On the Ramanujan's equations applied to various sectors of Particle Physics and Cosmology: new possible mathematical connections. VIII

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Abstract

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

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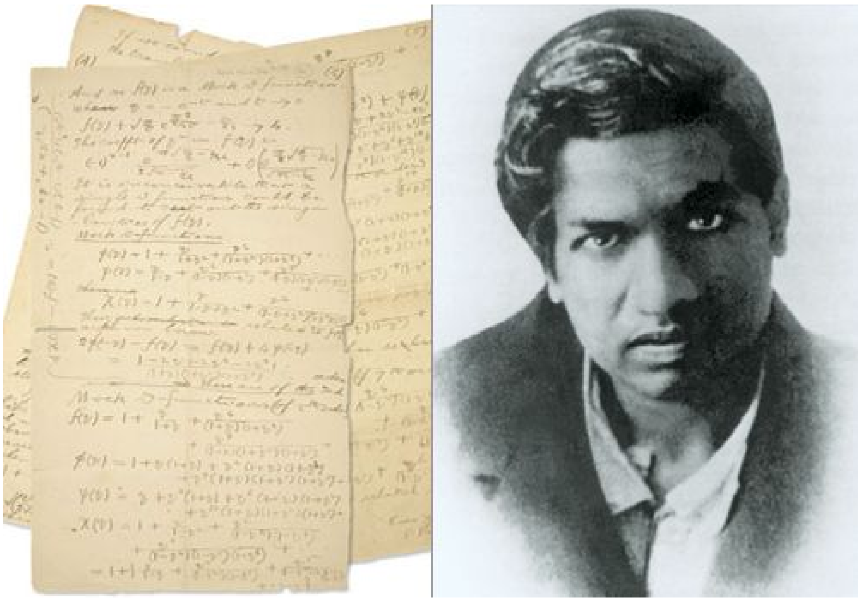

https://www.scientificamerican.com/article/one-of-srinivasa-ramanujans-neglected-manuscripts-has-helped-solve-long-standing-mathematical-mysteries/

Summary

In this research thesis, we have analyzed further Ramanujan formulas and described new mathematical connections with some sectors of Particle Physics and Cosmology. We have described, as in previous papers, 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, those in the range of the mass of candidates" glueball ", the scalar meson $f_0(1710)$ and the hypothetical mass of Gluino ("glueball" = 1760 ± 15 MeV; gluino = 1785.16 GeV), the mass of the hypothetical light particle, the boson m_X = 16.84 MeV and the masses of proton (or neutron), and other baryons and mesons. Moreover solutions of Ramanujan equations,

connected with the masses of the π mesons (139.576 and 134.9766 MeV) have been described and highlighted. We have showed also the mathematical connections between some Ramanujan equations, the boundary state corresponding to the NSNS-sector of N Dp-branes in the limit of $u \to \infty$, the ratio concerning the general asymptotically flat solution of the equations of motion of the p-brane and the Karatsuba's equation concerning the zeros of a special type of function connected with Dirichlet series.**

Further, we have described the connections between the mathematics of Ramanujan and different equations concerning some areas of theoretical physics such as the topics covered in the following paper" Comments on Global Symmetries, Anomalies, and Duality in (2 + 1)d". 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", and the Higgs boson mass itself, are fundamental.

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

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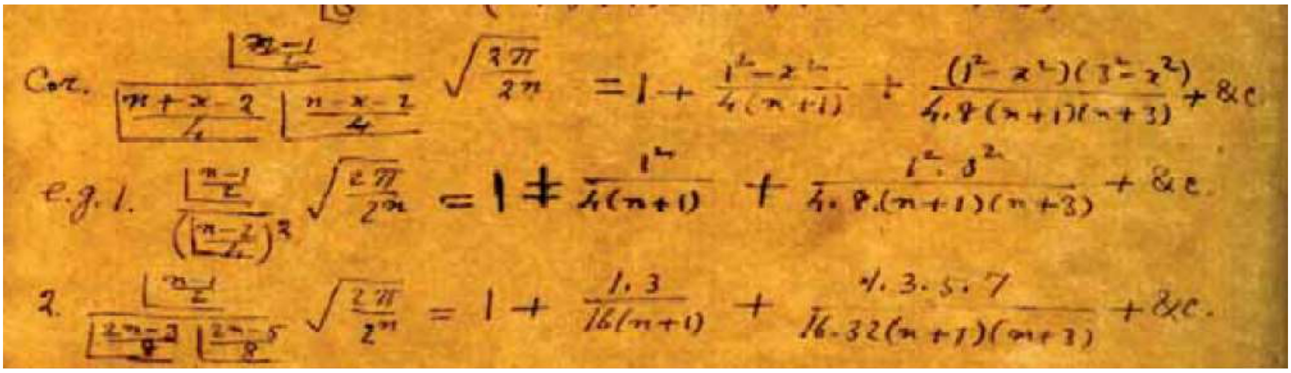

Cor. $\frac{\lfloor\frac{n-1}{2}}{\lfloor\frac{n+x-2}{4}\,\lfloor\frac{n-x-2}{4}}\sqrt{\frac{2\pi}{2^n}} = 1 + \frac{1^2-x^2}{4(n+1)} + \frac{(1^2-x^2)(3^2-x^2)}{4.8(n+1)(n+3)} + \&c$

e.g. 1. $\frac{\lfloor\frac{n-1}{2}}{\left(\lfloor\frac{n-2}{4}\right)^2}\sqrt{\frac{2\pi}{2^n}} = 1 + \frac{1^2}{4(n+1)} + \frac{1^2.3^2}{4.8.(n+1)(n+3)} + \&c.$

2. $\frac{\lfloor\frac{n-1}{2}}{\lfloor\frac{2n-3}{8}\,\lfloor\frac{2n-5}{8}}\sqrt{\frac{2\pi}{2^n}} = 1 + \frac{1.3}{16(n+1)} + \frac{1.3.5.7}{16.32(n+1)(n+3)} + \&c.$

1+(1^2-x^2)/(4(n+1))+((1^2-x^2)(3^2-x^2))/(4*8(n+1)(n+3))

For x = 2 and n = 3, we obtain:

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

Input:

$$1+\frac{1^2-2^2}{4(3+1)}+\frac{(1^2-2^2)(3^2-2^2)}{4\times 8(3+1)(3+3)}$$

Exact result:

$$\frac{203}{256}$$

Decimal form:

0.79296875

0.79296875

1+(1^2)/(4(3+1))+((1^2*3^2))/(4*8(3+1)(3+3))

Input:

$$1+\frac{1^2}{4(3+1)}+\frac{1^2\times 3^2}{4\times 8(3+1)(3+3)}$$

Exact result:

$$\frac{275}{256}$$

Decimal form:

1.07421875

1.07421875

1+(1*3)/(16(3+1))+((1*3*5*7))/(16*32(3+1)(3+3))

Input:

$$1+\frac{1\times 3}{16(3+1)}+\frac{3\times 5\times 7}{16\times 32(3+1)(3+3)}$$

Exact result:

$$\frac{4323}{4096}$$

Decimal form:

1.055419921875

1.055419921875

We have, from the sum of results, the following expression:

exp(0.79296875+1.07421875+1.055419921875)^3-199+47+3

where 199, 47 and 3 are Lucas numbers

Input interpretation:

$\exp^3(0.79296875 + 1.07421875 + 1.055419921875) - 199 + 47 + 3$

Result:

6275.1671...

6275.1671.... result very near to the rest mass of Charmed B meson 6276

We have also, from the 128th root, the following expression:

((1/(0.79296875+1.07421875+1.055419921875)))^1/128

Input interpretation:

$$\sqrt[128]{\frac{1}{0.79296875 + 1.07421875 + 1.055419921875}}$$

Result:

0.99165628356...

0.99165628356.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ** (see Appendix)

From which:

log base 0.99165628356 ((1/(0.79296875+1.07421875+1.055419921875)))-Pi+1/golden ratio

Input interpretation:

$$\log_{0.99165628356}\left(\frac{1}{0.79296875+1.07421875+1.055419921875}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.47644...

125.47644... 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:

$$\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{1}{2.92261}\right)}{\log(0.991656283560000)}$$

Series representations:

$$\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.65784)^k}{k}}{\log(0.991656283560000)}$$

$$\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-119.3506693260\log(0.34216)-\log(0.34216)\sum_{k=0}^{\infty}(-0.008343716440000)^k G(k)$$

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

And:

1/8 log base 0.99165628356 ((1/(0.79296875+1.07421875+1.055419921875)))+1/golden ratio

Input interpretation:

$$\frac{1}{8}\log_{0.99165628356}\left(\frac{1}{0.79296875+1.07421875+1.055419921875}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.618034...

16.618034… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{8}\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(\frac{1}{2.92261}\right)}{8\log(0.991656283560000)}$$

Series representations:

$$\frac{1}{8}\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.65784)^k}{k}}{8\log(0.991656283560000)}$$

$$\frac{1}{8}\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)+\frac{1}{\phi}=\frac{1}{\phi}-14.91883366574\log(0.34216)-\frac{1}{8}\log(0.34216)\sum_{k=0}^{\infty}(-0.008343716440000)^k\,G(k)$$

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

And again:

log base 0.99165628356 ((1/(0.79296875+1.07421875+1.055419921875)))+11+1/golden ratio

where 11 is a Lucas number

Input interpretation:

$$\log_{0.99165628356}\left(\frac{1}{0.79296875+1.07421875+1.055419921875}\right)+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.61803...

139.61803… result very near to the rest mass of Pion meson 139.57

Alternative representation:

$$\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{\log\left(\frac{1}{2.92261}\right)}{\log(0.991656283560000)}$$

Series representations:

$$\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.65784)^k}{k}}{\log(0.991656283560000)}$$

$$\log_{0.991656283560000}\left(\frac{1}{0.792969+1.07422+1.0554199218750000}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-$$

$$119.3506693260\log(0.34216)-\log(0.34216)\sum_{k=0}^{\infty}(-0.008343716440000)^{k}\,G(k)$$

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

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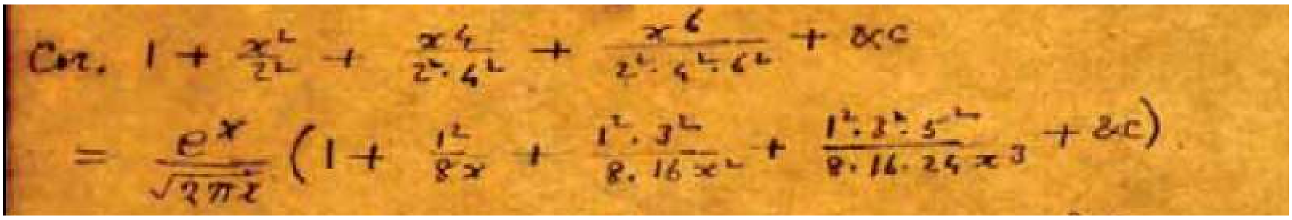

Cor. $1+\frac{x^2}{2^2}+\frac{x^4}{2^2.4^2}+\frac{x^6}{2^2.4^2.6^2}+\&c$

$=\frac{e^x}{\sqrt{2\pi x}}\left(1+\frac{1^2}{8x}+\frac{1^2.3^2}{8.16x^2}+\frac{1^2.3^2.5^2}{8.16.24x^3}+\&c\right)$

For x = 2, we obtain

e^2/(sqrt(4Pi))*(((1+1^2/(8*2)+(1^2*3^2)/(8*16*2^2)+(1^2*3^2*5^2)/(8*16*24*2^3)))

Input:

$$\frac{e^2}{\sqrt{4\pi}}\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)$$

Exact result:

$$\frac{8923\,e^2}{16\,384\sqrt{\pi}}$$

Decimal approximation:

2.270413608165813889895586838920523953456433651726566300558...

2.2704136081658138….

Series representations:

$$\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}} = \frac{8923\, e^2}{8192\sqrt{-1+4\pi}\,\sum_{k=0}^{\infty}(-1+4\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}} = \frac{8923\, e^2}{8192\sqrt{-1+4\pi}\,\sum_{k=0}^{\infty}\frac{(-1)^k(-1+4\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}} = \frac{8923\, e^2}{8192\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(4\pi-z_0)^k z_0^{-k}}{k!}}$$

for not $((z_0\in\mathbb{R}$ and $-\infty< z_0\le 0))$

From which, we obtain:

1/((((e^2/(sqrt(4Pi))*(((1+1^2/(8*2)+(1^2*3^2)/(8*16*2^2)+(1^2*3^2*5^2)/(8*16*24*2^3))))))))^1/128

Input:

$$\frac{1}{\sqrt[128]{\frac{e^2}{\sqrt{4\pi}}\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)}}$$

Exact result:

$$\frac{2^{7/64}\sqrt[256]{\pi}}{\sqrt[128]{8923}\sqrt[64]{e}}$$

Decimal approximation:

0.993614521086023183653653704132495905244805905802418911970...

0.993614521086023…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ** (see Appendix)

Series representations:

$$\frac{1}{\sqrt[128]{\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}}}}=\frac{2^{7/64}\sqrt[256]{\pi}}{\sqrt[128]{8923}\sqrt[64]{\sum_{k=0}^{\infty}\frac{1}{k!}}}$$

$$\frac{1}{\sqrt[128]{\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}}}}=\frac{2^{15/128}\sqrt[256]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}{\sqrt[128]{8923}\sqrt[64]{e}}$$

$$\frac{1}{\sqrt[128]{\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}}}}=\frac{2^{7/64}\sqrt[256]{\pi}}{\sqrt[128]{8923}\sqrt[64]{\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}}}$$

Integral representations:

$$\frac{1}{\sqrt[128]{\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}}}}=\frac{2^{15/128}\sqrt[256]{\int_0^1\sqrt{1-t^2}\,dt}}{\sqrt[128]{8923}\sqrt[64]{e}}$$

$$\frac{1}{\sqrt[128]{\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}}}}=\frac{2^{29/256}\sqrt[256]{\int_0^{\infty}\frac{1}{1+t^2}\,dt}}{\sqrt[128]{8923}\sqrt[64]{e}}$$

$$\frac{1}{\sqrt[128]{\frac{\left(1+\frac{1^2}{8\times 2}+\frac{1^2\times 3^2}{8\times 16\times 2^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 2^3}\right)e^2}{\sqrt{4\pi}}}}=\frac{2^{29/256}\sqrt[256]{\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt}}{\sqrt[128]{8923}\sqrt[64]{e}}$$

For x = 6, we obtain:

e^6/(sqrt(12Pi))*(((1+1^2/(8*6)+(1^2*3^2)/(8*16*6^2)+(1^2*3^2*5^2)/(8*16*24*6^3)))

Input:

$$\frac{e^6}{\sqrt{12\pi}}\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)$$

Exact result:

$$\frac{75433\,e^6}{147456\sqrt{3\pi}}$$

Decimal approximation:

67.224914586770607556909820690861367734828856653746529768 74...

67.2249145867….

Series representations:

$$\frac{\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)e^6}{\sqrt{12\pi}}=\frac{75433\,e^6}{73728\sqrt{-1+12\pi}\sum_{k=0}^{\infty}(-1+12\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)e^6}{\sqrt{12\pi}}=\frac{75433\,e^6}{73728\sqrt{-1+12\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+12\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)e^6}{\sqrt{12\pi}}=\frac{75433\,e^6}{73728\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(12\pi-z_0)^k z_0^{-k}}{k!}}$$

for not $((z_0\in\mathbb{R}$ and $-\infty< z_0\leq 0))$

From which, multiplying by 2:

2 * e^6/(sqrt(12Pi))*(((1+1^2/(8*6)+(1^2*3^2)/(8*16*6^2)+(1^2*3^2*5^2)/(8*16*24*6^3)))

Input:

$$2 \times \frac{e^6}{\sqrt{12\pi}} \left(1 + \frac{1^2}{8\times 6} + \frac{1^2\times 3^2}{8\times 16\times 6^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)$$

Exact result:

$$\frac{75\,433\, e^6}{73\,728\sqrt{3\pi}}$$

Decimal approximation:

134.44982917354121511381964138172273546965771330749305953 74...

134.44982917354…. result very near to the rest mass of Pion meson 134.9766

Series representations:

$$\frac{\left(2\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)\right)e^6}{\sqrt{12\pi}} = \frac{75\,433\, e^6}{36\,864\sqrt{-1+12\pi}\sum_{k=0}^{\infty}(-1+12\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\left(2\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)\right)e^6}{\sqrt{12\pi}} = \frac{75\,433\, e^6}{36\,864\sqrt{-1+12\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+12\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{\left(2\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)\right)e^6}{\sqrt{12\pi}} = \frac{75\,433\, e^6}{36\,864\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(12\pi-z_0)^k z_0^{-k}}{k!}}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

And again:

7 - 1/golden ratio + sqrt(Pi) e^6/(sqrt(12Pi))*(((1+1^2/(8*6)+(1^2*3^2)/(8*16*6^2)+(1^2*3^2*5^2)/(8*16*24*6^3)))

Where 7 is a Lucas number

Input:

$$7 - \frac{1}{\phi} + \sqrt{\pi} \times \frac{e^6}{\sqrt{12\pi}} \left(1 + \frac{1^2}{8 \times 6} + \frac{1^2 \times 3^2}{8 \times 16 \times 6^2} + \frac{1^2 \times 3^2 \times 5^2}{8 \times 16 \times 24 \times 6^3}\right)$$

ϕ is the golden ratio

Exact result:

$$-\frac{1}{\phi} + 7 + \frac{75433 e^6}{147456 \sqrt{3}}$$

Decimal approximation:

125.5350247473660651749504698674312430982921460734344649037...

125.535024747….. 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

Property:

$7 + \frac{75433 e^6}{147456 \sqrt{3}} - \frac{1}{\phi}$ is a transcendental number

Alternate forms:

$$7 - \frac{2}{1+\sqrt{5}} + \frac{75433 e^6}{147456 \sqrt{3}}$$

$$\frac{1}{2}\left(15 - \sqrt{5}\right) + \frac{75433 e^6}{147456 \sqrt{3}}$$

$$\frac{75433 e^6 \phi - 147456 \sqrt{3} (1 - 7\phi)}{147456 \sqrt{3} \phi}$$

Series representations:

$$7-\frac{1}{\phi}+\frac{\left(\sqrt{\pi}\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)\right)e^6}{\sqrt{12\pi}}=$$
$$\left(75433\,e^6\,\phi\sqrt{-1+\pi}\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}-73728\sqrt{-1+12\pi}\sum_{k=0}^{\infty}(-1+12\pi)^{-k}\binom{\frac{1}{2}}{k}+516096\,\phi\sqrt{-1+12\pi}\sum_{k=0}^{\infty}(-1+12\pi)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(73728\,\phi\sqrt{-1+12\pi}\sum_{k=0}^{\infty}(-1+12\pi)^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$7-\frac{1}{\phi}+\frac{\left(\sqrt{\pi}\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)\right)e^6}{\sqrt{12\pi}}=$$
$$\left(75433\,e^6\,\phi\sqrt{-1+\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}-73728\sqrt{-1+12\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+12\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}+516096\,\phi\sqrt{-1+12\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+12\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(73728\,\phi\sqrt{-1+12\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+12\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$7-\frac{1}{\phi}+\frac{\left(\sqrt{\pi}\left(1+\frac{1^2}{8\times 6}+\frac{1^2\times 3^2}{8\times 16\times 6^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 6^3}\right)\right)e^6}{\sqrt{12\pi}}=$$
$$\left(75433\,e^6\,\phi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}-73728\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(12\pi-z_0)^k z_0^{-k}}{k!}+516096\,\phi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(12\pi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(73728\,\phi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(12\pi-z_0)^k z_0^{-k}}{k!}\right)\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

For x = 5, we obtain:

((((e^5/(sqrt(10Pi))*(((1+1^2/(8*5)+(1^2*3^2)/(8*16*5^2)+(1^2*3^2*5^2)/(8*16*24*5^3)))))))

Input:

$$\frac{e^5}{\sqrt{10\pi}}\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)$$

Exact result:

$$\frac{26\,327\,e^5}{25\,600\sqrt{10\pi}}$$

Decimal approximation:

27.23070474740469285703660305536153024002775117173990371300...

27.2307047…..

Series representations:

$$\frac{\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\pi}}=\frac{26\,327\,e^5}{25\,600\sqrt{-1+10\pi}\sum_{k=0}^{\infty}(-1+10\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\pi}}=\frac{26\,327\,e^5}{25\,600\sqrt{-1+10\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+10\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\pi}}=\frac{26\,327\,e^5}{25\,600\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(10\pi-z_0)^k z_0^{-k}}{k!}}$$

for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\le 0))$

From which:

10^3+((((e^5/(sqrt(10Pi))*(((1+1^2/(8*5)+(1^2*3^2)/(8*16*5^2)+(1^2*3^2*5^2)/(8*16*24*5^3))))))))^2-13

Where 13 is a Fibonacci number

Input:

$$10^3+\left(\frac{e^5}{\sqrt{10\pi}}\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)\right)^2-13$$

Exact result:

$$987+\frac{693\,110\,929\,e^{10}}{6\,553\,600\,000\,\pi}$$

Decimal approximation:

1728.5112810403284774155310146533122990557151799531844685833...

1728.511281…

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

Alternate form:

$$\frac{7\,(99\,015\,847\,e^{10} + 924\,057\,600\,000\,\pi)}{6\,553\,600\,000\,\pi}$$

Series representations:

$$10^3 + \left(\frac{\left(1 + \frac{1^2}{8\times 5} + \frac{1^2\times 3^2}{8\times 16\times 5^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\,\pi}}\right)^2 - 13 = 987 + \frac{693\,110\,929\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{10}}{6\,553\,600\,000\,\pi}$$

$$10^3 + \left(\frac{\left(1 + \frac{1^2}{8\times 5} + \frac{1^2\times 3^2}{8\times 16\times 5^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\,\pi}}\right)^2 - 13 = 987 + \frac{693\,110\,929\,e^{10}}{26\,214\,400\,000\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$10^3 + \left(\frac{\left(1 + \frac{1^2}{8\times 5} + \frac{1^2\times 3^2}{8\times 16\times 5^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\,\pi}}\right)^2 - 13 = 987 + \frac{693\,110\,929}{6\,553\,600\,000\,\pi\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{10}}$$

Integral representations:

$$10^3+\left(\frac{\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\pi}}\right)^2-13=$$
$$987+\frac{693\,110\,929\,e^{10}}{26\,214\,400\,000\int_0^1\sqrt{1-t^2}\,dt}$$

$$10^3+\left(\frac{\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\pi}}\right)^2-13=987+\frac{693\,110\,929\,e^{10}}{13\,107\,200\,000\int_0^\infty\frac{1}{1+t^2}\,dt}$$

$$10^3+\left(\frac{\left(1+\frac{1^2}{8\times 5}+\frac{1^2\times 3^2}{8\times 16\times 5^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 5^3}\right)e^5}{\sqrt{10\pi}}\right)^2-13=$$
$$987+\frac{693\,110\,929\,e^{10}}{13\,107\,200\,000\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt}$$

For x = 3, we obtain:

(((e^3/(sqrt(6Pi))*(((1+1^2/(8*3)+(1^2*3^2)/(8*16*3^2)+(1^2*3^2*5^2)/(8*16*24*3^3)))))))

Input:

$$\frac{e^3}{\sqrt{6\pi}}\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)$$

Exact result:

$$\frac{9697\,e^3}{9216\sqrt{6\pi}}$$

Decimal approximation:

4.867744936649658147375963473239712658094300034457202785247...

4.86774493664….

Series representations:

$$\frac{\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)e^3}{\sqrt{6\pi}} = \frac{9697\,e^3}{9216\sqrt{-1+6\pi}\,\sum_{k=0}^{\infty}(-1+6\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)e^3}{\sqrt{6\pi}} = \frac{9697\,e^3}{9216\sqrt{-1+6\pi}\,\sum_{k=0}^{\infty}\frac{(-1)^k(-1+6\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)e^3}{\sqrt{6\pi}} = \frac{9697\,e^3}{9216\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(6\pi-z_0)^k z_0^{-k}}{k!}}$$

for not $((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \le 0))$

From which:

(((e^3/(sqrt(6Pi))*(((1+1^2/(8*3)+(1^2*3^2)/(8*16*3^2)+(1^2*3^2*5^2)/(8*16*24*3^3)))))))*322-29-3

Where 322, 29 and 3 are Lucas numbers

Input:

$$\left(\frac{e^3}{\sqrt{6\pi}}\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)\right)\times 322-29-3$$

Exact result:

$$\frac{1561217\,e^3}{4608\sqrt{6\pi}}-32$$

Decimal approximation:

1535.413869601189923455060238383187475906364611095219296849...

1535.4138696… result practically equal to the rest mass of Xi baryon 1535

Alternate forms:

$$\frac{1561217\sqrt{6}\,e^3-884736\sqrt{\pi}}{27648\sqrt{\pi}}$$

$$-\frac{884736\sqrt{\pi} - 1561217\sqrt{6}\, e^3}{27648\sqrt{\pi}}$$

$$\frac{1561217\, e^3 - 147456\sqrt{6\pi}}{4608\sqrt{6\pi}}$$

Series representations:

$$\frac{322\, e^3\left(1 + \frac{1^2}{8\times 3} + \frac{1^2\times 3^2}{8\times 16\times 3^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)}{\sqrt{6\pi}} - 29 - 3 = -32 + \frac{1561217\, e^3}{4608\sqrt{-1+6\pi}\,\sum_{k=0}^{\infty}(-1+6\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{322\, e^3\left(1 + \frac{1^2}{8\times 3} + \frac{1^2\times 3^2}{8\times 16\times 3^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)}{\sqrt{6\pi}} - 29 - 3 = -32 + \frac{1561217\, e^3}{4608\sqrt{-1+6\pi}\,\sum_{k=0}^{\infty}\frac{(-1)^k(-1+6\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{322\, e^3\left(1 + \frac{1^2}{8\times 3} + \frac{1^2\times 3^2}{8\times 16\times 3^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)}{\sqrt{6\pi}} - 29 - 3 = -32 + \frac{1561217\, e^3}{4608\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(6\pi-z_0)^k z_0^{-k}}{k!}} \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

And:

1/3*(((e^3/(sqrt(6Pi))*(((1+1^2/(8*3)+(1^2*3^2)/(8*16*3^2)+(1^2*3^2*5^2)/(8*16*24*3^3)))))))-4/(10^3)

Where 4 is a Lucas number

Input:

$$\frac{1}{3}\left(\frac{e^3}{\sqrt{6\pi}}\left(1 + \frac{1^2}{8\times 3} + \frac{1^2\times 3^2}{8\times 16\times 3^2} + \frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)\right) - \frac{4}{10^3}$$

Exact result:

$$\frac{9697 e^3}{27648\sqrt{6\pi}} - \frac{1}{250}$$

Decimal approximation:

1.618581645549886049125321157746570886031433344819067595082...

1.618581645549886…. result that is a very good approximation to the value of the golden ratio 1,618033988749...

Alternate forms:

$$\frac{1212125\sqrt{6}\, e^3 - 82944\sqrt{\pi}}{20736000\sqrt{\pi}}$$

$$-\frac{82944\sqrt{\pi} - 1212125\sqrt{6}\, e^3}{20736000\sqrt{\pi}}$$

$$\frac{1212125 e^3 - 13824\sqrt{6\pi}}{3456000\sqrt{6\pi}}$$

Series representations:

$$\frac{e^3\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)}{\sqrt{6\pi}\; 3} - \frac{4}{10^3} = -\frac{1}{250} + \frac{9697 e^3}{27648\sqrt{-1+6\pi}\sum_{k=0}^{\infty}(-1+6\pi)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{e^3\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)}{\sqrt{6\pi}\; 3} - \frac{4}{10^3} = -\frac{1}{250} + \frac{9697 e^3}{27648\sqrt{-1+6\pi}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+6\pi)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{e^3\left(1+\frac{1^2}{8\times 3}+\frac{1^2\times 3^2}{8\times 16\times 3^2}+\frac{1^2\times 3^2\times 5^2}{8\times 16\times 24\times 3^3}\right)}{\sqrt{6\pi}\ 3}-\frac{4}{10^3}=$$

$$-\frac{1}{250}+\frac{9697\,e^3}{27648\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(6\pi-z_0)^k z_0^{-k}}{k!}}$$

for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\le 0))$

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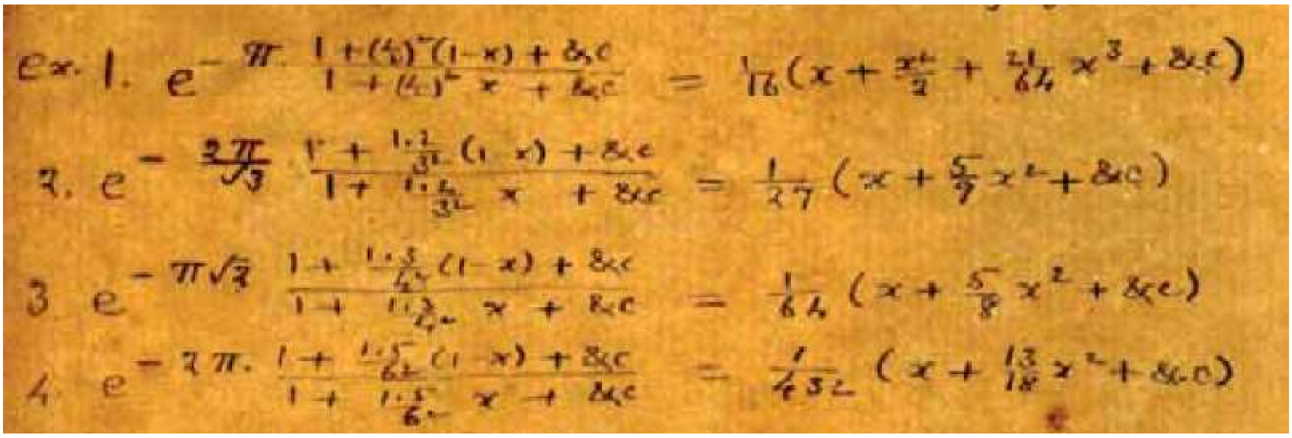


ex. 1. $e^{-\pi\frac{1+(\frac{1}{4})^2(1-x)+\&c}{1+(\frac{1}{4})^2 x+\&c}}=\frac{1}{16}\left(x+\frac{x^2}{2}+\frac{21}{64}x^3+\&c\right)$

2. $e^{-\frac{2\pi}{\sqrt{3}}\frac{1+\frac{1.2}{3^2}(1-x)+\&c}{1+\frac{1.2}{3^2}x+\&c}}=\frac{1}{27}\left(x+\frac{5}{9}x^2+\&c\right)$

3. $e^{-\pi\sqrt{2}\frac{1+\frac{1.3}{4^2}(1-x)+\&c}{1+\frac{1.3}{4^2}x+\&c}}=\frac{1}{64}\left(x+\frac{5}{8}x^2+\&c\right)$

4. $e^{-2\pi\frac{1+\frac{1.5}{6^2}(1-x)+\&c}{1+\frac{1.5}{6^2}x+\&c}}=\frac{1}{432}\left(x+\frac{13}{18}x^2+\&c\right)$

For x = 2, we obtain:

1/16(2+(2^2)/2+(21*2^3)/64)

Input:

$$\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}(21\times 2^3)\right)$$

Exact result:

$$\frac{53}{128}$$

Decimal form:

0.4140625

0.4140625

1/(((1+((1/16(2+(2^2)/2+(21*2^3)/64))))))

Input:

$$\frac{1}{1+\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}$$

Exact result:

$$\frac{128}{181}$$

Decimal approximation:

0.70718232044198895027624309392265193370165745856353591160 2...

0.70718232044198....

We note that:

1/(sqrt(2))

Input:

$$\frac{1}{\sqrt{2}}$$

Decimal approximation:

0.70710678118654752440084436210484903928483593768847403658 8...

0.7071067811865.....

Alternate form:

$$\frac{\sqrt{2}}{2}$$

Result very near to the previous. Thence, we have the following mathematical connection:

$$\left(\frac{1}{1+\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}\right) = 0.70718232044198.... \Rightarrow$$

$$\Rightarrow \left(\frac{1}{\sqrt{2}}\right) = 0.7071067811865.....$$

We have that (from Wikipedia):

Each of the (Hermitian) Pauli matrices has two eigenvalues, +1 and −1. The corresponding normalized eigenvectors are:

$$\psi_{x+} = \left|\tfrac{1}{2}, \tfrac{+1}{2}\right\rangle_x = \frac{1}{\sqrt{2}}\begin{pmatrix}1\\1\end{pmatrix}, \quad \psi_{x-} = \left|\tfrac{1}{2}, \tfrac{-1}{2}\right\rangle_x = \frac{1}{\sqrt{2}}\begin{pmatrix}-1\\1\end{pmatrix},$$
$$\psi_{y+} = \left|\tfrac{1}{2}, \tfrac{+1}{2}\right\rangle_y = \frac{1}{\sqrt{2}}\begin{pmatrix}1\\i\end{pmatrix}, \quad \psi_{y-} = \left|\tfrac{1}{2}, \tfrac{-1}{2}\right\rangle_y = \frac{1}{\sqrt{2}}\begin{pmatrix}1\\-i\end{pmatrix},$$
$$\psi_{z+} = \left|\tfrac{1}{2}, \tfrac{+1}{2}\right\rangle_z = \begin{pmatrix}1\\0\end{pmatrix}, \quad \psi_{z-} = \left|\tfrac{1}{2}, \tfrac{-1}{2}\right\rangle_z = \begin{pmatrix}0\\1\end{pmatrix}.$$

And:

$$|\langle\psi_{x\pm} \mid \psi_{y\pm}\rangle|^2 = |\langle\psi_{x\pm} \mid \psi_{z\pm}\rangle|^2 = |\langle\psi_{y\pm} \mid \psi_{z\pm}\rangle|^2 = \tfrac{1}{2}.$$

From

On ‘orbital’ and ‘spin’ angular momentum of light in classical and quantum theories – a general framework
Arvind S., Chaturvedi† , N. Mukunda‡ - https://arxiv.org/abs/1805.00762v1

We have that:

$$\hat{J}_3\ v_j(\mathbf{k}) = -i\hbar\frac{\partial}{\partial\varphi}v_j(\mathbf{k}) - i\hbar\ \epsilon_{3jl}\ v_l(\mathbf{k}). \qquad (3.22)$$

and

$$\begin{aligned}
&0 \le \theta < \pi, 0 \le \varphi < 2\pi :\\
&\{\epsilon^{(+)}(\mathbf{k}), \epsilon^{(-)}(\mathbf{k})\}\\
&= R_3(\varphi)R_2(\theta)R_3(\varphi)^{-1}\left\{\frac{1}{\sqrt{2}}\begin{pmatrix}1\\i\\0\end{pmatrix}, \frac{1}{\sqrt{2}}\begin{pmatrix}i\\1\\0\end{pmatrix}\right\},\\
&R_3(\varphi) = \begin{pmatrix}\cos\varphi & -\sin\varphi & 0\\ \sin\varphi & \cos\varphi & 0\\ 0 & 0 & 1\end{pmatrix},\\
&R_2(\theta) = \begin{pmatrix}\cos\theta & 0 & \sin\theta\\ 0 & 1 & 0\\ -\sin\theta & 0 & \cos\theta\end{pmatrix}. \qquad (3.37)
\end{aligned}$$

We have:

The action of $\hat{J}_3$ on a wave function $\mathbf{v}(\mathbf{k}) \in \mathcal{M}$ is given in eq. (3.22). Since $\hat{J}_3$ has discrete eigenvalues, normalisable eigenfunctions can be constructed. The general solution (in spherical polar variables $\mathbf{k} \to k, \theta, \varphi$) to

$$\hat{J}_3 \mathbf{v}_m(k,\theta,\varphi) = m\hbar \mathbf{v}_m(k,\theta,\varphi), \quad m = 0, \pm1, \pm2, \ldots,$$
$$\mathbf{k} \cdot \mathbf{v}_m(k,\theta,\varphi) = 0, \tag{5.1}$$

is a linear combination of

$$\boldsymbol{\alpha}_m(\theta,\varphi) = e^{i(m-1)\varphi} \begin{pmatrix} C \\ iC \\ -S\, e^{i\varphi} \end{pmatrix},$$
$$\boldsymbol{\beta}_m(\theta,\varphi) = e^{i(m+1)\varphi} \begin{pmatrix} iC \\ C \\ -iS\, e^{-i\varphi} \end{pmatrix},$$
$$C = \cos\theta, S = \sin\theta, \tag{5.2}$$

with any functions of k, θ as coefficients (subject to $\mathbf{v}_m(k,\theta,\varphi)$ being singlevalued at $\theta = 0, \pi$). The column vectors here are however not mutually orthogonal. Using the circular polarization basis vectors $\boldsymbol{\epsilon}^{(+)}(\hat{\mathbf{k}})$ of eq. (3.37), we can find an alternative construction. The orthonormal vectors $\boldsymbol{\epsilon}^{(\pm)}(\hat{\mathbf{k}})$ are

$$\boldsymbol{\epsilon}^{(+)}(\theta,\varphi) = \frac{e^{i\varphi}}{\sqrt{2}} \begin{pmatrix} \cos\theta\cos\varphi - i\sin\varphi \\ \cos\theta\sin\varphi + i\cos\varphi \\ -\sin\theta \end{pmatrix},$$
$$\boldsymbol{\epsilon}^{(-)}(\theta,\varphi) = i\boldsymbol{\epsilon}^{(+)}(\theta,\varphi)^*. \tag{5.3}$$

As expected, at $\theta = \pi$ we have φ-dependent limits:

$$\boldsymbol{\epsilon}^{(+)}(\pi,\varphi) = \frac{e^{2i\varphi}}{\sqrt{2}} \begin{pmatrix} -1 \\ i \\ 0 \end{pmatrix},$$
$$\boldsymbol{\epsilon}^{(-)}(\pi,\varphi) = -i\frac{e^{-2i\varphi}}{\sqrt{2}} \begin{pmatrix} 1 \\ i \\ 0 \end{pmatrix}. \tag{5.4}$$

We then find that any $\mathbf{v}_m(k,\theta,\varphi)$ obeying eq. (5.1) is a (k,θ) dependent linear combination of

$$e^{i(m-1)\varphi}\boldsymbol{\epsilon}^{(+)}(\theta,\varphi), \quad e^{i(m+1)\varphi}\boldsymbol{\epsilon}^{(-)}(\theta,\varphi), \tag{5.5}$$

subject again to being singlevalued at $\theta = 0, \pi$.

The sets (5.2), (5.5) of $\hat{J}_3$ eigenfunctions are linearly related:

$$\begin{pmatrix} \boldsymbol{\alpha}_m(\theta,\varphi) \\ \boldsymbol{\beta}_m(\theta,\varphi) \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} (1+C) & -i(1-C) \\ i(1-C) & (1+C) \end{pmatrix} \times \begin{pmatrix} e^{i(m-1)\varphi}\ \boldsymbol{\epsilon}^{(+)}(\theta,\varphi) \\ e^{i(m+1)\varphi}\ \boldsymbol{\epsilon}^{(-)}(\theta,\varphi) \end{pmatrix};$$

$$\begin{pmatrix} e^{i(m-1)\varphi}\ \boldsymbol{\epsilon}^{(+)}(\theta,\varphi) \\ e^{i(m+1)\varphi}\ \boldsymbol{\epsilon}^{(-)}(\theta,\varphi), \end{pmatrix} = \frac{1}{2\sqrt{2}} \begin{pmatrix} 1+\sec\theta & i(\sec\theta-1) \\ -i(\sec\theta-1) & 1+\sec\theta \end{pmatrix} \begin{pmatrix} \boldsymbol{\alpha}_m(\theta,\varphi) \\ \boldsymbol{\beta}_m(\theta,\varphi) \end{pmatrix}. \tag{5.6}$$

From Wikipedia

Those particles with half-integer spins, such as 1/2, 3/2, 5/2, are known as fermions, while those particles with integer spins, such as 0, 1, 2, are known as bosons. Note that $(1/\sqrt{2})^2 = 1/2$

e^(-Pi) * ((1+1/4*(1-2))) / (((1+1/4*2)))

Input:

$$e^{-\pi} \times \frac{1 + \frac{1}{4}(1-2)}{1 + \frac{1}{4} \times 2}$$

Exact result:

$$\frac{e^{-\pi}}{2}$$

Decimal approximation:

0.0216069591318861248872088685858640056378640549053165414 90...

0.0216069591318…

Property:

$\frac{e^{-\pi}}{2}$ is a transcendental number

Alternative representations:

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{\left(1-\frac{1}{4}\right)e^{-180\,°}}{1+\frac{2}{4}}$$

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{\left(1-\frac{1}{4}\right)e^{i\log(-1)}}{1+\frac{2}{4}}$$

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{\exp^{-\pi}(z)\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} \quad \text{for } z = 1$$

Series representations:

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{1}{2}\, e^{-4 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}$$

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{1}{2}\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-\pi}$$

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{1}{2}\left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{-\pi}$$

Integral representations:

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{1}{2}\, e^{-4 \int_0^1 \sqrt{1-t^2}\, dt}$$

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{1}{2}\, e^{-2 \int_0^1 1/\sqrt{1-t^2}\, dt}$$

$$\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{1+\frac{2}{4}} = \frac{1}{2}\, e^{-2 \int_0^{\infty} 1/(1+t^2)\, dt}$$

Now, we have that, for x = 2:

x * e^(-Pi) * ((1+1/4*(1-2))) / (((1+1/4*2))) = 1/16(2+(2^2)/2+(21*2^3)/64)

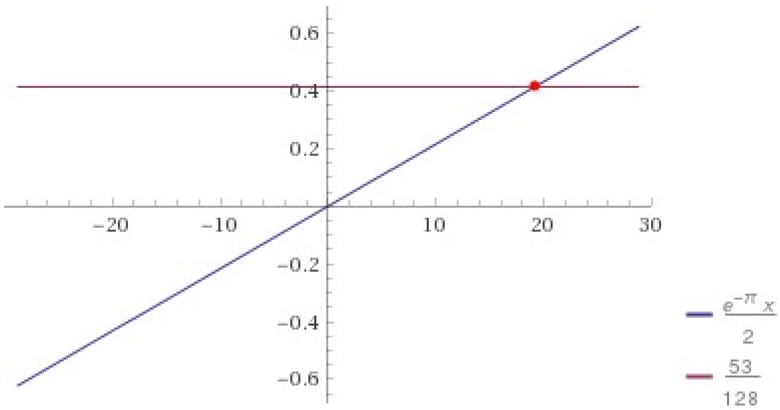
Input:

$$x\, e^{-\pi} \times \frac{1+\frac{1}{4}(1-2)}{1+\frac{1}{4}\times 2} = \frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}(21\times 2^3)\right)$$

Exact result:

$$\frac{e^{-\pi} x}{2} = \frac{53}{128}$$

Plot:



Alternate form:

$$\frac{e^{-\pi}x}{2} - \frac{53}{128} = 0$$

Solution:

$x \approx 19.163$

19.163

And:

e^(-Pi) * ((1+1/4*(1-2))) / (((1+1/4*2))) = x * 1/16(2+(2^2)/2+(21*2^3)/64)

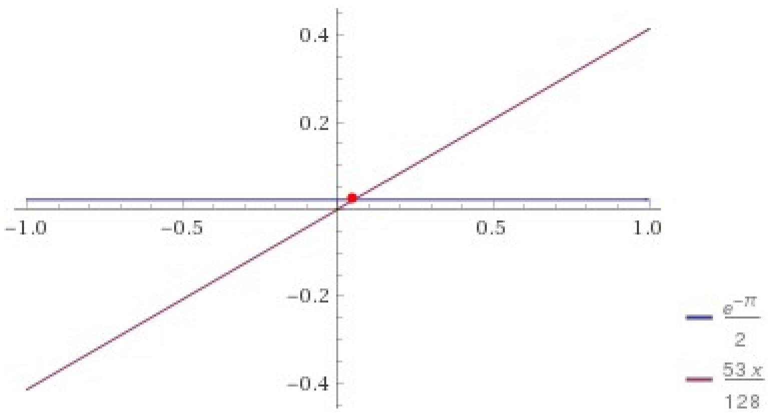
Input:

$$e^{-\pi} \times \frac{1 + \frac{1}{4}(1-2)}{1 + \frac{1}{4} \times 2} = x \times \frac{1}{16}\left(2 + \frac{2^2}{2} + \frac{1}{64}(21 \times 2^3)\right)$$

Exact result:

$$\frac{e^{-\pi}}{2} = \frac{53\,x}{128}$$

Plot:



Alternate form:

$$\frac{e^{-\pi}}{2} - \frac{53\,x}{128} = 0$$

Solution:

$x \approx 0.052183$

0.052183

That is:

Input:

$$e^{-\pi} \times \frac{\frac{1+\frac{1}{4}(1-2)}{1+\frac{1}{4}\times 2}}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}$$

Exact result:

$$\frac{64\,e^{-\pi}}{53}$$

Decimal approximation:

0.052182844695875924255900663754539485314086774110953156806...

0.052182844695875592…

Property:

$\frac{64\,e^{-\pi}}{53}$ is a transcendental number

Note that:

1/((((((((e^(-Pi) * ((1+1/4*(1-2))) *1/ (((1+1/4*2))) / (((((1/16(2+(2^2)/2+(21*2^3)/64)))))))))))))

Input:

$$\frac{1}{e^{-\pi}\left(1+\frac{1}{4}(1-2)\right)\times \frac{\frac{1}{1+\frac{1}{4}\times 2}}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}}$$

Exact result:

$$\frac{53 e^{\pi}}{64}$$

Decimal approximation:

19.163386086520332145369399648457390799282869232153300557 07...

19.163386…

Property:

$\frac{53 e^{\pi}}{64}$ is a transcendental number

Alternative representations:

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{1}{\frac{\left(1-\frac{1}{4}\right)e^{-180°}}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(4+\frac{168}{64}\right)}}$$

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{1}{\frac{\left(1-\frac{1}{4}\right)e^{i\log(-1)}}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(4+\frac{168}{64}\right)}}$$

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{1}{\frac{\left(1-\frac{1}{4}\right)e^{-2i\log((1-i)/(1+i))}}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(4+\frac{168}{64}\right)}}$$

Series representations:

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{53}{64}\, e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{53}{64}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi}$$

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{53}{64}\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi}$$

Integral representations:

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{53}{64}\, e^{4\int_0^1 \sqrt{1-t^2}\, dt}$$

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{53}{64}\, e^{2\int_0^1 1/\sqrt{1-t^2}\, dt}$$

$$\frac{1}{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}} = \frac{53}{64}\, e^{2\int_0^\infty 1/(1+t^2)\, dt}$$

And:

(((1/16(2+(2^2)/2+(21*2^3)/64)))) / (((e^(-Pi) * ((1+1/4*(1-2))) / (((1+1/4*2))))))

Input:

$$\frac{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}{e^{-\pi}\times\frac{1+\frac{1}{4}(1-2)}{1+\frac{1}{4}\times 2}}$$

Exact result:

$$\frac{53\, e^{\pi}}{64}$$

Decimal approximation:

19.163386086520332145369399648457390799282869232153300557 07...

19.163386…

Property:

$\frac{53\, e^{\pi}}{64}$ is a transcendental number

Alternative representations:

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{4+\frac{168}{64}}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-180\,°}\right)}{1+\frac{2}{4}}}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{4+\frac{168}{64}}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{i\log(-1)}\right)}{1+\frac{2}{4}}}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{4+\frac{168}{64}}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-2i\log((1-i)/(1+i))}\right)}{1+\frac{2}{4}}}$$

Series representations:

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{53}{64}\, e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{53}{64}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{53}{64}\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi}$$

Integral representations:

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{53}{64}\, e^{4\int_0^1\sqrt{1-t^2}\,dt}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{53}{64}\, e^{2\int_0^1 1/\sqrt{1-t^2}\,dt}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}} = \frac{53}{64}\, e^{2\int_0^\infty 1/(1+t^2)\,dt}$$

We have also:

(((1/16(2+(2^2)/2+(21*2^3)/64)))) / (((e^(-Pi) * ((1+1/4*(1-2))) / (((1+1/4*2))))))-Pi+1/golden ratio

Input:

$$\frac{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}{e^{-\pi}\times\frac{1+\frac{1}{4}(1-2)}{1+\frac{1}{4}\times 2}} - \pi + \frac{1}{\phi}$$

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}+\frac{53\,e^{\pi}}{64}-\pi$$

Decimal approximation:

16.639827421680433755111343099543526032806009012583957598230...

16.63982742… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternate forms:

$$\frac{53\,e^{\pi}\,\phi+64(1-\pi\,\phi)}{64\,\phi}$$

$$\frac{1}{2}\left(\sqrt{5}-1\right)+\frac{53\,e^{\pi}}{64}-\pi$$

$$\frac{2}{1+\sqrt{5}}+\frac{53\,e^{\pi}}{64}-\pi$$

Alternative representations:

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=-180\,°+\frac{1}{2\cos\left(\frac{\pi}{5}\right)}+\frac{4+\frac{168}{64}}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-180\,°}\right)}{1+\frac{2}{4}}}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{4+\frac{168}{64}}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-\pi}\right)}{1+\frac{2}{4}}}+\frac{1}{\text{root of } -1-x+x^2 \text{ near } x=1.61803}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=$$
$$-180\,°+\frac{4+\frac{168}{64}}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-180\,°}\right)}{1+\frac{2}{4}}}+\frac{1}{\text{root of } -1-x+x^2 \text{ near } x=1.61803}$$

Series representations:

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi+\frac{53}{64}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi+\frac{53}{64}\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=\frac{1}{64\left(1+\sqrt{5}\right)}$$
$$\left(128+53\,e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+53\sqrt{5}\,e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)}-\right.$$
$$\left.256\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}-256\sqrt{5}\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)$$

Integral representations:

$$\frac{\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}}{}-\pi+\frac{1}{\phi}=\frac{1}{64\left(1+\sqrt{5}\right)}\left(128+53\,e^{4\int_0^1\sqrt{1-t^2}\,dt}+53\sqrt{5}\,e^{4\int_0^1\sqrt{1-t^2}\,dt}-256\int_0^1\sqrt{1-t^2}\,dt-256\sqrt{5}\int_0^1\sqrt{1-t^2}\,dt\right)$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=\frac{128+53\,e^{2\int_0^\infty 1/(1+t^2)\,dt}+53\sqrt{5}\,e^{2\int_0^\infty 1/(1+t^2)\,dt}-128\int_0^\infty\frac{1}{1+t^2}\,dt-128\sqrt{5}\int_0^\infty\frac{1}{1+t^2}\,dt}{64\left(1+\sqrt{5}\right)}$$

$$\frac{2+\frac{2^2}{2}+\frac{21\times 2^3}{64}}{\frac{\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)16}{1+\frac{2}{4}}}-\pi+\frac{1}{\phi}=\frac{1}{64\left(1+\sqrt{5}\right)}\left(128+53\,e^{2\int_0^1 1/\sqrt{1-t^2}\,dt}+53\sqrt{5}\,e^{2\int_0^1 1/\sqrt{1-t^2}\,dt}-128\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt-128\sqrt{5}\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)$$

(((1/16(2+(2^2)/2+(21*2^3)/64)))) / (((e^(-Pi) * ((1+1/4*(1-2))) / (((1+1/4*2))))))*7+1/golden ratio

Where 7 is a Lucas number

Input:

$$\frac{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}{e^{-\pi}\times\frac{1+\frac{1}{4}(1-2)}{1+\frac{1}{4}\times 2}}\times 7+\frac{1}{\phi}$$

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}+\frac{371\,e^{\pi}}{64}$$

Decimal approximation:

134.7617365943922198657903843735673737127003938048788667616...

134.761736… result very near to the rest mass of Pion meson 134.9766

Property:

$\frac{371 e^{\pi}}{64} + \frac{1}{\phi}$ is a transcendental number

Alternate forms:

$$\frac{371 e^{\pi} \phi + 64}{64 \phi}$$

$$\frac{1}{2}\left(\sqrt{5} - 1\right) + \frac{371 e^{\pi}}{64}$$

$$\frac{2}{1+\sqrt{5}} + \frac{371 e^{\pi}}{64}$$

Alternative representations:

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}} + \frac{1}{\phi} = \frac{1}{2\cos\left(\frac{\pi}{5}\right)} + \frac{7\left(4+\frac{168}{64}\right)}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-180\,°}\right)}{1+\frac{2}{4}}}$$

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}} + \frac{1}{\phi} = \frac{7\left(4+\frac{168}{64}\right)}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-\pi}\right)}{1+\frac{2}{4}}} + \frac{1}{\text{root of } -1-x+x^2 \text{ near } x = 1.61803}$$

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}} + \frac{1}{\phi} = \frac{7\left(4+\frac{168}{64}\right)}{\frac{16\left(\left(1-\frac{1}{4}\right)e^{-180\,°}\right)}{1+\frac{2}{4}}} + \frac{1}{\text{root of } -1-x+x^2 \text{ near } x = 1.61803}$$

Series representations:

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}} + \frac{1}{\phi} = \frac{371}{64} e^{4\sum_{k=0}^{\infty}(-1)^k/(1+2k)} + \frac{1}{\phi}$$

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}} + \frac{1}{\phi} = \frac{1}{\phi} + \frac{371}{64}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{\pi}$$

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+\frac{1}{\phi}=\frac{1}{\phi}+\frac{371}{64}\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{\pi}$$

Integral representations:

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+\frac{1}{\phi}=\frac{371}{64}\,e^{4\int_0^1\sqrt{1-t^2}\,dt}+\frac{1}{\phi}$$

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+\frac{1}{\phi}=\frac{371}{64}\,e^{2\int_0^1 1/\sqrt{1-t^2}\,dt}+\frac{1}{\phi}$$

$$\frac{7\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+\frac{1}{\phi}=\frac{371}{64}\,e^{2\int_0^\infty 1/(1+t^2)\,dt}+\frac{1}{\phi}$$

(((1/16(2+(2^2)/2+(21*2^3)/64)))) / (((e^(-Pi) * ((1+1/4*(1-2))) / (((1+1/4*2))))))*2Pi+5

Where 5 is a Lucas number

Input:

$$\frac{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}{e^{-\pi}\times\frac{1+\frac{1}{4}(1-2)}{1+\frac{1}{4}\times 2}}\times 2\pi+5$$

Exact result:

$$5+\frac{53\,e^{\pi}\,\pi}{32}$$

Decimal approximation:

125.4071058946342666857820450592530909750805847900309558820...

125.40710589… 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

Alternate form:

$$\frac{1}{32}\left(160+53 e^{\pi} \pi\right)$$

Alternative representations:

$$\frac{(2 \pi)\left(2+\frac{2^2}{2}+\frac{21 \times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=5+\frac{360^{\circ}\left(4+\frac{168}{64}\right)}{\frac{16\left(\left(1-\frac{1}{4}\right) e^{-180^{\circ}}\right)}{1+\frac{2}{4}}}$$

$$\frac{(2 \pi)\left(2+\frac{2^2}{2}+\frac{21 \times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=5-\frac{2 i \log(-1)\left(4+\frac{168}{64}\right)}{\frac{16\left(\left(1-\frac{1}{4}\right) e^{i \log(-1)}\right)}{1+\frac{2}{4}}}$$

$$\frac{(2 \pi)\left(2+\frac{2^2}{2}+\frac{21 \times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=\frac{(2 \pi)\left(2+\frac{2^2}{2}+\frac{21 \times 2^3}{64}\right)}{\frac{16\left(\exp^{-\pi}(z)\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5 \quad \text{for } z=1$$

Series representations:

$$\frac{(2 \pi)\left(2+\frac{2^2}{2}+\frac{21 \times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=5+\frac{53}{32} \pi\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{\pi}$$

$$\frac{(2 \pi)\left(2+\frac{2^2}{2}+\frac{21 \times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=\frac{1}{8}\left(40+53 e^{4 \sum_{k=0}^{\infty}(-1)^k/(1+2 k)} \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2 k}\right)$$

$$\frac{(2 \pi)\left(2+\frac{2^2}{2}+\frac{21 \times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=5+\frac{53}{32} \pi\left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{\pi}$$

Integral representations:

$$\frac{(2\pi)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=\frac{1}{8}\left(40+53\,e^{4\int_0^1\sqrt{1-t^2}\,dt}\int_0^1\sqrt{1-t^2}\,dt\right)$$

$$\frac{(2\pi)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=\frac{1}{16}\left(80+53\,e^{2\int_0^1 1/\sqrt{1-t^2}\,dt}\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)$$

$$\frac{(2\pi)\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)}{\frac{16\left(e^{-\pi}\left(1+\frac{1-2}{4}\right)\right)}{1+\frac{2}{4}}}+5=\frac{1}{16}\left(80+53\,e^{2\int_0^\infty 1/(1+t^2)\,dt}\int_0^\infty\frac{1}{1+t^2}\,dt\right)$$

((((((e^(-Pi) * ((1+1/4*(1-2)))/(((1+1/4*2)))))) / (((1/16(2+(2^2)/2+(21*2^3)/64)))))))^1/256

Input:

$$\sqrt[256]{\frac{e^{-\pi}\times\frac{1+\frac{1}{4}(1-2)}{1+\frac{1}{4}\times 2}}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{1}{64}\left(21\times 2^3\right)\right)}}$$

Exact result:

$$\frac{2^{3/128}\,e^{-\pi/256}}{\sqrt[256]{53}}$$

Decimal approximation:

0.988531112860324068249561896253636525621305236083076742936...

0.9885311128… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Property:

$$\frac{2^{3/128}\, e^{-\pi/256}}{\sqrt[256]{53}} \text{ is a transcendental number}$$

All 256th roots of (64 e^(-π))/53:

$$\frac{2^{3/128}\, e^{-\pi/256}\, e^{0}}{\sqrt[256]{53}} \approx 0.988531 \quad \text{(real, principal root)}$$

$$\frac{2^{3/128}\, e^{-\pi/256}\, e^{(i\pi)/128}}{\sqrt[256]{53}} \approx 0.988233 + 0.024260\, i$$

$$\frac{2^{3/128}\, e^{-\pi/256}\, e^{(i\pi)/64}}{\sqrt[256]{53}} \approx 0.987340 + 0.048505\, i$$

$$\frac{2^{3/128}\, e^{-\pi/256}\, e^{(3i\pi)/128}}{\sqrt[256]{53}} \approx 0.985853 + 0.072721\, i$$

$$\frac{2^{3/128}\, e^{-\pi/256}\, e^{(i\pi)/32}}{\sqrt[256]{53}} \approx 0.983771 + 0.096893\, i$$

Alternative representations:

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \sqrt[256]{\frac{\left(1-\frac{1}{4}\right)e^{-180\,°}}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(4+\frac{168}{64}\right)}}$$

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \sqrt[256]{\frac{\left(1-\frac{1}{4}\right)e^{i\log(-1)}}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(4+\frac{168}{64}\right)}}$$

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \sqrt[256]{\frac{\left(1-\frac{1}{4}\right)e^{-2i\log((1-i)/(1+i))}}{\frac{1}{16}\left(1+\frac{2}{4}\right)\left(4+\frac{168}{64}\right)}}$$

Series representations:

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \frac{2^{3/128}\,e^{-1/64\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{\sqrt[256]{53}}$$

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \frac{2^{3/128}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-\pi/256}}{\sqrt[256]{53}}$$

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \frac{2^{3/128}\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-\pi/256}}{\sqrt[256]{53}}$$

Integral representations:

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \frac{2^{3/128}\,e^{-1/64\int_0^1\sqrt{1-t^2}\,dt}}{\sqrt[256]{53}}$$

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \frac{2^{3/128}\,e^{-1/128\int_0^1 1/\sqrt{1-t^2}\,dt}}{\sqrt[256]{53}}$$

$$\sqrt[256]{\frac{e^{-\pi}\left(1+\frac{1-2}{4}\right)}{\frac{1}{16}\left(2+\frac{2^2}{2}+\frac{21\times 2^3}{64}\right)\left(1+\frac{2}{4}\right)}} = \frac{2^{3/128}\,e^{-1/128\int_0^{\infty} 1/(1+t^2)\,dt}}{\sqrt[256]{53}}$$

Now, we have that:

e^(-2Pi/sqrt3) * ((1+2/9*(1-2))) / (((1+2/9*2)))

Input:

$$e^{-2\times\pi/\sqrt{3}} \times \frac{1+\frac{2}{9}(1-2)}{1+\frac{2}{9}\times 2}$$

Exact result:

$$\frac{7}{13} e^{-(2\pi)/\sqrt{3}}$$

Decimal approximation:

0.014312271871918186911503530600488757658922610894462102014...

0.0143122718719…

Property:

$\frac{7}{13} e^{-(2\pi)/\sqrt{3}}$ is a transcendental number

Series representations:

$$\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{1+\frac{2\times 2}{9}} = \frac{7}{13} e^{-(2\pi)/\left(\sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{1+\frac{2\times 2}{9}} = \frac{7}{13}\exp\left(-\frac{2\pi}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

$$\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{1+\frac{2\times 2}{9}} = \frac{7}{13}\exp\left(-\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)$$

1/27(2+5/9*4)

Input:

$$\frac{1}{27}\left(2+\frac{5}{9}\times 4\right)$$

Exact result:

$$\frac{38}{243}$$

Decimal approximation:

0.156378600823045267489711934156378600823045267489711934156...

0.1563786...

(((1/27(2+5/9*4)))) / (((e^(-2Pi/sqrt3) * ((1+2/9*(1-2))) / (((1+2/9*2))))))

Input:

$$\frac{\frac{1}{27}\left(2+\frac{5}{9}\times 4\right)}{e^{-2\times\pi/\sqrt{3}}\times\frac{1+\frac{2}{9}(1-2)}{1+\frac{2}{9}\times 2}}$$

Exact result:

$$\frac{494\,e^{(2\pi)/\sqrt{3}}}{1701}$$

Decimal approximation:

10.92618993144425176228949821664698855268894416376387611207...

10.926189931…

Property:

$\frac{494\,e^{(2\pi)/\sqrt{3}}}{1701}$ is a transcendental number

Series representations:

$$\frac{2+\frac{5\times 4}{9}}{\frac{\left(e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)\right)27}{1+\frac{2\times 2}{9}}}=\frac{494\,e^{(2\pi)/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}}{1701}$$

$$\frac{2+\frac{5\times 4}{9}}{\frac{\left(e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)\right)27}{1+\frac{2\times 2}{9}}} = \frac{494\exp\left(\frac{2\pi}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}{1701}$$

$$\frac{2+\frac{5\times 4}{9}}{\frac{\left(e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)\right)27}{1+\frac{2\times 2}{9}}} = \frac{494\exp\left(\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)}{1701}$$

(((e^(-2Pi/sqrt3) * ((1+2/9*(1-2))) / (((1+2/9*2)))))) / (((1/27(2+5/9*4))))

Input:

$$\frac{e^{-2\times\pi/\sqrt{3}}\times\frac{1+\frac{2}{9}(1-2)}{1+\frac{2}{9}\times 2}}{\frac{1}{27}\left(2+\frac{5}{9}\times 4\right)}$$

Exact result:

$$\frac{1701}{494}\,e^{-(2\pi)/\sqrt{3}}$$

Decimal approximation:

0.091523212233582089986719945682072845029426169667218178670...

0.091523212…

Property:

$\frac{1701}{494}\,e^{-(2\pi)/\sqrt{3}}$ is a transcendental number

Series representations:

$$\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{\frac{1}{27}\left(2+\frac{5\times 4}{9}\right)\left(1+\frac{2\times 2}{9}\right)} = \frac{1701}{494}\,e^{-(2\pi)/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{\frac{1}{27}\left(2+\frac{5\times4}{9}\right)\left(1+\frac{2\times2}{9}\right)} = \frac{1701}{494}\exp\left(-\frac{2\pi}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

$$\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{\frac{1}{27}\left(2+\frac{5\times4}{9}\right)\left(1+\frac{2\times2}{9}\right)} = \frac{1701}{494}\exp\left(-\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)$$

(((1/27(2+5/9*4)))) / (((e^(-2Pi/sqrt3) * ((1+2/9*(1-2)) / (((1+2/9*2))))))+5+1/golden ratio

Input:

$$\frac{\frac{1}{27}\left(2+\frac{5}{9}\times4\right)}{e^{-2\times\pi/\sqrt{3}}\times\frac{1+\frac{2}{9}(1-2)}{1+\frac{2}{9}\times2}}+5+\frac{1}{\phi}$$

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}+5+\frac{494\,e^{(2\pi)/\sqrt{3}}}{1701}$$

Decimal approximation:

16.54422392019414661049408505101262667040925334356963897421...

16.54422392… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Property:

$5+\frac{494\,e^{(2\pi)/\sqrt{3}}}{1701}+\frac{1}{\phi}$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\left(9+\sqrt{5}\right)+\frac{494\,e^{(2\pi)/\sqrt{3}}}{1701}$$

$$5+\frac{2}{1+\sqrt{5}}+\frac{494\,e^{(2\pi)/\sqrt{3}}}{1701}$$

$$\frac{494\,e^{(2\pi)/\sqrt{3}}\,\phi+1701\,(5\,\phi+1)}{1701\,\phi}$$

Series representations:

$$\frac{2+\frac{5\times4}{9}}{\frac{\left(e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)\right)27}{1+\frac{2\times2}{9}}}+5+\frac{1}{\phi}=5+\frac{494\,e^{(2\pi)/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}}{1701}+\frac{1}{\phi}$$

$$\frac{2+\frac{5\times4}{9}}{\frac{\left(e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)\right)27}{1+\frac{2\times2}{9}}}+5+\frac{1}{\phi}=5+\frac{494\exp\left(\frac{2\pi}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}{1701}+\frac{1}{\phi}$$

$$\frac{2+\frac{5\times4}{9}}{\frac{\left(e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)\right)27}{1+\frac{2\times2}{9}}}+5+\frac{1}{\phi}=5+\frac{494\exp\left(\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)}{1701}+\frac{1}{\phi}$$

(((1/27(2+5/9*4)))) / (((e^(-2Pi/sqrt3) * ((1+2/9*(1-2))) / (((1+2/9*2))))))*11+5

Input:

$$\frac{\frac{1}{27}\left(2+\frac{5}{9}\times4\right)}{e^{-2\times\pi/\sqrt{3}}\times\frac{1+\frac{2}{9}(1-2)}{1+\frac{2}{9}\times2}}\times11+5$$

Exact result:

$$5+\frac{5434\,e^{(2\pi)/\sqrt{3}}}{1701}$$

Decimal approximation:

125.18808924588676938518448038311687407957838580140263723 28...

125.1880892458… 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

Property:

$5 + \frac{5434\, e^{(2\pi)/\sqrt{3}}}{1701}$ is a transcendental number

Alternate form:

$$\frac{8505 + 5434\, e^{(2\pi)/\sqrt{3}}}{1701}$$

Series representations:

$$\frac{11\left(2+\frac{5\times 4}{9}\right)}{27\left(\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{1+\frac{2\times 2}{9}}\right)} + 5 = 5 + \frac{5434\, e^{(2\pi)/\left(\sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{\frac{1}{2}}{k}\right)}}{1701}$$

$$\frac{11\left(2+\frac{5\times 4}{9}\right)}{27\left(\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{1+\frac{2\times 2}{9}}\right)} + 5 = 5 + \frac{5434 \exp\left(\frac{2\pi}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}{1701}$$

$$\frac{11\left(2+\frac{5\times 4}{9}\right)}{27\left(\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{1+\frac{2\times 2}{9}}\right)} + 5 = 5 + \frac{5434 \exp\left(\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)}{1701}$$

((((((e^(-2Pi/sqrt3) * ((1+2/9*(1-2))) / (((1+2/9*2)))))) / (((1/27(2+5/9*4)))))))^1/256

Input:

$$\sqrt[256]{\frac{e^{-2\times\pi/\sqrt{3}} \times \frac{1+\frac{2}{9}(1-2)}{1+\frac{2}{9}\times 2}}{\frac{1}{27}\left(2+\frac{5}{9}\times 4\right)}}$$

Exact result:

$$\sqrt[256]{\frac{7}{494}}\, 3^{5/256}\, e^{-\pi/\left(128\sqrt{3}\right)}$$

Decimal approximation:

0.990703007659652795178888329729489182846482698752108244404...

0.9907030076596… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value $\mathbf{0.989117352243 = \phi}$ (see Appendix)

Property:

$\sqrt[256]{\frac{7}{494}}\, 3^{5/256}\, e^{-\pi/\left(128\sqrt{3}\right)}$ is a transcendental number

All 256th roots of 1701/494 e^(-(2 π)/sqrt(3)):

$\sqrt[256]{\frac{7}{494}}\, 3^{5/256}\, e^{-\pi/\left(128\sqrt{3}\right)}\, e^0 \approx 0.990703$ (real, principal root)

$$\sqrt[256]{\frac{7}{494}}\ 3^{5/256}\ e^{-\pi/\left(128\sqrt{3}\right)}\ e^{(i\pi)/128} \approx 0.990405 + 0.024313\, i$$

$$\sqrt[256]{\frac{7}{494}}\ 3^{5/256}\ e^{-\pi/\left(128\sqrt{3}\right)}\ e^{(i\pi)/64} \approx 0.989510 + 0.04861\, i$$

$$\sqrt[256]{\frac{7}{494}}\ 3^{5/256}\ e^{-\pi/\left(128\sqrt{3}\right)}\ e^{(3i\pi)/128} \approx 0.988019 + 0.07288\, i$$

$$\sqrt[256]{\frac{7}{494}}\ 3^{5/256}\ e^{-\pi/\left(128\sqrt{3}\right)}\ e^{(i\pi)/32} \approx 0.985933 + 0.09711\, i$$

Series representations:

$$\sqrt[256]{\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{\frac{1}{27}\left(2+\frac{5\times 4}{9}\right)\left(1+\frac{2\times 2}{9}\right)}} = \sqrt[256]{\frac{7}{494}}\ 3^{5/256}\ \sqrt[256]{e^{-(2\pi)/\left(\sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{\frac{1}{2}}{k}\right)}}$$

$$\sqrt[256]{\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{\frac{1}{27}\left(2+\frac{5\times 4}{9}\right)\left(1+\frac{2\times 2}{9}\right)}} = \sqrt[256]{\frac{7}{494}}\ 3^{5/256}\ \sqrt[256]{\exp\left(-\frac{2\pi}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}$$

$$\sqrt[256]{\frac{e^{-(2\pi)/\sqrt{3}}\left(1+\frac{2(1-2)}{9}\right)}{\frac{1}{27}\left(2+\frac{5\times 4}{9}\right)\left(1+\frac{2\times 2}{9}\right)}} =$$
$$\sqrt[256]{\frac{7}{494}}\ 3^{5/256}\ \sqrt[256]{\exp\left(-\frac{4\pi\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)}$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(s)\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

Now, we have that:

1/64(2+5/8*4)

Input:

$$\frac{1}{64}\left(2+\frac{5}{8}\times 4\right)$$

Exact result:

$$\frac{9}{128}$$

Decimal form:

0.0703125

0.0703125

e^(-Pi*sqrt2) * ((1+3/16*(1-2))) / (((1+3/16*2)))

Input:

$$e^{-\pi\sqrt{2}}\times\frac{1+\frac{3}{16}(1-2)}{1+\frac{3}{16}\times 2}$$

Exact result:

$$\frac{13}{22}e^{-\sqrt{2}\,\pi}$$

Decimal approximation:

0.006950261223093571907221897740842121645911910158080673121...

0.006950261223…

Property:

$\frac{13}{22}e^{-\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{1+\frac{3\times 2}{16}}=\frac{13}{22}\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0))$

$$\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{1+\frac{3\times 2}{16}} = \frac{13}{22}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
for ($x \in \mathbb{R}$ and $x < 0$)

$$\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{1+\frac{3\times 2}{16}} = \frac{13}{22}\exp\left(-\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

(((1/64(2+5/8*4)))) / (((e^(-Pi*sqrt2) * ((1+3/16*(1-2))) / (((1+3/16*2))))))

Input:

$$\frac{\frac{1}{64}\left(2+\frac{5}{8}\times 4\right)}{e^{-\pi\sqrt{2}}\times\frac{1+\frac{3}{16}(1-2)}{1+\frac{3}{16}\times 2}}$$

Exact result:

$$\frac{99\,e^{\sqrt{2}\,\pi}}{832}$$

Decimal approximation:

10.11652623449220497676511588103878111754716847893663928513...

10.11652623…

Property:

$\frac{99\,e^{\sqrt{2}\,\pi}}{832}$ is a transcendental number

Series representations:

$$\frac{2+\frac{5\times4}{8}}{\frac{\left(e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)\right)64}{1+\frac{3\times2}{16}}} = \frac{99}{832}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

for not $((z_0\in\mathbb{R}$ and $-\infty < z_0 \leq 0))$

$$\frac{2+\frac{5\times4}{8}}{\frac{\left(e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)\right)64}{1+\frac{3\times2}{16}}} = \frac{99}{832}\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for $(x\in\mathbb{R}$ and $x<0)$

$$\frac{2+\frac{5\times4}{8}}{\frac{\left(e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)\right)64}{1+\frac{3\times2}{16}}} =$$

$$\frac{99}{832}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

(((e^(-Pi*sqrt2) * ((1+3/16*(1-2))) / (((1+3/16*2)))))) / (((1/64(2+5/8*4))))

Input:

$$\frac{e^{-\pi\sqrt{2}}\times\frac{1+\frac{3}{16}(1-2)}{1+\frac{3}{16}\times2}}{\frac{1}{64}\left(2+\frac{5}{8}\times4\right)}$$

Exact result:

$$\frac{832}{99}e^{-\sqrt{2}\pi}$$

Decimal approximation:

0.098848159617330800458266990091976841186302722248258462170...

0.098848159617…

Property:

$\frac{832}{99}e^{-\sqrt{2}\pi}$ is a transcendental number

Series representations:

$$\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(2+\frac{5\times4}{8}\right)\left(1+\frac{3\times2}{16}\right)} = \frac{832}{99}\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

$$\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(2+\frac{5\times4}{8}\right)\left(1+\frac{3\times2}{16}\right)} = \frac{832}{99}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for $(x \in \mathbb{R}$ and $x < 0)$

$$\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(2+\frac{5\times4}{8}\right)\left(1+\frac{3\times2}{16}\right)} = \frac{832}{99}\exp\left(-\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

((((((e^(-Pi*sqrt2) * ((1+3/16*(1-2))) / (((1+3/16*2)))))) / (((1/64(2+5/8*4)))))))^1/256

Input:

$$\sqrt[256]{\frac{e^{-\pi\sqrt{2}}\times\frac{1+\frac{3}{16}(1-2)}{1+\frac{3}{16}\times2}}{\frac{1}{64}\left(2+\frac{5}{8}\times4\right)}}$$

Exact result:

$$\frac{\sqrt[256]{\frac{13}{11}}\,2^{3/128}\,e^{-\pi/\left(128\sqrt{2}\right)}}{\sqrt[128]{3}}$$

Decimal approximation:

0.991001007582258730927879325960733098202543221929770334604...

0.991001007582… 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 **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Property:

$$\frac{\sqrt[256]{\frac{13}{11}}\; 2^{3/128}\, e^{-\pi/\left(128\sqrt{2}\right)}}{\sqrt[128]{3}} \text{ is a transcendental number}$$

All 256th roots of 832/99 e^(-sqrt(2) π):

$$\frac{\sqrt[256]{\frac{13}{11}}\; 2^{3/128}\, e^{-\pi/\left(128\sqrt{2}\right)}\, e^{0}}{\sqrt[128]{3}} \approx 0.991001 \text{ (real, principal root)}$$

$$\frac{\sqrt[256]{\frac{13}{11}}\; 2^{3/128}\, e^{-\pi/\left(128\sqrt{2}\right)}\, e^{(i\pi)/128}}{\sqrt[128]{3}} \approx 0.990703 + 0.024320\, i$$

$$\frac{\sqrt[256]{\frac{13}{11}}\; 2^{3/128}\, e^{-\pi/\left(128\sqrt{2}\right)}\, e^{(i\pi)/64}}{\sqrt[128]{3}} \approx 0.989807 + 0.04863\, i$$

$$\frac{\sqrt[256]{\frac{13}{11}}\; 2^{3/128}\, e^{-\pi/\left(128\sqrt{2}\right)}\, e^{(3i\pi)/128}}{\sqrt[128]{3}} \approx 0.988316 + 0.07290\, i$$

$$\frac{\sqrt[256]{\frac{13}{11}}\; 2^{3/128}\, e^{-\pi/\left(128\sqrt{2}\right)}\, e^{(i\pi)/32}}{\sqrt[128]{3}} \approx 0.986229 + 0.09714\, i$$

Series representations:

$$\sqrt[256]{\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(2+\frac{5\times4}{8}\right)\left(1+\frac{3\times2}{16}\right)}} = \frac{\sqrt[256]{\frac{13}{11}}\ 2^{3/128}\ \sqrt[256]{\exp\left(-\pi\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)}}{\sqrt[128]{3}}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

$$\sqrt[256]{\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(2+\frac{5\times4}{8}\right)\left(1+\frac{3\times2}{16}\right)}} = \frac{\sqrt[256]{\frac{13}{11}}\ 2^{3/128}\ \sqrt[256]{\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}}{\sqrt[128]{3}}$$

for $(x \in \mathbb{R}$ and $x < 0)$

$$\sqrt[256]{\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(2+\frac{5\times4}{8}\right)\left(1+\frac{3\times2}{16}\right)}} = \frac{1}{\sqrt[128]{3}}\sqrt[256]{\frac{13}{11}}\ 2^{3/128}$$
$$\sqrt[256]{\exp\left(-\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)}$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0<\gamma<-\mathrm{Re}(a) \text{ and } |\arg(z)|<\pi)$$

1/2*log base 0.9910010075822 ((((((e^(-Pi*sqrt2) * ((1+3/16*(1-2))) / (((1+3/16*2)))))) / (((1/64(2+5/8*4)))))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.9910010075822}\left(\frac{e^{-\pi\sqrt{2}}\times\frac{1+\frac{3}{16}(1-2)}{1+\frac{3}{16}\times2}}{\frac{1}{64}\left(2+\frac{5}{8}\times4\right)}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.47644133...

125.47644133… 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:

$$\frac{1}{2}\log_{0.99100100758220000}\left(\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(1+\frac{3\times 2}{16}\right)\left(2+\frac{5\times 4}{8}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{\left(1-\frac{3}{16}\right)e^{-\pi\sqrt{2}}}{\frac{1}{64}\left(1+\frac{6}{16}\right)\left(2+\frac{20}{8}\right)}\right)}{2\log(0.99100100758220000)}$$

Series representations:

$$\frac{1}{2}\log_{0.99100100758220000}\left(\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(1+\frac{3\times 2}{16}\right)\left(2+\frac{5\times 4}{8}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{832}{99}e^{-\pi\sqrt{2}}\right)^k}{k}}{2\log(0.99100100758220000)}$$

$$\frac{1}{2}\log_{0.99100100758220000}\left(\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(1+\frac{3\times 2}{16}\right)\left(2+\frac{5\times 4}{8}\right)}\right)-\pi+\frac{1}{\phi}=\frac{1.00000000000000}{\phi}-$$

$$1.00000000000000\,\pi-55.3117758951547\log\left(\frac{832}{99}e^{-\pi\sqrt{2}}\right)-$$

$$0.500000000000000\log\left(\frac{832}{99}e^{-\pi\sqrt{2}}\right)\sum_{k=0}^{\infty}(-0.00899899241780000)^k\,G(k)$$

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

$$\frac{1}{2}\log_{0.99100100758220000}\left(\frac{e^{-\pi\sqrt{2}}\left(1+\frac{3(1-2)}{16}\right)}{\frac{1}{64}\left(1+\frac{3\times2}{16}\right)\left(2+\frac{5\times4}{8}\right)}\right)-\pi+\frac{1}{\phi}=\frac{1.00000000000000}{\phi}-$$

$$1.00000000000000\,\pi-55.3117758951547\log\left(\frac{832}{99}e^{-\pi\sqrt{2}}\right)-$$

$$0.500000000000000\log\left(\frac{832}{99}e^{-\pi\sqrt{2}}\right)\sum_{k=0}^{\infty}(-0.00899899241780000)^k\,G(k)$$

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

Now, we have that:

1/432(2+13/18*4)

Input:

$$\frac{1}{432}\left(2+\frac{13}{18}\times4\right)$$

Exact result:

$$\frac{11}{972}$$

Decimal approximation:

0.011316872427983539094650205761316872427983539094650205761...

0.0113168724...

e^(-2Pi) * ((1+5/36*(1-2))) / (((1+5/36*2)))

Input:

$$e^{-2\pi}\times\frac{1+\frac{5}{36}(1-2)}{1+\frac{5}{36}\times2}$$

Exact result:

$$\frac{31e^{-2\pi}}{46}$$

Decimal approximation:

0.0012584940148466881140725348039051726564371077190594528950...

0.001258494014…

Property:

$\frac{31 e^{-2\pi}}{46}$ is a transcendental number

Alternative representations:

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{\left(1-\frac{5}{36}\right)e^{-360\,°}}{1+\frac{10}{36}}$$

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{\left(1-\frac{5}{36}\right)e^{2 i \log(-1)}}{1+\frac{10}{36}}$$

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{\exp^{-2\pi}(z)\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} \quad \text{for } z = 1$$

Series representations:

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{31}{46}\, e^{-8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{31}{46}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-2\pi}$$

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{31}{46}\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-2\pi}$$

Integral representations:

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{31}{46}\, e^{-8\int_0^1 \sqrt{1-t^2}\, dt}$$

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{31}{46}\, e^{-4\int_0^1 1/\sqrt{1-t^2}\, dt}$$

$$\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}} = \frac{31}{46}\, e^{-4\int_0^{\infty} 1/(1+t^2)\,dt}$$

(((1/432(2+13/18*4)))) / (((e^(-2Pi) * ((1+5/36*(1-2))) / (((1+5/36*2))))))

Input:

$$\frac{\frac{1}{432}\left(2+\frac{13}{18}\times 4\right)}{e^{-2\pi}\times\frac{1+\frac{5}{36}(1-2)}{1+\frac{5}{36}\times 2}}$$

Exact result:

$$\frac{253\, e^{2\pi}}{15\,066}$$

Decimal approximation:

8.992392728512244679096739704369370563778366307821161132571...

8.992392728…

Property:

$\frac{253\, e^{2\pi}}{15\,066}$ is a transcendental number

Alternative representations:

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{2+\frac{52}{18}}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-360^\circ}\right)}{1+\frac{10}{36}}}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{2+\frac{52}{18}}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{2i\log(-1)}\right)}{1+\frac{10}{36}}}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{2+\frac{13\times 4}{18}}{\frac{\left(\exp^{-2\pi}(z)\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} \quad \text{for } z=1$$

Series representations:

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{253\, e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{15\,066}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{253\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}}{15\,066}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{253\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}}{15\,066}$$

Integral representations:

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{253\, e^{8\int_0^1\sqrt{1-t^2}\,dt}}{15\,066}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{253\, e^{4\int_0^1 1/\sqrt{1-t^2}\,dt}}{15\,066}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}} = \frac{253\, e^{4\int_0^{\infty} 1/(1+t^2)\,dt}}{15\,066}$$

(((1/432(2+13/18*4)))) / (((e^(-2Pi) * ((1+5/36*(1-2))) / (((1+5/36*2)))))) + 7 +1/golden ratio

Input:

$$\frac{\frac{1}{432}\left(2+\frac{13}{18}\times 4\right)}{e^{-2\pi}\times\frac{1+\frac{5}{36}(1-2)}{1+\frac{5}{36}\times 2}}+7+\frac{1}{\phi}$$

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}+7+\frac{253\,e^{2\pi}}{15\,066}$$

Decimal approximation:

16.610426717262139527301326538735008681498675487626923994 70...

16.61042671726… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Property:

$7+\frac{253\,e^{2\pi}}{15\,066}+\frac{1}{\phi}$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\left(13+\sqrt{5}\right)+\frac{253\,e^{2\pi}}{15\,066}$$

$$7+\frac{2}{1+\sqrt{5}}+\frac{253\,e^{2\pi}}{15\,066}$$

$$\frac{253\,e^{2\pi}\,\phi+15\,066\,(7\,\phi+1)}{15\,066\,\phi}$$

Alternative representations:

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=7+\frac{1}{2\cos\left(\frac{\pi}{5}\right)}+\frac{2+\frac{52}{18}}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-360\,^{\circ}}\right)}{1+\frac{10}{36}}}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=$$

$$7+\frac{2+\frac{52}{18}}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-2\pi}\right)}{1+\frac{10}{36}}}+\frac{1}{\text{root of } -1-x+x^2 \text{ near } x=1.61803}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=$$

$$7+\frac{2+\frac{52}{18}}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-360^\circ}\right)}{1+\frac{10}{36}}}+\frac{1}{\text{root of } -1-x+x^2 \text{ near } x=1.61803}$$

Series representations:

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=7+\frac{253\,e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{15\,066}+\frac{1}{\phi}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=7+\frac{1}{\phi}+\frac{253\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}}{15\,066}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=7+\frac{1}{\phi}+\frac{253\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}}{15\,066}$$

Integral representations:

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=7+\frac{253\,e^{8\int_0^1\sqrt{1-t^2}\,dt}}{15\,066}+\frac{1}{\phi}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=7+\frac{253\,e^{4\int_0^1 1/\sqrt{1-t^2}\,dt}}{15066}+\frac{1}{\phi}$$

$$\frac{2+\frac{13\times 4}{18}}{\frac{\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)432}{1+\frac{5\times 2}{36}}}+7+\frac{1}{\phi}=7+\frac{253\,e^{4\int_0^\infty 1/(1+t^2)\,dt}}{15066}+\frac{1}{\phi}$$

(((1/432(2+13/18*4)))) / (((e^(-2Pi) * ((1+5/36*(1-2))) / (((1+5/36*2)))))) *16-18-1/golden ratio

Input:

$$\frac{\frac{1}{432}\left(2+\frac{13}{18}\times 4\right)}{e^{-2\pi}\times\frac{1+\frac{5}{36}(1-2)}{1+\frac{5}{36}\times 2}}\times 16-18-\frac{1}{\phi}$$

ϕ is the golden ratio

Exact result:

$$-\frac{1}{\phi}-18+\frac{2024\,e^{2\pi}}{7533}$$

Decimal approximation:

125.26024966744602001734324843554429090273355174533281525 90...

125.260249667… 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

Property:

$$-18+\frac{2024\,e^{2\pi}}{7533}-\frac{1}{\phi}$$ is a transcendental number

Alternate forms:

$$-18-\frac{2}{1+\sqrt{5}}+\frac{2024\,e^{2\pi}}{7533}$$

$$\frac{2024\,e^{2\pi}\,\phi-7533\,(18\,\phi+1)}{7533\,\phi}$$

$$\frac{1}{2}\left(-35-\sqrt{5}\right)+\frac{2024\,e^{2\pi}}{7533}$$

Alternative representations:

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=-18-\frac{1}{2\cos\left(\frac{\pi}{5}\right)}+\frac{16\left(2+\frac{52}{18}\right)}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-360\,°}\right)}{1+\frac{10}{36}}}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=$$
$$-18+\frac{16\left(2+\frac{52}{18}\right)}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-2\pi}\right)}{1+\frac{10}{36}}}-\frac{1}{\text{root of } -1-x+x^2 \text{ near } x=1.61803}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=$$
$$-18+\frac{16\left(2+\frac{52}{18}\right)}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-360\,°}\right)}{1+\frac{10}{36}}}-\frac{1}{\text{root of } -1-x+x^2 \text{ near } x=1.61803}$$

Series representations:

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=-18+\frac{2024\,e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{7533}-\frac{1}{\phi}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=-18-\frac{1}{\phi}+\frac{2024\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}}{7533}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=-18-\frac{1}{\phi}+\frac{2024\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}}{7533}$$

Integral representations:

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=-18+\frac{2024\,e^{8\int_0^1\sqrt{1-t^2}\,dt}}{7533}-\frac{1}{\phi}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=-18+\frac{2024\,e^{4\int_0^1 1/\sqrt{1-t^2}\,dt}}{7533}-\frac{1}{\phi}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-18-\frac{1}{\phi}=-18+\frac{2024\,e^{4\int_0^\infty 1/(1+t^2)\,dt}}{7533}-\frac{1}{\phi}$$

(((1/432(2+13/18*4)))) / (((e^(-2Pi) * ((1+5/36*(1-2))) / (((1+5/36*2)))))) *16-4

Input:

$$\frac{\frac{1}{432}\left(2+\frac{13}{18}\times 4\right)}{e^{-2\pi}\times\frac{1+\frac{5}{36}(1-2)}{1+\frac{5}{36}\times 2}}\times 16-4$$

Exact result:

$$\frac{2024\,e^{2\pi}}{7533}-4$$

Decimal approximation:

139.8782836561959148655478352699099290204538609251385781211...

139.87828365619… result very near to the rest mass of Pion meson 139.57

Property:

$-4+\frac{2024\,e^{2\pi}}{7533}$ is a transcendental number

Alternate form:

$$\frac{4\left(506\,e^{2\pi}-7533\right)}{7533}$$

Alternative representations:

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{16\left(2+\frac{52}{18}\right)}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{-360\,^{\circ}}\right)}{1+\frac{10}{36}}}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{16\left(2+\frac{52}{18}\right)}{\frac{432\left(\left(1-\frac{5}{36}\right)e^{2\,i\log(-1)}\right)}{1+\frac{10}{36}}}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(\exp^{-2\pi}(z)\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4 \quad \text{for } z=1$$

Series representations:

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{2024\,e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{7533}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{2024\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}}{7533}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{2024\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}}{7533}$$

Integral representations:

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{2024\,e^{8\int_0^1\sqrt{1-t^2}\,dt}}{7533}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{2024\,e^{4\int_0^1 1/\sqrt{1-t^2}\,dt}}{7533}$$

$$\frac{16\left(2+\frac{13\times 4}{18}\right)}{\frac{432\left(e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)\right)}{1+\frac{5\times 2}{36}}}-4=-4+\frac{2024\,e^{4}\int_0^{\infty}1/(1+t^2)\,dt}{7533}$$

(((e^(-2Pi) * ((1+5/36*(1-2))) / (((1+5/36*2))))))^1/512

Input:

$$\sqrt[512]{e^{-2\pi}\times\frac{1+\frac{5}{36}(1-2)}{1+\frac{5}{36}\times 2}}$$

Exact result:

$$\sqrt[512]{\frac{31}{46}}\,e^{-\pi/256}$$

Decimal approximation:

0.98704203157614984741375599024971698025813069550089316165 1...

0.98704203157… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

Property:

$\sqrt[512]{\frac{31}{46}}\,e^{-\pi/256}$ is a transcendental number

All 512th roots of (31 e^(-2 π))/46:

$$\sqrt[512]{\frac{31}{46}}\ e^{-\pi/256}\ e^{0} \approx 0.987042 \text{ (real, principal root)}$$

$$\sqrt[512]{\frac{31}{46}}\ e^{-\pi/256}\ e^{(i\pi)/256} \approx 0.9869677 + 0.0121125\, i$$

$$\sqrt[512]{\frac{31}{46}}\ e^{-\pi/256}\ e^{(i\pi)/128} \approx 0.986745 + 0.024223\, i$$

$$\sqrt[512]{\frac{31}{46}}\ e^{-\pi/256}\ e^{(3i\pi)/256} \approx 0.986373 + 0.036330\, i$$

$$\sqrt[512]{\frac{31}{46}}\ e^{-\pi/256}\ e^{(i\pi)/64} \approx 0.985853 + 0.048432\, i$$

Alternative representations:

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{\left(1-\frac{5}{36}\right)e^{-360\,°}}{1+\frac{10}{36}}}$$

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{\left(1-\frac{5}{36}\right)e^{2i\log(-1)}}{1+\frac{10}{36}}}$$

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{\exp^{-2\pi}(z)\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} \quad \text{for } z = 1$$

Series representations:

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{31}{46}}\ e^{-1/64\sum_{k=0}^{\infty}(-1)^k/(1+2k)}$$

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{31}{46}}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-\pi/256}$$

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{31}{46}}\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-\pi/256}$$

Integral representations:

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{31}{46}}\ e^{-1/64\int_0^1 \sqrt{1-t^2}\,dt}$$

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{31}{46}}\ e^{-1/128\int_0^1 1/\sqrt{1-t^2}\,dt}$$

$$\sqrt[512]{\frac{e^{-2\pi}\left(1+\frac{5(1-2)}{36}\right)}{1+\frac{5\times 2}{36}}} = \sqrt[512]{\frac{31}{46}}\ e^{-1/128\int_0^\infty 1/(1+t^2)\,dt}$$

From the sum of the four results concerning the left hand-side:

0.0216069591318; 0.0143122718719; 0.006950261223; 0.001258494014

we obtain:

-ln^7(0.0216069591318 + 0.0143122718719 + 0.006950261223 + 0.001258494014)-199+11+golden ratio

Input interpretation:

$$-\log^7(0.0216069591318 + 0.0143122718719 + 0.006950261223 + 0.001258494014) - 199 + 11 + \phi$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Result:

2695.832151...

2695.832151… result practically equal to the rest mass of charmed Omega baryon 2695.2

Alternative representations:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 + \phi = -188 + \phi - \log_e^7(0.044128)$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 + \phi = -188 + \phi - (\log(a)\log_a(0.044128))^7$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 + \phi = -188 + \phi - (-\text{Li}_1(0.955872))^7$$

Series representations:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 + \phi = -188 + \phi + \left(\sum_{k=1}^{\infty} \frac{(-1)^k (-0.955872)^k}{k}\right)^7$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 + \phi = -188 + \phi - \left(2 i \pi \left\lfloor \frac{\arg(0.044128 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.044128 - x)^k x^{-k}}{k}\right)^7 \quad \text{for } x < 0$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 + \phi = -188 + \phi - \left(\log(z_0) + \left\lfloor \frac{\arg(0.044128 - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.044128 - z_0)^k z_0^{-k}}{k}\right)^7$$

Integral representation:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 + \phi = -188 + \phi - \left(\int_1^{0.044128} \frac{1}{t}\, dt\right)^7$$

-ln^7(0.0216069591318 + 0.0143122718719 + 0.006950261223 + 0.001258494014)-199+11-843-123+1/golden ratio

Input interpretation:

$$-\log^7(0.0216069591318 + 0.0143122718719 + 0.006950261223 + 0.001258494014) - 199 + 11 - 843 - 123 + \frac{1}{\phi}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

1728.832151...

1728.832151…

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

Alternative representations:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 - 843 - 123 + \frac{1}{\phi} = -1154 + \frac{1}{\phi} - \log_e^7(0.044128)$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 - 843 - 123 + \frac{1}{\phi} = -1154 + \frac{1}{\phi} - (\log(a)\log_a(0.044128))^7$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 - 843 - 123 + \frac{1}{\phi} = -1154 + \frac{1}{\phi} - (-\text{Li}_1(0.955872))^7$$

Series representations:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 - 843 - 123 + \frac{1}{\phi} = -1154 + \frac{1}{\phi} + \left(\sum_{k=1}^{\infty} \frac{(-1)^k (-0.955872)^k}{k}\right)^7$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 - 843 - 123 + \frac{1}{\phi} = -1154 + \frac{1}{\phi} - \left(2 i \pi \left\lfloor \frac{\arg(0.044128 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.044128 - x)^k x^{-k}}{k}\right)^7$$

for $x < 0$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 - 843 - 123 + \frac{1}{\phi} = -1154 + \frac{1}{\phi} - \left(\log(z_0) + \left\lfloor \frac{\arg(0.044128 - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.044128 - z_0)^k z_0^{-k}}{k}\right)^7$$

Integral representation:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 11 - 843 - 123 + \frac{1}{\phi} = -1154 + \frac{1}{\phi} - \left(\int_1^{0.044128} \frac{1}{t}\, dt\right)^7$$

-ln^7(0.0216069591318 + 0.0143122718719 + 0.006950261223 + 0.001258494014)-199+47-843-123+18+Pi

Input interpretation:

$$-\log^7(0.0216069591318 + 0.0143122718719 + 0.006950261223 + 0.001258494014) - 199 + 47 - 843 - 123 + 18 + \pi$$

log(x) is the natural logarithm

Result:

1785.355710...

1785.355710… result in the range of the hypothetical mass of Gluino (gluino = 1785.16 GeV).

Alternative representations:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 47 - 843 - 123 + 18 + \pi = -1100 + \pi - \log_e^7(0.044128)$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 47 - 843 - 123 + 18 + \pi = -1100 + \pi - (\log(a)\log_a(0.044128))^7$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 47 - 843 - 123 + 18 + \pi = -1100 + \pi - (-\text{Li}_1(0.955872))^7$$

Series representations:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 47 - 843 - 123 + 18 + \pi = -1100 + \pi + \left(\sum_{k=1}^{\infty} \frac{(-1)^k (-0.955872)^k}{k}\right)^7$$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 47 - 843 - 123 + 18 + \pi = -1100 + \pi - \left(2 i \pi \left\lfloor \frac{\arg(0.044128 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.044128 - x)^k x^{-k}}{k}\right)^7$$

for $x < 0$

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 47 - 843 - 123 + 18 + \pi = -1100 + \pi - \left(\log(z_0) + \left\lfloor \frac{\arg(0.044128 - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.044128 - z_0)^k z_0^{-k}}{k}\right)^7$$

Integral representation:

$$-\log^7(0.02160695913180000 + 0.01431227187190000 + 0.00695026 + 0.00125849) - 199 + 47 - 843 - 123 + 18 + \pi = -1100 + \pi - \left(\int_1^{0.044128} \frac{1}{t}\, dt\right)^7$$

From the multiplication, we obtain:

-ln(0.0216069591318 * 0.0143122718719 * 0.006950261223 * 0.001258494014)-Pi

Input interpretation:

$-\log(0.0216069591318 \times 0.0143122718719 \times 0.006950261223 \times 0.001258494014) - \pi$

log(x) is the natural logarithm

Result:

16.586600651...

16.586600651… result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representations:

$$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849) - \pi = -\pi - \log_e(2.70492 \times 10^{-9})$$

$$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849) - \pi = -\pi - \log(a) \log_a(2.70492 \times 10^{-9})$$

$$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849) - \pi = -\pi + \text{Li}_1(1.)$$

Series representations:

$$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849) - \pi = -\pi + \sum_{k=1}^{\infty} \frac{(-1)^k (-1.)^k}{k}$$

$$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849) - \pi = -\pi - 2 i \pi \left\lfloor \frac{\arg(2.70492 \times 10^{-9} - x)}{2 \pi} \right\rfloor - \log(x) + \sum_{k=1}^{\infty} \frac{(-1)^k (2.70492 \times 10^{-9} - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$-\log(0.0216069591318000\times 0.0143122718719000\times 0.00695026\times 0.00125849) - \pi = -\pi - \left\lfloor \frac{\arg(2.70492\times 10^{-9}-z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) - \log(z_0) - \left\lfloor \frac{\arg(2.70492\times 10^{-9}-z_0)}{2\pi} \right\rfloor \log(z_0) + \sum_{k=1}^{\infty} \frac{(-1)^k (2.70492\times 10^{-9}-z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$-\log(0.0216069591318000\times 0.0143122718719000\times 0.00695026\times 0.00125849) - \pi = -\pi - \int_1^{2.70492\times 10^{-9}} \frac{1}{t}\, dt$$

-ln(0.0216069591318 * 0.0143122718719 * 0.006950261223 * 0.001258494014)*2Pi+golden ratio

Input interpretation:

$$-\log(0.0216069591318\times 0.0143122718719\times 0.006950261223\times 0.001258494014)\times 2\pi + \phi$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Result:

125.57392830…

125.57392830… 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 representations:

$$-\log(0.0216069591318000\times 0.0143122718719000\times 0.00695026\times 0.00125849)\, 2\pi + \phi = \phi - 2\pi \log_e(2.70492\times 10^{-9})$$

$$-\log(0.0216069591318000\times 0.0143122718719000\times 0.00695026\times 0.00125849)\, 2\pi + \phi = \phi - 2\pi \log(a) \log_a(2.70492\times 10^{-9})$$

$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849)$

$$2\pi + \phi = \phi + 2\pi \operatorname{Li}_1(1.)$$

Series representations:

$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849)$

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

$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849)$

$$2\pi + \phi = \phi - 4 i \pi^2 \left\lfloor \frac{\arg(2.70492 \times 10^{-9} - x)}{2\pi} \right\rfloor - 2\pi \log(x) + 2\pi \sum_{k=1}^{\infty} \frac{(-1)^k (2.70492 \times 10^{-9} - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849)$

$$2\pi + \phi = \phi - 4 i \pi^2 \left\lfloor - \frac{-\pi + \arg\left(\frac{2.70492\times 10^{-9}}{z_0}\right) + \arg(z_0)}{2\pi} \right\rfloor - 2\pi \log(z_0) + 2\pi \sum_{k=1}^{\infty} \frac{(-1)^k (2.70492 \times 10^{-9} - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$-\log(0.02160695913180000 \times 0.01431227187190000 \times 0.00695026 \times 0.00125849)$

$$2\pi + \phi = \phi - 2\pi \int_1^{2.70492\times 10^{-9}} \frac{1}{t}\, dt$$

(0.0216069591318 *1/ 0.0143122718719 *1/ 0.006950261223 *1/ 0.001258494014)

Input interpretation:

$$0.0216069591318 \times \frac{1}{0.0143122718719} \times \frac{1}{0.006950261223} \times \frac{1}{0.001258494014}$$

Result:

172596.820567387696378762565221035005341253073190537899338 4...

172596.820567...

(0.0216069591318 *1/ 0.0143122718719 *1/ 0.006950261223 *1/ 0.001258494014)+14258+1729*3+728+64^2+16+golden ratio

Input interpretation:

$$0.0216069591318 \times \frac{1}{0.0143122718719} \times \frac{1}{0.006950261223} \times \frac{1}{0.001258494014} + 14\,258 + 1729 \times 3 + 728 + 64^2 + 16 + \phi^2$$

ϕ is the golden ratio

Result:

196884.4386...

196884.4386…. 196884 is a fundamental number of the following j-invariant

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's j-invariant or j function, regarded as a function of a complex variable τ, is a modular function of weight zero for SL(2, Z) defined on the upper half plane of complex numbers. Several remarkable properties of j have to do with its q expansion (Fourier series expansion), written as a Laurent series in terms of $q = e^{2\pi i\tau}$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that j has a simple pole at the cusp, so its q-expansion has no terms below q^{-1}.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of q^n is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\,n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

Alternative representations:

$$\frac{0.0216069591318000}{(0.0143122718719000 \times 0.00125849)\, 0.00695026} + 14258 + 1729 \times 3 + 728 + 64^2 + 16 + \phi^2 = 20189 + \frac{0.0216069591318000}{0.00125849 \times 0.00695026 \times 0.0143122718719000} + 64^2 + (2 \sin(54°))^2$$

$$\frac{0.0216069591318000}{(0.0143122718719000 \times 0.00125849)\, 0.00695026} + 14258 + 1729 \times 3 + 728 + 64^2 + 16 + \phi^2 = 20189 + \frac{0.0216069591318000}{0.00125849 \times 0.00695026 \times 0.0143122718719000} + 64^2 + (-2 \cos(216°))^2$$

$$\frac{0.0216069591318000}{(0.0143122718719000 \times 0.00125849)\, 0.00695026} + 14258 + 1729 \times 3 + 728 + 64^2 + 16 + \phi^2 = 20189 + \frac{0.0216069591318000}{0.00125849 \times 0.00695026 \times 0.0143122718719000} + 64^2 + (-2 \sin(666°))^2$$

Or:

(0.0216069591318 *1/ 0.0143122718719 *1/ 0.006950261223 *1/ 0.001258494014)+14258+11161-1010-135+12+golden ratio

Input interpretation:

$$0.0216069591318 \times \frac{1}{0.0143122718719} \times \frac{1}{0.006950261223} \times \frac{1}{0.001258494014} + 14258 + 11161 - 1010 - 135 + 12 + \phi$$

ϕ is the golden ratio

Result:

196884.4386...

196884.4386... 196884 is a fundamental number of the following j-invariant

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's j-invariant or j function, regarded as a function of a complex variable τ, is a modular function of weight zero for SL(2, Z) defined on the upper half plane of complex numbers. Several remarkable properties of j have to do with its q expansion (Fourier series expansion), written as a Laurent series in terms of $q = e^{2\pi i\tau}$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that j has a simple pole at the cusp, so its q-expansion has no terms below q^{-1}.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of q^n is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\,n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

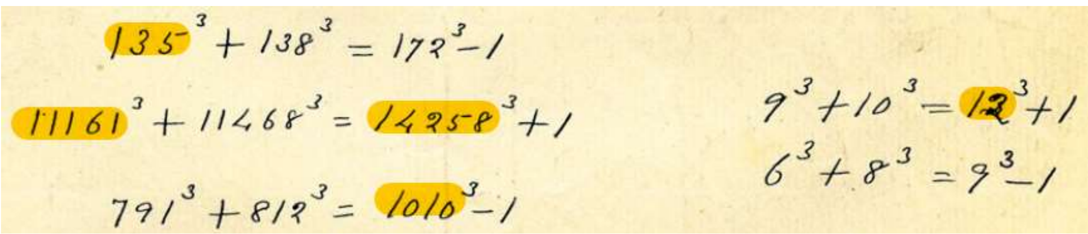
Alternative representations:

$$\frac{0.0216069591318000}{(0.0143122718719000 \times 0.00125849)\,0.00695026} + 14258 + 11161 - 1010 - 135 + 12 + \phi = 24286 + \frac{0.0216069591318000}{0.00125849 \times 0.00695026 \times 0.0143122718719000} + 2\sin(54°)$$

$$\frac{0.0216069591318000}{(0.0143122718719000 \times 0.00125849)\,0.00695026} + 14258 + 11161 - 1010 - 135 + 12 + \phi = 24286 - 2\cos(216°) + \frac{0.0216069591318000}{0.00125849 \times 0.00695026 \times 0.0143122718719000}$$

$$\frac{0.0216069591318000}{(0.0143122718719000 \times 0.00125849)\,0.00695026} + 14258 + 11161 - 1010 - 135 + 12 + \phi = 24286 + \frac{0.0216069591318000}{0.00125849 \times 0.00695026 \times 0.0143122718719000} - 2\sin(666°)$$

Where 14258, 11161, 1010, 135 and 12 can be obtained from the following Ramanujan cubes:



And:

1/2[(0.0216069591318 *1/ 0.0143122718719 *1/ 0.006950261223 *1/ 0.001258494014)-14258-11161-1010-135-12]+728-135-138+12+9

Input interpretation:

$$\frac{1}{2}\left(0.0216069591318\times\frac{1}{0.0143122718719}\times\frac{1}{0.006950261223}\times\frac{1}{0.001258494014}-14258-11161-1010-135-12\right)+728-135-138+12+9$$

Result:

73486.410283693848189381282610517502670626536595268949669 22...

73486.41028369...

Thence, we have the following mathematical connections:

$$\left(\frac{1}{2}\left(0.0216069591318\times\frac{1}{0.0143122718719}\times\frac{1}{0.006950261223}\times\frac{1}{0.001258494014}-14258-11161-1010-135-12\right)+728-135-138+12+9\right)=73486.41\Rightarrow$$

$$\Rightarrow -3927+2\left(\sqrt[13]{N\exp\left[\int d\hat{\sigma}\left(-\frac{1}{4u^2}\mathbf{P}_i D\mathbf{P}_i\right)\right]|Bp\rangle_{NS}+\int[d\mathbf{X}^\mu]\exp\left\{\int d\hat{\sigma}\left(-\frac{1}{4v^2}D\mathbf{X}^\mu D^2\mathbf{X}^\mu\right)\right\}|\mathbf{X}^\mu,\mathbf{X}^i=0\rangle_{NS}}\right)=$$

$$-3927+2\sqrt[13]{2.2983717437\times10^{59}+2.0823329825883\times10^{59}}$$

$$=73490.8437525....\Rightarrow$$

$$\Rightarrow\left(A(r)\times\frac{1}{B(r)}\left(-\frac{1}{\phi(r)}\right)\times\frac{1}{e^{\Lambda(r)}}\right)\Rightarrow$$

$$\Rightarrow\left(-0.000029211892\times\frac{1}{0.0003644621}\left(-\frac{1}{0.0005946833}\right)\times\frac{1}{0.00183393}\right)=$$

$$=73491.7883254811871054915957204222054802519572656341339870 0...$$

$= 73491.7883254... \Rightarrow$

$$\left(\begin{array}{c} I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leqslant P^{1-\varepsilon_1}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda) \lambda^{-i(T+t)} \right|^2 dt \ll \\ \ll H\left\{\left(\frac{4}{\varepsilon_2 \log T}\right)^{2r} (\log T)(\log X)^{-2\beta} + (\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}) T^{-\varepsilon_1}\right\} \end{array} \right) /$$

$$/(26 \times 4)^2 - 24 = \left(\frac{7.9313976505275 \times 10^8}{(26 \times 4)^2 - 24} \right) = 73493.30662\ldots$$

Mathematical connections with the boundary state corresponding to the NSNS-sector of N Dp-branes in the limit of $u \to \infty$, with the ratio concerning the general asymptotically flat solution of the equations of motion of the p-brane and with the Karatsuba's equation concerning the zeros of a special type of function connected with Dirichlet series.

Now, we have that:

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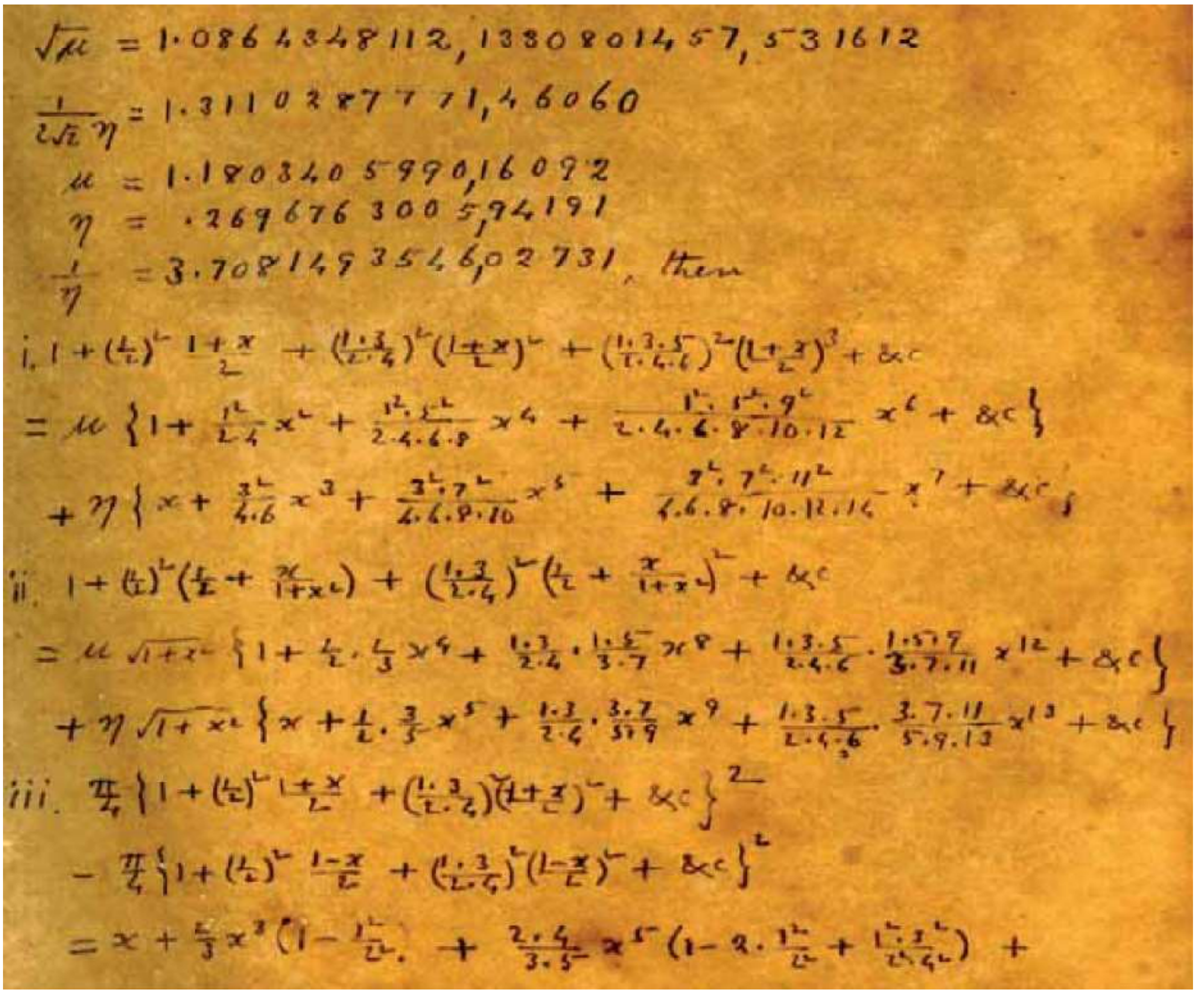


$$\sqrt{\mu} = 1.0864348112,1330801457,531612$$

$$\frac{1}{2\sqrt{2}\,\eta} = 1.3110287771,46060$$

$$\mu = 1.1803405990,16092$$

$$\eta = .2696763005,94191$$

$$\frac{1}{\eta} = 3.7081493546,02731, \text{ then}$$

i. $1 + \left(\frac{1}{2}\right)^2 \frac{1+x}{2} + \left(\frac{1\cdot3}{2\cdot4}\right)^2\left(\frac{1+x}{2}\right)^2 + \left(\frac{1\cdot3\cdot5}{2\cdot4\cdot6}\right)^2\left(\frac{1+x}{2}\right)^3 + \&c$

$$= \mu\left\{1 + \frac{1^2}{2\cdot4}x^2 + \frac{1^2\cdot5^2}{2\cdot4\cdot6\cdot8}x^4 + \frac{1^2\cdot5^2\cdot9^2}{2\cdot4\cdot6\cdot8\cdot10\cdot12}x^6 + \&c\right\}$$

$$+ \eta\left\{x + \frac{3^2}{4\cdot6}x^3 + \frac{3^2\cdot7^2}{4\cdot6\cdot8\cdot10}x^5 + \frac{3^2\cdot7^2\cdot11^2}{4\cdot6\cdot8\cdot10\cdot12\cdot14}x^7 + \&c\right\}$$

ii. $1 + \left(\frac{1}{2}\right)^2\left(\frac{1}{2} + \frac{x}{1+x^2}\right) + \left(\frac{1\cdot3}{2\cdot4}\right)^2\left(\frac{1}{2} + \frac{x}{1+x^2}\right)^2 + \&c$

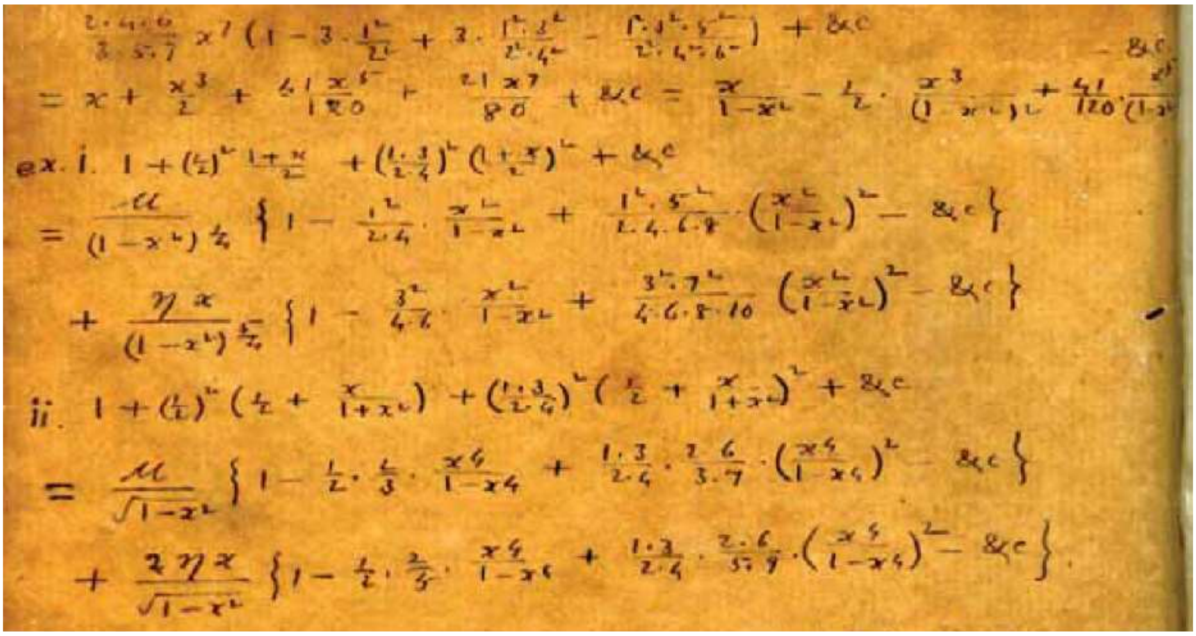
$$= \mu\sqrt{1+x^2}\left\{1 + \frac{1}{2}\cdot\frac{1}{3}x^4 + \frac{1\cdot3}{2\cdot4}\cdot\frac{1\cdot5}{3\cdot7}x^8 + \frac{1\cdot3\cdot5}{2\cdot4\cdot6}\cdot\frac{1\cdot5\cdot9}{3\cdot7\cdot11}x^{12} + \&c\right\}$$

$$+ \eta\sqrt{1+x^2}\left\{x + \frac{1}{2}\cdot\frac{3}{5}x^5 + \frac{1\cdot3}{2\cdot4}\cdot\frac{3\cdot7}{5\cdot9}x^9 + \frac{1\cdot3\cdot5}{2\cdot4\cdot6}\cdot\frac{3\cdot7\cdot11}{5\cdot9\cdot13}x^{13} + \&c\right\}$$

iii. $\frac{\pi}{4}\left\{1 + \left(\frac{1}{2}\right)^2\frac{1+x}{2} + \left(\frac{1\cdot3}{2\cdot4}\right)^2\left(\frac{1+x}{2}\right)^2 + \&c\right\}^2$

$$- \frac{\pi}{4}\left\{1 + \left(\frac{1}{2}\right)^2\frac{1-x}{2} + \left(\frac{1\cdot3}{2\cdot4}\right)^2\left(\frac{1-x}{2}\right)^2 + \&c\right\}^2$$

$$= x + \frac{2}{3}x^3\left(1 - \frac{1^2}{2^2}\right) + \frac{2\cdot4}{3\cdot5}x^5\left(1 - 2\cdot\frac{1^2}{2^2} + \frac{1^2\cdot3^2}{2^2\cdot4^2}\right) +$$



$$\frac{2\cdot4\cdot6}{3\cdot5\cdot7}x^7\left(1 - 3\cdot\frac{1^2}{2^2} + 3\cdot\frac{1^2\cdot3^2}{2^2\cdot4^2} - \frac{1^2\cdot3^2\cdot5^2}{2^2\cdot4^2\cdot6^2}\right) + \&c$$

$$= x + \frac{x^3}{2} + \frac{41x^5}{120} + \frac{21x^7}{80} + \&c = \frac{x}{1-x^2} - \frac{1}{2}\cdot\frac{x^3}{(1-x^2)^2} + \frac{41}{120}\cdot\frac{x^5}{(1-x^2)^3} - \&c$$

ex. i. $1 + \left(\frac{1}{2}\right)^2\frac{1+x}{2} + \left(\frac{1\cdot3}{2\cdot4}\right)^2\left(\frac{1+x}{2}\right)^2 + \&c$

$$= \frac{\mu}{(1-x^2)^{\frac{1}{4}}}\left\{1 - \frac{1^2}{2\cdot4}\cdot\frac{x^2}{1-x^2} + \frac{1^2\cdot5^2}{2\cdot4\cdot6\cdot8}\left(\frac{x^2}{1-x^2}\right)^2 - \&c\right\}$$

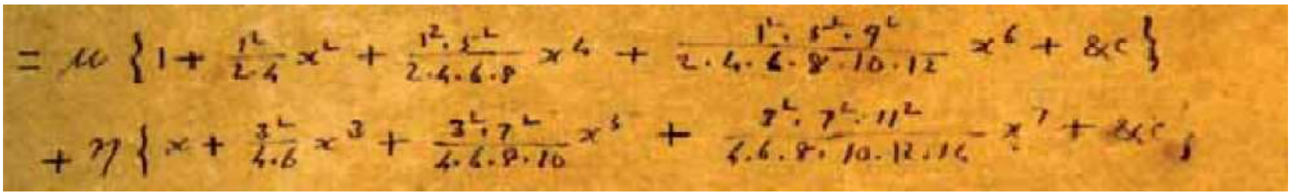
$$+ \frac{\eta x}{(1-x^2)^{\frac{3}{4}}}\left\{1 - \frac{3^2}{4\cdot6}\cdot\frac{x^2}{1-x^2} + \frac{3^2\cdot7^2}{4\cdot6\cdot8\cdot10}\left(\frac{x^2}{1-x^2}\right)^2 - \&c\right\}$$

ii. $1 + \left(\frac{1}{2}\right)^2\left(\frac{1}{2} + \frac{x}{1+x^2}\right) + \left(\frac{1\cdot3}{2\cdot4}\right)^2\left(\frac{1}{2} + \frac{x}{1+x^2}\right)^2 + \&c$

$$= \frac{\mu}{\sqrt{1-x^2}}\left\{1 - \frac{1}{2}\cdot\frac{1}{3}\cdot\frac{x^4}{1-x^4} + \frac{1\cdot3}{2\cdot4}\cdot\frac{1\cdot5}{3\cdot7}\cdot\left(\frac{x^4}{1-x^4}\right)^2 - \&c\right\}$$

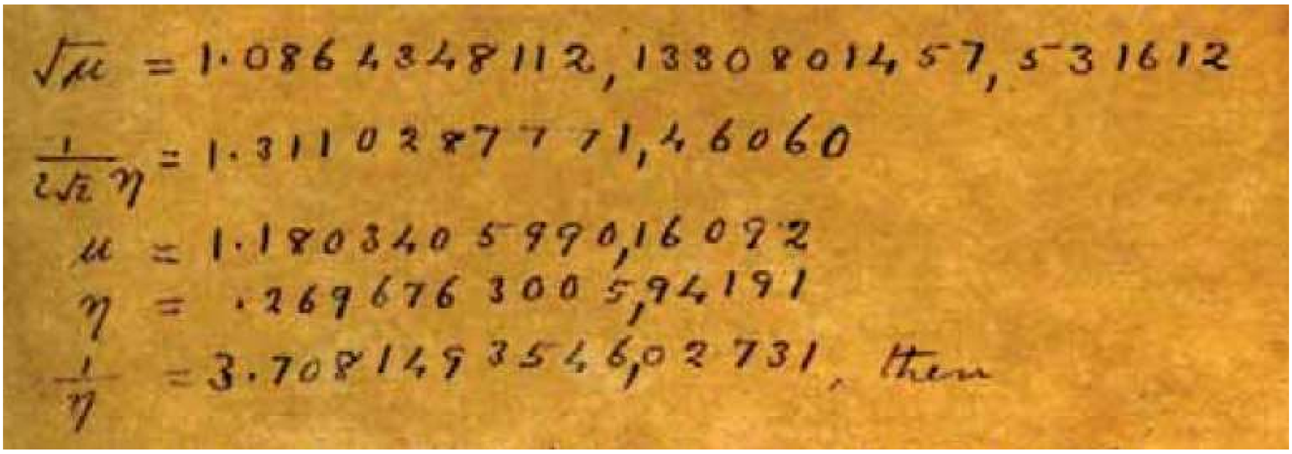
$$+ \frac{2\eta x}{\sqrt{1-x^2}}\left\{1 - \frac{1}{2}\cdot\frac{3}{5}\cdot\frac{x^4}{1-x^4} + \frac{1\cdot3}{2\cdot4}\cdot\frac{3\cdot7}{5\cdot9}\cdot\left(\frac{x^4}{1-x^4}\right)^2 - \&c\right\}.$$

Now:



$$= \mu\left\{1 + \frac{1^2}{2\cdot4}x^2 + \frac{1^2\cdot5^2}{2\cdot4\cdot6\cdot8}x^4 + \frac{1^2\cdot5^2\cdot9^2}{2\cdot4\cdot6\cdot8\cdot10\cdot12}x^6 + \&c\right\}$$
$$+ \eta\left\{x + \frac{3^2}{4\cdot6}x^3 + \frac{3^2\cdot7^2}{4\cdot6\cdot8\cdot10}x^5 + \frac{3^2\cdot7^2\cdot11^2}{4\cdot6\cdot8\cdot10\cdot12\cdot14}x^7 + \&c\right\}$$

For x = 2 and



$$\sqrt{\mu} = 1\cdot0864348112,1330801457,531612$$
$$\frac{1}{2\sqrt{2}\,\eta} = 1\cdot3110287771,46060$$
$$\mu = 1\cdot1803405990,16092$$
$$\eta = \cdot2696763005,94191$$
$$\frac{1}{\eta} = 3\cdot7081493546,02731, \text{ then}$$

We obtain:

1.180340599(((1+(1^2*2^2)/(2*4) + (1^2*5^2*2^4) / (2*4*6*8) + (1^2*5^2*9^2*2^6) / (2*4*6*8*10*12)))

0.2696763(((2+(3^2*2^3)/(4*6) + (3^2*7^2*2^5) / (4*6*8*10) + (2^2*7^2*11^2*2^7) / (4*6*8*10*12*14)))

1.180340599(((1+(1^2*2^2)/(2*4) + (1^2*5^2*2^4) / (2*4*6*8) + (1^2*5^2*9^2*2^6) / (2*4*6*8*10*12)))

Input interpretation:

$$1.180340599\left(1 + \frac{1^2\times2^2}{2\times4} + \frac{1^2\times5^2\times2^4}{2\times4\times6\times8} + \frac{1^2\times5^2\times9^2\times2^6}{2\times4\times6\times8\times10\times12}\right)$$

Result:

6.3197402904791666666666666666666666666666666666666666...

6.31974029047916………

0.2696763(((2+(3^2*2^3)/(4*6) + (3^2*7^2*2^5) / (4*6*8*10) + (3^2*7^2*11^2*2^7) / (4*6*8*10*12*14)))

Input interpretation:

$$0.2696763\left(2+\frac{3^2\times 2^3}{4\times 6}+\frac{3^2\times 7^2\times 2^5}{4\times 6\times 8\times 10}+\frac{3^2\times 7^2\times 11^2\times 2^7}{4\times 6\times 8\times 10\times 12\times 14}\right)$$

Result:

9.0408979575

Repeating decimal:

9.0408979575

9.0408979575

1.180340599(((1+(1^2*2^2)/(2*4) + (1^2*5^2*2^4) / (2*4*6*8) + (1^2*5^2*9^2*2^6) / (2*4*6*8*10*12))) + 9.0408979575

Input interpretation:

$$1.180340599\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\times 5^2\times 2^4}{2\times 4\times 6\times 8}+\frac{1^2\times 5^2\times 9^2\times 2^6}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.0408979575\right)$$

Result:

16.99107920113259320916666666666666666666666666666666666...

Repeating decimal:

$16.99107920113259320916\overline{6}$ (period 1)

16.9910792… result very near to the mass of the hypothetical light particle, the boson $m_X = 16.84$ MeV

1.180340599(((((((1+(1^2*2^2)/(2*4) + (1^2*5^2*2^4) / (2*4*6*8) + (1^2*5^2*9^2*2^6) / (2*4*6*8*10*12))) + 9.0408979575)))))^3+123-29+2+golden ratio

Where 2, 29 and 123 are Lucas numbers

Input interpretation:

$$1.180340599\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\times 5^2\times 2^4}{2\times 4\times 6\times 8}+\frac{1^2\times 5^2\times 9^2\times 2^6}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.0408979575\right)^3+123-29+2+\phi^3$$

ϕ is the golden ratio

Result:

3621.091573...

3621.091573… result practically equal to the rest mass of double charmed Xi baryon 3621.40

Alternative representations:

$$1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\,(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2\,(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)^3+123-29+2+\phi^3=96+1.18034\left(10.04089795750000+\frac{4}{8}+\frac{2^4\times 5^2}{384}+\frac{2^6\times 5^2\times 9^2}{46\,080}\right)^3+(2\sin(54\,°))^3$$

$$1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\,(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2\,(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)^3+123-29+2+\phi^3=96+(-2\cos(216\,°))^3+1.18034\left(10.04089795750000+\frac{4}{8}+\frac{2^4\times 5^2}{384}+\frac{2^6\times 5^2\times 9^2}{46\,080}\right)^3$$

$$1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\,(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2\,(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)^3+123-29+2+\phi^3=96+1.18034\left(10.04089795750000+\frac{4}{8}+\frac{2^4\times 5^2}{384}+\frac{2^6\times 5^2\times 9^2}{46\,080}\right)^3+(-2\sin(666\,°))^3$$

1.180340599(((((((1+(1^2*2^2)/(2*4) + (1^2*5^2*2^4) / (2*4*6*8) + (1^2*5^2*9^2*2^6) / (2*4*6*8*10*12))) + 9.0408979575)))))*8-11+1/golden ratio

Where 8 is a Fibonacci number and 11 is a Lucas number

Input interpretation:

$$1.180340599\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\times 5^2\times 2^4}{2\times 4\times 6\times 8}+\frac{1^2\times 5^2\times 9^2\times 2^6}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.0408979575\right)\times 8-11+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.5466676...

125.5466676... 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 representations:

$$1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\,(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2\,(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)8-11+\frac{1}{\phi}=$$

$$-11+9.44272\left(10.04089795750000+\frac{4}{8}+\frac{2^4\times 5^2}{384}+\frac{2^6\times 5^2\times 9^2}{46\,080}\right)+\frac{1}{2\sin(54\,°)}$$

$$1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\,(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2\,(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)8-11+\frac{1}{\phi}=$$

$$-11+9.44272\left(10.04089795750000+\frac{4}{8}+\frac{2^4\times 5^2}{384}+\frac{2^6\times 5^2\times 9^2}{46\,080}\right)+-\frac{1}{2\cos(216\,°)}$$

$$1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\,(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2\,(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)8-11+\frac{1}{\phi}=$$

$$-11+9.44272\left(10.04089795750000+\frac{4}{8}+\frac{2^4\times 5^2}{384}+\frac{2^6\times 5^2\times 9^2}{46\,080}\right)+-\frac{1}{2\sin(666\,°)}$$

(((1/(((1.180340599(((1+(1^2*2^2)/(2*4) + (1^2*5^2*2^4) / (2*4*6*8) + (1^2*5^2*9^2*2^6) / (2*4*6*8*10*12))) + 9.0408979575)))))))^1/256

Input interpretation:

$$\sqrt[256]{\frac{1}{1.180340599\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\times 5^2\times 2^4}{2\times 4\times 6\times 8}+\frac{1^2\times 5^2\times 9^2\times 2^6}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.0408979575\right)}}$$

Result:

0.988995804758...

0.988995804758.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$ (see Appendix)

4*log base 0.988995804758 (((1/(((1.180340599(((1+(1^2*2^2)/(2*4) + (1^2*5^2*2^4) / (2*4*6*8) + (1^2*5^2*9^2*2^6) / (2*4*6*8*10*12))) + 9.0408979575)))))))-5

Where 5 is a Fibonacci number

Input interpretation:

$$4\log_{0.988995804758}\left(\frac{1}{1.180340599\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2\times 5^2\times 2^4}{2\times 4\times 6\times 8}+\frac{1^2\times 5^2\times 9^2\times 2^6}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.0408979575\right)}\right)-5$$

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

Result:

1019.000000...

1019 result practically equal to the rest mass of Phi meson 1019.445

Alternative representation:

$$4\log_{0.9889958047580000}\left(\frac{1}{1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)}\right)-$$

$$5=-5+\frac{4\log\left(\frac{1}{1.18034\left(10.04089795750000+\frac{4}{8}+\frac{2^4\times 5^2}{384}+\frac{2^6\times 5^2\times 9^2}{46\,080}\right)}\right)}{\log(0.9889958047580000)}$$

Series representations:

$$4\log_{0.9889958047580000}\left(\frac{1}{1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)}\right)-$$

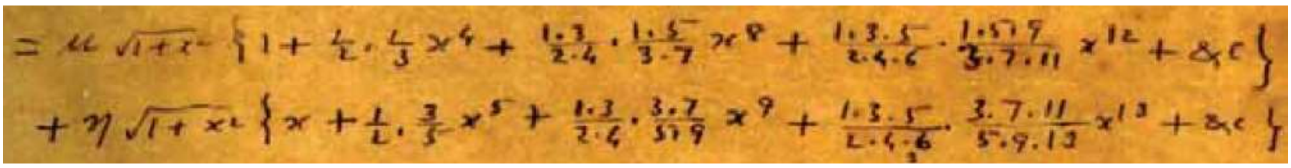
$$5=-5-\frac{4\sum_{k=1}^{\infty}\frac{(-1)^k(-0.941146)^k}{k}}{\log(0.9889958047580000)}$$

$$4\log_{0.9889958047580000}\left(\frac{1}{1.18034\left(\left(1+\frac{1^2\times 2^2}{2\times 4}+\frac{1^2(5^2\times 2^4)}{2\times 4\times 6\times 8}+\frac{1^2(5^2\times 9^2\times 2^6)}{2\times 4\times 6\times 8\times 10\times 12}\right)+9.04089795750000\right)}\right)-5=$$

$$-5.0000000000000-361.49773082298\log(0.0588544)-$$
$$4.0000000000000\log(0.0588544)\sum_{k=0}^{\infty}(-0.0110041952420000)^k\,G(k)$$

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

Now, we have:



$$=\mu\sqrt{1+x^2}\left\{1+\frac{1}{2}\cdot\frac{1}{3}x^4+\frac{1.3}{2.4}\cdot\frac{1.5}{3.7}x^8+\frac{1.3.5}{2.4.6}\cdot\frac{1.5.9}{3.7.11}x^{12}+\&c\right\}$$
$$+\eta\sqrt{1+x^2}\left\{x+\frac{1}{2}\cdot\frac{3}{5}x^5+\frac{1.3}{2.4}\cdot\frac{3.7}{5.9}x^9+\frac{1.3.5}{2.4.6}\cdot\frac{3.7.11}{5.9.13}x^{13}+\&c\right\}$$

For x = 2, μ = 1.180340599 and η = 0.2696763, we obtain:

1.180340599(sqrt(1+2^2))*(((1+1/2*1/3*2^4+3/8*5/21*2^8+15/48*45/231*2^12)))

Input interpretation:

$$1.180340599 \sqrt{1+2^2} \left(1+\frac{1}{2}\times\frac{1}{3}\times 2^4+\frac{3}{8}\times\frac{5}{21}\times 2^8+\frac{15}{48}\times\frac{45}{231}\times 2^{12}\right)$$

Result:

728.1214778...

728.1214778... result practically equal to the Ramanujan expression $9^3 - 1 = 728$

0.2696763(sqrt(1+2^2))*(((2+3/10*2^5+3/8*21/45*2^9+15/48*231/585*2^13)))

Input interpretation:

$$0.2696763 \sqrt{1+2^2} \left(2+\frac{3}{10}\times 2^5+\frac{3}{8}\times\frac{21}{45}\times 2^9+\frac{15}{48}\times\frac{231}{585}\times 2^{13}\right)$$

Result:

670.5955...

670.5955...

1.180340599(sqrt(1+2^2))*(((1+1/2*1/3*2^4+3/8*5/21*2^8+15/48*45/231*2^12)))
+670.5955

Input interpretation:

$$1.180340599 \sqrt{1+2^2} \left(1+\frac{1}{2}\times\frac{1}{3}\times 2^4+\frac{3}{8}\times\frac{5}{21}\times 2^8+\frac{15}{48}\times\frac{45}{231}\times 2^{12}\right)+670.5955$$

Result:

1398.717...

1398.717... total result

We have also:

1.180340599(sqrt(1+2^2))*(((1+1/2*1/3*2^4+3/8*5/21*2^8+15/48*45/231*2^12)))
+670.5955-11

Where 11 is a Lucas number

Input interpretation:

$$1.180340599 \sqrt{1+2^2} \left(1+\frac{1}{2}\times\frac{1}{3}\times 2^4+\frac{3}{8}\times\frac{5}{21}\times 2^8+\frac{15}{48}\times\frac{45}{231}\times 2^{12}\right)+670.5955-11$$

Result:

1387.717...

1387.717... result practically equal to the rest mass of Sigma baryon 1387.2

And:

(((1/((((1.180340599(sqrt(1+2^2))*(((1+1/2*1/3*2^4+3/8*5/21*2^8+15/48*45/231*2^12)))+670.5955)))))))^1/1024

Input interpretation:

$$\sqrt[1024]{\frac{1}{1.180340599\sqrt{1+2^2}\left(1+\frac{1}{2}\times\frac{1}{3}\times 2^4+\frac{3}{8}\times\frac{5}{21}\times 2^8+\frac{15}{48}\times\frac{45}{231}\times 2^{12}\right)+670.5955}}$$

Result:

0.9929514131...

0.9929514131... 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 $\mathbf{0.989117352243} = \boldsymbol{\phi}$ (see Appendix)

1/8 log base 0.9929514131 (((1/((((1.180340599(sqrt(1+2^2))*(((1+1/2*1/3*2^4+3/8*5/21*2^8+15/48*45/231*2^12)))+670.5955)))))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{8}\log_{0.9929514131}\left(\frac{1}{1.180340599\sqrt{1+2^2}\left(1+\frac{1}{2}\times\frac{1}{3}\times 2^4+\frac{3}{8}\times\frac{5}{21}\times 2^8+\frac{15}{48}\times\frac{45}{231}\times 2^{12}\right)+670.5955}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.47644...

125.47644… 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:

$$\frac{1}{8}\log_{0.992951}\left(\frac{1}{1.18034\sqrt{1+2^2}\left(1+\frac{2^4}{2\times 3}+\frac{3\times 5\times 2^8}{8\times 21}+\frac{15\times 45\times 2^{12}}{48\times 231}\right)+670.596}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{1}{670.596+1.18034\left(1+\frac{2^4}{6}+\frac{15\times 2^8}{8\times 21}+\frac{675\times 2^{12}}{48\times 231}\right)\sqrt{5}}\right)}{8\log(0.992951)}$$

Series representations:

$$\frac{1}{8}\log_{0.992951}\left(\frac{1}{1.18034\sqrt{1+2^2}\left(1+\frac{2^4}{2\times 3}+\frac{3\times 5\times 2^8}{8\times 21}+\frac{15\times 45\times 2^{12}}{48\times 231}\right)+670.596}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{670.596+325.626\sqrt{5}}\right)^k}{k}}{8\log(0.992951)}$$

$$\frac{1}{8}\log_{0.992951}\left(\frac{1}{1.18034\sqrt{1+2^2}\left(1+\frac{2^4}{2\times 3}+\frac{3\times 5\times 2^8}{8\times 21}+\frac{15\times 45\times 2^{12}}{48\times 231}\right)+670.596}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+\frac{1}{8}\log_{0.992951}\left(\frac{1}{670.596+325.626\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}}\right)$$

$$\frac{1}{8}\log_{0.992951}\left(\frac{1}{1.18034\sqrt{1+2^2}\left(1+\frac{2^4}{2\times 3}+\frac{3\times 5\times 2^8}{8\times 21}+\frac{15\times 45\times 2^{12}}{48\times 231}\right)+670.596}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+\frac{1}{8}\log_{0.992951}\left(\frac{1}{670.596+325.626\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

We have also:

1/10*((((1.180340599(sqrt(1+2^2))*(((1+1/2*1/3*2^4+3/8*5/21*2^8+15/48*45/231 *2^12)))+670.5955)))))))

Input interpretation:

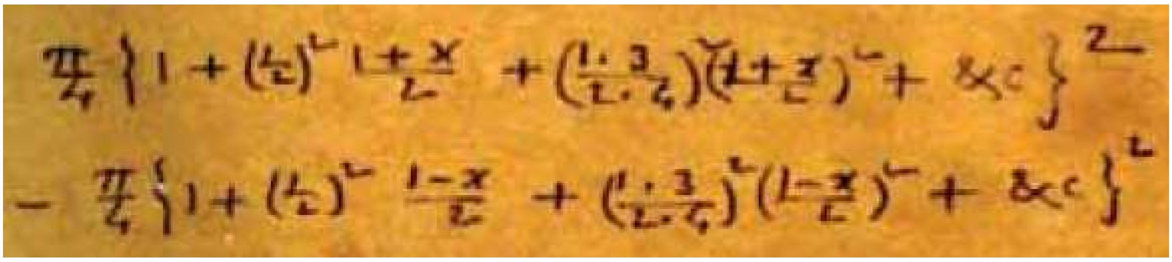
$$\frac{1}{10}\left(1.180340599\sqrt{1+2^2}\left(1+\frac{1}{2}\times\frac{1}{3}\times 2^4+\frac{3}{8}\times\frac{5}{21}\times 2^8+\frac{15}{48}\times\frac{45}{231}\times 2^{12}\right)+670.5955\right)$$

Result:

139.8717...

139.8717... result very near to the rest mass of Pion meson 139.57

Now, we have that:



Pi/4[(((1+1/4*3/2+(3/8)^2*(3/2)^2)))]^2 – Pi/4[(((1+1/4*(-1/2)+(3/8)^2*(-1/2)^2)))]^2

Input:

$$\frac{\pi}{4}\left(1+\frac{1}{4}\times\frac{3}{2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2-\frac{\pi}{4}\left(1+\frac{1}{2}\times\frac{1}{4}\times(-1)+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2$$

Result:

$$\frac{8325\,\pi}{16\,384}$$

Decimal approximation:

1.5962987573934954046753848978150550238611715850706638158 94...

1.59629875739….

Property:

$\frac{8325\pi}{16384}$ is a transcendental number

Alternative representations:

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi = -\frac{180}{4}\circ\left(1-\frac{1}{2\times 4}+\left(-\frac{1}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2+\frac{180}{4}\circ\left(1+\frac{3}{2\times 4}+\left(\frac{3}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2$$

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi = \frac{1}{4}i\log(-1)\left(1-\frac{1}{2\times 4}+\left(-\frac{1}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2-\frac{1}{4}i\left(\log(-1)\left(1+\frac{3}{2\times 4}+\left(\frac{3}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2\right)$$

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

Series representations:

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi = \frac{8325\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}{4096}$$

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi = \sum_{k=0}^{\infty}-\frac{333(-1)^k 5^{1-2k}\times 239^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{4096(1+2k)}$$

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi = \frac{8325\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}{16384}$$

Integral representations:

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi=\frac{8325}{4096}\int_0^1\sqrt{1-t^2}\,dt$$

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi=\frac{8325}{8192}\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

$$\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi=\frac{8325}{8192}\int_0^\infty\frac{1}{1+t^2}\,dt$$

And, we have:

10^3 * ((((Pi/4[(((1+1/4*3/2+(3/8)^2*(3/2)^2)))]^2 – Pi/4[(((1+1/4*(-1/2)+(3/8)^2*(-1/2)^2)))]^2))))-76+11+4

Where 4, 11 and 76 are Lucas numbers

Input:

$$10^3\left(\frac{\pi}{4}\left(1+\frac{1}{4}\times\frac{3}{2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2-\frac{\pi}{4}\left(1+\frac{1}{2}\times\frac{1}{4}\times(-1)+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\right)-76+11+4$$

Result:

$$\frac{1040625\,\pi}{2048}-61$$

Decimal approximation:

1535.298757393495404675384897815055023861171585070663815894...

1535.2987573… result practically equal to the rest mass of Xi baryon 1535

Property:

$-61+\frac{1040625\,\pi}{2048}$ is a transcendental number

Alternate form:

$$\frac{1040625\,\pi-124928}{2048}$$

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+10^3\left(-\frac{180}{4}\circ\left(1-\frac{1}{2\times 4}+\left(-\frac{1}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2+\frac{180}{4}\circ\left(1+\frac{3}{2\times 4}+\left(\frac{3}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2\right)$$

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+10^3\left(\frac{1}{4}\,i\log(-1)\left(1-\frac{1}{2\times 4}+\left(-\frac{1}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2-\frac{1}{4}\,i\left(\log(-1)\left(1+\frac{3}{2\times 4}+\left(\frac{3}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2\right)\right)$$

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+10^3\left(-\frac{1}{4}\cos^{-1}(-1)\left(1-\frac{1}{2\times 4}+\left(-\frac{1}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2+\frac{1}{4}\cos^{-1}(-1)\left(1+\frac{3}{2\times 4}+\left(\frac{3}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2\right)$$

Series representations:

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+\frac{1040625}{512}\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+\sum_{k=0}^{\infty}-\frac{333\,(-1)^k\,5^{4-2k}\times 239^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{512\,(1+2k)}$$

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+\frac{1040625\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}{2048}$$

Integral representations:

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+\frac{1040625}{512}\int_0^1\sqrt{1-t^2}\,dt$$

$$10^3\left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi\right)-76+11+4=$$
$$-61+\frac{1040625}{1024}\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

$$10^3 \left(\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2 \pi - \frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2 \pi\right) - 76 + 11 + 4 = -61 + \frac{1040625}{1024}\int_0^\infty \frac{1}{1+t^2}\,dt$$

Now, we have that:

2*log base 0.992719015845 (((1/((((Pi/4[(((1+1/4*3/2+(3/8)^2*(3/2)^2)))]^2 – Pi/4[(((1+1/4*(-1/2)+(3/8)^2*(-1/2)^2)))]^2)))))))-Pi+1/golden ratio

Input interpretation:

$$2 \log_{0.992719015845}\left(\frac{1}{\frac{\pi}{4}\left(1+\frac{1}{4}\times\frac{3}{2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2 - \frac{\pi}{4}\left(1+\frac{1}{2}\times\frac{1}{4}\times(-1)+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2}\right) - \pi + \frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4764413...

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:

$$2 \log_{0.9927190158450000}\left(\frac{1}{\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2 \pi - \frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2 \pi}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{2\log\left(\frac{1}{-\frac{1}{4}\pi\left(1-\frac{1}{2\times 4}+\left(-\frac{1}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2+\frac{1}{4}\pi\left(1+\frac{3}{2\times 4}+\left(\frac{3}{2}\right)^2\left(\frac{3}{8}\right)^2\right)^2}\right)}{\log(0.9927190158450000)}$$

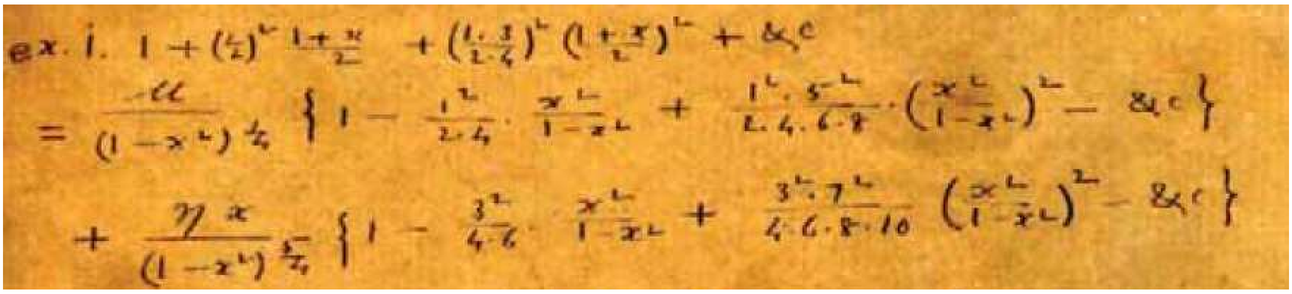
Series representations:

$$2\log_{0.9927190158450000}\left(\frac{1}{\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{2\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{16384}{8325\pi}\right)^k}{k}}{\log(0.9927190158450000)}$$

$$2\log_{0.9927190158450000}\left(\frac{1}{\frac{1}{4}\left(1+\frac{3}{4\times 2}+\left(\frac{3}{8}\right)^2\left(\frac{3}{2}\right)^2\right)^2\pi-\frac{1}{4}\left(1+-\frac{1}{4\times 2}+\left(\frac{3}{8}\right)^2\left(-\frac{1}{2}\right)^2\right)^2\pi}\right)-\pi+\frac{1}{\phi}=\frac{1.0000000000000}{\phi}-1.0000000000000\,\pi-273.68814069957\log\left(\frac{16384}{8325\pi}\right)-2.0000000000000\log\left(\frac{16384}{8325\pi}\right)\sum_{k=0}^{\infty}(-0.0072809841550000)^k\,G(k)$$

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

Now, we have:



$$\text{ex. i. } 1+\left(\tfrac{1}{2}\right)^2\frac{1+x}{2}+\left(\frac{1\cdot 3}{2\cdot 4}\right)^2\left(\frac{1+x}{2}\right)^2+\&c$$
$$=\frac{\mu}{(1-x^2)^{1/4}}\left\{1-\frac{1^2}{2\cdot 4}\cdot\frac{x^2}{1-x^2}+\frac{1^2\cdot 5^2}{2\cdot 4\cdot 6\cdot 8}\left(\frac{x^2}{1-x^2}\right)^2-\&c\right\}$$
$$+\frac{\eta x}{(1-x^2)^{3/4}}\left\{1-\frac{3^2}{4\cdot 6}\cdot\frac{x^2}{1-x^2}+\frac{3^2\cdot 7^2}{4\cdot 6\cdot 8\cdot 10}\left(\frac{x^2}{1-x^2}\right)^2-\&c\right\}$$

For x = 2, μ = 1.180340599 and η = 0.2696763, we obtain:

((1.180340599))/(((1-2^2)^0.25)) * (1-(1/8)*(2^2)/(1-2^2)+(1^2*5^2)/(2*4*6*8)*(((2^2)/(1-2^2)))^2

Input interpretation:

$$\frac{1.180340599}{(1-2^2)^{0.25}}\left(1-\frac{1}{8}\times\frac{2^2}{1-2^2}+\frac{1^2\times 5^2}{2\times 4\times 6\times 8}\left(\frac{2^2}{1-2^2}\right)^2\right)$$

Result:

0.813276... −
0.813276... i

Polar coordinates:

$r = 1.15015$ (radius), $\theta = -45°$ (angle)

1.15015

((((0.2696763))*2))/(((1-2^2)^1.25)) * (1-(9/24)*(2^2)/(1-2^2)+(3^2*7^2)/(4*6*8*10)*(((2^2)/(1-2^2)))^2

Input interpretation:

$$\frac{0.2696763\times 2}{(1-2^2)^{1.25}}\left(1-\frac{9}{24}\times\frac{2^2}{1-2^2}+\frac{3^2\times 7^2}{4\times 6\times 8\times 10}\left(\frac{2^2}{1-2^2}\right)^2\right)$$

Result:

$-0.184336... +$
$0.184336...\, i$

Polar coordinates:

$r = 0.260691$ (radius), $\theta = 135.°$ (angle)

0.260691

From the sum of the two radii, we obtain:

(1.15015+0.260691)

Input interpretation:

$1.15015 + 0.260691$

Result:

1.410841

1.410841

We note that:

sqrt2

Input:

$\sqrt{2}$

Decimal approximation:

1.4142135623730950488016887242096980785696718753769480731766...

1.4142135623...

Thence:

(1.15015+0.260691) = 1.410841 ≈ √2 = 1.41421356237309

From which:

1/(1.15015+0.260691)

Input interpretation:

$$\frac{1}{1.15015 + 0.260691}$$

Result:

0.708797093364879529302026238250802181110415702407287568195...

0.70879709336...

1/(sqrt2)

Input:

$$\frac{1}{\sqrt{2}}$$

Decimal approximation:

0.707106781186547524400844362104849039284835937688474036588...

0.70710678118....

And:

(((1/(1.15015+0.260691))))^2

Input interpretation:

$$\left(\frac{1}{1.15015 + 0.260691}\right)^2$$

Result:

0.502393319562501748462106104267456205986653139799089740229...

0.5023933....≈ 1/2

From Wikipedia

Those particles with half-integer spins, such as 1/2, 3/2, 5/2, are known as fermions, while those particles with integer spins, such as 0, 1, 2, are known as bosons. Note that $(1/\sqrt{2})^2 = 1/2$

Possible closed forms:

$\cot\left(\cot\left(\frac{15503979}{5254135}\right)\right) \approx 0.502393319562501727715$

$\frac{311731328\pi}{1949334937} \approx 0.50239331956250174849832 9$

$\frac{955+787\pi-320\pi^2}{3(15-127\pi+57\pi^2)} \approx 0.50239331956250174832115$

π root of $77473x^3+25212x^2-10209x+671$ near $x = 0.159917$ $\approx$ 0.50239331956250174840050 8

π root of $2859x^4+4935x^3-21x^2+5706x-934$ near $x = 0.159917$ $\approx$ 0.50239331956250174847979 2

root of $8497x^3+64098x^2+22678x-28649$ near $x = 0.502393$ $\approx$ 0.50239331956250174846150 68

π root of $1115x^5+1213x^4+27x^3+876x^2-209x+10$ near $x = 0.159917$ $\approx$ 0.50239331956250174841548 8

$\frac{657+78\sqrt{\pi}-17\pi-142\pi^{3/2}+217\pi^2}{1326\pi} \approx 0.50239331956250174845574 4$

$\frac{1}{\text{root of } 28649x^3-22678x^2-64098x-8497 \text{ near } x = 1.99047} \approx$ 0.50239331956250174846150 68

root of $4253x^4-2602x^3-4894x^2+1356x+613$ near $x = 0.502393$ $\approx$ 0.50239331956250174847073 0

$\frac{1}{\text{root of } 613x^4+1356x^3-4894x^2-2602x+4253 \text{ near } x = 1.99047} \approx$ 0.50239331956250174847073 0

root of $876x^5+1052x^4+671x^3+1469x^2+36x-569$ near $x = 0.502393$ $\approx$ 0.50239331956250174846192 03

$\frac{1}{8}\left(-37+7e-12e^2-29\sqrt{1+e}-27\sqrt{1+e^2}+36\pi+38\pi^2-24\sqrt{1+\pi}-59\sqrt{1+\pi^2}\right) \approx 0.50239331956250174845656 6$

$$\frac{e^{-\frac{26}{21}-\frac{5}{7e}+\frac{4e}{3}+\frac{10}{21\pi}+\frac{5\pi}{21}}\pi^{-26/21-(22e)/21}}{\sin^{31/21}(e\pi)(-\cos(e\pi))^{9/7}} \approx 0.50239331956250174828392$$

$$\frac{737-255e+678e^2}{92+576e+1137e^2} \approx 0.50239331956250174846695685$$

(((1/(1.15015+0.260691)))^1/32

Input interpretation:

$$\sqrt[32]{\frac{1}{1.15015+0.260691}}$$

Result:

0.98930183...

0.98930183... result practically equal to the dilaton value **0.989117352243 = ϕ** (see Appendix)

And:

4 log base 0.98930183 (((1/(1.15015+0.260691))))-Pi+1/golden ratio

Input interpretation:

$$4\log_{0.98930183}\left(\frac{1}{1.15015+0.260691}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.477...

125.477… 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:

$$4 \log_{0.989302}\left(\frac{1}{1.15015 + 0.260691}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{4 \log\left(\frac{1}{1.41084}\right)}{\log(0.989302)}$$

Series representations:

$$4 \log_{0.989302}\left(\frac{1}{1.15015 + 0.260691}\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{4 \sum_{k=1}^{\infty} \frac{(-1)^k (-0.291203)^k}{k}}{\log(0.989302)}$$

$$4 \log_{0.989302}\left(\frac{1}{1.15015 + 0.260691}\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi - 371.896 \log(0.708797) - 4 \log(0.708797) \sum_{k=0}^{\infty} (-0.0106982)^k G(k)$$
$$\text{for } \left(G(0) = 0 \text{ and } \frac{(-1)^k k}{2(1+k)(2+k)} + G(k) = \sum_{j=1}^{k} \frac{(-1)^{1+j} G(-j+k)}{1+j}\right)$$

4 log base 0.98930183 (((1/(1.15015+0.260691))))+2Pi+1/golden ratio

Input interpretation:

$$4 \log_{0.98930183}\left(\frac{1}{1.15015 + 0.260691}\right) + 2\pi + \frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

134.901...

134.901… result very near to the rest mass of Pion meson 134.9766

Alternative representation:

$$4 \log_{0.989302}\left(\frac{1}{1.15015 + 0.260691}\right) + 2\pi + \frac{1}{\phi} = 2\pi + \frac{1}{\phi} + \frac{4 \log\left(\frac{1}{1.41084}\right)}{\log(0.989302)}$$

Series representations:

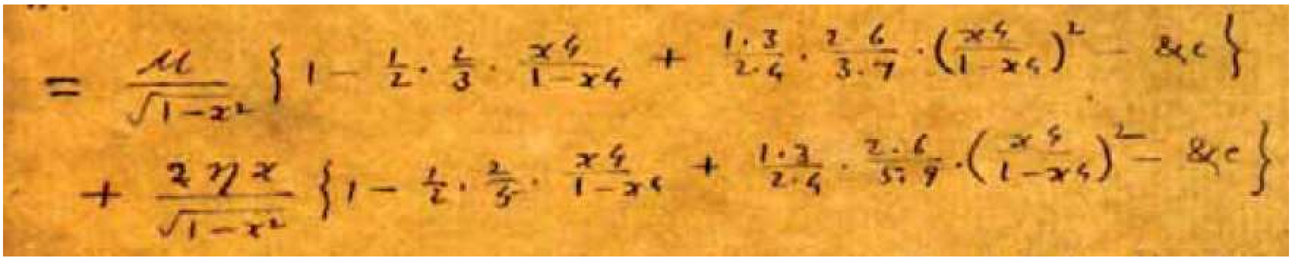
$$4 \log_{0.989302}\left(\frac{1}{1.15015 + 0.260691}\right) + 2\pi + \frac{1}{\phi} = \frac{1}{\phi} + 2\pi - \frac{4 \sum_{k=1}^{\infty} \frac{(-1)^k (-0.291203)^k}{k}}{\log(0.989302)}$$

$$4 \log_{0.989302}\left(\frac{1}{1.15015+0.260691}\right)+2\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}+2\pi-371.896\log(0.708797)-4\log(0.708797)\sum_{k=0}^{\infty}(-0.0106982)^k G(k)$$

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

Now, we have that:



For x = 2, μ = 1.180340599 and η = 0.2696763, we obtain:

1.180340599/(sqrt(1-2^2))*((((1-2/6*(2^4)/(1-2^4)+3/8 * 12/21 * ((2^4)/(1-2^4))^2))))

Input interpretation:

$$\frac{1.180340599}{\sqrt{1-2^2}}\left(1-\frac{2}{6}\times\frac{2^4}{1-2^4}+\frac{3}{8}\times\frac{12}{21}\left(\frac{2^4}{1-2^4}\right)^2\right)$$

Result:

$-1.089919261...\,i$

Polar coordinates:

$r = 1.08992$ (radius), $\theta = -90°$ (angle)

1.08992

4*0.2696763/(sqrt(1-2^2))*((((1-2/6*(2^4)/(1-2^4)+3/8 * 12/45 * ((2^4)/(1-2^4))^2))))

Input interpretation:

$$4\times\frac{0.2696763}{\sqrt{1-2^2}}\left(1-\frac{2}{6}\times\frac{2^4}{1-2^4}+\frac{3}{8}\times\frac{12}{45}\left(\frac{2^4}{1-2^4}\right)^2\right)$$

Result:

$-0.9150872\ldots i$

Polar coordinates:

$r = 0.915087$ (radius), $\theta = -90°$ (angle)

0.915087

We know that α' is the Regge slope (string tension). With regard the Omega mesons, the values are:

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

(1.08992+0.915087)

Input interpretation:

1.08992 + 0.915087

Result:

2.005007

2.005007 ≈ 2 result very near to the graviton spin (boson)

(1.08992+0.915087)^7-Pi-golden ratio

Input interpretation:

$(1.08992 + 0.915087)^7 - \pi - \phi$

ϕ is the golden ratio

Result:

125.50042690124672723985020904509164887762106442081913131 68...

125.5004269… 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 representations:

$$(1.08992+0.915087)^7-\pi-\phi=-\pi+2\cos(216\,^\circ)+2.00501^7$$

$$(1.08992+0.915087)^7-\pi-\phi=-180\,^\circ+2\cos(216\,^\circ)+2.00501^7$$

$$(1.08992+0.915087)^7-\pi-\phi=-\pi-2\cos\left(\frac{\pi}{5}\right)+2.00501^7$$

Series representations:

$$(1.08992+0.915087)^7-\pi-\phi=130.26-\phi-4\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$(1.08992+0.915087)^7-\pi-\phi=132.26-\phi-2\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$(1.08992+0.915087)^7-\pi-\phi=130.26-\phi-\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$(1.08992+0.915087)^7-\pi-\phi=130.26-\phi-2\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

$$(1.08992+0.915087)^7-\pi-\phi=130.26-\phi-4\int_0^{1}\sqrt{1-t^2}\,dt$$

$$(1.08992+0.915087)^7-\pi-\phi=130.26-\phi-2\int_0^{\infty}\frac{\sin(t)}{t}\,dt$$

(((1/ln((((1.08992+0.915087)^7-Pi-golden ratio))))))^1/128

Input interpretation:

$$\sqrt[128]{\frac{1}{\log\left((1.08992+0.915087)^7-\pi-\phi\right)}}$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Result:

0.98776820...

0.98776820... result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$ (see Appendix)

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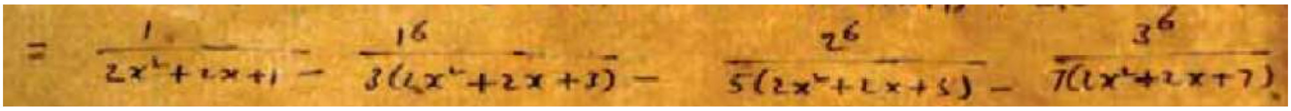


1/(8+4+1)-1^6/(3(8+4+3))-2^6/(5(8+4+5))-3^6/(7(8+4+7))

Input:

$$\frac{1}{8+4+1} - \frac{1^6}{3(8+4+3)} - \frac{2^6}{5(8+4+5)} - \frac{3^6}{7(8+4+7)}$$

Exact result:

$$-\frac{8173457}{1322685}$$

Decimal approximation:

-6.179443329288530526920619799876765821038266858700295232 80...

-6.179443329...

-21(((1/(8+4+1)-1^6/(3(8+4+3))-2^6/(5(8+4+5))-3^6/(7(8+4+7)))))-3-golden ratio

Where 3 and 21 are Fibonacci numbers

Input:

$$-21\left(\frac{1}{8+4+1} - \frac{1^6}{3(8+4+3)} - \frac{2^6}{5(8+4+5)} - \frac{3^6}{7(8+4+7)}\right) - 3 - \phi$$

ϕ is the golden ratio

Result:

$$\frac{7984502}{62985} - \phi$$

Decimal approximation:

125.1502759263092462171284289630464441240832948529004370267...

125.1502759… 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

Alternate forms:

$$\frac{15906019 - 62985\sqrt{5}}{125970}$$

$$\frac{7984502 - 62985\,\phi}{62985}$$

$$\frac{15906019}{125970} - \frac{\sqrt{5}}{2}$$

Alternative representations:

$$-21\left(\frac{1}{8+4+1} - \frac{1^6}{3(8+4+3)} - \frac{2^6}{5(8+4+5)} - \frac{3^6}{7(8+4+7)}\right) - 3 - \phi = -3 - 21\left(\frac{1}{13} - \frac{1^6}{45} - \frac{2^6}{85} - \frac{3^6}{133}\right) - 2\sin(54°)$$

$$-21\left(\frac{1}{8+4+1} - \frac{1^6}{3(8+4+3)} - \frac{2^6}{5(8+4+5)} - \frac{3^6}{7(8+4+7)}\right) - 3 - \phi = -3 + 2\cos(216°) - 21\left(\frac{1}{13} - \frac{1^6}{45} - \frac{2^6}{85} - \frac{3^6}{133}\right)$$

$$-21\left(\frac{1}{8+4+1} - \frac{1^6}{3(8+4+3)} - \frac{2^6}{5(8+4+5)} - \frac{3^6}{7(8+4+7)}\right) - 3 - \phi = -3 - 21\left(\frac{1}{13} - \frac{1^6}{45} - \frac{2^6}{85} - \frac{3^6}{133}\right) + 2\sin(666°)$$

-21(((1/(8+4+1)-1^6/(3(8+4+3))-2^6/(5(8+4+5))-3^6/(7(8+4+7)))))+5

Input:

$$-21\left(\frac{1}{8+4+1}-\frac{1^6}{3(8+4+3)}-\frac{2^6}{5(8+4+5)}-\frac{3^6}{7(8+4+7)}\right)+5$$

Exact result:

$$\frac{8488382}{62985}$$

Decimal approximation:

134.76830991505914106533301579741208224180360403270619988 88...

134.7683099... result very near to the rest mass of Pion meson 134.9766

An example of Ramanujan mathematics applied to the physics

From:

Comments on Global Symmetries, Anomalies, and Duality in (2 + 1)d

Francesco Benini, Po-Shen Hsin, and Nathan Seiberg

https://arxiv.org/abs/1702.07035v2

well-defined field strength of the $U(1)/\mathbb{Z}_D$ bundle. Then the correlation between the two bundles is expressed by the fact that

$$\frac{\widetilde{F}}{2\pi} = \frac{N_f}{d}\, w_2^{(N)} + \frac{N}{d}\, w_2^{(N_f)} \mod D \tag{2.12}$$

for some class $w_2^{(N)} \in H^2(\mathcal{M}_4, \mathbb{Z}_N)$. Such a class is the obstruction to lift a $U(N_f)/\mathbb{Z}_N$ bundle to a $U(N_f)$ bundle.

Now consider a general bundle for the group in (2.2). The $PSU(N)$ bundle associated to the dynamical fields is correlated with the $U(N_f)/\mathbb{Z}_N$ bundle such that their Stiefel-Whitney classes are equal: $w_2\big(PSU(N)\big) = w_2^{(N)}$. Therefore the dependence on the bulk fields is completely fixed by the classical $U(N_f)/\mathbb{Z}_N$ background. Such a dependence is described by

$$S_{\text{anom}} = 2\pi \int_{\mathcal{M}_4} \left[-\frac{k}{N}\, \frac{\mathcal{P}(w_2^{(N)})}{2} - \frac{L}{N_f}\, \frac{\mathcal{P}(w_2^{(N_f)})}{2} + \frac{J}{D^2}\, \frac{\widetilde{F}^2}{8\pi^2} \right] . \tag{2.13}$$

The integral is on a closed spin four-manifold $\mathcal{M}_4$, and $\mathcal{P}$ is the Pontryagin square operation [61,62] such that $\mathcal{P}(w_2^{(N)})/2 \in H^4(\mathcal{M}_4, \mathbb{Z}_N)$, etc. (for more details see [60] and references therein). We say that $e^{iS_{\text{anom}}}$ captures the phase dependence of the partition function on the bulk extension of the $U(N_f)/\mathbb{Z}_N$ bundle, in the sense that given two different extensions one can glue them into a closed manifold $\mathcal{M}_4$ and then $e^{iS_{\text{anom}}}$ is the relative phase of the two partition functions.

If we choose $J \in D\mathbb{Z}$, then we can substitute the square of (2.12) into (2.13) to obtain[13]

$$S_{\text{anom}} = 2\pi \int_{\mathcal{M}_4} \left[\frac{J - Nk}{N^2}\, \frac{\mathcal{P}(w_2^{(N)})}{2} + \frac{J - N_f L}{N_f^2}\, \frac{\mathcal{P}(w_2^{(N_f)})}{2} + \frac{J}{N N_f} w_2^{(N)} \cup w_2^{(N_f)} \right] , \tag{2.14}$$

which is well-defined modulo 2π. From this expression it is clear that if we can solve the constraints in (2.3), then $e^{iS_{\text{anom}}} = 1$ and there is no anomaly. On the other hand, it is

We have that:

$$\frac{\widetilde{F}}{2\pi} = \frac{N_f}{d}\, w_2^{(N)} + \frac{N}{d}\, w_2^{(N_f)} \mod D$$

$$L \in \mathbb{Z}\,, \qquad J + kN \in k^2\mathbb{Z}\,, \qquad J - N_f L \in N_f^2\mathbb{Z}\,, \qquad J \in kN_f\mathbb{Z}\,.$$

(1+2) mod 2

Input:

$(1 + 2) \bmod 2$

Result:

1

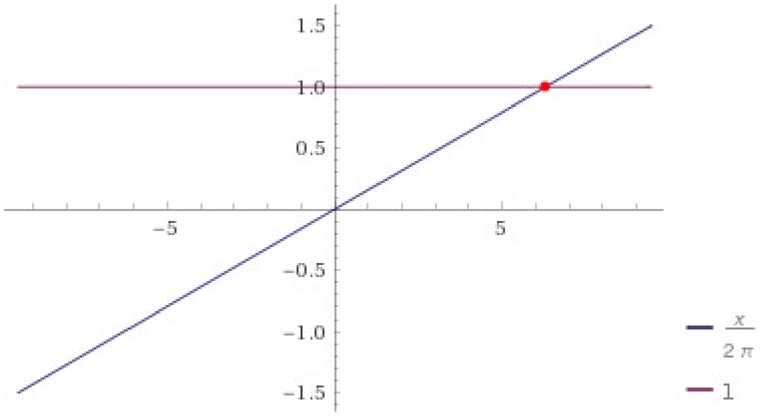
1

x/(2Pi) = 1

Input:

$\frac{x}{2\pi} = 1$

Plot:



Alternate form:

$\frac{x}{2\pi} - 1 = 0$

Solution:

$x = 2\pi$

Thence:

$\tilde{F} = 2\pi$

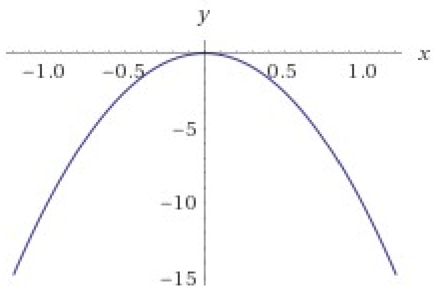
$$S_{\text{anom}} = 2\pi \int_{\mathcal{M}_4} \left[-\frac{k}{N} \frac{\mathcal{P}(w_2^{(N)})}{2} - \frac{L}{N_f} \frac{\mathcal{P}(w_2^{(N_f)})}{2} + \frac{J}{D^2} \frac{\widetilde{F}^2}{8\pi^2} \right].$$

2Pi integrate [-1-3+6/4*((2Pi)^2)*1/((8Pi^2))]x

Indefinite integral:

$$2\pi \int \left(-1-3+\frac{6(2\pi)^2}{4(8\pi^2)}\right) x\, dx = -\frac{13\pi x^2}{4} + \text{constant}$$

Plot:



(x from −1.2 to 1.2)

For x = 1:

-(13 π)/4

Input:

$$-\frac{1}{4}(13\pi)$$

Exact result:

$$-\frac{13\pi}{4}$$

Decimal approximation:

−10.2101761241668280250035909956583843736408005479690939181...

-10.210176124…

Property:

$-\frac{13\pi}{4}$ is a transcendental number

Alternative representations:

$$-\frac{1}{4}(13\pi) = -\frac{2340°}{4}$$

$$-\frac{1}{4}(13\pi) = \frac{13}{4} i \log(-1)$$

$$-\frac{1}{4}(13\pi) = -\frac{13}{4} \cos^{-1}(-1)$$

Series representations:

$$-\frac{1}{4}(13\pi) = -13 \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}$$

$$-\frac{1}{4}(13\pi) = \sum_{k=0}^{\infty} \frac{13(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}$$

$$-\frac{1}{4}(13\pi) = -\frac{13}{4}\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)$$

Integral representations:

$$-\frac{1}{4}(13\pi) = -13\int_0^1 \sqrt{1-t^2}\, dt$$

$$-\frac{1}{4}(13\pi) = -\frac{13}{2}\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt$$

$$-\frac{1}{4}(13\pi) = -\frac{13}{2}\int_0^{\infty} \frac{1}{1+t^2}\, dt$$

And:

$$S_{\text{anom}} = 2\pi \int_{\mathcal{M}_4} \left[\frac{J-Nk}{N^2}\,\frac{\mathcal{P}(w_2^{(N)})}{2} + \frac{J-N_f L}{N_f^2}\,\frac{\mathcal{P}(w_2^{(N_f)})}{2} + \frac{J}{NN_f} w_2^{(N)} \cup w_2^{(N_f)}\right],$$

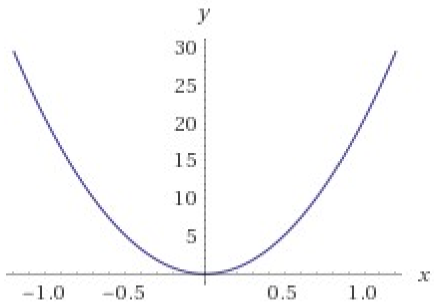
2Pi integrate [(6-4)/4+(6-3)+6/2]x

Indefinite integral:

$$2\pi \int \left(\frac{6-4}{4} + (6-3) + \frac{6}{2}\right) x\, dx = \frac{13\pi x^2}{2} + \text{constant}$$

$$2\pi \int \left(\frac{6-4}{4} + (6-3) + \frac{6}{2}\right) x\, dx \approx \text{constant} + 20.4204\, x^2$$

Plot:



(x from −1.2 to 1.2)

For x = 1:

(13 π)/2

Input:

$$\frac{13\pi}{2}$$

Decimal approximation:

20.42035224833365605000718199131676874728160109593818783633...

20.420352248333656….

Property:

$\frac{13\pi}{2}$ is a transcendental number

Alternative representations:

$$\frac{13\pi}{2} = 1170\,°$$

$$\frac{13\pi}{2} = -\frac{13}{2}\, i \log(-1)$$

$$\frac{13\pi}{2} = 13\, E(0)$$

Series representations:

$$\frac{13\pi}{2} = 26 \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}$$

$$\frac{13\pi}{2} = \sum_{k=0}^{\infty} -\frac{26\,(-1)^k\, 1195^{-1-2k} \left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}$$

$$\frac{13\pi}{2} = \frac{13}{2} \sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)$$

Integral representations:

$$\frac{13\pi}{2} = 26 \int_0^1 \sqrt{1-t^2}\, dt$$

$$\frac{13\pi}{2} = 13 \int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt$$

$$\frac{13\pi}{2} = 13\int_0^\infty \frac{1}{1+t^2}\,dt$$

From the following formula, regarding $a(n)$, the coefficients of the '5th order' mock theta function $\psi_1(q)$

a(n) ~ sqrt(phi) * exp(Pi*sqrt(n/15)) / (2*5^(1/4)*sqrt(n)) for n = 52, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(52/15)) / (2*5^(1/4)*sqrt(52))

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\sqrt{52}}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{2\sqrt{13/15}\,\pi}\sqrt{\frac{\phi}{13}}}{4\sqrt[4]{5}}$$

Decimal approximation:

20.466810739165952472724599317774877870699065988462658444 04...

20.4668107391659…..

Property:

$$\frac{e^{2\sqrt{13/15}\,\pi}\sqrt{\frac{\phi}{13}}}{4\sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{4}\sqrt{\frac{1}{130}\left(5+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}$$

$$\frac{\sqrt{\frac{1}{26}\left(1+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}}{4\sqrt[4]{5}}$$

Series representations:

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\sqrt{52}} = \frac{\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{52}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}}{2\sqrt[4]{5}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!}}$$

for not $((z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\sqrt{52}} = \left(\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{52}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{52}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \Bigg/ \left(2\sqrt[4]{5}\exp\left(i\pi\left\lfloor\frac{\arg(52-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(52-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for $(x \in \mathbb{R}$ and $x < 0)$

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\sqrt{52}} = \left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{52}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{52}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{52}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(52-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(52-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right) \Bigg/ \left(2\sqrt[4]{5}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!}\right)$$

Thence, we obtain the following mathematical connection:

$$\left(2\pi\int\left(\frac{6-4}{4}+(6-3)+\frac{6}{2}\right)x\,dx \approx \text{constant} + 20.4204\,x^2\right) \cong 20.4204\ldots \Rightarrow$$

$$\Rightarrow \left(\frac{e^{2\sqrt{13/15}\,\pi}\sqrt{\frac{\phi}{13}}}{4\sqrt[4]{5}} \right) = 20.46681.....$$

These results are very near also to the black hole entropy 20.5520, that is the log of 842609326. Indeed:
log(842609326) = 20.552013975... (see Appendix)

Further, from this result, we can to obtain:

7((((sqrt(golden ratio) * exp(Pi*sqrt(52/15)) / (2*5^(1/4)*sqrt(52))))))-18

Where 7 and 18 are Lucas numbers

Input:

$$7\left(\sqrt{\phi} \times \frac{\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{52}}\right) - 18$$

ϕ is the golden ratio

Exact result:

$$\frac{7\,e^{2\sqrt{13/15}\,\pi}\sqrt{\frac{\phi}{13}}}{4\sqrt[4]{5}} - 18$$

Decimal approximation:

125.26767517416166730907219522442414509489346191923860910 83...

125.267675174… 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

Property:

$$-18 + \frac{7\,e^{2\sqrt{13/15}\,\pi}\sqrt{\frac{\phi}{13}}}{4\sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$\frac{7}{4}\sqrt{\frac{1}{130}\left(5+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}-18$$

$$\frac{7\sqrt{\frac{1}{26}\left(1+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}}{4\sqrt[4]{5}}-18$$

$$\frac{1}{520}\left(7\times 5^{3/4}\sqrt{26\left(1+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}-9360\right)$$

Series representations:

$$\frac{7\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{52}}-18=\left(-180\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!}+7\times 5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{52}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!}\right)\text{ for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{7\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{52}}-18=\left(-180\exp\left(i\pi\left\lfloor\frac{\arg(52-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(52-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+7\times 5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{52}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{52}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(52-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(52-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\text{ for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{7\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{52}} - 18 = \left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(52-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(52-z_0)/(2\pi)\rfloor}\right.$$

$$\left(-180\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(52-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(52-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!} + \right.$$

$$7\times 5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{52}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{52}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{52}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!}\right)$$

And:

7((((sqrt(golden ratio) * exp(Pi*sqrt(52/15)) / (2*5^(1/4)*sqrt(52))))))-4

Where 7 and 4 are Lucas numbers

Input:

$$7\left(\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{52}}\right) - 4$$

ϕ is the golden ratio

Exact result:

$$\frac{7\,e^{2\sqrt{13/15}\,\pi}\sqrt{\frac{\phi}{13}}}{4\sqrt[4]{5}} - 4$$

Decimal approximation:

139.2676751741616673090721952244241450948934619192386091083...

139.267675174… result very near to the rest mass of Pion meson 139.57

Property:

$$-4+\frac{7\,e^{2\sqrt{13/15}\,\pi}\sqrt{\frac{\phi}{13}}}{4\sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$\frac{7}{4}\sqrt{\frac{1}{130}\left(5+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}-4$$

$$\frac{7\sqrt{\frac{1}{26}\left(1+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}}{4\sqrt[4]{5}}-4$$

$$\frac{1}{520}\left(7\times 5^{3/4}\sqrt{26\left(1+\sqrt{5}\right)}\,e^{2\sqrt{13/15}\,\pi}-2080\right)$$

Series representations:

$$\frac{7\sqrt{\phi}\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\sqrt{52}}-4=\left(-40\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!}+7\times 5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{52}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52-z_0)^k z_0^{-k}}{k!}\right)$$ for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0))$

$$\frac{7\sqrt{\phi}\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\sqrt{52}}-4=\left(-40\exp\left(i\pi\left\lfloor\frac{\arg(52-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(52-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+7\times 5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{52}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{52}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(52-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(52-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for $(x\in\mathbb{R}$ and $x<0)$

$$\frac{7\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{52}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{52}} - 4 = \left(\left(\frac{1}{z_0}\right)^{-1/2\,\lfloor \arg(52-z_0)/(2\pi)\rfloor} z_0^{-1/2\,\lfloor \arg(52-z_0)/(2\pi)\rfloor}\right.$$

$$\left(-40\left(\frac{1}{z_0}\right)^{1/2\,\lfloor \arg(52-z_0)/(2\pi)\rfloor} z_0^{1/2\,\lfloor \arg(52-z_0)/(2\pi)\rfloor} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (52-z_0)^k\, z_0^{-k}}{k!} + \right.$$

$$7\times 5^{3/4} \exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\,\left\lfloor \arg\left(\frac{52}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor \arg\left(\frac{52}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$

$$\left.\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(\frac{52}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\,\lfloor \arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\,\lfloor \arg(\phi-z_0)/(2\pi)\rfloor}$$

$$\left.\left.\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (\phi-z_0)^k\, z_0^{-k}}{k!}\right)\right) \Bigg/ \left(10 \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (52-z_0)^k\, z_0^{-k}}{k!}\right)$$

Appendix

From:

Rotating strings confronting PDG mesons
Jacob Sonnenschein and Dorin Weissman - arXiv:1402.5603v1 [hep-ph] 23 Feb 2014

$c\bar{c}$. **The Ψ trajectory:** The left side of figure (15) depicts the Ψ trajectory. Here we use the states $J/\Psi(1S)(3097)1^{--}, \chi_{c1}(1P)(3510)1^{++}$, and $\Psi(3770)1^{--}$. Since no $J = 3$ state has been observed, we use three states with $J = 1$, but with increasing orbital angular momentum ($L = 0, 1, 2$) and do the fit to L instead of J. To give an idea of the shifts in mass involved, the $J^{PC} = 2^{++}$ state χ_{c2} has a mass of 3556 MeV, and the $J^{PC} = 3^{--}$ state is expected to lie 30 − 60 MeV above the $\Psi(3770)$[23].

The best linear fit is

$$\alpha' = 0.418, a = -4.04$$

with $\chi^2_l = 3.41 \times 10^{-4}$, but the optimal fit is far from the linear, with endpoint masses in the range of the constituent c quark mass:

$$m_c = 1500, \alpha' = 0.979, a = -0.09$$

with $\chi^2_m = 5 \times 10^{-7}$ ($\chi^2_m/\chi^2_l = 0.002$). Aside from the improvement in χ^2, by adding the mass we also get a value for the slope (and to a lesser extent, the intercept) that is much closer to that obtained in fits for the light meson trajectories.

where α’ is the Regge slope (string tension)

We know also 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

The average of the various Regge slope of Omega mesons are:

1/7 * (0.979 + 0.910 + 0.918 + 0.988 + 0.937 + 1.18 +1) = 0.987428571

result very near to the value of dilaton and to the solution 0.987516007… of the above expression.

From:

Astronomy & Astrophysics manuscript no. ms c ESO 2019 - September 24, 2019
Planck 2018 results. VI. Cosmological parameters

The primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

from:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

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:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E \phi} = -\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\, e^{-2(8-p)C + 2\beta_E^{(p)}\phi}$$

$$16\, k'\, e^{\;2C} = \frac{h^2 \left(p + 1 - \frac{2\beta_E^{(p)}}{\gamma_E}\right) e^{-2(8-p)C + 2\beta_E^{(p)}\phi}}{(7 - p)}$$

$$(A')^2 - k\, e^{-2A} + \frac{h^2}{16(p+1)} \left(7 - p + \frac{2\beta_E^{(p)}}{\gamma_E}\right) e^{-2(8-p)C + 2\beta_E^{(p)}\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{-2(8-p)C + 2\beta_E^{(p)}\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096 e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 64^2, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18)) we obtain:

Input:

$\exp\left(-\pi\sqrt{18}\right)$

Exact result:

$e^{-3\sqrt{2}\,\pi}$

Decimal approximation:

$1.627201622607250929294215673911797954183858113695401\ldots \times 10^{-6}$

$1.6272016\ldots * 10^{-6}$

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

from which:

$$\frac{1}{4096}e^{-6C+\phi} = 1.6272016\ldots * 10^{-6}$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10^{-6}$$

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625}$$

Result:

0.00666501785...

0.00666501785…

Series representations:

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096 \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}} \times \frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

-5.010882647757...

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.993334982153810000)^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t}\, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

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

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

(http://www.bitman.name/math/article/102/109/)

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

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

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

Yermek Aldabergenov, Auttakit Chatrabhuti, Sergei V. Ketov

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_*
$\text{sgn}(\omega_1)$	−	+	−	+/−	+	−	−
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

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Gravitational waves from walking technicolor

Kohtaroh Miura, Hiroshi Ohki, Saeko Otani and Koichi Yamawaki

The phase transition dynamics is modified via the shift of $(2f_2/N_f)(s^0)^2 \to (\Delta m_s)^2 + (2f_2/N_f)(s^0)^2$ in $m^2_{s^i}$ with finite Δm_s. The details of the mass spectra at one loop with $(\Delta m_s)^2$ are summarized in appendix A. Using eq. (4.18), the total effective potential becomes,

$$V_{\rm eff}(s^0,\Delta m_p,\Delta m_s,T) = \frac{N_f^2-1}{64\pi^2}\mathcal{M}^4_{s^i}(s^0,\Delta m_p,\Delta m_s,T)\left(\ln\frac{\mathcal{M}^2_{s^i}(s^0,\Delta m_p,\Delta m_s,T)}{\mu^2_{\rm GW}}-\frac{3}{2}\right),$$
$$+\frac{T^4}{2\pi^2}(N_f^2-1)J_B\left(\mathcal{M}^2_{s^i}(s^0,\Delta m_p,\Delta m_s,T)/T^2\right)+C(T), \qquad (4.19)$$

with,

$$\mathcal{M}^2_{s^i}(s^0,\Delta m_p,\Delta m_s,T) = m^2_{s^i}(s^0,\Delta m_p,\Delta m_s)+\Pi(T), \qquad (4.20)$$

where the thermal mass $\Pi(T)$ is given in eq. (3.3). We require that the following properties remain intact for arbitrary Δm_s; (1) the vev $\langle s^0\rangle(T=0)$ determined by the minimum of the potential eq. (4.19) is identified with the dilaton decay constant favored by the walking technicolor model, $F_\phi = 1.25\,\text{TeV}$ or $1\,\text{TeV}$, (2) the dilaton mass given by the potential curvature at the vacuum is identified with the observed SM Higgs mass, $m_{s^0} = 125\,\text{GeV}$.

Thence $F_\phi = 1.25$ TeV

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Three-dimensional AdS gravity and extremal CFTs at c = 8m
Spyros D. Avramis, Alex Kehagiasb and Constantina Mattheopoulou
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m	L_0	d	S	S_{BH}
	1	196883	12.1904	12.5664
3	2	21296876	16.8741	17.7715
	3	842609326	20.5520	21.7656
	2/3	139503	11.8458	11.8477
4	5/3	69193488	18.0524	18.7328
	8/3	6928824200	22.6589	23.6954
	1/3	20619	9.9340	9.3664
5	4/3	86645620	18.2773	18.7328
	7/3	24157197490	23.9078	24.7812

m	L_0	d	S	S_{BH}
	1	42987519	17.5764	17.7715
6	2	40448921875	24.4233	25.1327
	3	8463511703277	29.7668	30.7812
	2/3	7402775	15.8174	15.6730
7	5/3	33934039437	24.2477	24.7812
	8/3	16953652012291	30.4615	31.3460
	1/3	278511	12.5372	11.8477
8	4/3	13996384631	23.3621	23.6954
	7/3	19400406113385	30.5963	31.3460

Table 1: Degeneracies, microscopic entropies and semiclassical entropies for the first few values of m and L_0.

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