On some Ramanujan's expressions (Hardy-Ramanujan number and mock theta functions) applied to various parameters of Particle Physics and Black Hole Physics: Further possible mathematical connections. II

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Abstract

In this research thesis, we have analyzed and deepened further Ramanujan expressions (Hardy-Ramanujan number and mock theta functions) applied to various parameters of Particle Physics and Black Hole Physics. We have therefore described further possible mathematical connections.

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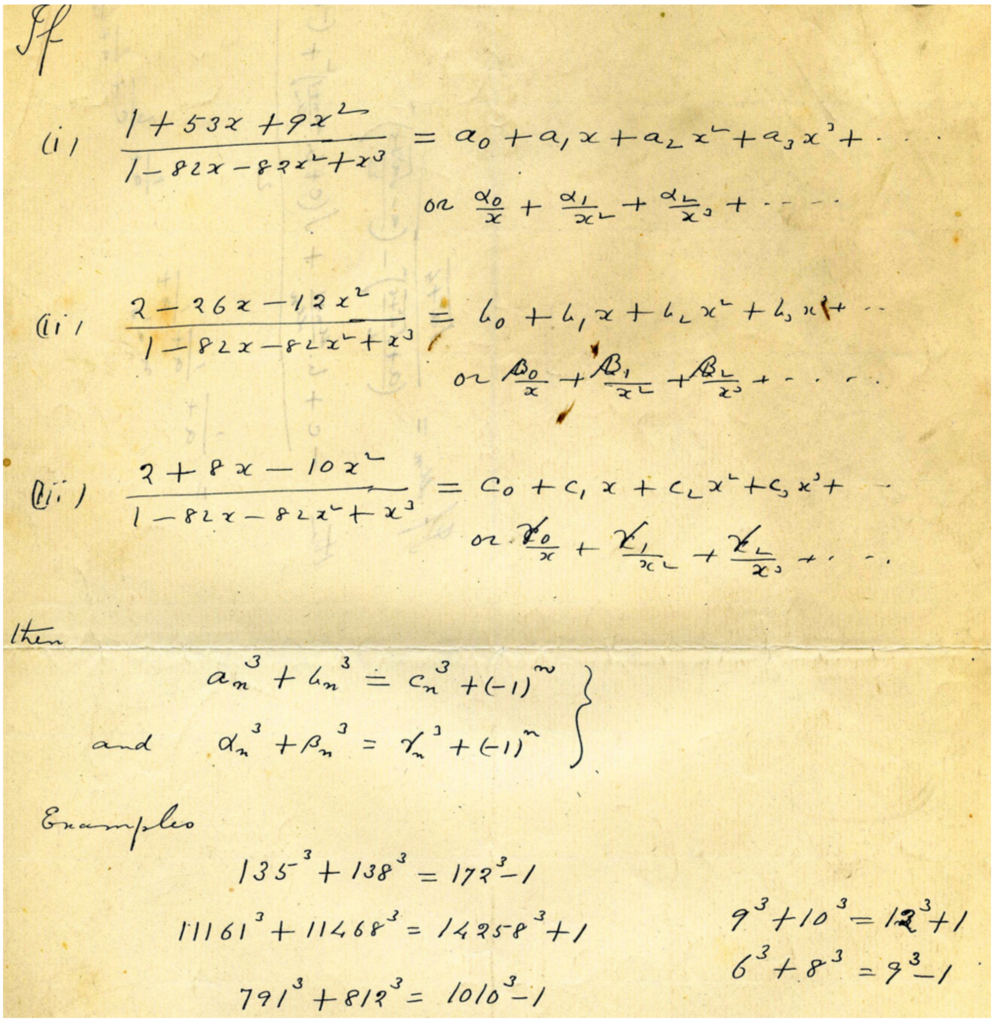
https://www.britannica.com/biography/Srinivasa-Ramanujan

http://www.meteoweb.eu/2019/10/wormhole-varchi-spazio-tempo/1332405/



If

(i) $\frac{1+53x+9x^2}{1-82x-82x^2+x^3} = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \cdots$

or $\frac{\alpha_0}{x} + \frac{\alpha_1}{x^2} + \frac{\alpha_2}{x^3} + \cdots$

(ii) $\frac{2-26x-12x^2}{1-82x-82x^2+x^3} = b_0 + b_1 x + b_2 x^2 + b_3 x^3 + \cdots$

or $\frac{\beta_0}{x} + \frac{\beta_1}{x^2} + \frac{\beta_2}{x^3} + \cdots$

(iii) $\frac{2+8x-10x^2}{1-82x-82x^2+x^3} = c_0 + c_1 x + c_2 x^2 + c_3 x^3 + \cdots$

or $\frac{\gamma_0}{x} + \frac{\gamma_1}{x^2} + \frac{\gamma_2}{x^3} + \cdots$

then

$a_n^3 + b_n^3 = c_n^3 + (-1)^n$

and $\alpha_n^3 + \beta_n^3 = \gamma_n^3 + (-1)^n$

Examples

$135^3 + 138^3 = 172^3 - 1$

$11161^3 + 11468^3 = 14258^3 + 1$

$791^3 + 812^3 = 1010^3 - 1$

$9^3 + 10^3 = 12^3 + 1$

$6^3 + 8^3 = 9^3 - 1$

https://plus.maths.org/content/ramanujan

Ramanujan's manuscript

The representations of 1729 as the sum of two cubes appear in the bottom right corner. The equation expressing the near counter examples to Fermat's last theorem appears further up: $\alpha^3 + \beta^3 = \gamma^3 + (-1)^n$.

From Wikipedia

*The **taxicab number**, typically denoted Ta(n) or Taxicab(n), also called the nth **Hardy–Ramanujan number**, is defined as the smallest integer that can be expressed as a sum of two positive integer cubes in n distinct ways. The most famous taxicab number is 1729 = Ta(2) =* $1^3 + 12^3 = 9^3 + 10^3$.

From

Replica Wormholes and the Entropy of Hawking Radiation
Ahmed Almheiri, Thomas Hartman, Juan Maldacena, Edgar Shaghoulian and Amirhossein Tajdini - arXiv:1911.12333v1 [hep-th] 27 Nov 2019

We have that:

$$\int_0^{2\pi} d\tau e^{-i\tau} \left(\frac{c}{12\phi_r} \mathcal{F} - \partial_\tau R(\tau) \right) = 0 \ . \qquad (3.29)$$

Doing the integrals, this gives the condition

$$\frac{c}{6\phi_r} \frac{\sinh \frac{a-b}{2}}{\sinh \frac{b+a}{2}} = \frac{1}{\sinh a} \ . \qquad (3.30)$$

For $\beta = 2\pi$, a = 3, b = 2 and $t_a = 8$ $t_b = 5$, c = 1 and $\phi_r \cong 1$, we obtain

$$\frac{c}{6\phi_r} \frac{\sinh \frac{a-b}{2}}{\sinh \frac{b+a}{2}} = \frac{1}{\sinh a} \ .$$

1/6 ((sinh ((3-2)/2)))/((sinh((3+2)/2)))

Input:

$$\frac{1}{6} \times \frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)}$$

sinh(x) is the hyperbolic sine function

Exact result:

$$\frac{1}{6} \sinh\left(\frac{1}{2}\right) \text{csch}\left(\frac{5}{2}\right)$$

csch(x) is the hyperbolic cosecant function

Decimal approximation:

0.014354757406044784156414236734772294151953744656170185968...

0.014354757…

Property:

$\frac{1}{6}\operatorname{csch}\left(\frac{5}{2}\right)\sinh\left(\frac{1}{2}\right)$ is a transcendental number

Alternate forms:

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

$$-\frac{\sinh\left(\frac{1}{2}\right)\sinh\left(\frac{5}{2}\right)}{3\left(1-\cosh(5)\right)}$$

$$\frac{\sqrt{e}-\frac{1}{\sqrt{e}}}{6\left(e^{5/2}-\frac{1}{e^{5/2}}\right)}$$

cosh(x) is the hyperbolic cosine function

Alternative representations:

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}=\frac{1}{\frac{6\operatorname{csch}\left(\frac{1}{2}\right)}{\operatorname{csch}\left(\frac{5}{2}\right)}}$$

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}=\frac{-\frac{1}{\sqrt{e}}+\sqrt{e}}{\frac{2}{2}\times 6\left(-\frac{1}{e^{5/2}}+e^{5/2}\right)}$$

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}=-\frac{i}{\frac{6\csc\left(\frac{i}{2}\right)(-i)}{\csc\left(\frac{5i}{2}\right)}}$$

Series representations:

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}=-\frac{1}{3}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{2^{-1-2k_2}\,q^{-1+2k_1}}{(1+2k_2)!}\quad\text{for } q=e^{5/2}$$

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}=\frac{5}{3}\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\,2^{-1-2k_2}}{(1+2k_2)!\left(25+4\pi^2 k_1^2\right)}$$

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}=\frac{1}{15}\left(1+50\sum_{k=1}^{\infty}\frac{(-1)^k}{25+4k^2\pi^2}\right)\sum_{k=0}^{\infty}\frac{2^{-1-2k}}{(1+2k)!}$$

Integral representations:

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6} = \frac{\int_0^1 \cosh\left(\frac{t}{2}\right)dt}{30\int_0^1 \cosh\left(\frac{5t}{2}\right)dt}$$

$$\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6} = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{1/(16s)+s}}{s^{3/2}}\,ds}{30\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{25/(16s)+s}}{s^{3/2}}\,ds} \quad \text{for } \gamma > 0$$

1/((1/6 ((sinh ((3-2)/2)))/((sinh((3+2)/2)))))

Input:

$$\frac{1}{\frac{1}{6}\times\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)}}$$

$\sinh(x)$ is the hyperbolic sine function

Exact result:

$$6\sinh\left(\frac{5}{2}\right)\operatorname{csch}\left(\frac{1}{2}\right)$$

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

69.663315910786502856481429182369693490746032047158903690 18...

69.6633159107…

Property:

$6\operatorname{csch}\left(\frac{1}{2}\right)\sinh\left(\frac{5}{2}\right)$ is a transcendental number

Alternate forms:

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

$$-\frac{12\sinh\left(\frac{1}{2}\right)\sinh\left(\frac{5}{2}\right)}{1-\cosh(1)}$$

$$\frac{6\left(e^{5/2}-\frac{1}{e^{5/2}}\right)}{\sqrt{e}-\frac{1}{\sqrt{e}}}$$

cosh(x) is the hyperbolic cosine function

Alternative representations:

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=\frac{1}{\frac{\frac{1}{6\operatorname{csch}\left(\frac{1}{2}\right)}}{\operatorname{csch}\left(\frac{5}{2}\right)}}$$

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=\frac{1}{\frac{-\frac{1}{\sqrt{e}}+\sqrt{e}}{\frac{2}{2}\times 6\left(-\frac{1}{e^{5/2}}+e^{5/2}\right)}}$$

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=-\frac{1}{\frac{\frac{i}{6\csc\left(\frac{i}{2}\right)(-i)}}{\csc\left(\frac{5i}{2}\right)}}$$

Series representations:

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=-12\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{\left(\frac{2}{5}\right)^{-1-2k_2}q^{-1+2k_1}}{(1+2k_2)!}\quad\text{for } q=\sqrt{e}$$

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=12\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\left(\frac{2}{5}\right)^{-1-2k_2}}{(1+2k_2)!\left(1+4\pi^2k_1^2\right)}$$

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=12\left(1+2\sum_{k=1}^{\infty}\frac{(-1)^k}{1+4k^2\pi^2}\right)\sum_{k=0}^{\infty}\frac{\left(\frac{5}{2}\right)^{1+2k}}{(1+2k)!}$$

Integral representations:

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=\frac{30\int_0^1\cosh\left(\frac{5t}{2}\right)dt}{\int_0^1\cosh\left(\frac{t}{2}\right)dt}$$

$$\frac{1}{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \frac{30\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{25/(16\,s)+s}}{s^{3/2}}\,d\,s}{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{1/(16\,s)+s}}{s^{3/2}}\,d\,s} \quad \text{for } \gamma > 0$$

((1/6 ((sinh ((3-2)/2)))/((sinh((3+2)/2)))))^1/1024

Input:

$$\sqrt[1024]{\frac{1}{6}\times\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)}}$$

$\sinh(x)$ is the hyperbolic sine function

Exact result:

$$\sqrt[1024]{\frac{1}{6}\sinh\left(\frac{1}{2}\right)\operatorname{csch}\left(\frac{5}{2}\right)}$$

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

Decimal approximation:

0.995864362640561609188000883962441370578896717040256776789...

0.99586436264… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Property:

$\sqrt[1024]{\frac{1}{6}\operatorname{csch}\left(\frac{5}{2}\right)\sinh\left(\frac{1}{2}\right)}$ is a transcendental number

Alternate forms:

$$\frac{1}{\sqrt[1024]{6\sinh\left(\frac{5}{2}\right)\operatorname{csch}\left(\frac{1}{2}\right)}}$$

$$\frac{1}{\sqrt[1024]{3(\cosh(5)-1)\operatorname{csch}\left(\frac{1}{2}\right)\operatorname{csch}\left(\frac{5}{2}\right)}}$$

$$\frac{\sqrt[512]{e}}{\sqrt[1024]{6\left(1+e+e^2+e^3+e^4\right)}}$$

cosh(x) is the hyperbolic cosine function

All 1024th roots of 1/6 sinh(1/2) csch(5/2):

$e^0\sqrt[1024]{\frac{1}{6}\sinh\left(\frac{1}{2}\right)\operatorname{csch}\left(\frac{5}{2}\right)}\approx 0.9958644$ (real, principal root)

$e^{(i\pi)/512}\sqrt[1024]{\frac{1}{6}\sinh\left(\frac{1}{2}\right)\operatorname{csch}\left(\frac{5}{2}\right)}\approx 0.9958456+0.006111\,i$

$e^{(i\pi)/256}\sqrt[1024]{\frac{1}{6}\sinh\left(\frac{1}{2}\right)\operatorname{csch}\left(\frac{5}{2}\right)}\approx 0.9957894+0.012221\,i$

$e^{(3i\pi)/512}\sqrt[1024]{\frac{1}{6}\sinh\left(\frac{1}{2}\right)\operatorname{csch}\left(\frac{5}{2}\right)}\approx 0.9956956+0.018331\,i$

$e^{(i\pi)/128}\sqrt[1024]{\frac{1}{6}\sinh\left(\frac{1}{2}\right)\operatorname{csch}\left(\frac{5}{2}\right)}\approx 0.9955644+0.024440\,i$

Alternative representations:

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}}=\sqrt[1024]{\frac{1}{\frac{6\operatorname{csch}\left(\frac{1}{2}\right)}{\operatorname{csch}\left(\frac{5}{2}\right)}}}$$

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \sqrt[1024]{\frac{-\frac{1}{\sqrt{e}}+\sqrt{e}}{\frac{2}{2}\times 6\left(-\frac{1}{e^{5/2}}+e^{5/2}\right)}}$$

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \sqrt[1024]{-\frac{i}{\frac{6\csc\left(\frac{i}{2}\right)(-i)}{\csc\left(\frac{5i}{2}\right)}}}$$

Series representations:

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \frac{\sqrt[1024]{-\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{2^{-1-2k_2}q^{-1+2k_1}}{(1+2k_2)!}}}{\sqrt[1024]{3}} \quad \text{for } q = e^{5/2}$$

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \sqrt[1024]{\frac{5}{3}}\sqrt[1024]{\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}2^{-1-2k_2}}{(1+2k_2)!\left(25+4\pi^2k_1^2\right)}}$$

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \frac{\sqrt[1024]{\left(1+50\sum_{k=1}^{\infty}\frac{(-1)^k}{25+4k^2\pi^2}\right)\sum_{k=0}^{\infty}\frac{2^{-1-2k}}{(1+2k)!}}}{\sqrt[1024]{15}}$$

Integral representations:

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \frac{\sqrt[1024]{\frac{\int_0^1\cosh\left(\frac{t}{2}\right)dt}{\int_0^1\cosh\left(\frac{5t}{2}\right)dt}}}{\sqrt[1024]{30}}$$

$$\sqrt[1024]{\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)6}} = \frac{\sqrt[1024]{\frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{1/(16s)+s}}{s^{3/2}}ds}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{25/(16s)+s}}{s^{3/2}}ds}}}{\sqrt[1024]{30}} \quad \text{for } \gamma > 0$$

1/8 log base 0.99586436264((1/6 ((sinh ((3-2)/2)))/((sinh((3+2)/2)))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{8} \log_{0.99586436264}\left(\frac{1}{6} \times \frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)}\right) - \pi + \frac{1}{\phi}$$

$\sinh(x)$ is the hyperbolic sine function

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

ϕ is the golden ratio

Result:

125.476441...

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

Alternative representations:

$$\frac{1}{8} \log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6 \sinh\left(\frac{3+2}{2}\right)}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6 \sinh\left(\frac{5}{2}\right)}\right)}{8 \log(0.995864362640000)}$$

$$\frac{1}{8} \log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6 \sinh\left(\frac{3+2}{2}\right)}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{8} \log_{0.995864362640000}\left(\frac{1}{\frac{6 \operatorname{csch}\left(\frac{1}{2}\right)}{\operatorname{csch}\left(\frac{5}{2}\right)}}\right) + \frac{1}{\phi}$$

$$\frac{1}{8} \log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6 \sinh\left(\frac{3+2}{2}\right)}\right) - \pi + \frac{1}{\phi} =$$
$$-\pi + \frac{1}{8} \log_{0.995864362640000}\left(\frac{-\frac{1}{\sqrt{e}} + \sqrt{e}}{\frac{2}{2} \times 6\left(-\frac{1}{e^{5/2}} + e^{5/2}\right)}\right) + \frac{1}{\phi}$$

Series representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)^k}{k}}{8\log(0.995864362640000)}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{-8+8\phi\pi-\phi\log_{0.995864362640000}\left(\frac{\sum_{k=0}^{\infty}\frac{2^{-1-2k}}{(1+2k)!}}{6\sum_{k=0}^{\infty}\frac{\left(\frac{5}{2}\right)^{1+2k}}{(1+2k)!}}\right)}{8\phi}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1.000000000000}{\phi}-1.000000000000\,\pi-30.16258724024\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)-$$
$$0.1250000000000\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)\sum_{k=0}^{\infty}(-0.004135637360000)^k\,G(k)$$
$$\text{for }\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Integral representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{-8+8\phi\pi-\phi\log_{0.995864362640000}\left(\frac{\int_0^1\cosh\left(\frac{t}{2}\right)dt}{30\int_0^1\cosh\left(\frac{5t}{2}\right)dt}\right)}{8\phi}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{-8+8\phi\pi-\phi\log_{0.995864362640000}\left(\frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{1/(16s)+s}}{s^{3/2}}ds}{30\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{25/(16s)+s}}{s^{3/2}}ds}\right)}{8\phi}\quad\text{for }\gamma>0$$

1/8 log base 0.99586436264((1/6 ((sinh ((3-2)/2)))/((sinh((3+2)/2)))))+11+1/golden ratio

Input interpretation:

$$\frac{1}{8}\log_{0.99586436264}\left(\frac{1}{6}\times\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}$$

$\sinh(x)$ is the hyperbolic sine function

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

ϕ is the golden ratio

Result:

139.618034...

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

Alternative representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)}{8\log(0.995864362640000)}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=$$
$$11+\frac{1}{8}\log_{0.995864362640000}\left(\frac{1}{\frac{6\operatorname{csch}\left(\frac{1}{2}\right)}{\operatorname{csch}\left(\frac{5}{2}\right)}}\right)+\frac{1}{\phi}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=$$
$$11+\frac{1}{8}\log_{0.995864362640000}\left(\frac{-\frac{1}{\sqrt{e}}+\sqrt{e}}{\frac{2}{2}\times 6\left(-\frac{1}{e^{5/2}}+e^{5/2}\right)}\right)+\frac{1}{\phi}$$

Series representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)^k}{k}}{8\log(0.995864362640000)}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=$$
$$\frac{8+88\phi+\phi\log_{0.995864362640000}\left(\frac{\sum_{k=0}^{\infty}\frac{2^{-1-2k}}{(1+2k)!}}{6\sum_{k=0}^{\infty}\frac{\left(\frac{5}{2}\right)^{1+2k}}{(1+2k)!}}\right)}{8\phi}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=$$
$$11.00000000000+\frac{1.000000000000}{\phi}-30.1625872402\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)-$$
$$0.1250000000000\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)\sum_{k=0}^{\infty}(-0.004135637360000)^k\,G(k)$$
$$\text{for}\left(G(0)=0\text{ and }\frac{(-1)^k k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Integral representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=$$
$$\frac{8+88\phi+\phi\log_{0.995864362640000}\left(\frac{\int_0^1\cosh\left(\frac{t}{2}\right)dt}{30\int_0^1\cosh\left(\frac{5t}{2}\right)dt}\right)}{8\phi}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+11+\frac{1}{\phi}=$$
$$\frac{8+88\phi+\phi\log_{0.995864362640000}\left(\frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{1/(16s)+s}}{s^{3/2}}ds}{30\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{25/(16s)+s}}{s^{3/2}}ds}\right)}{8\phi}\quad\text{for }\gamma>0$$

1/8 log base 0.99586436264((1/6 ((sinh ((3-2)/2)))/((sinh((3+2)/2)))))+8+golden ratio

Input interpretation:

$$\frac{1}{8}\log_{0.99586436264}\left(\frac{1}{6}\times\frac{\sinh\left(\frac{3-2}{2}\right)}{\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi$$

$\sinh(x)$ is the hyperbolic sine function

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

ϕ is the golden ratio

Result:

137.618034...

137.618034…

This result is very near to the inverse of fine-structure constant 137,035

Alternative representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=8+\phi+\frac{\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)}{8\log(0.995864362640000)}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=8+\phi+\frac{1}{8}\log_{0.995864362640000}\left(\frac{1}{\frac{6\operatorname{csch}\left(\frac{1}{2}\right)}{\operatorname{csch}\left(\frac{5}{2}\right)}}\right)$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=$$
$$8+\phi+\frac{1}{8}\log_{0.995864362640000}\left(\frac{-\frac{1}{\sqrt{e}}+\sqrt{e}}{\frac{2}{2}\times6\left(-\frac{1}{e^{5/2}}+e^{5/2}\right)}\right)$$

Series representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=8+\phi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)^k}{k}}{8\log(0.995864362640000)}$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=$$
$$\frac{1}{8}\left(64+8\phi+\log_{0.995864362640000}\left(\frac{\sum_{k=0}^{\infty}\frac{2^{-1-2k}}{(1+2k)!}}{6\sum_{k=0}^{\infty}\frac{\left(\frac{5}{2}\right)^{1+2k}}{(1+2k)!}}\right)\right)$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=$$
$$8.00000000000+\phi-30.16258724024\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)-$$
$$0.1250000000000\log\left(\frac{\sinh\left(\frac{1}{2}\right)}{6\sinh\left(\frac{5}{2}\right)}\right)\sum_{k=0}^{\infty}(-0.004135637360000)^k\,G(k)$$
$$\text{for }\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

Integral representations:

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=$$
$$\frac{1}{8}\left(64+8\phi+\log_{0.995864362640000}\left(\frac{\int_0^1\cosh\left(\frac{t}{2}\right)dt}{30\int_0^1\cosh\left(\frac{5t}{2}\right)dt}\right)\right)$$

$$\frac{1}{8}\log_{0.995864362640000}\left(\frac{\sinh\left(\frac{3-2}{2}\right)}{6\sinh\left(\frac{3+2}{2}\right)}\right)+8+\phi=$$
$$\frac{1}{8}\left(64+8\phi+\log_{0.995864362640000}\left(\frac{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{1/(16s)+s}}{s^{3/2}}\,ds}{30\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{25/(16s)+s}}{s^{3/2}}\,ds}\right)\right)\quad\text{for }\gamma>0$$

Now, we have that:

SYK Wormhole formation in real time
Juan Maldacena and Alexey Milekhin - arXiv:1912.03276v1 [hep-th] 6 Dec 2019

The result for the marginal deformation $\Delta = 1/2$:

$$S/N - \frac{\alpha_S}{\mathcal{J}\beta} \sum_{n=2}^{+\infty} \epsilon_{-n}^{L,r} \left(n^4 - n^2\right) \epsilon_n^{L,R} + \frac{c_\Delta^2 \mu^2 \beta^2}{(J\beta)^2} \left(8\pi^2 |\epsilon_2^L - \epsilon_2^R|^2 + 32\pi^2 |\epsilon_3^L - \epsilon_3^R|^2 + 80\pi^2 |\epsilon_4^L - \epsilon_4^R|^2\right) + \ldots \tag{92}$$

and the coefficients tend to grow. One can also evaluate non-quadratic terms. Below are the first three. All of them have positive coefficients too:

$$+28\pi^2 |\epsilon_2^L - \epsilon_2^R|^4 + 224\pi^2 |\epsilon_3^L - \epsilon_3^R|^4 + 952\pi^2 |\epsilon_3^L - \epsilon_3^R|^4 + \ldots \tag{93}$$
$$+\frac{2860\pi^2}{9} |\epsilon_2^L - \epsilon_2^R|^6 + \ldots$$

For the case of relevant deformation $\mu \psi_L \psi_R$ with $\Delta = 1/4$ the results are similar. The interaction term has the expansion:

$$\frac{8}{3}|\epsilon_2^L + \epsilon_2^R|^2 + 8|\epsilon_2^L - \epsilon_2^R|^2 + \frac{48}{5}|\epsilon_3^L + \epsilon_3^R|^2 + \frac{80}{3}|\epsilon_3^L - \epsilon_3^R|^2 + \ldots \tag{94}$$
$$+\frac{304}{15}|\epsilon_2^L + \epsilon_2^R|^4 + \frac{4432}{105}|\epsilon_2^L - \epsilon_2^R|^4 + \frac{7146}{55}|\epsilon_3^L + \epsilon_3^R|^4 + \frac{137018}{495}|\epsilon_3^L - \epsilon_3^R|^4 + \ldots$$
$$+\frac{135424}{693}|\epsilon_2^L + \epsilon_2^R|^6 + \frac{1053952}{2835}|\epsilon_2^L - \epsilon_2^R|^6 + \ldots \tag{95}$$

From

$$+28\pi^2 |\epsilon_2^L - \epsilon_2^R|^4 + 224\pi^2 |\epsilon_3^L - \epsilon_3^R|^4 + 952\pi^2 |\epsilon_3^L - \epsilon_3^R|^4 + \ldots$$
$$+\frac{2860\pi^2}{9} |\epsilon_2^L - \epsilon_2^R|^6 + \ldots$$

For $\epsilon_2^L = 0.08333 = 1/12$; $\epsilon_2^R = 0.04166 = 1/24$; $\epsilon_3^L = 0.02083 = 1/48$

$\epsilon_3^R = 0.0104166 = 1/96$

28Pi^2(1/12 – 1/24)^4+224Pi^2(1/48-1/96)^4+952Pi^2(1/48-1/96)^4+(2860Pi^2)/9 (1/12-1/24)^6

Input:

$$28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\left(\frac{1}{9}\left(2860\,\pi^2\right)\right)\left(\frac{1}{12}-\frac{1}{24}\right)^6$$

Result:

$$\frac{85\,913\,\pi^2}{859\,963\,392}$$

Decimal approximation:

0.000986003975051521805965349307883514851395215968884263907...

0.000986003975…

Property:

$\frac{85\,913\,\pi^2}{859\,963\,392}$ is a transcendental number

Alternative representations:

$$28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6\left(2860\,\pi^2\right)=168\left(\frac{1}{12}-\frac{1}{24}\right)^4\zeta(2)+\frac{17\,160}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6\zeta(2)+7056\left(\frac{1}{48}-\frac{1}{96}\right)^4\zeta(2)$$

$$28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6\left(2860\,\pi^2\right)=28\,(180\,°)^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+\frac{2860}{9}\,(180\,°)^2\left(\frac{1}{12}-\frac{1}{24}\right)^6+1176\,(180\,°)^2\left(\frac{1}{48}-\frac{1}{96}\right)^4$$

$$28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6\left(2860\,\pi^2\right)=28\cos^{-1}(-1)^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+\frac{2860}{9}\cos^{-1}(-1)^2\left(\frac{1}{12}-\frac{1}{24}\right)^6+1176\cos^{-1}(-1)^2\left(\frac{1}{48}-\frac{1}{96}\right)^4$$

Series representations:

$$28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)=\frac{85\,913\sum_{k=1}^{\infty}\frac{1}{k^2}}{143\,327\,232}$$

$$28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)=-\frac{85\,913\sum_{k=1}^{\infty}\frac{(-1)^k}{k^2}}{71\,663\,616}$$

$$28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)=\frac{85\,913\sum_{k=0}^{\infty}\frac{1}{(1+2k)^2}}{107\,495\,424}$$

Integral representations:

$$28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)=\frac{85\,913\left(\int_0^1\sqrt{1-t^2}\,dt\right)^2}{53\,747\,712}$$

$$28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)=\frac{85\,913\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}{214\,990\,848}$$

$$28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)=\frac{85\,913\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^2}{214\,990\,848}$$

1/((((28Pi^2(1/12 – 1/24)^4+224Pi^2(1/48-1/96)^4+952Pi^2(1/48-1/96)^4+(2860Pi^2)/9 (1/12-1/24)^6))))+5

Input:

$$\frac{1}{28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\left(\frac{1}{9}(2860\pi^2)\right)\left(\frac{1}{12}-\frac{1}{24}\right)^6}+5$$

Result:

$$5 + \frac{859\,963\,392}{85\,913\,\pi^2}$$

Decimal approximation:

1019.1946942432426377917116247945780935172038626530191054 38...

1019.19469424… result practically equal to the rest mass of Phi meson 1019.445

Property:

$$5 + \frac{859\,963\,392}{85\,913\,\pi^2} \text{ is a transcendental number}$$

Alternate form:

$$\frac{859\,963\,392 + 429\,565\,\pi^2}{85\,913\,\pi^2}$$

Alternative representations:

$$\frac{1}{28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4 + 224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + 952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + \frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\,\pi^2)} + 5 = 5 + \frac{1}{168\left(\frac{1}{12}-\frac{1}{24}\right)^4\zeta(2) + \frac{17160}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6\zeta(2) + 7056\left(\frac{1}{48}-\frac{1}{96}\right)^4\zeta(2)}$$

$$\frac{1}{28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4 + 224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + 952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + \frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\,\pi^2)} + 5 = 5 + \frac{1}{28\cos^{-1}(-1)^2\left(\frac{1}{12}-\frac{1}{24}\right)^4 + \frac{2860}{9}\cos^{-1}(-1)^2\left(\frac{1}{12}-\frac{1}{24}\right)^6 + 1176\cos^{-1}(-1)^2\left(\frac{1}{48}-\frac{1}{96}\right)^4}$$

$$\frac{1}{28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4 + 224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + 952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + \frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\,\pi^2)} + 5 = 5 + \frac{1}{28\,(180\,°)^2\left(\frac{1}{12}-\frac{1}{24}\right)^4 + \frac{2860}{9}(180\,°)^2\left(\frac{1}{12}-\frac{1}{24}\right)^6 + 1176\,(180\,°)^2\left(\frac{1}{48}-\frac{1}{96}\right)^4}$$

Series representations:

$$\frac{1}{28\,\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4 + 224\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + 952\,\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4 + \frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\,\pi^2)} + 5 = 5 + \frac{53\,747\,712}{85\,913\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

$$\frac{1}{28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)}+5 = 5+\frac{53\,747\,712}{85\,913\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^2}$$

$$\frac{1}{28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)}+5 = 5+\frac{859\,963\,392}{85\,913\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^2}$$

Integral representations:

$$\frac{1}{28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)}+5 = 5+\frac{53\,747\,712}{85\,913\left(\int_0^1\sqrt{1-t^2}\,dt\right)^2}$$

$$\frac{1}{28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)}+5 = 5+\frac{214\,990\,848}{85\,913\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}$$

$$\frac{1}{28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)}+5 = 5+\frac{214\,990\,848}{85\,913\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^2}$$

((((28Pi^2(1/12 – 1/24)^4+224Pi^2(1/48-1/96)^4+952Pi^2(1/48-1/96)^4+(2860Pi^2)/9 (1/12-1/24)^6))))^1/4096

Input:

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\left(\frac{1}{9}(2860\pi^2)\right)\left(\frac{1}{12}-\frac{1}{24}\right)^6\right)\verb|^|(1/4096)$$

Exact result:

$$\frac{\sqrt[4096]{85913}\ \sqrt[2048]{\pi}}{2^{17/4096}\ \sqrt[512]{3}}$$

Decimal approximation:

0.998311522258051299399899591092223071368552407229396740085...

0.99831152225… 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** = $\boldsymbol{\phi}$

Property:

$$\frac{\sqrt[4096]{85913}\ \sqrt[2048]{\pi}}{2^{17/4096}\ \sqrt[512]{3}}$$ is a transcendental number

All 4096th roots of (85913 π^2)/859963392:

$$\frac{\sqrt[4096]{85913}\ \sqrt[2048]{\pi}\ e^0}{2^{17/4096}\ \sqrt[512]{3}}\approx 0.9983115 \text{ (real, principal root)}$$

$$\frac{\sqrt[4096]{85913}\ \sqrt[2048]{\pi}\ e^{(i\pi)/2048}}{2^{17/4096}\ \sqrt[512]{3}}\approx 0.9983103+0.0015314\,i$$

$$\frac{\sqrt[4096]{85913}\ \sqrt[2048]{\pi}\ e^{(i\pi)/1024}}{2^{17/4096}\ \sqrt[512]{3}}\approx 0.9983068+0.0030628\,i$$

$$\frac{\sqrt[4096]{85913}\ \sqrt[2048]{\pi}\ e^{(3i\pi)/2048}}{2^{17/4096}\ \sqrt[512]{3}}\approx 0.9983010+0.0045942\,i$$

$$\frac{\sqrt[4096]{85913}\ \sqrt[2048]{\pi}\ e^{(i\pi)/512}}{2^{17/4096}\ \sqrt[512]{3}}\approx 0.9982927+0.006126\,i$$

Alternative representations:

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\hat{}(1/4096)=\sqrt[4096]{168\left(\frac{1}{12}-\frac{1}{24}\right)^4\zeta(2)+\frac{17160}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6\zeta(2)+7056\left(\frac{1}{48}-\frac{1}{96}\right)^4\zeta(2)}$$

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\hat{}(1/4096)=\left(28\cos^{-1}(-1)^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+\frac{2860}{9}\cos^{-1}(-1)^2\left(\frac{1}{12}-\frac{1}{24}\right)^6+1176\cos^{-1}(-1)^2\left(\frac{1}{48}-\frac{1}{96}\right)^4\right)\hat{}(1/4096)$$

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\hat{}(1/4096)=\sqrt[4096]{28(180^\circ)^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+\frac{2860}{9}(180^\circ)^2\left(\frac{1}{12}-\frac{1}{24}\right)^6+1176(180^\circ)^2\left(\frac{1}{48}-\frac{1}{96}\right)^4}$$

Series representations:

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\hat{}(1/4096)=\frac{\sqrt[4096]{85913}\,\sqrt[2048]{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}{2^{13/4096}\,\sqrt[512]{3}}$$

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\hat{}(1/4096)=\frac{\sqrt[4096]{85913}\,\sqrt[2048]{\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times239^{1+2k}\right)}{1+2k}}}{2^{13/4096}\,\sqrt[512]{3}}$$

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\text{^}(1/4096)=\frac{\sqrt[4096]{85913}\sqrt[2048]{\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}}{2^{17/4096}\sqrt[512]{3}}$$

Integral representations:

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\text{^}(1/4096)=\frac{\sqrt[4096]{85913}\sqrt[2048]{\int_0^1\sqrt{1-t^2}\,dt}}{2^{13/4096}\sqrt[512]{3}}$$

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\text{^}(1/4096)=\frac{\sqrt[4096]{85913}\sqrt[2048]{\int_0^\infty\frac{1}{1+t^2}\,dt}}{2^{15/4096}\sqrt[512]{3}}$$

$$\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)\text{^}(1/4096)=\frac{\sqrt[4096]{85913}\sqrt[2048]{\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt}}{2^{15/4096}\sqrt[512]{3}}$$

2sqrt((log base 0.998311522258((((28Pi^2(1/12 – 1/24)^4+224Pi^2(1/48-1/96)^4+952Pi^2(1/48-1/96)^4+(2860Pi^2)/9 (1/12-1/24)^6))))))-Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.998311522258}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\left(\frac{1}{9}(2860\pi^2)\right)\left(\frac{1}{12}-\frac{1}{24}\right)^6\right)}-\pi+\frac{1}{\phi}$$

$\log_b(x)$ 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 GeV

Alternative representation:

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+2\sqrt{\frac{\log\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+\frac{2860}{9}\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^6+1176\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4\right)}{\log(0.9983115222580000)}}$$

Series representations:

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi+2\sqrt{-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{85913\pi^2}{859963392}\right)^k}{k}}{\log(0.9983115222580000)}}$$

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi+2\sqrt{-1+\log_{0.9983115222580000}\left(\frac{85913\pi^2}{859963392}\right)}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\log_{0.9983115222580000}\left(\frac{85913\pi^2}{859963392}\right)\right)^{-k}$$

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{\left(-1.0000000000000\log\left(\frac{85913\pi^2}{859963392}\right)\left(591.7494416867+\sum_{k=0}^{\infty}(-0.0016884777420000)^k\,G(k)\right)\right)}$$

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

2sqrt((log base 0.998311522258((((28Pi^2(1/12 – 1/24)^4+224Pi^2(1/48-1/96)^4+952Pi^2(1/48-1/96)^4+(2860Pi^2)/9 (1/12-1/24)^6))))))+11+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.998311522258}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\left(\frac{1}{9}(2860\pi^2)\right)\left(\frac{1}{12}-\frac{1}{24}\right)^6\right)}+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.6180340...

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

Alternative representation:

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}+2\sqrt{\frac{\log\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+\frac{2860}{9}\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^6+1176\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4\right)}{\log(0.9983115222580000)}}$$

Series representations:

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}+11+\frac{1}{\phi}=11+\frac{1}{\phi}+2\sqrt{-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{85913\pi^2}{859963392}\right)^k}{k}}{\log(0.9983115222580000)}}$$

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+2\sqrt{-1+\log_{0.9983115222580000}\left(\frac{85913\pi^2}{859963392}\right)}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\log_{0.9983115222580000}\left(\frac{85913\pi^2}{859963392}\right)\right)^{-k}$$

$$2\sqrt{\log_{0.9983115222580000}\left(28\pi^2\left(\frac{1}{12}-\frac{1}{24}\right)^4+224\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+952\pi^2\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{1}{9}\left(\frac{1}{12}-\frac{1}{24}\right)^6(2860\pi^2)\right)}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+2\sqrt{\left(-1.0000000000000\log\left(\frac{85913\pi^2}{859963392}\right)\left(591.7494416867+\sum_{k=0}^{\infty}(-0.0016884777420000)^k G(k)\right)\right)}$$
$$\text{for}\left(G(0)=0\text{ and }\frac{(-1)^k k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}G(-j+k)}{1+j}\right)$$

from

$$\frac{8}{3}|\epsilon_2^L+\epsilon_2^R|^2-8|\epsilon_2^L-\epsilon_2^R|^2+\frac{48}{5}|\epsilon_3^L+\epsilon_3^R|^2+\frac{80}{3}|\epsilon_3^L-\epsilon_3^R|^2+\ldots$$
$$+\frac{304}{15}|\epsilon_2^L+\epsilon_2^R|^4+\frac{4432}{105}|\epsilon_2^L-\epsilon_2^R|^4+\frac{7146}{55}|\epsilon_3^L+\epsilon_3^R|^4+\frac{137018}{495}|\epsilon_3^L-\epsilon_3^R|^4+\ldots$$
$$+\frac{135424}{693}|\epsilon_2^L+\epsilon_2^R|^6+\frac{1053952}{2835}|\epsilon_2^L-\epsilon_2^R|^6+\ldots$$

We have that:

8/3(1/12+1/24)^2+8(1/12-1/24)^2+48/5(1/48+1/96)^2+80/3(1/48-1/96)^2

Input:

$$\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2$$

Exact result:

$$\frac{293}{4320}$$

Decimal approximation:

0.067824074074074074074074074074074074074074074074074074074...

0.067824074074…

From

$$+\frac{304}{15}|\epsilon_2^L+\epsilon_2^R|^4+\frac{4432}{105}|\epsilon_2^L-\epsilon_2^R|^4+\frac{7146}{55}|\epsilon_3^L+\epsilon_3^R|^4+\frac{137018}{495}|\epsilon_3^L-\epsilon_3^R|^4+\dots$$
$$+\frac{135424}{693}|\epsilon_2^L+\epsilon_2^R|^6+\frac{1053952}{2835}|\epsilon_2^L-\epsilon_2^R|^6+\dots \qquad (95)$$

We obtain:

304/15(1/12+1/24)^4+4432/105(1/12-1/24)^4+7146/55(1/48+1/96)^4+137018/495(1/48-1/96)^4+135424/693(1/12+1/24)^6+1053952/2835(1/12-1/24)^6

Input:

$$\frac{304}{15}\left(\frac{1}{12}+\frac{1}{24}\right)^4+\frac{4432}{105}\left(\frac{1}{12}-\frac{1}{24}\right)^4+\frac{7146}{55}\left(\frac{1}{48}+\frac{1}{96}\right)^4+\frac{137018}{495}\left(\frac{1}{48}-\frac{1}{96}\right)^4+\frac{135424}{693}\left(\frac{1}{12}+\frac{1}{24}\right)^6+\frac{1053952}{2835}\left(\frac{1}{12}-\frac{1}{24}\right)^6$$

Exact result:

$$\frac{5065366709}{851363758080}$$

Decimal approximation:

0.0059497091119117420441651694509490577163188045675471372 77...

0.00594970911…

Input interpretation:

0.005949709111911742044165169450949057716318804567547137277

And we have that:

8/3(1/12+1/24)^2+8(1/12-1/24)^2+48/5(1/48+1/96)^2+80/3(1/48-1/96)^2+0.005949709111911742

Input interpretation:

$$\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.005949709111911742$$

Result:

0.07377378318598581607407407407407407407407407407407407407407...

0.073773783185…

Repeating decimal:

$0.07377378318598581\overline{6074}$ (period 3)

11/((((8/3(1/12+1/24)^2+8(1/12-1/24)^2+48/5(1/48+1/96)^2+80/3(1/48-1/96)^2+0.0059497091))))-12

Input interpretation:

$$\frac{11}{\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.0059497091}-12$$

Result:

137.1044586129571182032699954533487068812432638932514668231...

137.10445861295711…

This result is very near to the inverse of fine-structure constant 137,035

((((8/3(1/12+1/24)^2+8(1/12-1/24)^2+48/5(1/48+1/96)^2+80/3(1/48-1/96)^2+0.0059497091))))^1/256

Input interpretation:

$$\sqrt[256]{\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.0059497091}$$

Result:

0.989869042979...

0.989869042979... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

1/2log base 0.989869042979((((8/3(1/12+1/24)^2+8(1/12-1/24)^2+48/5(1/48+1/96)^2+80/3(1/48-1/96)^2+0.0059497091))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.989869042979}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.0059497091\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.476441...

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

Alternative representation:

$$\frac{1}{2}\log_{0.9898690429790000}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.00594971\right)-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{\log\left(0.00594971+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2\right)}{2\log(0.9898690429790000)}$$

Series representations:

$$\frac{1}{2}\log_{0.9898690429790000}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.00594971\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.926226)^k}{k}}{2\log(0.9898690429790000)}$$

$$\frac{1}{2}\log_{0.9898690429790000}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.00594971\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-49.103678923282\log(0.0737738)-\frac{1}{2}\log(0.0737738)\sum_{k=0}^{\infty}(-0.0101309570210000)^k G(k)$$

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

1/2log base 0.989869042979((((8/3(1/12+1/24)^2+8(1/12-1/24)^2+48/5(1/48+1/96)^2+80/3(1/48-1/96)^2+0.0059497091))))+11+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.989869042979}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.0059497091\right)+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.618034...

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

Alternative representation:

$$\frac{1}{2}\log_{0.9898690429790000}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.00594971\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{\log\left(0.00594971+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2\right)}{2\log(0.9898690429790000)}$$

Series representations:

$$\frac{1}{2}\log_{0.9898690429790000}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.00594971\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.926226)^k}{k}}{2\log(0.9898690429790000)}$$

$$\frac{1}{2}\log_{0.9898690429790000}\left(\frac{8}{3}\left(\frac{1}{12}+\frac{1}{24}\right)^2+8\left(\frac{1}{12}-\frac{1}{24}\right)^2+\frac{48}{5}\left(\frac{1}{48}+\frac{1}{96}\right)^2+\frac{80}{3}\left(\frac{1}{48}-\frac{1}{96}\right)^2+0.00594971\right)+11+\frac{1}{\phi}=11+\frac{1}{\phi}-49.103678923282\log(0.0737738)-\frac{1}{2}\log(0.0737738)\sum_{k=0}^{\infty}(-0.0101309570210000)^k G(k)$$

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

From

Eternal traversable wormhole
Juan Maldacena and Xiao-Liang Qi - arXiv:1804.00491v3 [hep-th] 15 Oct 2018

we have that:

$$\hat{N} \sim \frac{1}{2\pi}\int pdq = \frac{N4}{2\pi}4\int_{-\infty}^{\varphi_0} d\varphi\sqrt{\eta e^{2\Delta\varphi} - e^{2\varphi}} = \frac{2Ne^{\varphi_0}}{\pi}\int_0^1 dz\sqrt{z^{-2(1-\Delta)} - 1}$$
$$\hat{N} \sim \frac{N}{\sqrt{\pi}}\frac{\Gamma\left(\frac{\Delta}{2-2\Delta}\right)}{\Gamma\left(\frac{1}{2-2\Delta}\right)}\eta^{\frac{1}{2(1-\Delta)}} = (Nt')\frac{1}{\sqrt{\pi}}\frac{\Gamma\left(\frac{\Delta}{2-2\Delta}\right)}{\Gamma\left(\frac{1}{2-2\Delta}\right)\Delta^{\frac{1}{2-2\Delta}}}\,, \qquad \text{where} \quad e^{2(1-\Delta)\varphi_0} = \eta \; (4.46)$$

For

$$Nt' = N(\eta\Delta)^{\frac{1}{2(1-\Delta)}} \gg 1 \quad \Delta = \frac{1}{2}$$

from:

$$(Nt')\frac{1}{\sqrt{\pi}}\frac{\Gamma\left(\frac{\Delta}{2-2\Delta}\right)}{\Gamma\left(\frac{1}{2-2\Delta}\right)\Delta^{\frac{1}{2-2\Delta}}}$$

we obtain:

24*1/(sqrtPi) ((gamma (0.5/(2-2*0.5)))) / ((gamma (1/(2-2*0.5)))) * 0.5^(1/(2-2*0.5))

Input:

$$24\times\frac{1}{\sqrt{\pi}}\left(\frac{\Gamma\left(\frac{0.5}{2-2\times0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)}\sqrt[2-2\times0.5]{0.5}\right)$$

$\Gamma(x)$ is the gamma function

Result:

12

12

Alternative representations:

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{24\left(-1+\frac{0.5}{1}\right)!\ \sqrt[1]{0.5}}{\left(-1+\frac{1}{1}\right)!\ \sqrt{\pi}}$$

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{24\, G\left(1+\frac{0.5}{1}\right)\sqrt[1]{0.5}}{\frac{G\left(\frac{0.5}{1}\right)G\left(1+\frac{1}{1}\right)\sqrt{\pi}}{G\left(\frac{1}{1}\right)}}$$

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{24\sqrt[1]{0.5}\, e^{\log G(1+0.5/1)-\log G(0.5/1)}}{e^{-\log G(1/1)+\log G(1+1/1)}\sqrt{\pi}}$$

Series representations:

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{12\,\Gamma(0.5)}{\exp\left(i\pi\left\lfloor\frac{\arg(\pi-x)}{2\pi}\right\rfloor\right)\Gamma(1)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

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

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{12\,\Gamma(0.5)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(\pi-z_0)/(2\pi)\rfloor} z_0^{-1/2-1/2\lfloor\arg(\pi-z_0)/(2\pi)\rfloor}}{\Gamma(1)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}}$$

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{12\sum_{k=0}^{\infty}\frac{(0.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}{\sqrt{-1+\pi}\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

for $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$

Integral representations:

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{12\exp\left(\int_0^1\frac{-0.5+x^{0.5}+0.5\,x-x^1}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}}$$

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{12\exp\left(0.5\,\gamma+\int_0^1\frac{x^{0.5}-x^1-\log\left(x^{0.5}\right)+\log\left(x^1\right)}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}}$$

$$\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}} = \frac{12\int_0^1 \frac{1}{\log^{0.5}\left(\frac{1}{t}\right)}\,dt}{\sqrt{\pi}\int_0^1 1\,dt}$$

((((24*1/(sqrtPi) ((gamma (0.5/(2-2*0.5)))) / ((gamma (1/(2-2*0.5)))) * 0.5^(1/(2-2*0.5))))))^2-7+1/golden ratio

Input:

$$\left(24\times\frac{1}{\sqrt{\pi}}\left(\frac{\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)}\sqrt[2-2\times 0.5]{0.5}\right)\right)^2 - 7 + \frac{1}{\phi}$$

$\Gamma(x)$ is the gamma function

ϕ is the golden ratio

Result:

137.618...

137.618…

This result is very near to the inverse of fine-structure constant 137,035

Alternative representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \left(\frac{24\left(-1+\frac{0.5}{1}\right)!\sqrt[1]{0.5}}{\left(-1+\frac{1}{1}\right)!\sqrt{\pi}}\right)^2$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \left(\frac{24\,\Gamma\left(\frac{0.5}{1}, 0\right)\sqrt[1]{0.5}}{\Gamma\left(\frac{1}{1}, 0\right)\sqrt{\pi}}\right)^2$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \left(\frac{24\,G\left(1+\frac{0.5}{1}\right)\sqrt[1]{0.5}}{\frac{G\left(\frac{0.5}{1}\right)G\left(1+\frac{1}{1}\right)\sqrt{\pi}}{G\left(\frac{1}{1}\right)}}\right)^2$$

Series representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \frac{144\,\Gamma(0.5)^2}{\exp^2\left(i\pi\left\lfloor\frac{\arg(\pi-x)}{2\pi}\right\rfloor\right)\Gamma(1)^2\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \frac{144\,\Gamma(0.5)^2\left(\frac{1}{z_0}\right)^{-\lfloor\arg(\pi-z_0)/(2\pi)\rfloor} z_0^{-1-\lfloor\arg(\pi-z_0)/(2\pi)\rfloor}}{\Gamma(1)^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}\right)^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -\left(\left(7\left(-20.5714\,\phi\left(\sum_{k=0}^{\infty}\frac{(0.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2 - 0.142857\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2 + \phi\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2\right)\right)\Big/\left(\phi\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2\right)\right) \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

Integral representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \frac{144\exp\left(\int_0^1 -\frac{2\left(0.5-x^{0.5}-0.5\,x+x^1\right)}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \frac{144\exp\left(\gamma + \int_0^1 \frac{2\left(x^{0.5}-x^1-\log\left(x^{0.5}\right)+\log\left(x^1\right)\right)}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)\sqrt[2-2\times 0.5]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 7 + \frac{1}{\phi} = -7 + \frac{1}{\phi} + \frac{144\left(\oint_L \frac{e^t}{t^1}\, dt\right)^2}{\left(\oint_L \frac{e^t}{t^{0.5}}\, dt\right)^2 \sqrt{\pi}^2}$$

((((24*1/(sqrtPi) ((gamma (0.5/(2-2*0.5)))) / ((gamma (1/(2-2*0.5)))) * 0.5^(1/(2-2*0.5))))))^2-5+1/golden ratio

Input:

$$\left(24\times\frac{1}{\sqrt{\pi}}\left(\frac{\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)}\sqrt[2-2\times 0.5]{0.5}\right)\right)^2 - 5 + \frac{1}{\phi}$$

$\Gamma(x)$ is the gamma function

ϕ is the golden ratio

Result:

139.618...

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

Alternative representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)\sqrt[2-2\times 0.5]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 5 + \frac{1}{\phi} = -5 + \frac{1}{\phi} + \left(\frac{24\left(-1+\frac{0.5}{1}\right)!\,\sqrt[1]{0.5}}{\left(-1+\frac{1}{1}\right)!\,\sqrt{\pi}}\right)^2$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)\sqrt[2-2\times 0.5]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 5 + \frac{1}{\phi} = -5 + \frac{1}{\phi} + \left(\frac{24\,\Gamma\left(\frac{0.5}{1}, 0\right)\sqrt[1]{0.5}}{\Gamma\left(\frac{1}{1}, 0\right)\sqrt{\pi}}\right)^2$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)\sqrt[2-2\times 0.5]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 5 + \frac{1}{\phi} = -5 + \frac{1}{\phi} + \left(\frac{24\,G\left(1+\frac{0.5}{1}\right)\sqrt[1]{0.5}}{\frac{G\left(\frac{0.5}{1}\right)G\left(1+\frac{1}{1}\right)\sqrt{\pi}}{G\left(\frac{1}{1}\right)}}\right)^2$$

Series representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2-5+\frac{1}{\phi}=-5+\frac{1}{\phi}+\frac{144\,\Gamma(0.5)^2}{\exp^2\left(i\pi\left\lfloor\frac{\arg(\pi-x)}{2\pi}\right\rfloor\right)\Gamma(1)^2\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2}\quad\text{for } (x\in\mathbb{R}\text{ and } x<0)$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2-5+\frac{1}{\phi}=-5+\frac{1}{\phi}+\frac{144\,\Gamma(0.5)^2\left(\frac{1}{z_0}\right)^{-\lfloor\arg(\pi-z_0)/(2\pi)\rfloor}z_0^{-1-\lfloor\arg(\pi-z_0)/(2\pi)\rfloor}}{\Gamma(1)^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}\right)^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2-5+\frac{1}{\phi}=-\left(\left(5\left(-28.8\,\phi\left(\sum_{k=0}^{\infty}\frac{(0.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2-0.2\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2+\phi\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2\right)\right)\Big/\left(\phi\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2\right)\right)\quad\text{for } (z_0\notin\mathbb{Z}\text{ or } z_0>0)$$

Integral representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2-5+\frac{1}{\phi}=-5+\frac{1}{\phi}+\frac{144\exp\left(2\int_0^1\frac{-0.5+x^{0.5}+0.5\,x-x^1}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2-5+\frac{1}{\phi}=-5+\frac{1}{\phi}+\frac{144\exp\left(\gamma+\int_0^1\frac{2\left(x^{0.5}-x^1-\log\left(x^{0.5}\right)+\log\left(x^1\right)\right)}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2 - 5 + \frac{1}{\phi} = -5 + \frac{1}{\phi} + \frac{144\left(\oint_L \frac{e^t}{t^1}\,dt\right)^2}{\left(\oint_L \frac{e^t}{t^{0.5}}\,dt\right)^2 \sqrt{\pi}^2}$$

((((24*1/(sqrtPi) ((gamma (0.5/(2-2*0.5)))) / ((gamma (1/(2-2*0.5)))) * 0.5^(1/(2-2*0.5))))))^2-18-1/golden ratio

Input:

$$\left(24\times\frac{1}{\sqrt{\pi}}\left(\frac{\Gamma\left(\frac{0.5}{2-2\times0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)}\sqrt[2-2\times0.5]{0.5}\right)\right)^2 - 18 - \frac{1}{\phi}$$

$\Gamma(x)$ is the gamma function

ϕ is the golden ratio

Result:

125.382...

125.382… 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 GeV

Alternative representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \left(\frac{24\left(-1+\frac{0.5}{1}\right)!\,\sqrt[1]{0.5}}{\left(-1+\frac{1}{1}\right)!\,\sqrt{\pi}}\right)^2$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \left(\frac{24\,\Gamma\left(\frac{0.5}{1}, 0\right)\sqrt[1]{0.5}}{\Gamma\left(\frac{1}{1}, 0\right)\sqrt{\pi}}\right)^2$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \left(\frac{24\,G\left(1+\frac{0.5}{1}\right)\sqrt[1]{0.5}}{\frac{G\left(\frac{0.5}{1}\right)G\left(1+\frac{1}{1}\right)\sqrt{\pi}}{G\left(\frac{1}{1}\right)}}\right)^2$$

Series representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \frac{144\,\Gamma(0.5)^2}{\exp^2\left(i\,\pi\left\lfloor\frac{\arg(\pi-x)}{2\,\pi}\right\rfloor\right)\Gamma(1)^2\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2} \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \frac{144\,\Gamma(0.5)^2\left(\frac{1}{z_0}\right)^{-\lfloor\arg(\pi-z_0)/(2\,\pi)\rfloor} z_0^{-1-\lfloor\arg(\pi-z_0)/(2\,\pi)\rfloor}}{\Gamma(1)^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}\right)^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -\left(\left(18\left(-8\,\phi\left(\sum_{k=0}^{\infty}\frac{(0.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2 + 0.0555556\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2\right) + \phi\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2\right)\Bigg/\left(\phi\sqrt{-1+\pi}^2\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^2\right)\right) \quad \text{for } (z_0\notin\mathbb{Z} \text{ or } z_0>0)$$

Integral representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \frac{144\exp\left(\int_0^1 -\frac{2\left(0.5-x^{0.5}-0.5\,x+x^1\right)}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \frac{144\exp\left(\gamma + \int_0^1 \frac{2\left(x^{0.5}-x^1-\log\left(x^{0.5}\right)+\log\left(x^1\right)\right)}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^2}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times0.5}\right)^{2-2\times0.5}\sqrt{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)\sqrt{\pi}}\right)^2 - 18 - \frac{1}{\phi} = -18 - \frac{1}{\phi} + \frac{144\left(\oint_L \frac{e^t}{t^1}\,dt\right)^2}{\left(\oint_L \frac{e^t}{t^{0.5}}\,dt\right)^2\sqrt{\pi}^2}$$

((((24*1/(sqrtPi) ((gamma (0.5/(2-2*0.5)))) / ((gamma (1/(2-2*0.5)))) * 0.5^(1/(2-2*0.5))))))^3+1

Input:

$$\left(24\times\frac{1}{\sqrt{\pi}}\left(\frac{\Gamma\left(\frac{0.5}{2-2\times0.5}\right)}{\Gamma\left(\frac{1}{2-2\times0.5}\right)}\sqrt[2-2\times0.5]{0.5}\right)\right)^3 + 1$$

$\Gamma(x)$ is the gamma function

Result:

1729

1729

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

Alternative representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3+1=1+\left(\frac{24\left(-1+\frac{0.5}{1}\right)!\sqrt[1]{0.5}}{\left(-1+\frac{1}{1}\right)!\sqrt{\pi}}\right)^3$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3+1=1+\left(\frac{24\,\Gamma\left(\frac{0.5}{1},0\right)\sqrt[1]{0.5}}{\Gamma\left(\frac{1}{1},0\right)\sqrt{\pi}}\right)^3$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3+1=1+\left(\frac{24\,G\left(1+\frac{0.5}{1}\right)\sqrt[1]{0.5}}{\frac{G\left(\frac{0.5}{1}\right)G\left(1+\frac{1}{1}\right)\sqrt{\pi}}{G\left(\frac{1}{1}\right)}}\right)^3$$

Series representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3+1=$$
$$1+\frac{1728\,\Gamma(0.5)^3}{\exp^3\left(i\pi\left\lfloor\frac{\arg(\pi-x)}{2\pi}\right\rfloor\right)\Gamma(1)^3\sqrt{x}^3\left(\sum_{k=0}^{\infty}\frac{(-1)^k(\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^3}\quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3+1=$$
$$1+\frac{1728\,\Gamma(0.5)^3\left(\frac{1}{z_0}\right)^{-3/2\lfloor\arg(\pi-z_0)/(2\pi)\rfloor}z_0^{-3/2(1+\lfloor\arg(\pi-z_0)/(2\pi)\rfloor)}}{\Gamma(1)^3\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}\right)^3}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3+1=\left(1728\left(\sum_{k=0}^{\infty}\frac{(0.5-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3+\right.$$
$$\left.\sqrt{-1+\pi}^3\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^3\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3\right)\Big/$$
$$\left(\sqrt{-1+\pi}^3\left(\sum_{k=0}^{\infty}(-1+\pi)^{-k}\binom{\frac{1}{2}}{k}\right)^3\left(\sum_{k=0}^{\infty}\frac{(1-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)^3\right)\quad \text{for } (z_0\notin\mathbb{Z} \text{ or } z_0>0)$$

Integral representations:

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[2-2\times 0.5]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3 + 1 = 1 + \frac{1728\exp\left(3\int_0^1 \frac{-0.5+x^{0.5}+0.5x-x^1}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^3}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[2-2\times 0.5]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3 + 1 = 1 + \frac{1728\exp\left(1.5\gamma + \int_0^1 \frac{3\left(x^{0.5}-x^1-\log(x^{0.5})+\log(x^1)\right)}{(-1+x)\log(x)}\,dx\right)}{\sqrt{\pi}^3}$$

$$\left(\frac{24\left(\Gamma\left(\frac{0.5}{2-2\times 0.5}\right)^{2-2\times 0.5}\sqrt[2-2\times 0.5]{0.5}\right)}{\Gamma\left(\frac{1}{2-2\times 0.5}\right)\sqrt{\pi}}\right)^3 + 1 = \frac{1728\left(\int_0^1 \frac{1}{\log^{0.5}\left(\frac{1}{t}\right)}\,dt\right)^3 + \left(\int_0^1 1\,dt\right)^3\sqrt{\pi}^3}{\left(\int_0^1 1\,dt\right)^3\sqrt{\pi}^3}$$

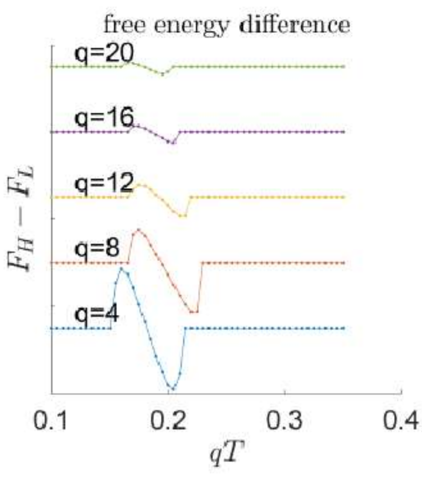
Now, we have that:

$q = 8$

$\hat{\mu} = \frac{\mu}{q} = 0.5.$

$\mathcal{J} = 1,\ q = 4.$

$\mu = 0.075$



From

$$\tanh^2 \gamma = \frac{\epsilon}{2}(\sqrt{4+\epsilon^2} - \epsilon) \ , \qquad \epsilon = \frac{\hat{\mu}}{2\mathcal{J}}$$

We obtain, for q = 8:

$$\hat{\mu} = \frac{\mu}{q} = 0.5.$$

$$\frac{x}{8} = 0.5$$

$$\frac{x}{8} - 0.5 = 0$$

$$x = 4$$

Thence μ = 4 and $\epsilon = 0.125$

tanh^2x = 0.125/2((4+0.125^2)^1/2 - 0.125)

Input:

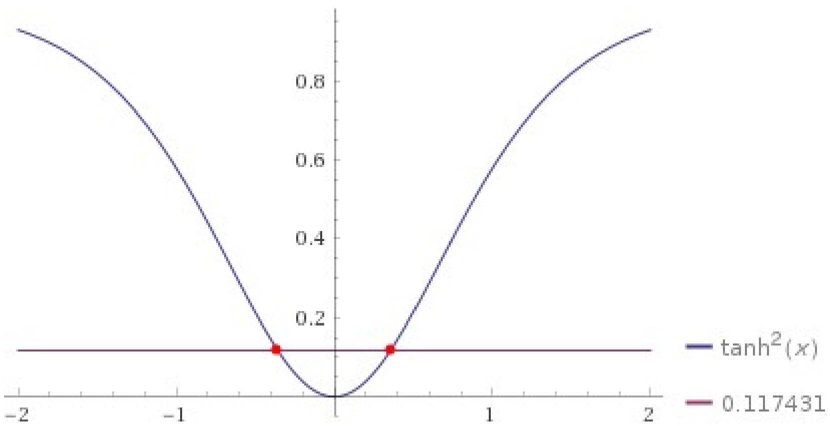
$$\tanh^2(x) = \frac{0.125}{2}\left(\sqrt{4+0.125^2} - 0.125\right)$$

tanh(x) is the hyperbolic tangent function

Result:

$$\tanh^2(x) = 0.117431$$

Plot:



Alternate forms:

$$\frac{\sinh^2(x)}{\cosh^2(x)} = 0.117431$$

$$\frac{\cosh(2x) - 1}{\cosh(2x) + 1} = 0.117431$$

$$\frac{(e^x - e^{-x})^2}{(e^{-x} + e^x)^2} = 0.117431$$

cosh(x) is the hyperbolic cosine function
sinh(x) is the hyperbolic sine function

Alternate form assuming x is real:

$$\frac{\sinh^2(2x)}{(\cosh(2x)+1)^2} = 0.117431$$

Real solutions:

$x \approx -0.357129$

$x \approx 0.357129$

Solutions:

$x \approx i(3.14159\, n + (-0.357129\, i)), \quad n \in \mathbb{Z}$

$x \approx i(3.14159\, n + (0.357129\, i)), \quad n \in \mathbb{Z}$

$\mathbb{Z}$ is the set of integers

tanh^2 (0.357129)

Input interpretation:

$\tanh^2(0.357129)$

tanh(x) is the hyperbolic tangent function

Result:

0.117431...

0.117431...

0.125/2((4+0.125^2)^1/2 - 0.125)

Input:

$$\frac{0.125}{2}\left(\sqrt{4+0.125^2} - 0.125\right)$$

Result:

0.117431...

Thence: γ = 0.357129

From

$$\frac{E}{N} = \frac{\hat{\mu}}{q^2}\left[-\frac{q}{2} + 1 - \log\tanh\gamma - \frac{1}{\tanh^2\gamma}\right]$$

we obtain:

0.5/64((((-8/2+1- ln(tanh 0.357129) – 1/(tanh^2 (0.357129)))))

Input interpretation:

$$\frac{0.5}{64}\left(-\frac{8}{2} + 1 - \log(\tanh(0.357129)) - \frac{1}{\tanh^2(0.357129)}\right)$$

tanh(x) is the hyperbolic tangent function

log(x) is the natural logarithm

Result:

-0.0815989...

-0.0815989…

Note that, we have the following 7th order Ramanujan mock theta functions

Mock ϑ-functions (of 7th order)

$$\text{(i)} \quad 1 + \frac{q}{1-q^2} + \frac{q^4}{(1-q^3)(1-q^4)} + \frac{q^9}{(1-q^4)(1-q^5)(1-q^6)} + \ldots$$

$$\text{(ii)} \quad \frac{q}{1-q} + \frac{q^4}{(1-q^2)(1-q^3)} + \frac{q^9}{(1-q^3)(1-q^4)(1-q^5)} + \ldots$$

$$\text{(iii)} \quad \frac{1}{1-q} + \frac{q^2}{(1-q^2)(1-q^3)} + \frac{q^6}{(1-q^3)(1-q^4)(1-q^5)} + \ldots$$

From the (iii), we have:

-0.0818490473675659731164199386742529714823980189619 22

0.000435734563064045714075785307083428104970561697246 6

-1.8762261787851325482986508127679968797519452065 × 10^-7

$$-0.0818490473675659731164199386742529714823980189619 22 + 0.000435734563064045714075785307083428104970561697246 6 - 1.8762261787851325482986508127679968797519452065 \times 10^{-7}$$

$$-0.0814135004271198059155989832322508201771154324591960 5$$

The result is:

-0.0814135004271198059155989832322508201771154324591960 5

very near to the above value:

-0.0814135 ≈ -0.0815989…

Alternative representations:

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = \frac{1}{64}\times 0.5\left(-3-\log\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)^2}\right)$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = \frac{1}{64}\times 0.5\left(-3-\log_e(\tanh(0.357129))-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)^2}\right)$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = \frac{1}{64}\times 0.5\left(-3-\log(a)\log_a(\tanh(0.357129))-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)^2}\right)$$

Series representations:

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = -0.0234375 - 0.0078125\log\left(-1-2\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)-\frac{0.00195313}{\left(0.5+\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)^2} \quad \text{for } q = 1.42922$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = -0.0234375-\frac{0.00195313}{\left(0.5+\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)^2}+0.0078125\sum_{k=1}^{\infty}\frac{(-1)^k(-1+\tanh(0.357129))^k}{k} \quad \text{for } q = 1.42922$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = -\left(\left(0.0078125\left(0.12251+3\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)^2 + \log\left(2.85703\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)^2\right)\right)\Big/\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)^2\right)$$

Integral representations:

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = -\left(\left(0.0078125\left(1+3\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)^2+\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)^2\log\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\right)\right)\Big/\left(\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)^2\right)\right)$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)0.5 = -\left(\left(0.0078125\left(1+3\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)^2+\left(\int_1^{\tanh(0.357129)}\frac{1}{t}\,dt\right)\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)^2\right)\right)\Big/\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)^2\right)$$

For

$$E = -N\mu/2$$

We have that:

$$\frac{E}{N} = \frac{\hat{\mu}}{q^2}\left[-\frac{q}{2}+1-\log\tanh\gamma-\frac{1}{\tanh^2\gamma}\right]$$

-4N/2*1/N

Input:

$$-4\times\frac{N}{2}\times\frac{1}{N}$$

Result:

-2 (for $N \neq 0$)

((-4N/2*1/N))x = 0.5/64((((-8/2+1- ln(tanh 0.357129) – 1/(tanh^2 (0.357129))))))

Input interpretation:

$$\left(-4\times\frac{N}{2}\times\frac{1}{N}\right)x = \frac{0.5}{64}\left(-\frac{8}{2}+1-\log(\tanh(0.357129))-\frac{1}{\tanh^2(0.357129)}\right)$$

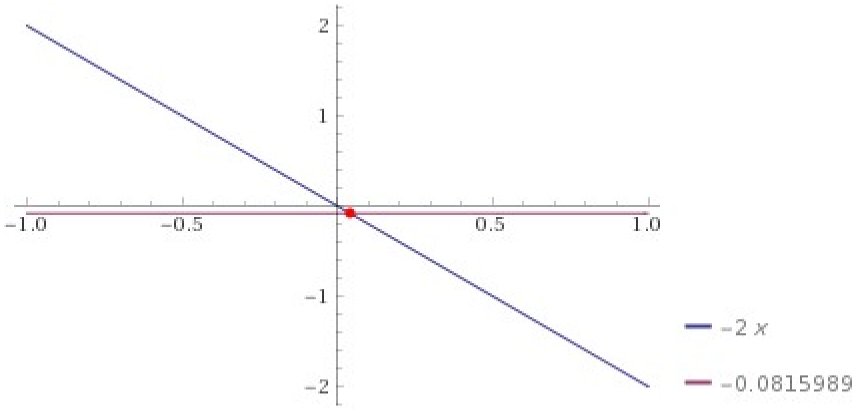
$\tanh(x)$ is the hyperbolic tangent function

$\log(x)$ is the natural logarithm

Result:

$-2x = -0.0815989$

Plot:



Alternate form:

$0.0815989 - 2x = 0$

Solution:

$x \approx 0.0407994$

0.0407994

Now

Taking the small $\hat{\mu}$ limit of (5.86) we get

$$\frac{E}{N} = -\frac{\hat{\mu}}{2q} + \frac{1}{q^2}\left[-2\mathcal{J} + \frac{\hat{\mu}}{2}(1 - \log\frac{\hat{\mu}}{2\mathcal{J}})\right]$$

We obtain:

-0.5/16+1/64[(-4+0.5/2(1-ln(0.5/4)))]

Input:

$$-\frac{0.5}{16} + \frac{1}{64}\left(-4 + \frac{0.5}{2}\left(1 - \log\left(\frac{0.5}{4}\right)\right)\right)$$

log(x) is the natural logarithm

Result:

−0.0817209...

-0.0817209…

With the regard the 7th order Ramanujan mock theta functions (see above)

From the (i), we have:

0.9239078+0.000433255+(-
1.8754140254243246404383299476354805043847163776 × 10^-7)

Input interpretation:

$0.9239078 + 0.000433255 - 1.8754140254243246404383299476354805043847163776 \times 10^{-7}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

0.92434086745859745756753595616700523645194956152836224

Open code

The result is

0.92434086745859745756753595616700523645194956152836224

From the (ii), we have:

-1.0818490473675659731164199386742529714823980189619 22 +

0.076125136781444046402220274946667197167621511872585 7

-0.000433255719961759072744149660169833646052283127278

Input interpretation:

$-1.0818490473675659731164199386742529714823980189619 22 + 0.076125136781444046402220274946667197167621511872585 7 - 0.000433255719961759072744149660169833646052283127278$

Open code

Result:

$-1.006157166306083685786943813387755607960828790216614 3$

The result is -1.0061571663…

-1.006157166306083685786943813387755607960828790216614 3

From the difference, we obtain:

0,9243408 - 1,00615716 = -0,08181636 result that is very near to the value obtained -0.0817209…

Alternative representations:

$$-\frac{0.5}{16}+\frac{1}{64}\left(-4+\frac{1}{2}\times 0.5\left(1-\log\left(\frac{0.5}{4}\right)\right)\right)=-\frac{0.5}{16}+\frac{1}{64}\left(-4+0.25\left(1-\log_e\left(\frac{0.5}{4}\right)\right)\right)$$

$$-\frac{0.5}{16}+\frac{1}{64}\left(-4+\frac{1}{2}\times 0.5\left(1-\log\left(\frac{0.5}{4}\right)\right)\right)=-\frac{0.5}{16}+\frac{1}{64}\left(-4+0.25\left(1-\log(a)\log_a\left(\frac{0.5}{4}\right)\right)\right)$$

$$-\frac{0.5}{16}+\frac{1}{64}\left(-4+\frac{1}{2}\times 0.5\left(1-\log\left(\frac{0.5}{4}\right)\right)\right)=-\frac{0.5}{16}+\frac{1}{64}\left(-4+0.25\left(1+\text{Li}_1\left(1-\frac{0.5}{4}\right)\right)\right)$$

Series representations:

$$-\frac{0.5}{16}+\frac{1}{64}\left(-4+\frac{1}{2}\times 0.5\left(1-\log\left(\frac{0.5}{4}\right)\right)\right)=$$
$$-0.0898438+0.00390625\sum_{k=1}^{\infty}\frac{(-1)^k(-0.875)^k}{k}$$

$$-\frac{0.5}{16}+\frac{1}{64}\left(-4+\frac{1}{2}\times 0.5\left(1-\log\left(\frac{0.5}{4}\right)\right)\right)=$$
$$-0.0898438-0.0078125\, i\, \pi\left\lfloor\frac{\arg(0.125-x)}{2\,\pi}\right\rfloor-0.00390625\log(x)+$$
$$0.00390625\sum_{k=1}^{\infty}\frac{(-1)^k\,(0.125-x)^k\,x^{-k}}{k}\quad \text{for } x<0$$

$$-\frac{0.5}{16}+\frac{1}{64}\left(-4+\frac{1}{2}\times 0.5\left(1-\log\left(\frac{0.5}{4}\right)\right)\right)=$$
$$-0.0898438-0.00390625\left\lfloor\frac{\arg(0.125-z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)-0.00390625\log(z_0)-$$
$$0.00390625\left\lfloor\frac{\arg(0.125-z_0)}{2\,\pi}\right\rfloor\log(z_0)+0.00390625\sum_{k=1}^{\infty}\frac{(-1)^k\,(0.125-z_0)^k\,z_0^{-k}}{k}$$

Integral representation:

$$-\frac{0.5}{16}+\frac{1}{64}\left(-4+\frac{1}{2}\times 0.5\left(1-\log\left(\frac{0.5}{4}\right)\right)\right)=-0.0898438-0.00390625\int_1^{0.125}\frac{1}{t}\,dt$$

Appendix

DILATON VALUE CALCULATIONS 0.989117352243

from:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

5. Since G_n and g_n can be expressed as roots of algebraical equations with rational coefficients, the same is true of G_n^{24} or g_n^{24}. So let us suppose that

$$1 = ag_n^{-24} - bg_n^{-48} + \cdots,$$

or

$$g_n^{24} = a - bg_n^{-24} + \cdots.$$

But we know that

$$\begin{aligned}
64e^{-\pi\sqrt{n}}g_n^{24} &= 1 - 24e^{-\pi\sqrt{n}} + 276e^{-2\pi\sqrt{n}} - \cdots, \\
64g_n^{24} &= e^{\pi\sqrt{n}} - 24 + 276e^{-\pi\sqrt{n}} - \cdots, \\
64a - 64bg_n^{-24} + \cdots &= e^{\pi\sqrt{n}} - 24 + 276e^{-\pi\sqrt{n}} - \cdots, \\
64a - 4096be^{-\pi\sqrt{n}} + \cdots &= e^{\pi\sqrt{n}} - 24 + 276e^{-\pi\sqrt{n}} - \cdots,
\end{aligned}$$

that is

$$e^{\pi\sqrt{n}} = (64a + 24) - (4096b + 276)e^{-\pi\sqrt{n}} + \cdots \tag{13}$$

Similarly, if

$$1 = aG_n^{-24} - bG_n^{-48} + \cdots,$$

then

$$e^{\pi\sqrt{n}} = (64a - 24) - (4096b + 276)e^{-\pi\sqrt{n}} + \cdots \tag{14}$$

From (13) and (14) we can find whether $e^{\pi\sqrt{n}}$ is very nearly an integer for given values of n, and ascertain also the number of 9's or 0's in the decimal part. But if G_n and g_n be simple quadratic surds we may work independently as follows. We have, for example,

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

Hence

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

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

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

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

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

Now, we have that:

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 $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

Therefore with respect to the exponential of the vacuum equation, 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.

phi = -Pi*sqrt(18) + 6C, for C = 1, we obtain:

exp((-Pi*sqrt(18))

Input:

$\exp\left(-\pi\sqrt{18}\right)$

Exact result:

$e^{-3\sqrt{2}\,\pi}$

Decimal approximation:

$1.6272016226072509292942156739117979541838581136954016\ldots \times 10^{-6}$

1.6272016… * 10^{-6}

Now:

$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$

$e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^{-6}

$\frac{1}{4096}e^{-6C+\phi}$ = 1.6272016… * 10^{-6}

0.000244140625 $e^{-6C+\phi}$ = $e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^{-6}

$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

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…

$e^{-6C+\phi} = 0.0066650177536$

$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625} =$

$e^{-\pi\sqrt{18}} \times \frac{1}{0.000244140625}$

= 0.00666501785…

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

-5.010882647757…

-5.010882647757…

Now:

$-6C + \phi = -5.010882647757 \ldots$

For C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Conclusions

Note that:

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

Hence

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

so that

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

Hence

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

Thence:

$$64 g_{22}^{-24} = 4096 e^{-\pi\sqrt{22}} + \cdots$$

And

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

That are connected with 64, 128, 256, 512, 1024 and 4096 = 64^2

(**Modular equations and approximations to π -** *S. Ramanujan* - Quarterly Journal of Mathematics, XLV, 1914, 350 – 372)

All the results of the most important connections are signed in blue throughout the drafting of the paper. We highlight as in the development of the various equations we use always the constants π, ϕ, 1/ϕ, the Fibonacci and Lucas numbers, linked to the golden ratio, that play a fundamental role in the development, and therefore, in the final results of the analyzed expressions.

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