{2}{3}\cosh(-i\pi)+\frac{4\cosh(-2i\pi)}{2(1-2^4)}+\frac{8\cosh(-3i\pi)}{3(1-2^6)}\right)}{10^{52}}$$

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = \frac{-\frac{8}{175}+2\left(-\frac{2}{3\sec(\pi)}+\frac{4}{(2(1-2^4))\sec(2\pi)}+\frac{8}{(3(1-2^6))\sec(3\pi)}\right)}{10^{52}}$$

Series representations:

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = -\frac{1}{218\,750\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-51-2k}\left(315+7\times 3^{3+2k}+4\times 25^{1+k}\right)\pi^{1+2k}}{2\,098\,321\,516\,541\,545\,861\,400\,663\,852\,691\,650\,390\,625\,(1+2k)!}$$

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = -\frac{1}{218\,750\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \sum_{k=0}^{\infty}-\left(\left((-1)^k\left(315+63\times 4^k+20\times 9^k\right)\pi^{2k}\right)\Big/\left(2\,362\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,(2k)!\right)\right)$$

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = -\frac{1}{218\,750\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \sum_{k=0}^{\infty}-\left(\left(\cos\left(\frac{k\pi}{2}+z_0\right)\left(315(\pi-z_0)^k+63(2\pi-z_0)^k+20(3\pi-z_0)^k\right)\right)\Big/\left(2\,362\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,k!\right)\right)$$

Integral representations:

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = -\frac{73}{421\,875\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \int_0^1 \frac{\pi(105\sin(\pi t)+42\sin(2\pi t)+20\sin(3\pi t))}{787\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}\,dt$$

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = -\frac{1}{218\,750\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \int_{\frac{\pi}{2}}^{3\pi} \frac{100\sin(t)+63\left(5\sin\left(\frac{1}{5}(2\pi+t)\right)+3\sin\left(\frac{1}{5}(\pi+3t)\right)\right)}{11\,812\,500\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} dt$$

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = -\frac{1}{218\,750\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \int_{-i\infty+\gamma}^{i\infty+\gamma} -\left(\left(e^{-(9\pi^2)/(4s)+s}\left(20+63\,e^{(5\pi^2)/(4s)}+315\,e^{(2\pi^2)/s}\right)\sqrt{\pi}\right)\Big/\left(4\,725\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,i\,\pi\sqrt{s}\right)\right) ds \quad \text{for } \gamma > 0$$

$$\frac{-\frac{8}{175}+2\left(\frac{2\cos(\pi)}{1-4}+\frac{2^2\cos(2\pi)}{2(1-2^4)}+\frac{2^3\cos(3\pi)}{3(1-2^6)}\right)}{10^{52}} = -\frac{1}{218\,750\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000} + \int_{-i\infty+\gamma}^{i\infty+\gamma} \left(-\left(\left(\pi^{-1-2s}\,\Gamma(s)\sqrt{\pi}\right)\Big/\left(75\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000\,i\,\Gamma\left(\frac{1}{2}-s\right)\right)\right) - \frac{2^{-51+2s}\,\pi^{-1-2s}\,\Gamma(s)\sqrt{\pi}}{6\,661\,338\,147\,750\,939\,242\,541\,790\,008\,544\,921\,875\,i\,\Gamma\left(\frac{1}{2}-s\right)} - \frac{2^{-49+2s}\times 3^{-3-2s}\,\pi^{-1-2s}\,\Gamma(s)\sqrt{\pi}}{15\,543\,122\,344\,752\,191\,565\,930\,843\,353\,271\,484\,375\,i\,\Gamma\left(\frac{1}{2}-s\right)}\right) ds \quad \text{for } 0 < \gamma < \frac{1}{2}$$

[2((((2/(1-4)*cos(Pi)+ 2^2/(2*(1-2^4))*cos(2Pi) + 2^3/(3*(1-2^6))*cos(3Pi)))))]^47+29+golden ratio

Input:

$$\left(2\left(\frac{2}{1-4}\cos(\pi)+\frac{2^2}{2(1-2^4)}\cos(2\pi)+\frac{2^3}{3(1-2^6)}\cos(3\pi)\right)\right)^{47}+29+\phi$$

ϕ is the golden ratio

Exact result:

$\phi +$ 54 700 285 804 157 255 619 147 835 510 155 689 141 812 509 330 735 666 419 891 508 155 213 628 338 678 427 073 039 279 195 467 073 074 421 874 897 362 290 382 200 779 425 655 569 693 974 317 / 70 031 753 388 283 328 262 250 343 378 047 033 818 492 911 316 654 501 558 446 034 130 403 499 558 931 305 810 077 088 206 291 437 317 304 249 887 683 909 037 150 442 600 250 244 140 625

Decimal approximation:

782.69637570722090703521364979228801316112962302421494889 67...

782.6963757…. result practically equal to the rest mass of Omega meson 782.65

Alternate forms:

(70 031 753 388 283 328 262 250 343 378 047 033 818 492 911 316 654 501 558 446 034 130 403 499 558 931 305 810 077 088 206 291 437 317 304 249 887 683 909 037 150 442 600 250 244 140 625 ϕ + 54 700 285 804 157 255 619 147 835 510 155 689 141 812 509 330 735 666 419 891 508 155 213 628 338 678 427 073 039 279 195 467 073 074 421 874 897 362 290 382 200 779 425 655 569 693 974 317) / 70 031 753 388 283 328 262 250 343 378 047 033 818 492 911 316 654 501 558 446 034 130 403 499 558 931 305 810 077 088 206 291 437 317 304 249 887 683 909 037 150 442 600 250 244 140 625

109 470 603 361 702 794 566 557 921 363 689 425 317 443 511 572 787 987 341 341 462 344 557 660 176 915 785 451 888 635 479 140 437 586 161 054 044 612 264 673 438 709 293 911 389 632 089 259 / 140 063 506 776 566 656 524 500 686 756 094 067 636 985 822 633 309 003 116 892 068 260 806 999 117 862 611 620 154 176 412 582 874 634 608 499 775 367 818 074 300 885 200 500 488 281 250 + $\frac{\sqrt{5}}{2}$

54 700 285 804 157 255 619 147 835 510 155 689 141 812 509 330 735 666 419 891 ⋱
508 155 213 628 338 678 427 073 039 279 195 467 073 074 421 874 897 362 290 382 ⋱
200 779 425 655 569 693 974 317 /
70 031 753 388 283 328 262 250 343 378 047 033 818 492 911 316 654 501 558 ⋱
446 034 130 403 499 558 931 305 810 077 088 206 291 437 317 304 249 887 683 ⋱
909 037 150 442 600 250 244 140 625 + $\frac{1}{2}\left(1+\sqrt{5}\right)$

Alternative representations:

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\,\pi)\,2^2}{2\,(1-2^4)}+\frac{\cos(3\,\pi)\,2^3}{3\,(1-2^6)}\right)\right)^{47}+29+\phi = 29+\phi+\left(2\left(-\frac{2}{3}\cosh(i\,\pi)+\frac{4\cosh(2\,i\,\pi)}{2\,(1-2^4)}+\frac{8\cosh(3\,i\,\pi)}{3\,(1-2^6)}\right)\right)^{47}$$

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\,\pi)\,2^2}{2\,(1-2^4)}+\frac{\cos(3\,\pi)\,2^3}{3\,(1-2^6)}\right)\right)^{47}+29+\phi = 29+\phi+\left(2\left(-\frac{2}{3}\cosh(-i\,\pi)+\frac{4\cosh(-2\,i\,\pi)}{2\,(1-2^4)}+\frac{8\cosh(-3\,i\,\pi)}{3\,(1-2^6)}\right)\right)^{47}$$

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\,\pi)\,2^2}{2\,(1-2^4)}+\frac{\cos(3\,\pi)\,2^3}{3\,(1-2^6)}\right)\right)^{47}+29+\phi = 29+\phi+\left(2\left(-\frac{2}{3\sec(\pi)}+\frac{4}{(2\,(1-2^4))\sec(2\,\pi)}+\frac{8}{(3\,(1-2^6))\sec(3\,\pi)}\right)\right)^{47}$$

Series representations:

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\,\pi)\,2^2}{2\,(1-2^4)}+\frac{\cos(3\,\pi)\,2^3}{3\,(1-2^6)}\right)\right)^{47}+29+\phi = 29+\phi+140\,737\,488\,355\,328\left(\sum_{k=0}^{\infty}-\frac{2\,(-1)^k\left(315+63\times 4^k+20\times 9^k\right)\pi^{2\,k}}{945\,(2\,k)!}\right)^{47}$$

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\,\pi)\,2^2}{2\,(1-2^4)}+\frac{\cos(3\,\pi)\,2^3}{3\,(1-2^6)}\right)\right)^{47}+29+\phi = 29+\phi+140\,737\,488\,355\,328\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(315+7\times 3^{3+2\,k}+4\times 25^{1+k}\right)\pi^{1+2\,k}}{945\,(1+2\,k)!}\right)^{47}$$

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2\left(1-2^4\right)}+\frac{\cos(3\pi)\,2^3}{3\left(1-2^6\right)}\right)\right)^{47}+29+\phi=29+\phi+140\,737\,488\,355\,328$$
$$\left(\sum_{k=0}^{\infty}-\frac{2\cos\left(\frac{k\pi}{2}+z_0\right)\left(315\,(\pi-z_0)^k+63\,(2\pi-z_0)^k+20\,(3\pi-z_0)^k\right)}{945\,k!}\right)^{47}$$

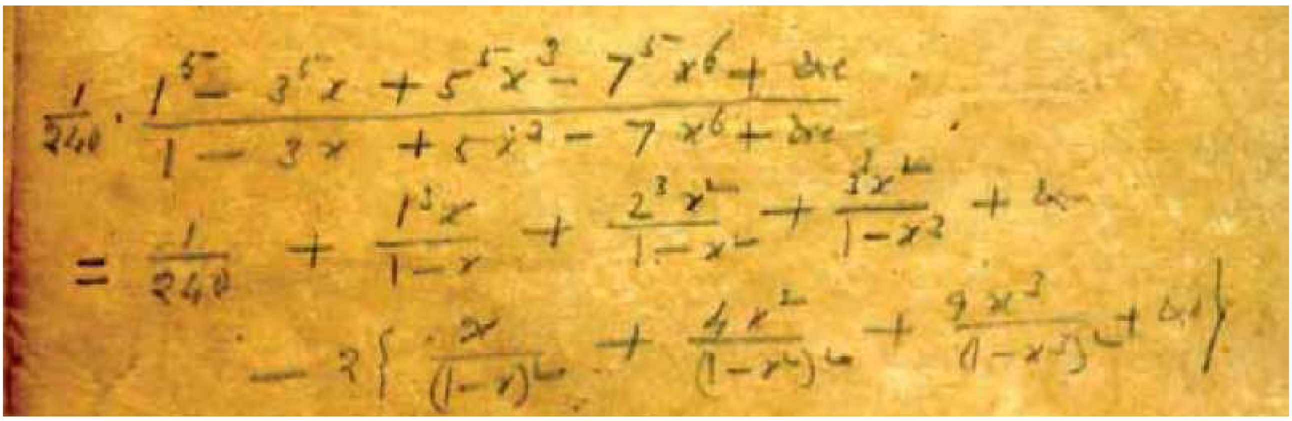
Multiple-argument formulas:

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2\left(1-2^4\right)}+\frac{\cos(3\pi)\,2^3}{3\left(1-2^6\right)}\right)\right)^{47}+29+\phi=$$
$$29+\phi+140\,737\,488\,355\,328\left(-\frac{2}{15}\,T_2(\cos(\pi))-\frac{8\,T_3(\cos(\pi))}{189}-\frac{2\cos(\pi)}{3}\right)^{47}$$

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2\left(1-2^4\right)}+\frac{\cos(3\pi)\,2^3}{3\left(1-2^6\right)}\right)\right)^{47}+29+\phi=29+\phi+140\,737\,488\,355\,328$$
$$\left(-\frac{2\cos(\pi)}{3}-\frac{2}{15}\left(-\cos(0)+2\cos^2(\pi)\right)-\frac{8}{189}\left(-\cos(\pi)+2\cos(\pi)\cos(2\pi)\right)\right)^{47}$$

$$\left(2\left(\frac{\cos(\pi)\,2}{1-4}+\frac{\cos(2\pi)\,2^2}{2\left(1-2^4\right)}+\frac{\cos(3\pi)\,2^3}{3\left(1-2^6\right)}\right)\right)^{47}+29+\phi=29+\phi+140\,737\,488\,355\,328$$
$$\left(-\frac{2}{3}\left(-1+2\cos^2\left(\frac{\pi}{2}\right)\right)-\frac{2}{15}\left(-1+2\cos^2(\pi)\right)-\frac{8}{189}\left(-1+2\cos^2\left(\frac{3\pi}{2}\right)\right)\right)^{47}$$

Page 251



$$\frac{1}{240}\cdot\frac{1^5-3^5x+5^5x^3-7^5x^6+\&c}{1-3x+5x^3-7x^6+\&c}=\frac{1}{240}+\frac{1^3x}{1-x}+\frac{2^3x^2}{1-x^2}+\frac{3^3x^3}{1-x^3}+\&c-2\left\{\frac{x}{(1-x)^2}+\frac{4x^2}{(1-x^2)^2}+\frac{9x^3}{(1-x^3)^2}+\&c\right\}$$

For x = 2, we obtain:

1/240 + (1^3*2)/(1-2) + (2^3*2^2)/(1-2^2) + (3^3*2^3)/(1-2^3)– 2((((2/(1-2)^2 + (4*2^2)/(1-2^2)^2 + (9*2^3)/(1-2^3)^2))))

Input:

$$\frac{1}{240}+\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}+\frac{3^3\times 2^3}{1-2^3}-2\left(\frac{2}{(1-2)^2}+\frac{4\times 2^2}{(1-2^2)^2}+\frac{9\times 2^3}{(1-2^3)^2}\right)$$

Exact result:

$$-\frac{1905613}{35280}$$

Decimal approximation:

-54.013973922902494331065759637188208616780045351473922902 4...

-54.01397392...

1/240(1^5-3^5*2+5^5*2^3-7^5*2^6)/(1-3*2+5*2^3-7*2^6)

Input:

$$\frac{1}{240}\times\frac{1^5-3^5\times 2+5^5\times 2^3-7^5\times 2^6}{1-3\times 2+5\times 2^3-7\times 2^6}$$

Exact result:

$$\frac{1051133}{99120}$$

Decimal approximation:

10.604650928167877320419693301049233252623083131557707828 89...

10.60465….

1/240 + (1^3*2)/(1-2) + (2^3*2^2)/(1-2^2) + (3^3*2^3)/(1-2^3)

Input:

$$\frac{1}{240}+\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}+\frac{3^3\times 2^3}{1-2^3}$$

Exact result:

$$-\frac{24371}{560}$$

Decimal approximation:

-43.519642857142857142857142857142857142857142857142857142 8...

-43.519642….

– 2((((2/(1-2)^2 + (4*2^2)/(1-2^2)^2 + (9*2^3)/(1-2^3)^2))))

Input:

$$-2\left(\frac{2}{(1-2)^2}+\frac{4\times 2^2}{(1-2^2)^2}+\frac{9\times 2^3}{(1-2^3)^2}\right)$$

Exact result:

$$-\frac{4628}{441}$$

Decimal approximation:

−10.4943310657596371882086167800453514739229024943310657596...

-10.494331.....

We note that:

((((-(1/240 + (1^3*2)/(1-2) + (2^3*2^2)/(1-2^2) + (3^3*2^3)/(1-2^3)– 2((((2/(1-2)^2 + (4*2^2)/(1-2^2)^2 + (9*2^3)/(1-2^3)^2)))))))))^1/8

Input:

$$\sqrt[8]{-\left(\frac{1}{240}+\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}+\frac{3^3\times 2^3}{1-2^3}-2\left(\frac{2}{(1-2)^2}+\frac{4\times 2^2}{(1-2^2)^2}+\frac{9\times 2^3}{(1-2^3)^2}\right)\right)}$$

Result:

$$\frac{\sqrt[8]{\frac{1905613}{5}}}{\sqrt{2}\sqrt[4]{21}}$$

Decimal approximation:

1.646505805314693801781961279943795052888752959517294353004...

$1.646505805\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternate forms:

$$\frac{1}{210}\sqrt[8]{1905613}\sqrt{2}\,5^{7/8}\times 21^{3/4}$$

root of $35280x^8 - 1905613$ near $x = 1.64651$

1/10^27[(18+7)/10^3+((((-(1/240 + (1^3*2)/(1-2) + (2^3*2^2)/(1-2^2) + (3^3*2^3)/(1-2^3)– 2((((2/(1-2)^2 + (4*2^2)/(1-2^2)^2 + (9*2^3)/(1-2^3)^2)))))))))^1/8]

Where 18 and 7 are Lucas numbers

Input:

$$\frac{1}{10^{27}}\left(\frac{18+7}{10^3}+\sqrt[8]{-\left(\frac{1}{240}+\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}+\frac{3^3\times 2^3}{1-2^3}-2\left(\frac{2}{(1-2)^2}+\frac{4\times 2^2}{(1-2^2)^2}+\frac{9\times 2^3}{(1-2^3)^2}\right)\right)}\right)$$

Result:

$$\frac{\frac{1}{40}+\frac{\sqrt[8]{\frac{1905613}{5}}}{\sqrt{2}\sqrt[4]{21}}}{1000000000000000000000000000}$$

Decimal approximation:

$1.6715058053146938017819612799437950528887529595172943\ldots\times 10^{-27}$

$1.67150580531\ldots*10^{-27}$ result practically equal to the value of the formula:

$$m_{p'} = 2\times\frac{\eta}{R}m_P = 1.6714213\times 10^{-27}\text{ kg}$$

that is the holographic proton mass (N. Haramein)

Alternate forms:

$$\frac{21+4\sqrt{2}\,5^{7/8}\times 21^{3/4}\sqrt[8]{1905613}}{840000000000000000000000000000}$$

$$\frac{\left(\text{root of } 35280x^8-1905613 \text{ near } x=1.64651\right)+\frac{1}{40}}{1000000000000000000000000000}$$

$$\frac{1}{40000000000000000000000000000}+\frac{\sqrt[8]{\frac{1905613}{5}}}{1000000000000000000000000000\sqrt{2}\sqrt[4]{21}}$$

Page 253

$1 - 5x + 7x^2 - 11x^5 + 13x^7 - \&c = \phi^2(-x) f(-x, -x^4) = B_1$

We have that:

11*(2^5)+13*(2^7)

Input:

$11 \times 2^5 + 13 \times 2^7$

Result:

2016

2016

$1 - 2x + 4x^5 - 5x^8 + 7x^{16} \&c = \psi(x^2) f^2(-x, -x^3) = A_x$

1-2(2)+4*2^5-5*2^8+7*2^16

Input:

$1 - 2 \times 2 + 4 \times 2^5 - 5 \times 2^8 + 7 \times 2^{16}$

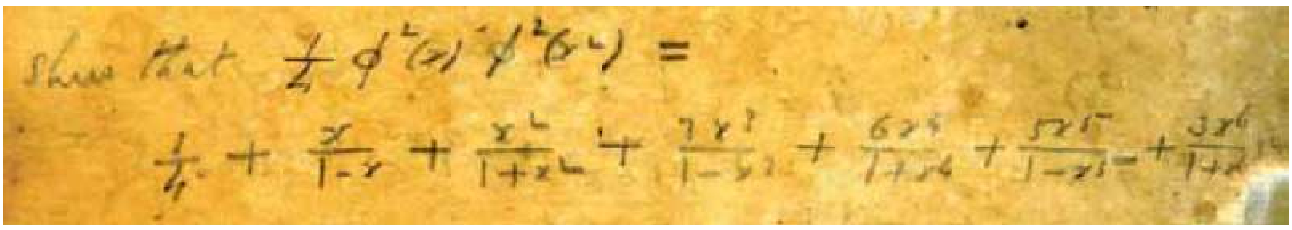
Result:

457597

457597

For x = 2, we obtain:

1-2(2)+4*2^5-5*2^8+7*2^16



Show that $\frac{1}{4}\phi^2(x)\psi^2(x^2) =$

$\frac{1}{4} + \frac{x}{1-x} + \frac{x^2}{1+x^2} + \frac{3x^3}{1-x^3} + \frac{6x^4}{1+x^4} + \frac{5x^5}{1-x^5} + \frac{3x^6}{1+x^6}$

For x = 2, we obtain:

1/4+2/(1-2)+(2^2)/(1+2^2)+(3*2^3)/(1-2^3)+(6*2^4)/(1+2^4)+(5*2^5)/(1-2^5)+(3*2^6)/(1+2^6)

Input:

$$\frac{1}{4}+\frac{2}{1-2}+\frac{2^2}{1+2^2}+\frac{3\times 2^3}{1-2^3}+\frac{6\times 2^4}{1+2^4}+\frac{5\times 2^5}{1-2^5}+\frac{3\times 2^6}{1+2^6}$$

Exact result:

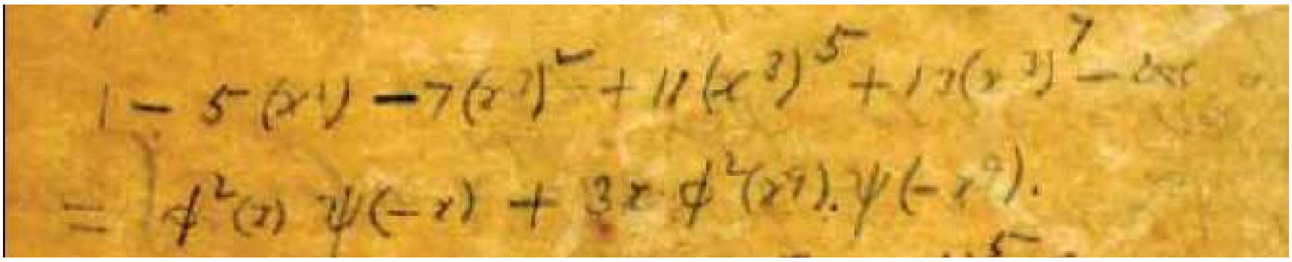
$$-\frac{900591}{959140}$$

Decimal approximation:

−0.9389567737765081218591655024292595450090706257689179890 3...

-0.9389567737….

We have also that:



For x = 2, we obtain:

1-5(2^3)-7(2^3)^2+11(2^3)^5+13(2^3)^7

Input:

$$1-5\times 2^3-7\,(2^3)^2+11\,(2^3)^5+13\,(2^3)^7$$

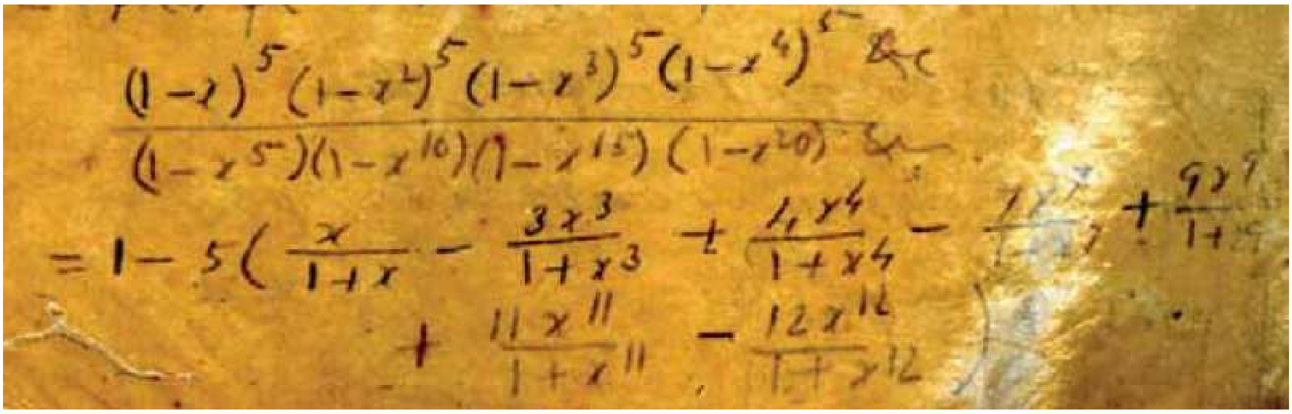
Result:

27622937

27622937

Scientific notation:

$$2.7622937\times 10^7$$



For x = 2, we obtain:

1-5(((2/3-(3*2^3)/(1+2^3)+(4*2^4)/(1+2^4)-(7*2^7)/(1+2^7)+(9*2^9)/(1+2^9)+(11*2^11)/(1+2^11)-(12*2^12)/(1+2^12)))

Input:

$$1-5\left(\frac{2}{3}-\frac{3\times 2^3}{1+2^3}+\frac{4\times 2^4}{1+2^4}-\frac{7\times 2^7}{1+2^7}+\frac{9\times 2^9}{1+2^9}+\frac{11\times 2^{11}}{1+2^{11}}-\frac{12\times 2^{12}}{1+2^{12}}\right)$$

Exact result:

$$-\frac{5242700117}{403441953}$$

Decimal approximation:

-12.994930442942804215505074158710509712409606543819 2046428...

-12.99493044…

From the results obtained:

-12.99493044+27622937-0.9389567737+457597+2016

we have:

ln(-12.99493044+27622937-0.9389567737+457597+2016)+1/golden ratio

Input interpretation:

$$\log(-12.99493044+27622937-0.9389567737+457597+2016)+\frac{1}{\phi}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

17.7686924375383153...

17.7686924…. result practically equal to the black hole entropy 17.7715

Alternative representations:

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} = \log_e(2.80825 \times 10^7) + \frac{1}{\phi}$$

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} = \log(a) \log_a(2.80825 \times 10^7) + \frac{1}{\phi}$$

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} = -\text{Li}_1(-2.80825 \times 10^7) + \frac{1}{\phi}$$

Series representations:

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} = \frac{1}{\phi} + \log(2.80825 \times 10^7) - \sum_{k=1}^{\infty} \frac{(-1)^k e^{-17.1507 k}}{k}$$

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} = \frac{1}{\phi} + 2 i \pi \left\lfloor \frac{\arg(2.80825 \times 10^7 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2.80825 \times 10^7 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} =$$

$$\frac{1}{\phi} + \left\lfloor \frac{\arg(2.80825 \times 10^7 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(2.80825 \times 10^7 - z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (2.80825 \times 10^7 - z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} = \frac{1}{\phi} + \int_1^{2.80825\times10^7} \frac{1}{t}\, dt$$

$$\log(-12.9949 + 27622937 - 0.938957 + 457597 + 2016) + \frac{1}{\phi} =$$

$$\frac{1}{\phi} + \frac{1}{2 i \pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-17.1507 s}\, \Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

$\Gamma(x)$ is the gamma function

(-12.99493044+27622937-0.9389567737+457597+2016)^1/34

Where 34 is a Fibonacci number

Input interpretation:

$$\sqrt[34]{-12.99493044 + 27622937 - 0.9389567737 + 457597 + 2016}$$

Result:

1.65604318057028662...

1.65604318…. is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

We have also:

1/3[(-12.99493044+27622937-0.9389567737+457597+2016)^1/2]-29-2Pi-golden ratio^2

Where 29 is a Lucas number

Input interpretation:

$$\frac{1}{3}\sqrt{-12.99493044+27622937-0.9389567737+457597+2016}-29-2\pi-\phi^2$$

ϕ is the golden ratio

Result:

1728.5307168747351...

1728.530716…

This result is very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem. The number 1728 is one less than the Hardy–Ramanujan number 1729

Series representations:

$$\frac{1}{3}\sqrt{-12.9949+27622937-0.938957+457597+2016}-29-2\pi-\phi^2 = 1737.43-\phi^2-8\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\frac{1}{3}\sqrt{-12.9949+27622937-0.938957+457597+2016}-29-2\pi-\phi^2 = 1741.43-\phi^2-4\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$\frac{1}{3}\sqrt{-12.9949+27622937-0.938957+457597+2016}-29-2\pi-\phi^2 = 1737.43-\phi^2-2\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$\frac{1}{3}\sqrt{-12.9949+27622937-0.938957+457597+2016}-29-2\pi-\phi^2 = 1737.43-\phi^2-4\int_0^\infty \frac{1}{1+t^2}\,dt$$

$$\frac{1}{3}\sqrt{-12.9949+27622937-0.938957+457597+2016}-29-2\pi-\phi^2 = 1737.43-\phi^2-8\int_0^1 \sqrt{1-t^2}\,dt$$

$$\frac{1}{3}\sqrt{-12.9949+27622937-0.938957+457597+2016}-29-2\pi-\phi^2 = 1737.43-\phi^2-4\int_0^\infty \frac{\sin(t)}{t}\,dt$$

And:

1/3[(-12.99493044+27622937-0.9389567737+457597+2016)^1/2]+18

Where 18 is a Lucas number

Input interpretation:

$$\frac{1}{3}\sqrt{-12.99493044+27622937-0.9389567737+457597+2016}+18$$

Result:

1784.4319361706646...

1784.431936... result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

1/26[(-12.99493044+27622937-0.9389567737+457597+2016)^1/2] - 47-18 + 1/golden ratio

Input interpretation:

$$\frac{1}{26}\sqrt{-12.99493044+27622937-0.9389567737+457597+2016}-47-18+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.4371035469035...

139.4371.... result practically equal to the rest mass of Pion meson 139.57

1/26[(-12.99493044+27622937-0.9389567737+457597+2016)^1/2] - 76 -golden ratio

Input interpretation:

$$\frac{1}{26}\sqrt{-12.99493044+27622937-0.9389567737+457597+2016}-76-\phi$$

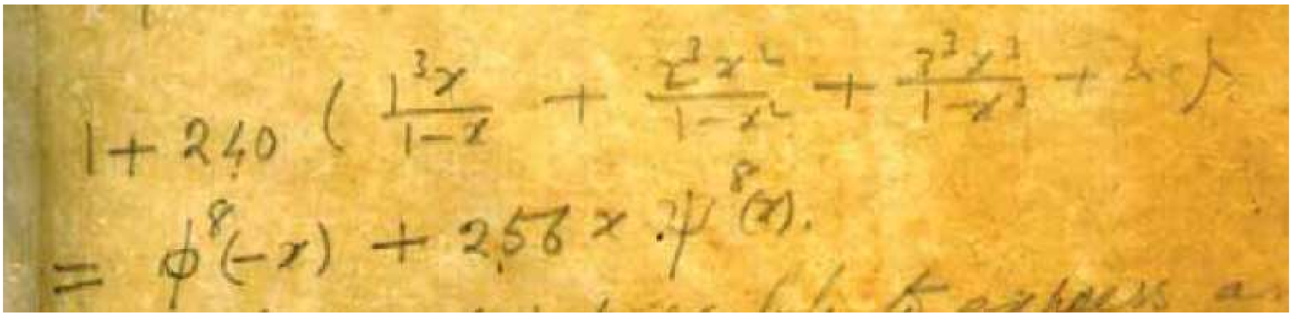
ϕ is the golden ratio

Result:

126.2010355694037...

126.201035... result in the range of the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and the Higgs boson mass 125.18

Page 258



For x = 2

1+240(((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)+(3^3*2^3)/(1-2^3))) = -2y^8+256*2*2z^8

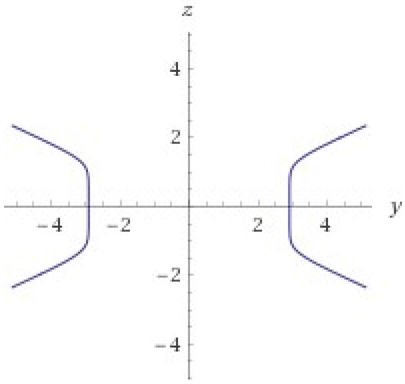
Input:

$$1+240\left(\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}+\frac{3^3\times 2^3}{1-2^3}\right)=-2\,y^8+256\times 2\times 2\,z^8$$

Exact result:

$$-\frac{73113}{7}=1024\,z^8-2\,y^8$$

Implicit plot:



Alternate forms:

$$y^8 - 512\,z^8 = \frac{73\,113}{14}$$

$$-\frac{73\,113}{7} = -2\left(y^8 - 512\,z^8\right)$$

$$2\,y^8 - 1024\,z^8 - \frac{73\,113}{7} = 0$$

Solutions:

$$z = -\frac{\sqrt[8]{14\,y^8 - 73\,113}}{2\,\sqrt[4]{2}\,\sqrt[8]{7}}$$

$$z = -\frac{i\,\sqrt[8]{14\,y^8 - 73\,113}}{2\,\sqrt[4]{2}\,\sqrt[8]{7}}$$

$$z = \frac{i\,\sqrt[8]{14\,y^8 - 73\,113}}{2\,\sqrt[4]{2}\,\sqrt[8]{7}}$$

$$z = \frac{\sqrt[8]{14\,y^8 - 73\,113}}{2\,\sqrt[4]{2}\,\sqrt[8]{7}}$$

$$z = -\frac{\sqrt[4]{-1}\,\sqrt[8]{14\,y^8 - 73\,113}}{2\,\sqrt[4]{2}\,\sqrt[8]{7}}$$

Implicit derivatives:

$$\frac{\partial y(z)}{\partial z} = \frac{512\,z^7}{y^7}$$

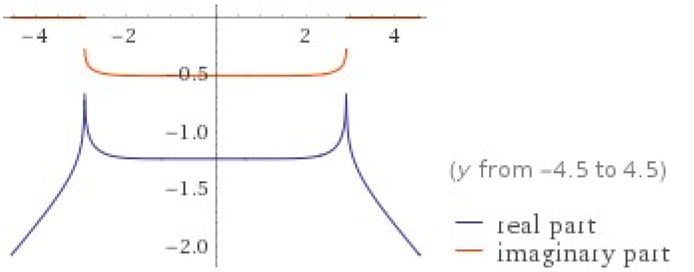
$$\frac{\partial z(y)}{\partial y} = \frac{y^7}{512\,z^7}$$

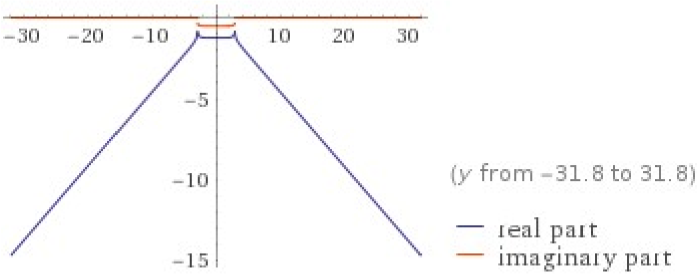
For:

Input:

$$-\frac{\sqrt[8]{-73\,113+14\,y^8}}{2\sqrt[4]{2}\,\sqrt[8]{7}}$$

Plots:





Alternate form:

$$-\frac{\sqrt[8]{2\,y^8-\frac{73\,113}{7}}}{2\sqrt[4]{2}}$$

Real roots:

$$y=-\sqrt[8]{\frac{73\,113}{14}}$$

$$y=\sqrt[8]{\frac{73\,113}{14}}$$

Complex roots:

$$y=-i\sqrt[8]{\frac{73\,113}{14}}$$

$$y=i\sqrt[8]{\frac{73\,113}{14}}$$

$$y=-\sqrt[4]{-1}\,\sqrt[8]{\frac{73\,113}{14}}$$

$$y = \sqrt[4]{-1}\ \sqrt[8]{\frac{73\,113}{14}}$$

$$y = -(-1)^{3/4}\ \sqrt[8]{\frac{73\,113}{14}}$$

Properties as a real function:

Domain

$$\left\{y \in \mathbb{R} : y \le -\sqrt[8]{\frac{73\,113}{14}} \text{ or } y \ge \sqrt[8]{\frac{73\,113}{14}}\right\}$$

Range

$\{z \in \mathbb{R} : z \le 0\}$ (all non-positive real numbers)

Parity

even

$\mathbb{R}$ is the set of real numbers

Series expansion at y = 0:

$$\begin{cases} -\dfrac{\sqrt[8]{-\frac{73\,113}{7}}}{2\sqrt[4]{2}} + \dfrac{\sqrt[8]{-1}\left(\frac{7}{73113}\right)^{7/8} y^8}{8\sqrt[4]{2}} + O(y^{13}) & \operatorname{Im}(y^8) \ge 0 \\ \dfrac{-\sqrt[8]{\frac{73\,113}{7}}\cos\left(\frac{\pi}{8}\right) + i\sqrt[8]{\frac{73\,113}{7}}\sin\left(\frac{\pi}{8}\right)}{2\sqrt[4]{2}} + \dfrac{\left(\frac{7}{73113}\right)^{7/8} y^8\left(\cos\left(\frac{\pi}{8}\right) - i\sin\left(\frac{\pi}{8}\right)\right)}{8\sqrt[4]{2}} + O(y^{13}) & \text{(otherwise)} \end{cases}$$

Series expansion at y = -(73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{-14\,y-14^{7/8}\sqrt[8]{73113}}}{2^{63/64}\times 7^{15/64}}+\frac{7^{57/64}\sqrt[8]{-14\,y-14^{7/8}\sqrt[8]{73113}}\left(y+\sqrt[8]{\frac{73113}{14}}\right)}{16\times 2^{55/64}\sqrt[64]{73113}}-\frac{35\left(3^{55/64}\sqrt[64]{7}\sqrt[8]{-14\,y-14^{7/8}\sqrt[8]{73113}}\right)\left(y+\sqrt[8]{\frac{73113}{14}}\right)^2}{512\,(2^{47/64}\times 24371^{9/64})}-\frac{329\left(3^{47/64}\times 7^{9/64}\sqrt[8]{-14\,y-14^{7/8}\sqrt[8]{73113}}\right)\left(y+\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\,(2^{39/64}\times 24371^{17/64})}+\frac{8407\times 3^{39/64}\times 7^{17/64}\sqrt[8]{-14\,y-14^{7/8}\sqrt[8]{73113}}\left(y+\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\times 2^{31/64}\times 24371^{25/64}}+O\left(\left(y+\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = -i (73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}+14\,i\,y}}{2^{63/64}\times 7^{15/64}}-\frac{i\,7^{57/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}+14\,i\,y}\left(y+i\sqrt[8]{\frac{73113}{14}}\right)}{16\times 2^{55/64}\sqrt[64]{73113}}+\frac{35\times 3^{55/64}\sqrt[64]{7}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}+14\,i\,y}\left(y+i\sqrt[8]{\frac{73113}{14}}\right)^2}{512\times 2^{47/64}\times 24371^{9/64}}-\frac{329\,i\,3^{47/64}\times 7^{9/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}+14\,i\,y}\left(y+i\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\times 2^{39/64}\times 24371^{17/64}}+\frac{8407\times 3^{39/64}\times 7^{17/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}+14\,i\,y}\left(y+i\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\times 2^{31/64}\times 24371^{25/64}}+O\left(\left(y+i\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = i (73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}-14\,i\,y}}{2^{63/64}\times 7^{15/64}}+\frac{i\,7^{57/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}-14\,i\,y}\left(y-i\sqrt[8]{\frac{73113}{14}}\right)}{16\times 2^{55/64}\sqrt[64]{73113}}+\frac{35\times 3^{55/64}\sqrt[64]{7}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}-14\,i\,y}\left(y-i\sqrt[8]{\frac{73113}{14}}\right)^2}{512\times 2^{47/64}\times 24371^{9/64}}+\frac{329\,i\,3^{47/64}\times 7^{9/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}-14\,i\,y}\left(y-i\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\times 2^{39/64}\times 24371^{17/64}}+\frac{8407\times 3^{39/64}\times 7^{17/64}\sqrt[8]{-14^{7/8}\sqrt[8]{73113}-14\,i\,y}\left(y-i\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\times 2^{31/64}\times 24371^{25/64}}+O\left(\left(y-i\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = (73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{14\,y-14^{7/8}\sqrt[8]{73113}}}{2^{63/64}\times 7^{15/64}}-\frac{\left(7^{57/64}\sqrt[8]{14\,y-14^{7/8}\sqrt[8]{73113}}\right)\left(y-\sqrt[8]{\frac{73113}{14}}\right)}{16\left(2^{55/64}\sqrt[64]{73113}\right)}-\frac{35\left(3^{55/64}\sqrt[64]{7}\sqrt[8]{14\,y-14^{7/8}\sqrt[8]{73113}}\right)\left(y-\sqrt[8]{\frac{73113}{14}}\right)^2}{512\left(2^{47/64}\times 24371^{9/64}\right)}+\frac{329\times 3^{47/64}\times 7^{9/64}\sqrt[8]{14\,y-14^{7/8}\sqrt[8]{73113}}\left(y-\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\times 2^{39/64}\times 24371^{17/64}}+\frac{8407\times 3^{39/64}\times 7^{17/64}\sqrt[8]{14\,y-14^{7/8}\sqrt[8]{73113}}\left(y-\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\times 2^{31/64}\times 24371^{25/64}}+O\left(\left(y-\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = -(-1)^(1/4) (73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7+7i)y}}{2^{59/64}\times 7^{15/64}}+$$
$$\frac{\left(\frac{1}{32}-\frac{i}{32}\right)7^{57/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7+7i)y}\left(y+\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)}{2^{19/64}\sqrt[64]{73113}}+$$
$$\frac{35i\,3^{55/64}\sqrt[64]{7}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7+7i)y}\left(y+\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^2}{512\times 2^{43/64}\times 24371^{9/64}}+$$
$$\frac{329\sqrt[4]{-1}\,3^{47/64}\times 7^{9/64}\sqrt[8]{14(-1)^{3/4}y-14^{7/8}\sqrt[8]{73113}}\left(y+\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\times 2^{39/64}\times 24371^{17/64}}-$$
$$\frac{8407\left(3^{39/64}\times 7^{17/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7+7i)y}\right)\left(y+\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\left(2^{27/64}\times 24371^{25/64}\right)}+$$
$$O\left(\left(y+\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = (-1)^(1/4) (73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7-7i)y}}{2^{59/64}\times 7^{15/64}}-$$
$$\frac{\left(\frac{1}{32}-\frac{i}{32}\right)7^{57/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7-7i)y}\left(y-\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)}{2^{19/64}\sqrt[64]{73113}}+$$
$$\frac{35i\,3^{55/64}\sqrt[64]{7}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7-7i)y}\left(y-\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^2}{512\times 2^{43/64}\times 24371^{9/64}}-$$
$$\frac{329\left(\sqrt[4]{-1}\,3^{47/64}\times 7^{9/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7-7i)y}\right)\left(y-\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\left(2^{35/64}\times 24371^{17/64}\right)}-$$
$$\frac{8407\left(3^{39/64}\times 7^{17/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7-7i)y}\right)\left(y-\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\left(2^{27/64}\times 24371^{25/64}\right)}+$$
$$O\left(\left(y-\sqrt[4]{-1}\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = -(-1)^(3/4) (73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7+7i)y}}{2^{59/64}\times 7^{15/64}}-$$

$$\frac{\left(\frac{1}{32}+\frac{i}{32}\right)7^{57/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7+7i)y}\left(y+(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)}{2^{19/64}\sqrt[64]{73113}}-$$

$$\frac{35\,i\,3^{55/64}\sqrt[64]{7}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7+7i)y}\left(y+(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^2}{512\times 2^{43/64}\times 24371^{9/64}}+$$

$$\frac{329(-1)^{3/4}\,3^{47/64}\times 7^{9/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7+7i)y}\left(y+(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\times 2^{35/64}\times 24371^{17/64}}$$

$$-\frac{8407\left(3^{39/64}\times 7^{17/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(7+7i)y}\right)\left(y+(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\left(2^{27/64}\times 24371^{25/64}\right)}+$$

$$O\left(\left(y+(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = (-1)^(3/4) (73113/14)^(1/8):

$$-\frac{73113^{7/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7-7i)y}}{2^{59/64}\times 7^{15/64}}+$$
$$\frac{\left(\frac{1}{32}+\frac{i}{32}\right)7^{57/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7-7i)y}\left(y-(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)}{2^{19/64}\sqrt[64]{73113}}-$$
$$\frac{35\,i\,3^{55/64}\sqrt[64]{7}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7-7i)y}\left(y-(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^2}{512\times 2^{43/64}\times 24371^{9/64}}-$$
$$\frac{329\left((-1)^{3/4}\,3^{47/64}\times 7^{9/64}\sqrt[8]{-14\sqrt[4]{-1}\,y-14^{7/8}\sqrt[8]{73113}}\right)\left(y-(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^3}{8192\left(2^{39/64}\times 24371^{17/64}\right)}-$$
$$\frac{8407\left(3^{39/64}\times 7^{17/64}\sqrt[8]{-2^{3/8}\times 7^{7/8}\sqrt[8]{73113}+(-7-7i)y}\right)\left(y-(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^4}{524288\left(2^{27/64}\times 24371^{25/64}\right)}+$$
$$O\left(\left(y-(-1)^{3/4}\sqrt[8]{\frac{73113}{14}}\right)^5\right)$$

(generalized Puiseux series)

Series expansion at y = ∞:

$$-\frac{y}{2\sqrt[8]{2}}+\frac{73113}{224\sqrt[8]{2}\,y^7}+O\left(\left(\frac{1}{y}\right)^{13}\right)$$

(Laurent series)

Derivative:

$$\frac{d}{dy}\left(-\frac{\sqrt[8]{-73113+14y^8}}{2\sqrt[4]{2}\sqrt[8]{7}}\right)=-\frac{y^7}{\sqrt[4]{2}\left(2y^8-\frac{73113}{7}\right)^{7/8}}$$

Indefinite integral:

$$\int -\frac{\sqrt[8]{-73113+14y^8}}{2\sqrt[4]{2}\sqrt[8]{7}}\,dy=$$
$$\frac{y\left(\sqrt[8]{73113}\,(73113-14y^8)^{7/8}\,{}_2F_1\left(\frac{1}{8},\frac{7}{8};\frac{9}{8};\frac{14y^8}{73113}\right)-14y^8+73113\right)}{4\sqrt[4]{2}\sqrt[8]{7}\,(14y^8-73113)^{7/8}}+\text{constant}$$

${}_2F_1(a,b;c;x)$ is the hypergeometric function

Global maxima:

$$\max\left\{-\frac{\sqrt[8]{-73113+14y^8}}{2\sqrt[4]{2}\,\sqrt[8]{7}}\right\}=0 \text{ at } y=\sqrt[8]{\frac{73113}{14}}$$

$$\max\left\{-\frac{\sqrt[8]{-73113+14y^8}}{2\sqrt[4]{2}\,\sqrt[8]{7}}\right\}=0 \text{ at } y=-\sqrt[8]{\frac{73113}{14}}$$

Series representations:

$$-\frac{\sqrt[8]{-73113+14y^8}}{2\sqrt[4]{2}\,\sqrt[8]{7}}=\sum_{n=-\infty}^{\infty}\left(\begin{cases}-(-73113)^{(1-n)/8}\,2^{1/8(-10+n)}\times 7^{1/8(-1+n)}\binom{\frac{1}{8}}{\frac{n}{8}} & (n \bmod 8=0 \text{ and } n\geq 0)\\ 0 & \text{otherwise}\end{cases}\right)y^n$$

$$-\frac{\sqrt[8]{-73113+14y^8}}{2\sqrt[4]{2}\,\sqrt[8]{7}}=\sum_{n=0}^{\infty}\frac{1}{2\left(\sqrt[4]{2}\,\sqrt[8]{7}\right)}(-1+y)^n\,(-1)\,\text{DifferenceRoot}\Big[\{y,n\}\mapsto\Big\{(14-14n)y(n)+(-14-112n)y(1+n)+(-490-392n)y(2+n)+(-1862-784n)y(3+n)+(-3430-980n)y(4+n)+(-3626-784n)y(5+n)+(-2254-392n)y(6+n)+(-770-112n)y(7+n)+(584792+73099n)y(8+n)=0,$$
$$y(0)=\sqrt[8]{-73099},\ y(1)=-\frac{14\sqrt[8]{-1}}{73099^{7/8}},\ y(2)=-\frac{3582537\sqrt[8]{-1}}{73099\times 73099^{7/8}},$$
$$y(3)=-\frac{524010521916\sqrt[8]{-1}}{5343463801\times 73099^{7/8}},$$
$$y(4)=-\frac{47944987183198035\sqrt[8]{-1}}{390601860389299\times 73099^{7/8}},$$
$$y(5)=-\frac{2815989016953345208542\sqrt[8]{-1}}{28552605392597367601\times 73099^{7/8}},$$
$$y(6)=-\frac{8054533051083447351063039\sqrt[8]{-1}}{160551300122574998020423\times 73099^{7/8}},$$
$$y(7)=-\frac{184029908811334635678404841324\sqrt[8]{-1}}{11736139487660109780294900877\times 73099^{7/8}}\Big\}\Big](n)$$

$\binom{n}{m}$ is the binomial coefficient

From

$$y = \sqrt[8]{\frac{73113}{14}}$$

we have:

(73113/14)^(1/8)

Input:

$$\sqrt[8]{\frac{73113}{14}}$$

Decimal approximation:

2.915636115280214646936604438881477147791905653862806377301...

2.91563611528…. = y = ϕ

Alternate form:

$$\frac{1}{14}\sqrt[8]{73113}\ 14^{7/8}$$

From

$$z = -\frac{\sqrt[8]{14\,y^8 - 73113}}{2\sqrt[4]{2}\ \sqrt[8]{7}}$$

For y = 2.91563611528…, we obtain:

(73113 - 14 * 2.91563611528^8)^(1/8)/(2 2^(1/4) 7^(1/8))

Input interpretation:

$$\frac{\sqrt[8]{73113 - 14 \times 2.91563611528^8}}{2\sqrt[4]{2}\ \sqrt[8]{7}}$$

Result:

0.0395671...

0.0395671… = z = ψ

We have thence from

1+240(((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)+(3^3*2^3)/(1-2^3))) = -2y^8+256*2*2z^8

That:

1+240(((1^3*2)/(1-2)+(2^3*2^2)/(1-2^2)+(3^3*2^3)/(1-2^3)))

Input:

$$1+240\left(\frac{1^3\times 2}{1-2}+\frac{2^3\times 2^2}{1-2^2}+\frac{3^3\times 2^3}{1-2^3}\right)$$

Exact result:

$$-\frac{73113}{7}$$

Decimal approximation:

-10444.714285714285714285714285714285714285714285714285714...

-10444.71428571…

Is equal to

-2(2.91563611528)^8+256*2*2(0.0395671)^8

Input interpretation:

$$-2\times 2.91563611528^8+256\times 2\times 2\times 0.0395671^8$$

Result:

-10444.7142857019828617399658333240063729389056340773605593...

-10444.71428570198…

Repeating decimal:

-10444.7142857019828617399658333240063729389056340773605593...

-10444.7142857…

From which:

(((-10444.7142857019828617399658333324+2(2.91563611528)^8))) / ((2*2(0.0395671)^8))

Input interpretation:

$$\frac{-10444.7142857019828617399658333324 + 2 \times 2.91563611528^8}{2 \times 2 \times 0.0395671^8}$$

Result:

256.00000000000000000265219834092084325933426205853616062 4...

256.00000000...

1/2 (((-10444.7142857019828617399658333324+2(2.91563611528)^8))) / ((2*2(0.0395671)^8))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2} \times \frac{-10444.7142857019828617399658333324 + 2 \times 2.91563611528^8}{2 \times 2 \times 0.0395671^8} - \pi + \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.476...

125.476... result practically equal to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternative representations:

$$\frac{-10444.71428570198286173996583332400000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} = -\pi + -\frac{1}{2\cos(216\,°)} + \frac{-10444.71428570198286173996583332400000 + 2 \times 2.915636115280000^8}{2\,(4 \times 0.0395671^8)}$$

$$\frac{-10444.71428570198286173996583332400000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} = -180\,° + -\frac{1}{2\cos(216\,°)} + \frac{-10444.71428570198286173996583332400000 + 2 \times 2.915636115280000^8}{2\,(4 \times 0.0395671^8)}$$

$$\frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} =$$

$$-\pi + \frac{1}{2 \cos\left(\frac{\pi}{5}\right)} + \frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{2 (4 \times 0.0395671^8)}$$

Series representations:

$$\frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} =$$

$$128. + \frac{1}{\phi} - 4 \sum_{k=0}^{\infty} \frac{(-1)^k}{1 + 2 k}$$

$$\frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} =$$

$$130 + \frac{1}{\phi} - 2 \sum_{k=1}^{\infty} \frac{2^k}{\binom{2 k}{k}}$$

$$\frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} =$$

$$128. + \frac{1}{\phi} - \sum_{k=0}^{\infty} \frac{2^{-k} (-6 + 50 k)}{\binom{3 k}{k}}$$

Integral representations:

$$\frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} =$$

$$128. + \frac{1}{\phi} - 2 \int_0^{\infty} \frac{1}{1 + t^2} \, dt$$

$$\frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} =$$

$$128. + \frac{1}{\phi} - 4 \int_0^{1} \sqrt{1 - t^2} \, dt$$

$$\frac{-10444.7142857019828617399658333240000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\, 2} - \pi + \frac{1}{\phi} =$$

$$128. + \frac{1}{\phi} - 2 \int_0^{\infty} \frac{\sin(t)}{t} \, dt$$

1/2 (((-10444.71428570198286173996583332 4+2(2.91563611528)^8))) / ((2*2(0.0395671)^8))+11+1/golden ratio

Input interpretation:

$$\frac{1}{2} \times \frac{-10\,444.7142857019828617399658333 24 + 2 \times 2.91563611528^8}{2 \times 2 \times 0.0395671^8} + 11 + \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.618...

139.618… result practically equal to the rest mass of Pion meson 139.57

Alternative representations:

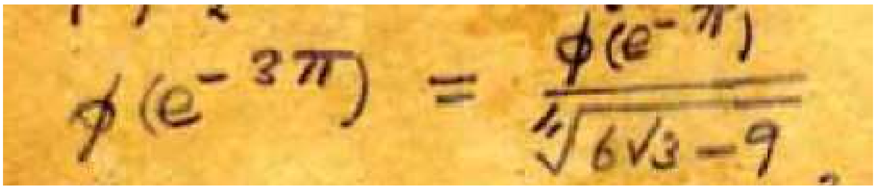
$$\frac{-10\,444.71428570198286173996583332 40000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\,2} + 11 + \frac{1}{\phi} = 11 + \frac{-10\,444.71428570198286173996583332 40000 + 2 \times 2.915636115280000^8}{2\,(4 \times 0.0395671^8)} + \frac{1}{2 \sin(54\,°)}$$

$$\frac{-10\,444.71428570198286173996583332 40000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\,2} + 11 + \frac{1}{\phi} = 11 + -\frac{1}{2 \cos(216\,°)} + \frac{-10\,444.71428570198286173996583332 40000 + 2 \times 2.915636115280000^8}{2\,(4 \times 0.0395671^8)}$$

$$\frac{-10\,444.71428570198286173996583332 40000 + 2 \times 2.915636115280000^8}{(2 \times 2 \times 0.0395671^8)\,2} + 11 + \frac{1}{\phi} = 11 + \frac{-10\,444.71428570198286173996583332 40000 + 2 \times 2.915636115280000^8}{2\,(4 \times 0.0395671^8)} + -\frac{1}{2 \sin(666\,°)}$$

Now, we take the value 2.91563611528 of ϕ that we have previously obtained and insert it in the following expression:

Page 271



$$\phi(e^{-3\pi}) = \frac{\phi(e^{-\pi})}{\sqrt[4]{6\sqrt{3}-9}}$$

We obtain:

2.91563611528 (e^(-3Pi))*x = ((2.91563611528 (e^(-Pi)))/(((6*sqrt3-9)^1/4)))

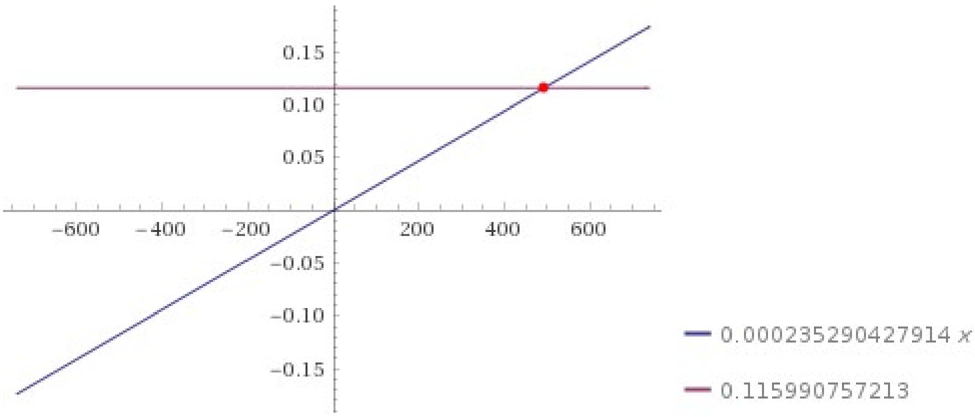
Input interpretation:

$$2.91563611528\, e^{-3\pi}\, x = \frac{2.91563611528\, e^{-\pi}}{\sqrt[4]{6\sqrt{3}-9}}$$

Result:

$$0.000235290427914\, x = 0.115990757213$$

Plot:



Alternate form:

$$0.000235290427914\, x - 0.115990757213 = 0$$

Solution:

$$x \approx 492.968448575$$

492.968448575 result very near to the rest mass of Kaon meson 493.677

(2.91563611528 (e^(-3Pi)))*(0.927+golden ratio^2)x = ((2.91563611528 (e^(-Pi)))/(((6*sqrt3-9)^1/4)))

Where 0.927 is the Kaon Regge slope

Input interpretation:

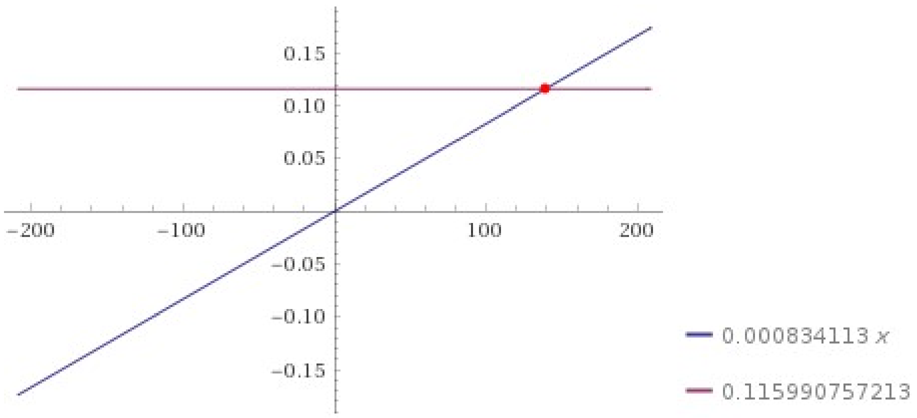
$$(2.91563611528\, e^{-3\pi})(0.927 + \phi^2)\, x = \frac{2.91563611528\, e^{-\pi}}{\sqrt[4]{6\sqrt{3} - 9}}$$

ϕ is the golden ratio

Result:

$$0.000834113\, x = 0.115990757213$$

Plot:



Alternate form:

$$0.000834113\, x - 0.115990757213 = 0$$

Alternate form assuming x is real:

$$0.000834113\, x + 0 = 0.115990757213$$

Solution:

$$x \approx 139.059$$

139.059 result practically equal to the rest mass of Pion meson 139.57

(2.91563611528 (e^(-3Pi)))*(0.927+golden ratio^2)*139.059

Input interpretation:

$$(2.91563611528\, e^{-3\pi})(0.927 + \phi^2) \times 139.059$$

ϕ is the golden ratio

Result:

0.115991...

0.115991…

Alternative representations:

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = 405.445\,e^{-540^\circ}\left(0.927+\left(2\cos\left(\frac{\pi}{5}\right)\right)^2\right)$$

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = \left(\left(0.927+\left(2\cos\left(\frac{\pi}{5}\right)\right)^2\right)139.059\right)2.915636115280000\,\exp^{-3\pi}(z) \text{ for } z=1$$

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = 405.445\,e^{-3\pi}\left(0.927+\boxed{\text{root of } -1-x+x^2 \text{ near } x=1.61803}^2\right)$$

Series representations:

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = 405.445\,(0.927+\phi^2)\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-12\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = 405.445\,(0.927+\phi^2)\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{-12\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = 405.445\,(0.927+\phi^2)\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-3\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}$$

Integral representations:

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = 405.445\,e^{-6\int_0^{\infty}1/(1+t^2)\,dt}\,(0.927+\phi^2)$$

$$((0.927+\phi^2)\,139.059)\,2.915636115280000\,e^{-3\pi} = 405.445\,e^{-12\int_0^1\sqrt{1-t^2}\,dt}\,(0.927+\phi^2)$$

$$((0.927 + \phi^2)\, 139.059)\, 2.915636115280000\, e^{-3\pi} = 405.445\, e^{-6 \int_0^\infty \sin(t)/t\, dt}\, (0.927 + \phi^2)$$

((2.91563611528 (e^(-Pi)))/(((6*sqrt3-9)^1/4)))

Input interpretation:

$$\frac{2.91563611528\, e^{-\pi}}{\sqrt[4]{6\sqrt{3} - 9}}$$

Result:

0.115990757213...

0.115990757213…

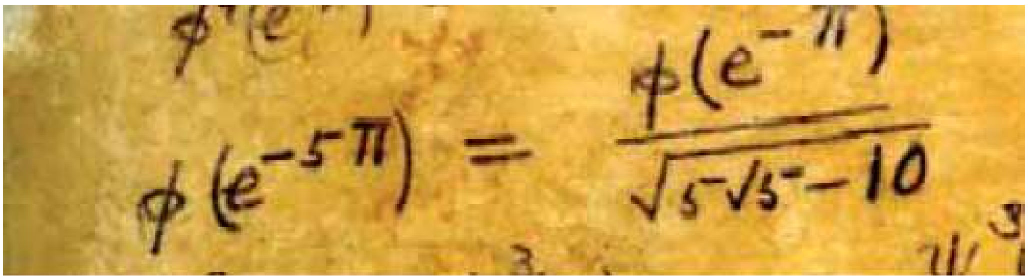
Series representations:

$$\frac{2.915636115280000\, e^{-\pi}}{\sqrt[4]{6\sqrt{3} - 9}} = \frac{2.215404366764325\, e^{-\pi}}{\sqrt[4]{-3 + 2\sqrt{2} \sum_{k=0}^{\infty} 2^{-k} \binom{\frac{1}{2}}{k}}}$$

$$\frac{2.915636115280000\, e^{-\pi}}{\sqrt[4]{6\sqrt{3} - 9}} = \frac{2.215404366764325\, e^{-\pi}}{\sqrt[4]{-3 + 2\sqrt{2} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}}$$

$$\frac{2.915636115280000\, e^{-\pi}}{\sqrt[4]{6\sqrt{3} - 9}} = \frac{2.215404366764325\, e^{-\pi}}{\sqrt[4]{-3 + \frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\, \Gamma\left(-\frac{1}{2} - s\right) \Gamma(s)}{\sqrt{\pi}}}}$$

Page 272



We obtain, from the same previous value of ϕ:

2.91563611528 (e^(-5Pi))*x = ((2.91563611528 (e^(-Pi)))/(((5*sqrt5-10)^1/2)))

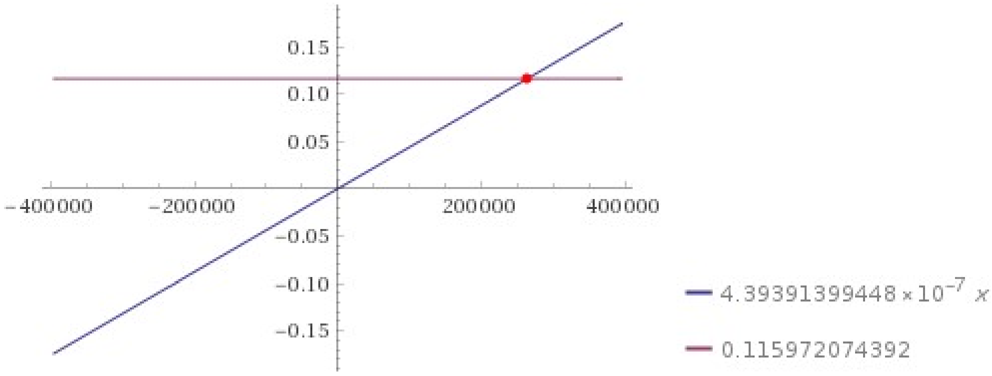
Input interpretation:

$$2.91563611528\, e^{-5\pi}\, x = \frac{2.91563611528\, e^{-\pi}}{\sqrt{5\sqrt{5} - 10}}$$

Result:

$$4.39391399448 \times 10^{-7}\, x = 0.115972074392$$

Plot:



Alternate form:

$$4.39391399448 \times 10^{-7}\, x - 0.115972074392 = 0$$

Solution:

$$x \approx 263937.970879$$

263937.970879

We have:

2.91563611528 (e^(-5Pi))*263937.970879

Input interpretation:

$$2.91563611528\, e^{-5\pi} \times 263937.970879$$

Result:

0.115972074392...

0.115972074392…

Alternative representations:

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533\, e^{-900°}$$

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533\, e^{5 i \log(-1)}$$

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 2.915636115280000 \exp^{-5\pi}(z)\, 263937.9708790000 \quad \text{for } z = 1$$

Series representations:

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533 \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-20 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$$

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533 \left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{-20 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$$

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533 \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-5 \times \sum_{k=1}^{\infty} 4^{-k} \left(-1+3^k\right) \zeta(1+k)}$$

Integral representations:

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533\, e^{-10 \int_0^{\infty} 1/(1+t^2)\, dt}$$

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533\, e^{-20 \int_0^1 \sqrt{1-t^2}\, dt}$$

$$2.915636115280000\, e^{-5\pi}\, 263937.9708790000 = 769547.080088533\, e^{-10 \int_0^{\infty} \sin(t)/t\, dt}$$

And:

((2.91563611528 (e^(-Pi)))/(((5*sqrt5-10)^1/2))

Input interpretation:

$$\frac{2.91563611528\, e^{-\pi}}{\sqrt{5\sqrt{5}-10}}$$

Result:

0.115972074392...

0.115972074932…

Series representations:

$$\frac{2.915636115280000\, e^{-\pi}}{\sqrt{5\sqrt{5}-10}} = \frac{1.303912110283899\, e^{-\pi}}{\sqrt{-2+\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}}}$$

$$\frac{2.915636115280000\, e^{-\pi}}{\sqrt{5\sqrt{5}-10}} = \frac{1.303912110283899\, e^{-\pi}}{\sqrt{-2+\sqrt{4}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{4}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}}$$

$$\frac{2.915636115280000\, e^{-\pi}}{\sqrt{5\sqrt{5}-10}} = \frac{1.844010190506012\, e^{-\pi}}{\sqrt{-4+\frac{\sum_{j=0}^{\infty} \text{Res}_{s=-\frac{1}{2}+j}\, 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}}}$$

From the previous expression, we obtain:

(((((2.91563611528 (e^(-Pi)))/(((5*sqrt5-10)^1/2))))))^1/256

Input interpretation:

$$\sqrt[256]{\frac{2.91563611528\, e^{-\pi}}{\sqrt{5\sqrt{5}-10}}}$$

Result:

0.99161966456557...

0.9916196645… result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

and to the dilaton value $\mathbf{0.989117352243 = \phi}$

1/2*log base 0.99161966456(((((2.91563611528 (e^(-Pi)))/(((5*sqrt5-10)^1/2)))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.99161966456}\left(\frac{2.91563611528\, e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)-\pi+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

125.476441…

125.476441… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternative representation:

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\, e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{2.915636115280000\, e^{-\pi}}{\sqrt{-10+5\sqrt{5}}}\right)}{2\log(0.991619664560000)}$$

Series representations:

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1.303912110283899\,e^{-\pi}}{\sqrt{-2+\sqrt{5}}}\right)^k}{k}}{2\log(0.991619664560000)}$$

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+\frac{1}{2}\log_{0.991619664560000}\left(\frac{1.303912110283899\,e^{-\pi}}{\sqrt{-2+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}}}\right)$$

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+\frac{1}{2}\log_{0.991619664560000}\left(\frac{1.303912110283899\,e^{-\pi}}{\sqrt{-2+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}\right)$$

1/2*log base 0.99161966456(((((2.91563611528 (e^(-Pi)))/(((5*sqrt5-10)^1/2))))))+11+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.99161966456}\left(\frac{2.91563611528\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)+11+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

139.618034...

139.618034… result practically equal to the rest mass of Pion meson 139.57

Alternative representation:

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{\log\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{-10+5\sqrt{5}}}\right)}{2\log(0.991619664560000)}$$

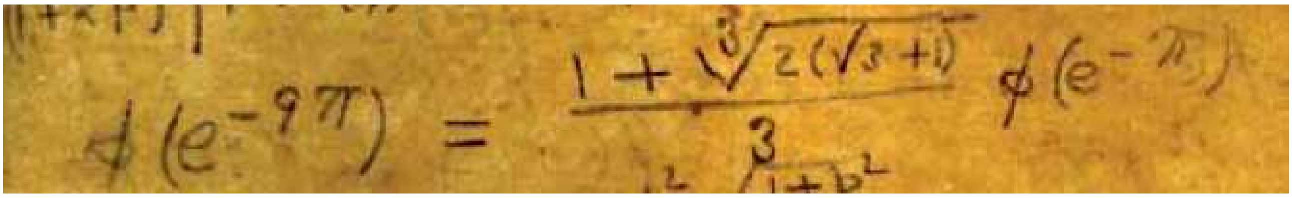
Series representations:

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1.303912110283899\,e^{-\pi}}{\sqrt{-2+\sqrt{5}}}\right)^k}{k}}{2\log(0.991619664560000)}$$

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{1}{2}\log_{0.991619664560000}\left(\frac{1.303912110283899\,e^{-\pi}}{\sqrt{-2+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}}}\right)$$

$$\frac{1}{2}\log_{0.991619664560000}\left(\frac{2.915636115280000\,e^{-\pi}}{\sqrt{5\sqrt{5}-10}}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{1}{2}\log_{0.991619664560000}\left(\frac{1.303912110283899\,e^{-\pi}}{\sqrt{-2+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}\right)$$

Page 274



We obtain, from the same previous value of ϕ:

2.91563611528 (e^(-9Pi))*x = 1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi))))

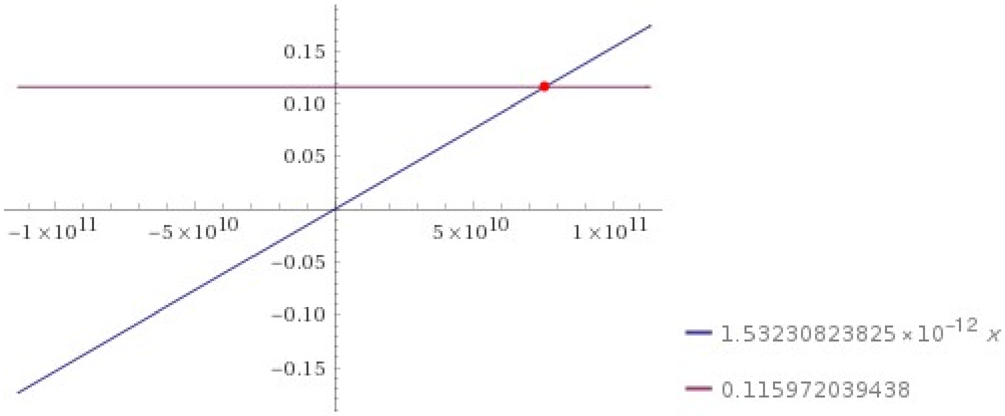
Input interpretation:

$$2.91563611528\, e^{-9\pi}\, x = \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\, e^{-\pi}\right)$$

Result:

$$1.53230823825\times 10^{-12}\, x = 0.115972039438$$

Plot:



Alternate form:

$$1.53230823825\times 10^{-12}\, x - 0.115972039438 = 0$$

Solution:

$$x \approx 7.5684536925\times 10^{10}$$

$7.5684536925*10^{10}$

2.91563611528 (e^(-9Pi))*(7.5684536925e+10) = 1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi))))

Input interpretation:

$$2.91563611528\, e^{-9\pi} \times 7.5684536925 \times 10^{10} = \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\, e^{-\pi}\right)$$

Result:

True

We have that:

2.91563611528 (e^(-9Pi))*(7.5684536925e+10)

Input interpretation:

$$2.91563611528\, e^{-9\pi} \times 7.5684536925 \times 10^{10}$$

Result:

0.11597203944...

0.11597203944…

1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi))))

Input interpretation:

$$\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\, e^{-\pi}\right)$$

Result:

0.115972039438...

0.115972039438…

Series representations:

$$\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)(2.915636115280000\, e^{-\pi}) = 0.971878705093333\, e^{-\pi} + 1.224490438491662\, e^{-\pi} \sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)(2.915636115280000\, e^{-\pi}) = 0.971878705093333\, e^{-\pi} + 1.224490438491662\, e^{-\pi} \sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)(2.915636115280000\, e^{-\pi}) = 0.9718787050933\, e^{-\pi} + 0.9718787050933\, e^{-\pi} \sqrt[3]{2+\frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\, \Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}}$$

((((0.9568666373+(((1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi)))))))))))^7

Where 0.9568666373 is the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1} = 1-\frac{e^{-\pi}}{1+\frac{e^{-2\pi}}{1+\frac{e^{-3\pi}}{1+\frac{e^{-4\pi}}{1+\ldots}}}} \approx 0.9568666373$$

Input interpretation:

$$\left(0.9568666373+\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)(2.91563611528\, e^{-\pi})\right)^7$$

Result:

1.63584049...

$1.63584049\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

((((0.9243408674589+(((1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi)))))))))))^13

Where 0.9243408674589 is a Ramanujan mock theta function value

Input interpretation:

$$\left(0.9243408674589 + \frac{1}{3}\left(1 + \sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\, e^{-\pi}\right)\right)^{13}$$

Result:

1.67159793946...

1.67159793946... result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-27}$ kg

that is the holographic proton mass (N. Haramein)

((((0.9243408674589+(((1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi)))))))))))^12

Input interpretation:

$$\left(0.9243408674589 + \frac{1}{3}\left(1 + \sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\, e^{-\pi}\right)\right)^{12}$$

Result:

1.60682226316...

1.60682226316...

(((1.63584049+((((0.9243408674589+(((1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi)))))))))))^12)))*1/((34+3)Pi/(55+3))

Input interpretation:

$$\left(1.63584049+\left(0.9243408674589+\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\,e^{-\pi}\right)\right)^{12}\right)\times\frac{1}{(34+3)\times\frac{\pi}{55+3}}$$

Result:

1.61799874...

1.61799874… result that is a very good approximation to the value of the golden ratio 1,618033988749...

Series representations:

$$\frac{1}{\frac{(34+3)\pi}{55+3}}\left(1.63584+\left(0.92434086745890000+\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\,e^{-\pi}\right)\right)^{12}\right)=\frac{1}{37\pi}58\left(1.63584+\left(0.92434086745890000+0.9718787050933333\,e^{-\pi}\left(1+\sqrt[3]{2}\sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}\right)\right)^{12}\right)$$

$$\frac{1}{\frac{(34+3)\pi}{55+3}}\left(1.63584+\left(0.92434086745890000+\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\,e^{-\pi}\right)\right)^{12}\right)=\frac{1}{37\pi}58\left(1.63584+\left(0.92434086745890000+0.9718787050933333\,e^{-\pi}\left(1+\sqrt[3]{2}\sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}}\right)\right)^{12}\right)$$

$$\frac{1}{\frac{(34+3)\pi}{55+3}}\left(1.63584+\left(0.92434086745890000+\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\,e^{-\pi}\right)\right)^{12}\right)=$$

$$\frac{1}{37\pi}\,58\left(1.63584+\left(0.92434086745890000+0.9718787050933333\,e^{-\pi}\left(1+\sqrt[3]{2}\,\sqrt[3]{1+\frac{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}}\right)\right)^{12}\right)$$

Possible closed forms:

$$\frac{5823014063\,\pi}{11306274669}\approx 1.61799874296604649918666619$$

$$\pi\,\left(\text{root of } 224x^5-503x^4+32x^3+187x^2-1411x+700 \text{ near } x=0.515025\right)\approx 1.6179987429660464991817718$$

$$\frac{288+19e-123e^2}{2\left(408-348e+49e^2\right)}\approx 1.6179987429660465 0220$$

$$\frac{-497+204\sqrt{\pi}+247\pi-870\pi^{3/2}+565\pi^2}{270\pi}\approx 1.61799874296604649913 0094$$

$$\pi\,\left(\text{root of } 4094x^4+1028x^3-8460x^2+2199x+683 \text{ near } x=0.515025\right)\approx 1.61799874296604649918 80921$$

$$\sqrt[3]{\frac{3578+1208e+33\pi-1243\log(2)}{1441}}\approx 1.61799874296604649912 6776$$

$$\frac{1}{2}\sqrt{\frac{1}{433}\left(4763+1288e-1039\pi-672\log(2)\right)}\approx 1.6179987429660464990 6740$$

$$\pi\,\left(\text{root of } 117773x^3+41117x^2-42787x-4959 \text{ near } x=0.515025\right)\approx 1.61799874296604649919 4700$$

$$\text{root of } 61x^5+699x^4-1003x^3+439x^2-922x-876 \text{ near } x=1.618\approx 1.61799874296604649919 8419$$

$$46+17e+38e^2+39\sqrt{1+e}+\sqrt{1+e^2}+38\pi-25\pi^2-87\sqrt{1+\pi}-44\sqrt{1+\pi^2}\approx 1.617998742966046498 8388$$

$$e^{\frac{3}{8}+\frac{13}{88e}-\frac{5e}{88}-\frac{5}{44\pi}+\frac{2\pi}{11}}\ \pi^{3/44-(5e)/44}\ \sqrt[22]{\sin(e\pi)}\ \sqrt[11]{-\cos(e\pi)} \approx$$
$$1.61799874296604649922092$$

$$\frac{-1161-525\pi+193\pi^2}{-1103+63\pi+35\pi^2} \approx 1.61799874296604649479125$$

$$\frac{9-5\sqrt{2}+\sqrt{3}-7e-2\pi^2-\log(8)}{5\sqrt{2}-3\sqrt{3}+e-4\pi-\pi^2-9\log(2)+\log(3)} \approx 1.61799874296604649947075$$

$$\frac{3743399633}{2313598604} \approx 1.61799874296604649922238$$

From the following continued fraction:

(((((1/(1 + 1/(95 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(2 + 1/(1 + 1))))))))))))

Input:

$$\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}}}$$

Exact result:

$$\frac{12526}{12657}$$

Decimal approximation:

0.989649996049616812830844591925416765426246345895551868531...

0.98964999604 ≈ 0.98965 that is very near to the mean of the values of the following four fundamental Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{2\pi}{5}}}{\sqrt{\varphi\sqrt{5}-\varphi}}=1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-4\pi}}{1+\cfrac{e^{-6\pi}}{1+\cfrac{e^{-8\pi}}{1+\ldots}}}}\approx 1.0018674362$$

$$\frac{e^{-\frac{2\pi}{\sqrt{5}}}}{\dfrac{\sqrt{5}}{1+\sqrt[5]{\sqrt{(\varphi-1)^5\sqrt[4]{5^3}}-1}}-\varphi}=1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\cfrac{e^{-6\pi\sqrt{5}}}{1+\cfrac{e^{-8\pi\sqrt{5}}}{1+\ldots}}}}\approx 1.0000007913$$

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}-\varphi+1}}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\dfrac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}}\approx 0.9991104684$$

1/4(1.0018674362 + 1.0000007913 + 0.9568666373 + 0.9991104684) = 0.9894613333

we obtain also:

(((((1/(1 + 1/(95 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(1 + 1/(2 + 1/(1 + 1))))))))))))+(((1/3*((1+(2((sqrt3)+1))^1/3))((2.91563611528 (e^(-Pi))))))))))

Input interpretation:

$$\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}}+\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\,e^{-\pi}\right)$$

Result:

1.105622035488…

1.105622035488…

Series representations:

$$\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}}+\frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\,e^{-\pi}\right)=$$

$$0.98964999604962+0.97187870509333\,e^{-\pi}+1.22449043849166\,e^{-\pi}\sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}}} + \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\, e^{-\pi}\right) =$$

$$0.98964999604962 + 0.97187870509333\, e^{-\pi} + 1.22449043849166\, e^{-\pi} \sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}}} + \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\, e^{-\pi}\right) =$$

$$0.9896499960496 + 0.9718787050933\, e^{-\pi} + 0.9718787050933\, e^{-\pi} \sqrt[3]{2+\frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\, \Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}}$$

We observe that:

Input interpretation:

$$\frac{1}{10^{52}}\left(\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}}} + \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.91563611528\, e^{-\pi}\right)\right)$$

Result:

1.105622035488... × 10^{-52}

1.105622…*10^{-52} result practically equal to the value of Cosmological Constant

Series representations:

$$\frac{\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}} + \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\, e^{-\pi}\right)}{10^{52}} =$$

$$9.89649996049617\times 10^{-53} + 9.71878705093333\times 10^{-53}\, e^{-\pi} + 1.224490438491662\times 10^{-52}\, e^{-\pi}\sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\frac{1}{1+\frac{1}{95+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{2+\frac{1}{1+1}}}}}}}}}} + \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\, e^{-\pi}\right)}{10^{52}} =$$

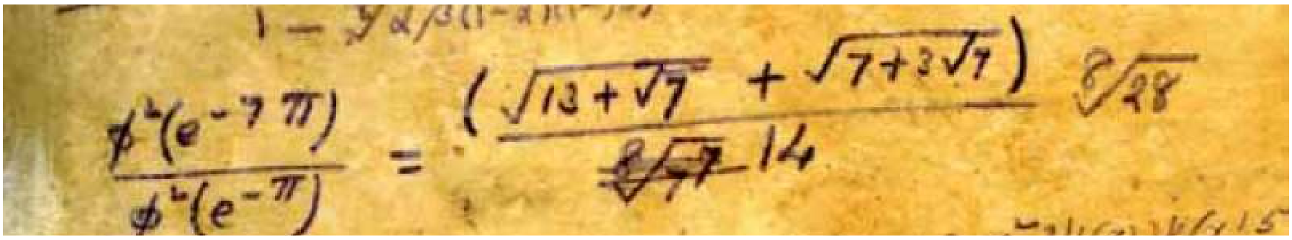
$$9.89649996049617\times 10^{-53} + 9.71878705093333\times 10^{-53}\, e^{-\pi} + 1.224490438491662\times 10^{-52}\, e^{-\pi}\sqrt[3]{1+\sqrt{2}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{\dfrac{1}{1+\dfrac{1}{95+\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{1+\dfrac{1}{2+\dfrac{1}{1+1}}}}}}}}}}} + \frac{1}{3}\left(1+\sqrt[3]{2\left(\sqrt{3}+1\right)}\right)\left(2.915636115280000\, e^{-\pi}\right)}{10^{52}} =$$

$$9.89649996049617\times 10^{-53} + 9.71878705093333\times 10^{-53}\, e^{-\pi} + 9.71878705093333\times 10^{-53}\, e^{-\pi}\sqrt[3]{2+\frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j}\, 2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}}$$

Now, we have that:

Page 284



We obtain, from the same previous value of ϕ:

(((((2.91563611528^2 (e^(-7Pi))) *1/ ((2.91563611528^2 (e^(-Pi))))))*x = (28)^1/8 * 1/14((((13+sqrt7))^1/2))+(((7+3sqrt7)^1/2))))

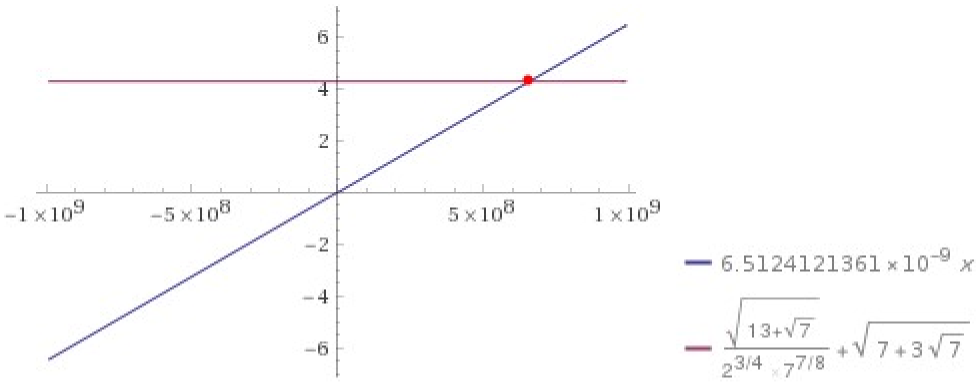
Input interpretation:

$$\left(\left(2.91563611528^2\, e^{-7\pi}\right)\times\frac{1}{2.91563611528^2\, e^{-\pi}}\right)x = \sqrt[8]{28}\times\frac{1}{14}\sqrt{13+\sqrt{7}}+\sqrt{7+3\sqrt{7}}$$

Result:

$$6.5124121361\times 10^{-9}\, x = \frac{\sqrt{13+\sqrt{7}}}{2^{3/4}\times 7^{7/8}}+\sqrt{7+3\sqrt{7}}$$

Plot:



Alternate forms:

$$6.5124121361\times10^{-9}\,x=\sqrt{7+3\sqrt{7}}+\frac{\sqrt[4]{91+88\sqrt{7}}}{7\sqrt{2}}$$

$$6.5124121361\times10^{-9}\,x=\frac{1}{14}\left(\sqrt[4]{2}\,\sqrt[8]{7}\,\sqrt{13+\sqrt{7}}+14\sqrt{7+3\sqrt{7}}\right)$$

$$6.5124121361\times10^{-9}\,x=\sqrt{\text{root of }173625106649344\,x^8-9723005972363264\,x^7+194453538903864576\,x^6-1498771403857541632\,x^5+1159021887091951456\,x^4+20840169720671219072\,x^3+38742854856889191120\,x^2+25174749039929292832\,x+6894039009519142849\text{ near }x=18.4332}$$

Solution:

$x\approx6.592623748\times10^8$

6.592623748*10^8

(((((2.91563611528^2 (e^(-7Pi))) *1/ ((2.91563611528^2 (e^(-Pi))))))*(6.592623748×10^8)

Input interpretation:

$$\left((2.91563611528^2\,e^{-7\pi})\times\frac{1}{2.91563611528^2\,e^{-\pi}}\right)\times6.592623748\times10^8$$

Result:

4.293388291...

4.293388291….

(((28)^1/8 * 1/14((((13+sqrt7))^1/2))+(((7+3sqrt7)^1/2))))

Input:

$$\sqrt[8]{28} \times \frac{1}{14} \sqrt{13+\sqrt{7}} + \sqrt{7+3\sqrt{7}}$$

Result:

$$\frac{\sqrt{13+\sqrt{7}}}{2^{3/4} \times 7^{7/8}} + \sqrt{7+3\sqrt{7}}$$

Decimal approximation:

4.293388290292366604711671866594386380711862864679518547720...

4.29338829029…..

Alternate forms:

$$\frac{1}{14}\left(\sqrt[4]{2}\ \sqrt[8]{7}\ \sqrt{13+\sqrt{7}} + 14\sqrt{7+3\sqrt{7}}\right)$$

$$\sqrt{7+3\sqrt{7}} + \frac{\sqrt[4]{91+88\sqrt{7}}}{7\sqrt{2}}$$

$$\sqrt{\text{root of } 173625106649344 x^8 - 9723005972363264 x^7 + 194453538903864576 x^6 - 1498771403857541632 x^5 + 1159021887091951456 x^4 + 20840169720671219072 x^3 + 38742854856889191120 x^2 + 25174749039929292832 x + 6894039009519142849 \text{ near } x = 18.4332}$$

Minimal polynomial:

$$173625106649344 x^{16} - 9723005972363264 x^{14} + 194453538903864576 x^{12} - 1498771403857541632 x^{10} + 1159021887091951456 x^8 + 20840169720671219072 x^6 + 38742854856889191120 x^4 + 25174749039929292832 x^2 + 6894039009519142849$$

We note that:

1/2(1/1.0018674362)*1/(((28)^1/8 * 1/14((((13+sqrt7))^1/2))+(((7+3sqrt7)^1/2))))

where 1.0018674362 is the value of the following Rogers-Ramanujan continued fraction

$$\frac{e^{-\frac{2\pi}{5}}}{\sqrt{\varphi\sqrt{5}-\varphi}} = 1+\frac{e^{-2\pi}}{1+\frac{e^{-4\pi}}{1+\frac{e^{-6\pi}}{1+\frac{e^{-8\pi}}{1+\dots}}}} \approx 1.0018674362$$

Input interpretation:

$$\frac{1}{2}\times\frac{1}{1.0018674362}\times\frac{1}{\sqrt[8]{28}\times\frac{1}{14}\sqrt{13+\sqrt{7}}+\sqrt{7+3\sqrt{7}}}$$

Result:

0.11624106383233578635687194786832678984484457577090772 1152...

0.1162410638…

And:

1/2(1/1.0018674362)*1/(((((((((2.91563611528^2 (e^(-7Pi))) *1/ ((2.91563611528^2 (e^(-Pi)))))))*(6.592623748×10^8)))

Input interpretation:

$$\frac{1}{2}\times\frac{1}{1.0018674362}\times\frac{1}{\left(\left(2.91563611528^2\, e^{-7\pi}\right)\times\frac{1}{2.91563611528^2\, e^{-\pi}}\right)\times 6.592623748\times 10^8}$$

Result:

0.116241063826487450785004257180506994610987838295922673120...

0.1162410638…

And also:

1/10^52 * 7/(10e) (((((((((2.91563611528^2 (e^(-7Pi))) *1/ ((2.91563611528^2 (e^(-Pi)))))))*(6.592623748×10^8)))))))

Input interpretation:

$$\frac{1}{10^{52}}\times\frac{7}{10\,e}\left(\left(\left(2.91563611528^2\, e^{-7\pi}\right)\times\frac{1}{2.91563611528^2\, e^{-\pi}}\right)\times 6.592623748\times 10^8\right)$$

Result:

$1.105614500... \times 10^{-52}$

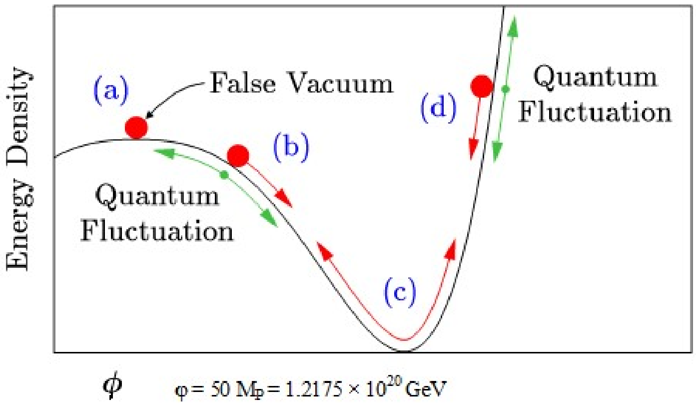
1.1056145…*10^{-52} result practically equal to the value of the Cosmological Constant

Appendix

A possible proposal of physical theory that explains the mathematical connections between Ramanujan's equations and the analyzed physical and cosmological parameters.

We calculate the 4096^{th} ($4096 = 64^2$) root of the value of scalar field and from it, we obtain 64

Inflationary Cosmology: Exploring the Universe from the Smallest to the Largest Scales



$\varphi = 50\ M_P = 1.2175 \times 10^{20}$ GeV

$$\sqrt[4096]{\frac{1}{1.2175 \times 10^{20}}} = 0.98877237...$$

$$\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175 \times 10^{20}}\right)} = 64.0000...$$

$64^2 = 4096$

where ϕ is the scalar field.

Thence, we obtain:

$$\sqrt[4096]{\frac{1}{\phi}} = 0.98877237 \; ; \quad \sqrt{\log_{0.98877237}\left(\frac{1}{\phi}\right)} = 64 \; ; \quad 64^2 = 4096$$

Now, we calculate the 4096[th] root of the value of inflaton mass and from it we obtain, also here, 64

Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

Table 2 The masses of inflaton, axion and gravitino, and the VEVs of F- and D-fields derived from our models by fixing the amplitude A_s according to PLANCK data – see Eq. (57). The value of $\langle F_T \rangle$ for a positive ω_1 is not fixed by A_s

α	3	4		5		6		7	
$\mathrm{sgn}(\omega_1)$	$-$	$+$	$-$	$+$	$-$	$+$	$-$	$-$	
m_φ	2.83	2.95	2.73	2.71	2.71	2.53	2.58	1.86	$\times 10^{13}$ GeV
$m_{t'}$	0	0.93	1.73	2.02	2.02	4.97	2.01	1.56	$\times 10^{13}$ GeV
$m_{3/2}$	≥ 1.41	2.80	0.86	2.56	0.64	3.91	0.49	0.29	$\times 10^{13}$ GeV
$\langle F_T \rangle$	any	$\neq 0$	0	$\neq 0$	0	$\neq 0$	0	0	$\times 10^{31}$ GeV^2
$\langle D \rangle$	8.31	4.48	5.08	3.76	3.76	3.25	2.87	1.73	$\times 10^{31}$ GeV^2

$m_\varphi = 2.542 - 2.33 * 10^{13}$ GeV with an average of $2.636 * 10^{13}$ GeV

$$\sqrt[4096]{\frac{1}{2.83 \times 10^{13}}} = 0.992466536725379764\ldots$$

$$\sqrt{\log_{0.99246653}\left(\frac{1}{2.83 \times 10^{13}}\right)} = 64.0000\ldots$$

$$64^2 = 4096$$

where m_φ is the inflaton mass.

Thence we obtain:

$$\sqrt[4096]{\frac{1}{m_\varphi}} = 0.99246653\ ; \quad \sqrt{\log_{0.99246653}\left(\frac{1}{m_\varphi}\right)} = 64\ ; \quad 64^2 = 4096$$

We have the following mathematical connections:

$$\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times10^{20}}\right)} = 64; \quad \sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times10^{13}}\right)} = 64$$

$$\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times10^{20}}\right)} = \sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times10^{13}}\right)} = 64$$

From Ramanujan collected papers

$$g_{22} = \sqrt{(1+\sqrt{2})}.$$

Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From the following expression (see above part of paper), we obtain:

$$e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^6 + (6-\sqrt{37})^6\}.$$

(((exp(Pi*sqrt37)+24+(4096+276)exp-(Pi*sqrt37))) / ((((6+sqrt37)^6+(6- sqrt37)^6)))

$$\frac{\exp(\pi\sqrt{37}) + 24 + (4096+276)\exp(-(\pi\sqrt{37}))}{(6+\sqrt{37})^6 + (6-\sqrt{37})^6} = \frac{24 + 4372\, e^{-\sqrt{37}\,\pi} + e^{\sqrt{37}\,\pi}}{(6-\sqrt{37})^6 + (6+\sqrt{37})^6} =$$

$$= \frac{24 + 4372\, e^{-\sqrt{37}\,\pi} + e^{\sqrt{37}\,\pi}}{(6-\sqrt{37})^6 + (6+\sqrt{37})^6} \text{ is a transcendental number } =$$

$$= 64.00000000000000000077996590154140877656204274015527898430\ldots \sim 64$$

From which:

(((exp(Pi*sqrt37)+24+(x+276)exp-(Pi*sqrt37)))/((((6+sqrt37)^6+(6-sqrt37)^6))) = 64

$$\frac{\exp(\pi\sqrt{37}) + 24 + (x+276)\exp(-(\pi\sqrt{37}))}{(6+\sqrt{37})^6 + (6-\sqrt{37})^6} = 64$$

Exact result:

$$\frac{e^{-\sqrt{37}\,\pi}(x+276) + e^{\sqrt{37}\,\pi} + 24}{(6-\sqrt{37})^6 + (6+\sqrt{37})^6} = 64$$

Alternate forms:

$$\frac{e^{-\sqrt{37}\,\pi}\,(x+276)}{3\,111\,698} + \frac{e^{\sqrt{37}\,\pi}}{3\,111\,698} + \frac{12}{1\,555\,849} = 64$$

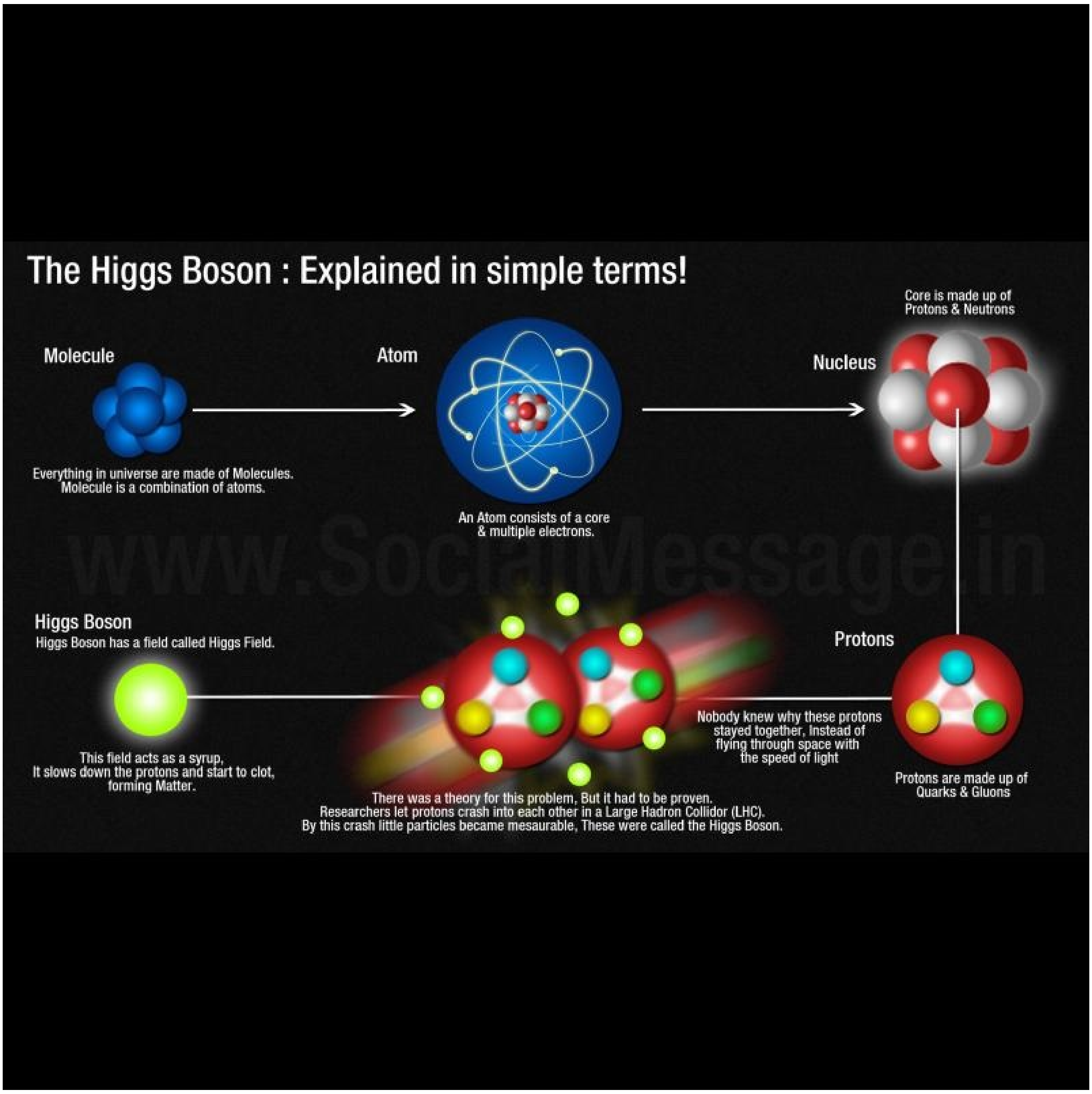
$$\frac{e^{-\sqrt{37}\,\pi}\left(x + e^{2\sqrt{37}\,\pi} + 24\,e^{\sqrt{37}\,\pi} + 276\right)}{3\,111\,698} = 64$$

$$\frac{e^{-\sqrt{37}\,\pi}\,x}{(6-\sqrt{37})^6+(6+\sqrt{37})^6} + \frac{e^{\sqrt{37}\,\pi}}{(6-\sqrt{37})^6+(6+\sqrt{37})^6} + \frac{276\,e^{-\sqrt{37}\,\pi}}{(6-\sqrt{37})^6+(6+\sqrt{37})^6} + \frac{24}{(6-\sqrt{37})^6+(6+\sqrt{37})^6} - 64 = 0$$

$$x = -276 + 199\,148\,648\,e^{\sqrt{37}\,\pi} - e^{2\sqrt{37}\,\pi}$$

$$x \approx 4096.0$$

Higgs Boson



http://therealmrscience.net/exactly-what-does-the-higgs-boson-do.html

From the above values of scalar field ϕ, and of the inflaton mass m_{φ} , we obtain results that are in the range of the Higgs boson mass:

$$2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times10^{20}}\right)}-\pi+\frac{1}{\phi}$$

125.476...

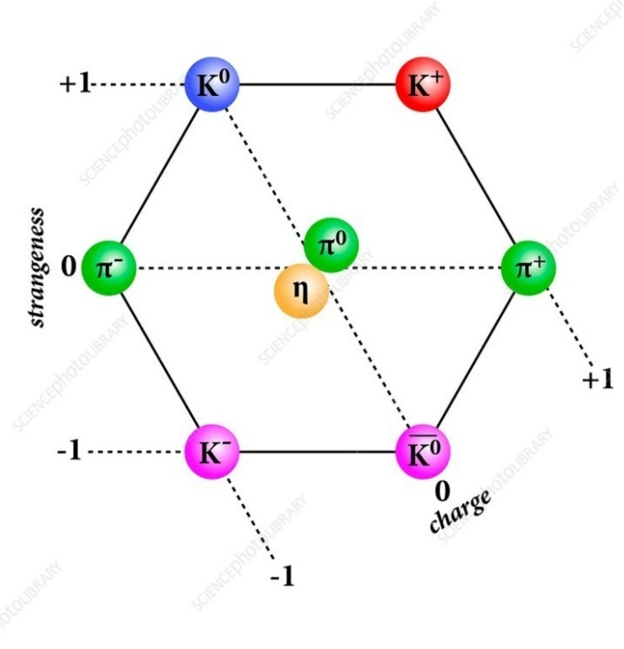
and

$$2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times10^{13}}\right)}-\pi+\frac{1}{\phi}$$

125.476...

Pion mesons

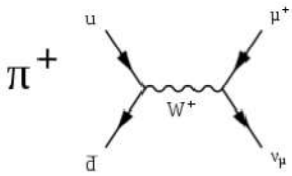
https://www.sciencephoto.com/media/476068/view/meson-octet-diagram



Meson octet. Diagram organising mesons into an octet according to their charge and strangeness. Particles along the same diagonal line share the same charge; positive (+1), neutral (0), or negative (-1). Particles along the same horizontal line share the same strangeness. Strangeness is a quantum property that is conserved in strong and electromagnetic interactions, between particles, but not in weak interactions. Mesons are made up of one quark and one antiquark. Particles with a strangeness of +1, such as the kaons (blue and red) in the top line, contain one strange antiquark. Particles with a strangeness of 0, such as the pion mesons (green) and eta meson (yellow) in the middle line, contain no strange quarks. Particles with a strangeness of -1, such as the antiparticle kaons (pink) in the bottom line, contain one strange quark

The $\pi^{\pm}$ mesons have a mass of 139.6 MeV/c^2 and a mean lifetime of 2.6033×10^{-8} s. They decay due to the weak interaction. The primary decay mode of a pion, with a branching fraction of 0.999877, is a leptonic decay into a muon and a muon neutrino:

$$\pi^+ \rightarrow \mu^+ + \nu_\mu$$
$$\pi^- \rightarrow \mu^- + \bar{\nu}_\mu$$

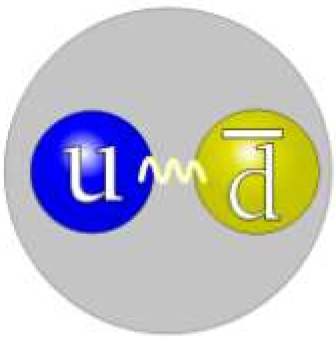


Feynman diagram of the dominant leptonic pion decay.

The second most common decay mode of a pion, with a branching fraction of 0.000123, is also a leptonic decay into an electron and the corresponding electron antineutrino. This "electronic mode" was discovered at CERN in 1958:[6]

$$\pi^+ \rightarrow e^+ + \nu_e$$
$$\pi^- \rightarrow e^- + \bar{\nu}_e$$

Pion



The quark structure of the pion.

Types	3
Mass	$\pi^{\pm}$: 139.570 18(35) MeV/c^2 π^0: 134.9766(6) MeV/c^2
Composition	π^+: $u\bar{d}$ π^0: $u\bar{u}$ or $d\bar{d}$ π^-: $d\bar{u}$
Statistics	Bosonic
Interactions	Strong, Weak, Electromagnetic and Gravity
Symbol	π^+, π^0, and π^-
Theorized	Hideki Yukawa (1935)
Discovered	César Lattes, Giuseppe Occhialini (1947) and Cecil Powell

From the above values of scalar field ϕ, and the inflaton mass m_φ , we obtain also the value of Pion meson $\pi^{\pm}$ = 139.57018 MeV/c^2

$$2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times 10^{20}}\right)}+11+\frac{1}{\phi}$$

139.618...

and

$$2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times 10^{13}}\right)}+11+\frac{1}{\phi}$$

139.618...

The $\pi^{\pm}$ mesons have a mass of 139.6 MeV/c^2 and a mean lifetime of 2.6033×10^{-8} s. They decay due to the weak interaction. The primary decay mode of a pion, with a branching fraction of 0.999877, is a leptonic decay into a muon and a muon neutrino.

Note that the value 0.999877 is very closed to the following Rogers-Ramanujan continued fraction (http://www.bitman.name/math/article/102/109/):

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

We observe that also the results of 4096th root of the values of scalar field ϕ, and the inflaton mass m_φ:

$$\sqrt[4096]{\frac{1}{\phi}} = 0.98877237 \; ; \quad \sqrt[4096]{\frac{1}{m_\varphi}} = 0.99246653$$

are very closed to the above continued fraction.

Furthermore, from the results concerning the scalar field ϕ (0.98877237, 1.2175e+20), and the inflaton mass m_φ (0.99246653, 2.83e+13), we obtain, performing the 10th root:

((((2sqrt (((log base 0.98877237 ((1/1.2175e+20)))))-Pi))))^1/10

Input interpretation:

$$\sqrt[10]{2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times 10^{20}}\right)} - \pi}$$

Result:

1.620472942364990195996419034511458317811826267744760835367...

And:

1/10^27 [(47+4)/10^3+((((2sqrt (((log base 0.98877237 ((1/1.2175e+20)))))-Pi))))^1/10]

where 47 and 4 are Lucas numbers

$$\frac{1}{10^{27}}\left(\frac{47+4}{10^3} + \sqrt[10]{2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times 10^{20}}\right)} - \pi}\right)$$

Result:

$1.671473... \times 10^{-27}$

$1.671473...*10^{-27}$ result practically equal to the proton mass

We have also:

((((2sqrt (((log base 0.99246653 ((1/2.83e+13)))))-Pi))))^1/10

$$\sqrt[10]{2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times 10^{13}}\right)}-\pi}$$

Result:

1.6204728501614154392895862048865871624444052827097014473 26...

And:

1/10^27 [(47+4)/10^3+((((2sqrt (((log base 0.99246653 ((1/2.83e+13)))))-Pi))))^1/10]

$$\frac{1}{10^{27}}\left(\frac{47+4}{10^3}+\sqrt[10]{2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times 10^{13}}\right)}-\pi}\right)$$

Result:

$1.671473... \times 10^{-27}$

$1.671473...*10^{-27}$ result that is practically equal to the proton mass as the previous

Trascendental numbers

From the paper of S. Ramanujan "*Modular equations and approximations to π*" have the following expression:

$$\frac{3}{\pi} = 1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1} + \cdots\right)$$

1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))]

$$1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1}\right)$$

Decimal approximation:

0.954929659721612900604724361833045671977574376370221277342...

0.954929659...

Property:

$1 - 24\left(\frac{1}{-1+e^{2\pi}} + \frac{2}{-1+e^{4\pi}} + \frac{3}{-1+e^{6\pi}}\right)$ is a transcendental number

Series representations:

$$1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1}\right) = 1 - \frac{24}{-1+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{48}{-1+e^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{72}{-1+e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1}\right) = 1 - \frac{24}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{48}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{72}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}-\frac{48}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}-\frac{72}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}-\frac{48}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}-\frac{72}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}$$

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+e^{4\int_0^{\infty}\sin(t)/t\,dt}}-\frac{48}{-1+e^{8\int_0^{\infty}\sin(t)/t\,dt}}-\frac{72}{-1+e^{12\int_0^{\infty}\sin(t)/t\,dt}}$$

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+e^{8\int_0^{1}\sqrt{1-t^2}\,dt}}-\frac{48}{-1+e^{16\int_0^{1}\sqrt{1-t^2}\,dt}}-\frac{72}{-1+e^{24\int_0^{1}\sqrt{1-t^2}\,dt}}$$

Note that the value of the following Rogers-Ramanujan continued fraction is practically equal to the result of the previous expression. Indeed:

$$\left(\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373\right)\cong$$

$$\cong \left(1 - 24\left(\frac{1}{e^{2\pi} - 1} + \frac{2}{e^{4\pi} - 1} + \frac{3}{e^{6\pi} - 1}\right)\right) = 0.954929659\ldots$$

We know that:

ω	6	$m_{u/d} = 0 - 60$	$0.910 - 0.918$
ω/ω_3	$5 + 3$	$m_{u/d} = 255 - 390$	$0.988 - 1.18$
ω/ω_3	$5 + 3$	$m_{u/d} = 240 - 345$	$0.937 - 1.000$

that are the various Regge slope of Omega mesons

From the paper:

Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

Table 1 The predictions for the inflationary parameters (n_s, r), and the values of φ at the horizon crossing (φ_i) and at the end of inflation (φ_f), in the case $3 \le \alpha \le \alpha_*$ with both signs of ω_1. The α parameter is taken to be integer, except of the upper limit $\alpha_* \equiv (7 + \sqrt{33})/2$

α	3	4		5	6		α_*
$\mathrm{sgn}(\omega_1)$	$-$	$+$	$-$	$+/-$	$+$	$-$	$-$
n_s	0.9650	0.9649	0.9640	0.9639	0.9634	0.9637	0.9632
r	0.0035	0.0010	0.0013	0.0007	0.0005	0.0004	0.0003
$-\kappa\varphi_i$	5.3529	3.5542	3.9899	3.2657	3.0215	2.7427	2.5674
$-\kappa\varphi_f$	0.9402	0.7426	0.8067	0.7163	0.6935	0.6488	0.6276

We note that the value of inflationary parameter n_s (spectral index) for $\alpha = 3$ is equal to 0.9650 and that the range of Regge slope of the following Omega meson is:

$\omega/\omega_3 \mid 5 + 3 \mid m_{u/d} = 240 - 345 \mid 0.937 - 1.000$

the values 0.954929659... and 0.9568666373 are very near to the above Regge slope, to the spectral index n_s and to the dilaton value 0.989117352243 = ϕ

We observe that 0.954929659 has the following property:

$$1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right) \text{ is a transcendental number}$$

= 0.9549296597216129 the result is a transcendental number

We have also that, performing the 128th root, we obtain:

((((1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))]))))^1/128

Input:

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)}$$

Decimal approximation:

0.999639771179582593534832998563472389939029398477483191618...

0.9996397711… is also a transcendental number

This result is connected to the primary decay mode of a pion, with a branching fraction of 0.999877, that is a leptonic decay into a muon and a muon neutrino.

Property:

$$\sqrt[128]{1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right)} \text{ is a transcendental number}$$

Series representations:

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \left(1-24\left(\frac{1}{-1+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{2}{-1+e^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{3}{-1+e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}\right)\right)^\wedge(1/128)$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}}+\frac{2}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4\pi}}+\frac{3}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6\pi}}\right)}$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}}+\frac{2}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{4\pi}}+\frac{3}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{6\pi}}\right)}$$

Integral representations:

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{2}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{3}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}\right)}$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+e^{4\int_0^{\infty}\sin(t)/t\,dt}}+\frac{2}{-1+e^{8\int_0^{\infty}\sin(t)/t\,dt}}+\frac{3}{-1+e^{12\int_0^{\infty}\sin(t)/t\,dt}}\right)}$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} =$$

$$\sqrt[128]{1-24\left(\frac{1}{-1+e^{8\int_0^1\sqrt{1-t^2}\,dt}}+\frac{2}{-1+e^{16\int_0^1\sqrt{1-t^2}\,dt}}+\frac{3}{-1+e^{24\int_0^1\sqrt{1-t^2}\,dt}}\right)}$$

Performing:

log base 0.999639771179((((1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))]))))-Pi+1/golden ratio

we obtain:

Input interpretation:

$$\log_{0.999639771179}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)-\pi+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

125.476441...

125.476441…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Series representations:

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)-\pi+\frac{1}{\phi} =$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-24)^k\left(\frac{1}{1-e^{2\pi}}-\frac{2}{-1+e^{4\pi}}-\frac{3}{-1+e^{6\pi}}\right)^k}{k}}{\log(0.9996397711790000)}$$

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)-\pi+\frac{1}{\phi} = \frac{1.000000000000}{\phi} - 1.000000000000\,\pi + \log\left(1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right)\right)\left(-2775.513305165 - 1.000000000000\sum_{k=0}^{\infty}(-0.0003602288210000)^k\, G(k)\right)$$

$$\text{for } \left(G(0)=0 \text{ and } G(k)=\frac{(-1)^{1+k}\,k}{2\,(1+k)\,(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

And:

log base 0.999639771179((((1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))]))))+11+1/golden ratio

where 11 is a Lucas number

Input interpretation:

$$\log_{0.999639771179}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)+11+\frac{1}{\phi}$$

$\log_b(x)$ is the base- b logarithm

ϕ is the golden ratio

Result:

139.618034...

139.618034…. result practically equal to the rest mass of Pion meson 139.57

Series representations:

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)+11+\frac{1}{\phi} = 11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-24)^k\left(\frac{1}{1-e^{2\pi}}-\frac{2}{-1+e^{4\pi}}-\frac{3}{-1+e^{6\pi}}\right)^k}{k}}{\log(0.9996397711790000)}$$

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)+11+\frac{1}{\phi}=$$

$$11.00000000000+\frac{1.000000000000}{\phi}+$$

$$\log\left(1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right)\right)$$

$$\left(-2775.513305165-1.000000000000\sum_{k=0}^{\infty}(-0.0003602288210000)^k\, G(k)\right)$$

$$\text{for}\left(G(0)=0 \text{ and } G(k)=\frac{(-1)^{1+k}\,k}{2\,(1+k)\,(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

In conclusion, we have shown a possible theoretical connection between some parameters of inflationary cosmology, of particle masses (Higgs boson and Pion meson $\pi\pm$) and some fundamental equations of Ramanujan’s mathematics.

Further, we note that π, ϕ, 1/ϕ and 11, that is a Lucas number (often in developing Ramanujan's equations we use Fibonacci and Lucas numbers), play a fundamental role in the development, and therefore, in the final results of Ramanujan's equations. This fact can be explained by admitting that π, ϕ, 1/ϕ and 11, and other numbers connected with Fibonacci and Lucas sequences, are not only mathematical constants and / or simple numbers, but "data", which inserted in the right place, and in the most various possible and always logical combinations, lead precisely to the solutions discussed so far: masses of particles and other physical and cosmological parameters.

References

MANUSCRIPT BOOK 1 OF SRINIVASA RAMANUJAN