On some Ramanujan's equations (Hardy-Ramanujan number and mock theta functions) linked to various parameters of Standard Model and Black Hole Physics: New possible mathematical connections. III

Michele Nardelli[1], Antonio Nardelli

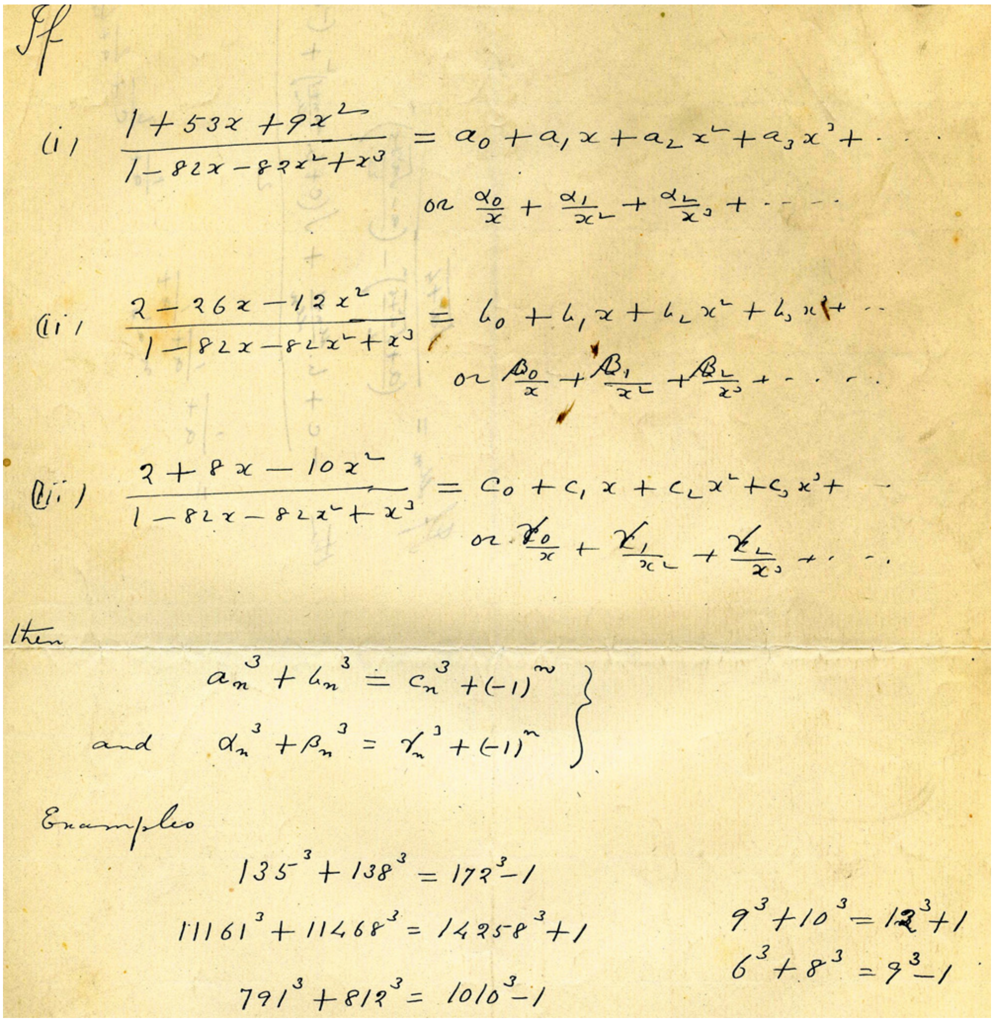
Abstract

In this research thesis, we have described and deepened further Ramanujan equations (Hardy-Ramanujan number and mock theta functions) linked to various parameters of Standard Model and Black Hole Physics. We have therefore obtained further possible mathematical connections.

[1] M.Nardelli studied at Dipartimento di Scienze della Terra Università degli Studi di Napoli Federico II, Largo S. Marcellino, 10 - 80138 Napoli, Dipartimento di Matematica ed Applicazioni "R. Caccioppoli" - Università degli Studi di Napoli "Federico II" – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

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:

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

Now, we have that:

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:

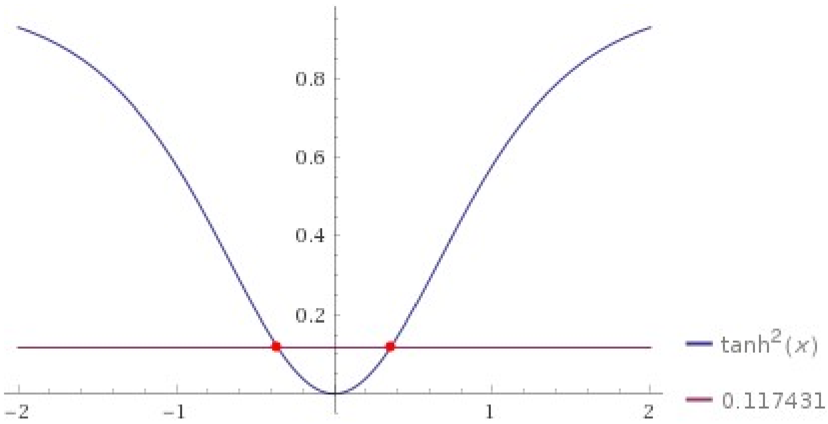
$$\tanh^2(x) = \frac{0.125}{2}\left(\sqrt{4+0.125^2} - 0.125\right)$$

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...

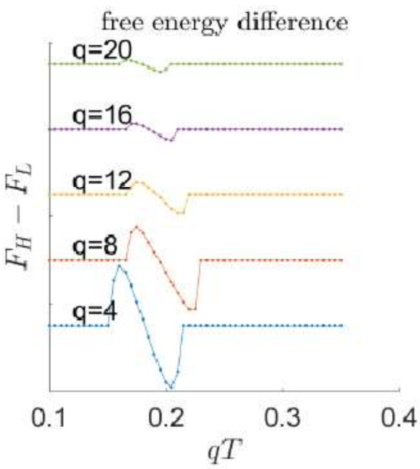
Thence: $\gamma = 0.357129$

$q = 8$

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

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

$\mu = 0.075$



$\gamma = 0.357129$ Thence $\mu = 4$ and $\epsilon = 0.125$

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

q = 8

$\gamma, \sigma \ll 1$

$$\tilde{\alpha} = \alpha \ , \qquad \tilde{\gamma} = \gamma + \sigma$$

$\tilde{\gamma} = \gamma + \sigma = 0.357129 + 0.0864055 = 0.4435345$

$$\beta = q \log q$$

From

$$\nu \equiv i \int_{-\infty}^{\infty} d\tau \Sigma_{LR} = \frac{2\tilde{\alpha}}{q} = \frac{\mu}{\tanh \tilde{\gamma}} \ ,$$

we obtain:

4/(tanh(0.4435345))

Input interpretation:

$$\frac{4}{\tanh(0.4435345)}$$

tanh(x) is the hyperbolic tangent function

Result:

9.602230...

9.602230…

Alternative representations:

$$\frac{4}{\tanh(0.443535)} = \frac{4}{\frac{1}{\coth(0.443535)}}$$

$$\frac{4}{\tanh(0.443535)} = \frac{4}{-1 + \frac{2}{1+\frac{1}{e^{0.887069}}}}$$

$$\frac{4}{\tanh(0.443535)} = -\frac{4}{\frac{i}{\cot(0.443535\, i)}}$$

Series representations:

$$\frac{4}{\tanh(0.443535)} = -\frac{4}{1 + 2 \sum_{k=1}^{\infty} (-1)^k q^{2k}} \quad \text{for } q = 1.5582$$

$$\frac{4}{\tanh(0.443535)} = \frac{1.12731}{\sum_{k=1}^{\infty} \frac{1}{0.786891+(1-2k)^2 \pi^2}}$$

$$\frac{4}{\tanh(0.443535)} = \frac{1.77414}{\sum_{k=1}^{\infty} \frac{(-1+4^k) e^{-0.239665 k} B_{2k}}{(2k)!}}$$

Integral representation:

$$\frac{4}{\tanh(0.443535)} = \frac{4}{\int_0^{0.443535} \operatorname{sech}^2(t)\,dt}$$

Note that:

1+2/sqrt(((4/(tanh(0.4435345)))))

Input interpretation:

$$1 + \frac{2}{\sqrt{\frac{4}{\tanh(0.4435345)}}}$$

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

Result:

1.6454223...

1.6454223….≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Alternative representations:

$$1 + \frac{2}{\sqrt{\frac{4}{\tanh(0.443535)}}} = 1 + \frac{2}{\sqrt{\frac{4}{\frac{1}{\coth(0.443535)}}}}$$

$$1 + \frac{2}{\sqrt{\frac{4}{\tanh(0.443535)}}} = 1 + \frac{2}{\sqrt{\frac{4}{-1+\frac{2}{1+\frac{1}{e^{0.887069}}}}}}$$

$$1+\frac{2}{\sqrt{\frac{4}{\tanh(0.443535)}}}=1+\frac{2}{\sqrt{\frac{4}{\coth\left(0.443535-\frac{i\pi}{2}\right)}}}$$

Series representations:

$$1+\frac{2}{\sqrt{\frac{4}{\tanh(0.443535)}}}=1+\frac{2}{\sqrt{-\frac{4}{1+2\sum_{k=1}^{\infty}(-1)^k q^{2k}}}} \quad \text{for } q=1.5582$$

$$1+\frac{2}{\sqrt{\frac{4}{\tanh(0.443535)}}}=1+\frac{2}{\sqrt{\frac{1.12731}{\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}}}}$$

$$1+\frac{2}{\sqrt{\frac{4}{\tanh(0.443535)}}}=1+\frac{2}{\sqrt{-1+\frac{4}{\tanh(0.443535)}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\frac{4}{\tanh(0.443535)}\right)^{-k}}$$

Integral representation:

$$1+\frac{2}{\sqrt{\frac{4}{\tanh(0.443535)}}}=1+\frac{2}{\sqrt{\frac{4}{\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}}}$$

Now:

$$\beta = q\log q$$

8 ln 8

Input:

8 log(8)

log(x) is the natural logarithm

Decimal approximation:

16.63553233343868742601357091499623763381200322464612609889...

β = 16.635532333438

Property:

8 log(8) is a transcendental number

Alternate form:

24 log(2)

Alternative representations:

$$8\log(8) = 8\log_e(8)$$

$$8\log(8) = 8\log(a)\log_a(8)$$

$$8\log(8) = -8\,\mathrm{Li}_1(-7)$$

Series representations:

$$8\log(8) = 8\log(7) - 8\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{7}\right)^k}{k}$$

$$8\log(8) = 16\,i\,\pi\left\lfloor\frac{\arg(8-x)}{2\pi}\right\rfloor + 8\log(x) - 8\sum_{k=1}^{\infty}\frac{(-1)^k(8-x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$8\log(8) = 8\left\lfloor\frac{\arg(8-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + 8\log(z_0) + 8\left\lfloor\frac{\arg(8-z_0)}{2\pi}\right\rfloor\log(z_0) - 8\sum_{k=1}^{\infty}\frac{(-1)^k(8-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$8\log(8) = 8\int_1^8\frac{1}{t}\,dt$$

$$8\log(8) = -\frac{4\,i}{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{7^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

Now:

$$\sigma = qe^{-\beta\nu}$$

8*e^(-16.635532333438*9.602230)

Input interpretation:

$8\,e^{-16.635532333438\times 9.602230}$

Result:

$3.38585\ldots \times 10^{-69}$

$3.38585\ldots*10^{-69}$

Alternative representation:

$8\,e^{9.60223\,(-1)\,16.6355323334380000} = 8\exp^{9.60223\,(-1)\,16.6355323334380000}(z)$ for $z = 1$

Series representations:

$$8\,e^{9.60223\,(-1)\,16.6355323334380000} = \frac{8}{\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{159.738}}$$

$$8\,e^{9.60223\,(-1)\,16.6355323334380000} = \frac{9.75174\times 10^{48}}{\left(\sum_{k=0}^{\infty} \frac{1+k}{k!}\right)^{159.738}}$$

$$8\,e^{9.60223\,(-1)\,16.6355323334380000} = \frac{8}{\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{159.738}}$$

$\gamma = 0.357129$ Thence $\mu = 4$ and $\epsilon = 0.125$

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

$q = 8$

$$\gamma, \sigma \ll 1$$

$$\tilde{\alpha} = \alpha \;, \qquad \tilde{\gamma} = \gamma + \sigma$$

$\tilde{\gamma} = \gamma + \sigma = 0.357129 + 0.0864055 = 0.4435345$

$\sigma = 3.38585\ldots \times 10^{-69}$

3.38585e-69

ν = 9.602230

β = 16.635532333438

We can compute the energy from (5.75) and also the free energy, see appendix A for a derivation. We find

$$\begin{aligned} \frac{E}{N} &= \frac{\hat{\mu}}{q^2}\left[-\frac{q}{2}+1-\frac{1}{\tanh\gamma\tanh\tilde{\gamma}}-\log\frac{\sinh\gamma}{\cosh\tilde{\gamma}}\right] \\ -\frac{\beta F}{N} &= \frac{\beta\hat{\mu}}{q^2}\left[\frac{q}{2}-1+\frac{1}{\tanh\gamma\tanh\tilde{\gamma}}+\log\frac{\sinh\gamma}{\cosh\tilde{\gamma}}+\frac{\sigma}{\tanh\tilde{\gamma}}\right]+\frac{\sigma}{q} \\ \frac{S}{N} &= \frac{\sigma}{q}\left[1+\log\frac{q}{\sigma}\right]=e^{-\beta\nu}\left[1+\beta\nu\right] \end{aligned} \quad (5.99)$$

From

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

we obtain:

0.5/64 (((-8/2+1-1/(tanh0.357129 tanh0.4435345)-ln(sinh0.357129 / cosh0.4435345))))

Input interpretation:

$$\frac{0.5}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.4435345)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)$$

tanh(x) is the hyperbolic tangent function

sinh(x) is the hyperbolic sine function

cosh(x) is the hyperbolic cosine function

log(x) is the natural logarithm

Result:

−0.0695422…

-0.0695422…

Alternative representations:

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = \frac{1}{64}\times 0.5\left(-3-\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = \frac{1}{64}\times 0.5\left(-3-\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = \frac{1}{64}\times 0.5\left(-3-\log\left(\frac{-\frac{1}{e^{0.357129}}+e^{0.357129}}{\frac{2}{2}\left(\frac{1}{e^{0.443535}}+e^{0.443535}\right)}\right)-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

Series representations:

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = \left(0.0078125\left(-0.0986433-3\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{1}{\left(0.510164+\pi^2(1-2k_1)^2\right)\left(0.786891+\pi^2(1-2k_2)^2\right)}+\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\sum_{k_3=1}^{\infty}\frac{(-1)^{k_3}\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}}{\left(0.510164+\pi^2(1-2k_1)^2\right)\left(0.786891+\pi^2(1-2k_2)^2\right)k_3}\right)\right) \Bigg/ \left(\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}\right)$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = \left(0.0078125\left(-1-3\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\delta_{k_1}+\frac{2^{1+k_1}\,\text{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\,\text{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)(0.357129-z_0)^{k_1}\,(0.443535-z_0)^{k_2}+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=1}^{\infty}\frac{1}{k_3}(-1)^{k_3}\left(\delta_{k_1}+\frac{2^{1+k_1}\,\text{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\,\text{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}(0.357129-z_0)^{k_1}\,(0.443535-z_0)^{k_2}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\text{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.357129-z_0)^k\right)\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\text{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.443535-z_0)^k\right) \quad \text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = -\frac{0.0078125\left(1+2\int_0^1\int_0^1\text{sech}^2(0.357129\,t_1)\,\text{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)}{\left(\int_0^{0.357129}\text{sech}^2(t)\,dt\right)\int_0^{0.443535}\text{sech}^2(t)\,dt}$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = -\frac{0.0078125\left(1+2\int_0^1\int_0^1\text{sech}^2(0.357129\,t_1)\,\text{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)}{\left(\int_0^{0.357129}\text{sech}^2(t)\,dt\right)\int_0^{0.443535}\text{sech}^2(t)\,dt} \quad \text{for } \gamma>0$$

$$\frac{1}{64}\left(-\frac{8}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5 = -\left(\left(0.0078125\left(1+\int_0^1\int_0^1\text{sech}^2(0.357129\,t_1)\,\text{sech}^2(0.443535\,t_2)\,dt_2\,dt_1-\cosh(0.443535)\int_0^1\int_0^1\int_0^1\frac{\text{sech}^2(0.357129\,t_2)\,\text{sech}^2(0.443535\,t_3)}{-\cosh(0.443535)+(\cosh(0.443535)-\sinh(0.357129))\,t_1}\,dt_3\,dt_2\,dt_1\right)\right)\Big/\left(\left(\int_0^{0.357129}\text{sech}^2(t)\,dt\right)\int_0^{0.443535}\text{sech}^2(t)\,dt\right)\right)$$

From:

$$-\frac{\beta F}{N} = \frac{\beta\hat{\mu}}{q^2}\left[\frac{q}{2} - 1 + \frac{1}{\tanh\gamma\tanh\tilde{\gamma}} + \log\frac{\sinh\gamma}{\cosh\tilde{\gamma}} + \frac{\sigma}{\tanh\tilde{\gamma}}\right] + \frac{\sigma}{q}$$

we obtain:

(16.635532333438*0.5)/64 (((8/2-1+1/(tanh0.357129 tanh0.4435345)+ln(sinh0.357129 / cosh0.4435345)+ 3.38585e-69/tanh0.4435345)))+ 3.38585e-69/8

Input interpretation:

$$\frac{16.635532333438\times 0.5}{64}\left(\frac{8}{2} - 1 + \frac{1}{\tanh(0.357129)\tanh(0.4435345)} + \log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right) + \frac{3.38585\times 10^{-69}}{\tanh(0.4435345)}\right) + \frac{3.38585\times 10^{-69}}{8}$$

tanh(x) is the hyperbolic tangent function
sinh(x) is the hyperbolic sine function
cosh(x) is the hyperbolic cosine function
log(x) is the natural logarithm

Result:

1.156871787225131716351828221004930493660412216289535366190...

1.15687178722…

$$\frac{S}{N} = \frac{\sigma}{q}\left[1 + \log\frac{q}{\sigma}\right] = e^{-\beta\nu}\left[1 + \beta\nu\right]$$

3.38585e-69/8(1+ln(8/3.38585e-69)) = e^(-16.635532333438*9.602230)*(1+16.635532333438*9.602230)

3.38585e-69/8(1+ln(8/3.38585e-69))

Input interpretation:

$$\frac{3.38585\times 10^{-69}}{8}\left(1 + \log\left(\frac{8}{3.38585\times 10^{-69}}\right)\right)$$

log(x) is the natural logarithm

Result:

$6.80294\ldots \times 10^{-68}$

6.80294e-68

e^(-16.635532333438*9.602230)*(1+16.635532333438*9.602230)

Input interpretation:

$e^{-16.635532333438\times 9.602230}(1 + 16.635532333438 \times 9.602230)$

Result:

$6.80295\ldots \times 10^{-68}$

$6.80295\ldots*10^{-68}$

Alternative representation:

$$e^{9.60223 (-1) 16.6355323334380000}(1 + 16.6355323334380000 \times 9.60223) = \exp^{9.60223 (-1) 16.6355323334380000}(z)(1 + 16.6355323334380000 \times 9.60223) \text{ for } z = 1$$

Series representations:

$$e^{9.60223 (-1) 16.6355323334380000}(1 + 16.6355323334380000 \times 9.60223) = \frac{160.738}{\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{159.738}}$$

$$e^{9.60223 (-1) 16.6355323334380000}(1 + 16.6355323334380000 \times 9.60223) = \frac{1.95935 \times 10^{50}}{\left(\sum_{k=0}^{\infty} \frac{1+k}{k!}\right)^{159.738}}$$

$$e^{9.60223 (-1) 16.6355323334380000}(1 + 16.6355323334380000 \times 9.60223) = \frac{160.738}{\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{159.738}}$$

Note that:

((sqrt(sqrt(6.80295*10^-68))))*10^-18

Input interpretation:

$$\frac{\sqrt{\sqrt{6.80295\times 10^{-68}}}}{10^{18}}$$

Result:

$1.615007... \times 10^{-35}$

$1.615007...*10^{-35}$ result very near to the value of the Planck length $1.616252*10^{-35}$

From the sum of the three results, we obtain:

(-0.0695422+1.15687178722+6.80294e-68)

Input interpretation:

$-0.0695422 + 1.15687178722 + 6.80294\times 10^{-68}$

Result:

1.087329587220000000000000000000000000000000000000000000000...

1.08732958722...

We note that:

MOCK THETA ORDER 3

For $\phi(q)$ q = $-e^{-t}$, t = 0.5 $q^n = -21.79216 * -e^{-0.5} = 13.2176$, we obtain:

$$\phi(q) = 1 + \frac{q}{1+q^2} + \frac{q^4}{(1+q^2)(1+q^4)} + \ldots$$

$$\psi(q) = \frac{q}{1-q} + \frac{q^4}{(1-q)(1-q^3)} + \frac{q^9}{(1-q)(1-q^3)(1-q^5)} + \ldots$$

$$\chi(q) = 1 + \frac{q}{1-q+q^2} + \frac{q^4}{(1-q+q^2)(1-q^2+q^4)} + \ldots$$

χ(q) = 1.081345 + 0.00618954 = 1.08753454

Note that:

(-0.0695422+1.15687178722+6.80294e-68)^6

Input interpretation:

$$\left(-0.0695422 + 1.15687178722 + 6.80294 \times 10^{-68}\right)^6$$

Result:

1.652598044122941384904844795618212790032272258810763849347...

1.652598044... result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

and:

(-0.0695422+1.15687178722+6.80294e-68)^6-34*1/10^3

Input interpretation:

$$\left(-0.0695422 + 1.15687178722 + 6.80294 \times 10^{-68}\right)^6 - 34 \times \frac{1}{10^3}$$

Result:

1.618598044122941384904844795618212790032272258810763849347...

1.61859804412... result that is a very good approximation to the value of the golden ratio 1,618033988749...

Note that from

$$-0.0695422 + 1.15687178722 + 6.80294 \times 10^{-68}$$

we obtain:

(-(-0.0695422*1.15687178722*6.80294e-68))^1/4096

Input interpretation:

$$\sqrt[4096]{-\left(-0.0695422 \times 1.15687178722 \times 6.80294 \times 10^{-68}\right)}$$

Result:

0.962353276...

0.962353276… result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 (see Appendix) and to the value of the following Rogers-Ramanujan continued fraction:

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

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 ± 0.004, consistent with the predictions of slow-roll, single-field, inflation.

and:

2sqrt((log base 0.962353276(-(-0.0695422*1.15687178722*6.80294e-68))))-Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.962353276}\left(-\left(-0.0695422\times 1.15687178722\times 6.80294\times 10^{-68}\right)\right)}-\pi+\frac{1}{\phi}$$

$\log_b(x)$ 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 GeV

2sqrt((log base 0.962353276(-(-0.0695422*1.15687178722*6.80294e-68))))+11+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.962353276}\left(-\left(-0.0695422\times 1.15687178722\times 6.80294\times 10^{-68}\right)\right)}+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.61803...

139.61803... result practically equal to the rest mass of Pion meson 139.57 MeV

2sqrt((log base 0.962353276(-(-0.0695422*1.15687178722*6.80294e-68))))+11-Pi+golden ratio

Input interpretation:

$$2\sqrt{\log_{0.962353276}\left(-\left(-0.0695422\times 1.15687178722\times 6.80294\times 10^{-68}\right)\right)}+11-\pi+\phi$$

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

ϕ is the golden ratio

Result:

137.47644...

137.47644...

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

For q = 96, we obtain:

0.5/96^2 (((-96/2+1-1/(tanh0.357129 tanh0.4435345)-ln(sinh0.357129 / cosh0.4435345))))

Input interpretation:

$$\frac{0.5}{96^2}\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.4435345)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)$$

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

cosh(x) is the hyperbolic cosine function

log(x) is the natural logarithm

Result:

−0.00287008...

-0.00287008

Alternative representations:

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} = \frac{0.5\left(-47-\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)}{96^2}$$

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} = \frac{0.5\left(-47-\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)}{96^2}$$

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} = \frac{0.5\left(-47-\log\left(\frac{-\frac{1}{e^{0.357129}}+e^{0.357129}}{\frac{2}{2}\left(\frac{1}{e^{0.443535}}+e^{0.443535}\right)}\right)-\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)}{96^2}$$

Series representations:

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} =$$

$$\left(0.0000542535\left(-0.0986433 - 47\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{1}{(0.510164+\pi^2(1-2k_1)^2)(0.786891+\pi^2(1-2k_2)^2)} + \sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\sum_{k_3=1}^{\infty}\frac{(-1)^{k_3}\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}}{(0.510164+\pi^2(1-2k_1)^2)(0.786891+\pi^2(1-2k_2)^2)k_3}\right)\right) \Big/ \left(\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}\right)$$

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} =$$

$$\left(0.0000542535\left(-1-47\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\delta_{k_1}+\frac{2^{1+k_1}\operatorname{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\operatorname{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)(0.357129-z_0)^{k_1}(0.443535-z_0)^{k_2} + \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=1}^{\infty}\frac{1}{k_3}(-1)^{k_3}\left(\delta_{k_1}+\frac{2^{1+k_1}\operatorname{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\operatorname{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}(0.357129-z_0)^{k_1}(0.443535-z_0)^{k_2}\right)\right) \Big/ \left(\left(\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.357129-z_0)^k\right)\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.443535-z_0)^k\right) \quad \text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} = -\frac{0.0000542535\left(1+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}$$

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} =$$

$$-\frac{0.0000542535\left(1+2\int_0^1\int_0^1 \operatorname{sech}^2(0.357129\, t_1)\operatorname{sech}^2(0.443535\, t_2)\,dt_2\,dt_1\right)}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt} \quad \text{for } \gamma > 0$$

$$\frac{\left(-\frac{96}{2}+1-\frac{1}{\tanh(0.357129)\tanh(0.443535)}-\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)0.5}{96^2} =$$

$$-\left(\left(0.0000542535\left(1+\int_0^1\int_0^1 \operatorname{sech}^2(0.357129\, t_1)\operatorname{sech}^2(0.443535\, t_2)\,dt_2\,dt_1 - \cosh(0.443535)\int_0^1\int_0^1\int_0^1 \frac{\operatorname{sech}^2(0.357129\, t_2)\operatorname{sech}^2(0.443535\, t_3)}{-\cosh(0.443535)+(\cosh(0.443535)-\sinh(0.357129))\,t_1}\,dt_3\,dt_2\,dt_1\right)\right)\right) \Big/ \left(\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt\right)$$

For

$$\beta = q \log q$$

96 ln(96)

Input:

96 log(96)

log(x) is the natural logarithm

Decimal approximation:

438.1774263809122788942149610444872203223991580439064693444...

438.1774263809…. = β

Property:

96 log(96) is a transcendental number

Alternate forms:

96 (5 log(2) + log(3))

480 log(2) + 96 log(3)

Alternative representations:

$$96\log(96) = 96\log_e(96)$$

$$96\log(96) = 96\log(a)\log_a(96)$$

$$96\log(96) = -96\,\text{Li}_1(-95)$$

Series representations:

$$96\log(96) = 96\log(95) - 96\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{95}\right)^k}{k}$$

$$96\log(96) = 192\,i\,\pi\left\lfloor\frac{\arg(96-x)}{2\pi}\right\rfloor + 96\log(x) - 96\sum_{k=1}^{\infty}\frac{(-1)^k(96-x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$96\log(96) = 96\left\lfloor\frac{\arg(96-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + 96\log(z_0) + 96\left\lfloor\frac{\arg(96-z_0)}{2\pi}\right\rfloor\log(z_0) - 96\sum_{k=1}^{\infty}\frac{(-1)^k(96-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$96\log(96) = 96\int_1^{96}\frac{1}{t}\,dt$$

$$96\log(96) = -\frac{48\,i}{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{95^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

96*e^(-438.1774263809*9.602230)

Input interpretation:

$96\,e^{-438.1774263809\times 9.602230}$

Result:

$4.97437\ldots\times 10^{-1826}$

4.97437e-1826 = σ

Alternative representation:

$$96\, e^{9.60223 (-1) 438.17742638090000} = 96 \exp^{9.60223 (-1) 438.17742638090000}(z) \quad \text{for } z = 1$$

Series representations:

$$96\, e^{9.60223 (-1) 438.17742638090000} = \frac{96}{\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{4207.48}}$$

$$96\, e^{9.60223 (-1) 438.17742638090000} = \frac{3.63150382850 \times 10^{1268}}{\left(\sum_{k=0}^{\infty} \frac{1+k}{k!}\right)^{4207.48}}$$

$$96\, e^{9.60223 (-1) 438.17742638090000} = \frac{96}{\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{4207.48}}$$

(438.1774263809*0.5)/96^2 (((96/2-1+1/(tanh0.357129 tanh0.4435345)+ln(sinh0.357129 / cosh0.4435345)+ 4.97437e-1826 /tanh0.4435345)))+ 4.97437e-1826/96

Input interpretation:

$$\frac{438.1774263809 \times 0.5}{96^2} \left(\frac{96}{2} - 1 + \frac{1}{\tanh(0.357129) \tanh(0.4435345)} + \log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right) + \frac{\frac{4.97437}{10^{1826}}}{\tanh(0.4435345)}\right) + \frac{\frac{4.97437}{10^{1826}}}{96}$$

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

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

$\cosh(x)$ is the hyperbolic cosine function

$\log(x)$ is the natural logarithm

Result:

1.25761...

1.25761…

Alternative representations:

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}}=$$

$$\frac{4.97437}{10^{1826}\times 96}+\frac{1}{96^2}\,219.089\left(47+\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)}+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}}=$$

$$\frac{4.97437}{10^{1826}\times 96}+\frac{1}{96^2}\,219.089\left(47+\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)}+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}}=$$

$$\frac{4.97437}{10^{1826}\times 96}+\frac{1}{96^2}\,219.089\left(47+\log\left(\frac{-\frac{1}{e^{0.357129}}+e^{0.357129}}{\frac{2}{2}\left(\frac{1}{e^{0.443535}}+e^{0.443535}\right)}\right)+\frac{4.97437}{10^{1826}\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)}+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

Series representations:

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}}=-\left(\left(0.0237726\left(-0.0986433-1.401911801674954\times 10^{-1826}\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}-47\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{1}{\left(0.510164+\pi^2(1-2k_1)^2\right)\left(0.786891+\pi^2(1-2k_2)^2\right)}+\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\sum_{k_3=1}^{\infty}\frac{(-1)^{k_3}\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}}{\left(0.510164+\pi^2(1-2k_1)^2\right)\left(0.786891+\pi^2(1-2k_2)^2\right)k_3}\right)\right)\Big/\left(\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}\right)\right)$$

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}}=$$

$$-\left(\left(0.0237726\left(-1+4.974370000000000\times 10^{-1826}\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.357129-z_0)^k - 47\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\delta_{k_1}+\frac{2^{1+k_1}\operatorname{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\operatorname{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)(0.357129-z_0)^{k_1}(0.443535-z_0)^{k_2} + \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=1}^{\infty}\frac{1}{k_3}(-1)^{k_3}\left(\delta_{k_1}+\frac{2^{1+k_1}\operatorname{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\operatorname{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}(0.357129-z_0)^{k_1}(0.443535-z_0)^{k_2}\right)\right)\right) \Big/ \left(\left(\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.357129-z_0)^k\right)\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.443535-z_0)^k\right) \text{ for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}}=$$

$$\left(0.0237726\left(1+4.974370000000000\times 10^{-1826}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt + 2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)\right) \Big/ \left(\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt\right)$$

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}} = \left(0.0237726\left(1+4.974370000000000\times 10^{-1826}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt + 2\int_0^1\int_0^1 \operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)\right) \Big/ \left(\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt\right) \quad \text{for } \gamma > 0$$

$$\frac{1}{96^2}\left(\frac{96}{2}-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{4.97437}{10^{1826}\tanh(0.443535)}\right)(438.17742638090000\times 0.5)+\frac{4.97437}{96\times 10^{1826}} = \left(0.0237726\left(1+4.974370000000000\times 10^{-1826}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt + \int_0^1\int_0^1 \operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1 - \cosh(0.443535)\int_0^1\int_0^1\int_0^1 \frac{\operatorname{sech}^2(0.357129\,t_2)\operatorname{sech}^2(0.443535\,t_3)}{-\cosh(0.443535)+(\cosh(0.443535)-\sinh(0.357129))\,t_1}\,dt_3\,dt_2\,dt_1\right)\right) \Big/ \left(\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt\right)$$

4.97437e-1826/96(1+ln(96/4.97437e-1826)) = e^(-438.1774263809*9.602230)*(1+438.1774263809*9.602230)

4.97437e-1826/96(1+ln(96/4.97437e-1826))

Input interpretation:

$$\frac{\frac{4.97437}{10^{1826}}}{96}\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)$$

log(x) is the natural logarithm

Result:

$2.18068\ldots \times 10^{-1824}$

2.18068e-1824

Alternative representations:

$$\frac{\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)4.97437}{10^{1826}\times 96} = \frac{4.97437\left(1+\log_e\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)}{10^{1826}\times 96}$$

$$\frac{\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)4.97437}{10^{1826}\times 96} = \frac{4.97437\left(1+\log(a)\log_a\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)}{10^{1826}\times 96}$$

$$\frac{\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)4.97437}{10^{1826}\times 96} = \frac{4.97437\left(1-\text{Li}_1\left(1-\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)}{10^{1826}\times 96}$$

Series representations:

$$\frac{\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)4.97437}{10^{1826}\times 96} = 5.181635416666667\times 10^{-1828} + 5.181635416666667\times 10^{-1828}\log(1.929892629619429\times 10^{1827}) - 5.181635416666667\times 10^{-1828}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-4207.480429269169185\,k}}{k}$$

$$\frac{\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)4.97437}{10^{1826}\times 96} = 5.181635416666667\times 10^{-1828} + 1.036327083333333\times 10^{-1827}\, i\,\pi \left\lfloor\frac{\arg(1.929892629619429\times 10^{1827}-x)}{2\pi}\right\rfloor + 5.181635416666667\times 10^{-1828}\log(x) - 5.181635416666667\times 10^{-1828}\sum_{k=1}^{\infty}\frac{(-1)^k (1.929892629619429\times 10^{1827}-x)^k x^{-k}}{k} \quad \text{for } x<0$$

$$\frac{\left(1+\log\left(\frac{\frac{96}{4.97437}}{10^{1826}}\right)\right)4.97437}{10^{1826}\times 96} = 5.181635416666667\times 10^{-1828} + 5.181635416666667\times 10^{-1828}\left\lfloor\frac{\arg(1.929892629619429\times 10^{1827}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + 5.181635416666667\times 10^{-1828}\log(z_0) + 5.181635416666667\times 10^{-1828}\left\lfloor\frac{\arg(1.929892629619429\times 10^{1827}-z_0)}{2\pi}\right\rfloor\log(z_0) - 5.181635416666667\times 10^{-1828}\sum_{k=1}^{\infty}\frac{(-1)^k (1.929892629619429\times 10^{1827}-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$\frac{\left(1+\log\left(\frac{\frac{96}{4.97437}}{10^{1826}}\right)\right)4.97437}{10^{1826}\times 96} = 5.181635416666667\times 10^{-1828} + 5.181635416666667\times 10^{-1828}\int_1^{1.929892629619429\times 10^{1827}}\frac{1}{t}\,dt$$

$$\frac{\left(1+\log\left(\frac{\frac{96}{4.97437}}{10^{1826}}\right)\right)4.97437}{10^{1826}\times 96} = 5.181635416666667\times 10^{-1828} + \frac{2.590817708333334\times 10^{-1828}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-4207.480429269169185\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

e^(-438.1774263809*9.602230)*(1+438.1774263809*9.602230)

Input interpretation:

$$e^{-438.1774263809\times 9.602230}\,(1+438.1774263809\times 9.602230)$$

Result:

$2.18068\ldots\times 10^{-1824}$

2.18068e-1824

Alternative representation:

$$e^{9.60223(-1)438.17742638090000}(1+438.17742638090000\times 9.60223) = \exp^{9.60223(-1)438.17742638090000}(z)\,(1+438.17742638090000\times 9.60223) \quad \text{for } z=1$$

Series representations:

$$e^{9.60223(-1)438.17742638090000}(1+438.17742638090000\times 9.60223)=\frac{4208.48}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4207.48}}$$

$$e^{9.60223(-1)438.17742638090000}(1+438.17742638090000\times 9.60223)=\frac{1.591990915602643\times 10^{1270}}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4207.48}}$$

$$e^{9.60223(-1)438.17742638090000}(1+438.17742638090000\times 9.60223)=\frac{4208.48}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4207.48}}$$

From the sum of the three results, we obtain:

(-0.00287008+1.25761+2.18068e-1824)

Input interpretation:

$$-0.00287008+1.25761+\frac{2.18068}{10^{1824}}$$

Result:

1.254739920000000000000000000000000000000000000000000000...

1.25473992...

Note that:

1+1/(-0.00287008+1.25761+2.18068e-1824)^2

Input interpretation:

$$1+\frac{1}{\left(-0.00287008+1.25761+\frac{2.18068}{10^{1824}}\right)^2}$$

Result:

1.635173790253641112482781766959410459485095894766227157580...

1.63517379... result near to $\zeta(2)=\frac{\pi^2}{6}=1.644934$ ...

and:

1+1/2(-0.00287008+1.25761+2.18068e-1824)-(7+2)*1/10^3

Input interpretation:

$$1+\frac{1}{2}\left(-0.00287008+1.25761+\frac{2.18068}{10^{1824}}\right)-(7+2)\times\frac{1}{10^3}$$

Result:

1.618369960000000000000000000000000000000000000000000000...

1.61836996... result that is a very good approximation to the value of the golden ratio 1,618033988749...

From

$$\frac{\frac{4.97437}{10^{1826}}}{96}\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)$$

We obtain:

(((4.97437e-1826/96(1+ln(96/4.97437e-1826)))))^1/(4096^2)

Input interpretation:

$$\sqrt[4096^2]{\frac{\frac{4.97437}{10^{1826}}}{96}\left(1+\log\left(\frac{96}{\frac{4.97437}{10^{1826}}}\right)\right)}$$

$\log(x)$ is the natural logarithm

Result:

0.9997497433353...

0.9997497433353… 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 $\mathbf{0.989117352243 = \phi}$

While, from the multiplication of the three results, we obtain:

(((-(-0.00287008*1.25761*2.18068e-1824))))^1/4096^2

Input interpretation:

$$\sqrt[4096^2]{-\left(-0.00287008\times 1.25761\times \frac{2.18068}{10^{1824}}\right)}$$

Result:

0.9997494081906...

0.9997494081906… 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 $\mathbf{0.989117352243 = \phi}$

From which:

2sqrt(sqrt(((log base 0.9997494081906(((-(-0.00287008*1.25761*2.18068e-1824))))))))-Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\sqrt{\log_{0.9997494081906}\left(-\left(-0.00287008\times 1.25761\times \frac{2.18068}{10^{1824}}\right)\right)}}-\pi+\frac{1}{\phi}$$

$\log_b(x)$ 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:

$$2\sqrt{\sqrt{\log_{0.99974940819060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}}-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{\phi}+2\sqrt{\sqrt{\frac{\log\left(\frac{0.00787104}{10^{1824}}\right)}{\log(0.99974940819060000)}}}$$

Series representations:

$$2\sqrt{\sqrt{\log_{0.99974940819060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}}-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\sqrt{-1+\sqrt{\log_{0.99974940819060000}(7.871036473273985\times 10^{-1827})}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\sqrt{\log_{0.99974940819060000}(7.871036473273985\times 10^{-1827})}\right)^{-k}$$

$$2\sqrt{\sqrt{\log_{0.99974940819060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}}-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\sqrt{-1+\sqrt{\log_{0.99974940819060000}(7.871036473273985\times 10^{-1827})}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+\sqrt{\log_{0.99974940819060000}(7.871036473273985\times 10^{-1827})}\right)^{-k}}{k!}$$

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

$n!$ is the factorial function

$(a)_n$ is the Pochhammer symbol (rising factorial)

and:

2sqrt(sqrt(((log base 0.9997494081906(((-(-0.00287008*1.25761*2.18068e-1824))))))))+11+1/golden ratio

Input interpretation:

$$2\sqrt{\sqrt{\log_{0.9997494081906}\left(-\left(-0.00287008\times 1.25761\times \frac{2.18068}{10^{1824}}\right)\right)}}+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.6180340...

139.6180340… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternative representation:

$$2\sqrt{\sqrt{\log_{0.99974940819060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}}+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}+2\sqrt{\sqrt{\frac{\log\left(\frac{0.00787104}{10^{1824}}\right)}{\log(0.99974940819060000)}}}$$

Series representations:

$$2\sqrt{\sqrt{\log_{0.999749408190060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}+11+\frac{1}{\phi}} =$$

$$11+\frac{1}{\phi}+2\sqrt{-1+\sqrt{\log_{0.999749408190060000}(7.871036473273985\times 10^{-1827})}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\sqrt{\log_{0.999749408190060000}(7.871036473273985\times 10^{-1827})}\right)^{-k}$$

$$2\sqrt{\sqrt{\log_{0.999749408190060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}+11+\frac{1}{\phi}} =$$

$$11+\frac{1}{\phi}+2\sqrt{-1+\sqrt{\log_{0.999749408190060000}(7.871036473273985\times 10^{-1827})}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-1+\sqrt{\log_{0.999749408190060000}(7.871036473273985\times 10^{-1827})}\right)^{-k}}{k!}$$

2sqrt(sqrt(((log base 0.9997494081906(((-(-0.00287008*1.25761*2.18068e-1824)))))))+11-golden ratio

Input interpretation:

$$2\sqrt{\sqrt{\log_{0.9997494081906}\left(-\left(-0.00287008\times 1.25761\times\frac{2.18068}{10^{1824}}\right)\right)}+11-\phi}$$

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

ϕ is the golden ratio

Result:

137.3819660...

137.3819660…

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

Alternative representation:

$$2\sqrt{\sqrt{\log_{0.99974940819060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}} + 11 - \phi =$$

$$11 - \phi + 2\sqrt{\sqrt{\frac{\log\left(\frac{0.00787104}{10^{1824}}\right)}{\log(0.99974940819060000)}}}$$

Series representations:

$$2\sqrt{\sqrt{\log_{0.99974940819060000}\left(-\frac{-0.00287008\,(1.25761\times 2.18068)}{10^{1824}}\right)}} + 11 - \phi =$$

$$11 - \phi + 2\sqrt{-1 + \sqrt{\log_{0.99974940819060000}(7.871036473273985\times 10^{-1827})}}$$
$$\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1 + \sqrt{\log_{0.99974940819060000}(7.871036473273985\times 10^{-1827})}\right)^{-k}$$

Now, we have that:

The free energy is now

$$-\frac{\beta F}{N} = \log[2\cosh\frac{\beta\mu}{2}] + \frac{\beta\mu}{q}\tanh\frac{\beta\mu}{2}\left[\log(2\sinh\gamma) + \frac{1}{\tanh\gamma} - \gamma - 1\right] \quad (5.101)$$

$\gamma = 0.357129$ Thence $\mu = 4$ and $\epsilon = 0.125$

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

$q = 8$

$$\gamma, \sigma \ll 1$$

$$\tilde{\alpha} = \alpha\,, \qquad \tilde{\gamma} = \gamma + \sigma$$

$\tilde{\gamma} = \gamma + \sigma = 0.357129 + 0.0864055 = 0.4435345$

σ = 3.38585... × 10^{-69}

3.38585e-69

ν = 9.602230

β = 16.635532333438

$$-\frac{\beta F}{N} = \log[2\cosh\frac{\beta\mu}{2}] + \frac{\beta\mu}{q}\tanh\frac{\beta\mu}{2}\left[\log(2\sinh\gamma) + \frac{1}{\tanh\gamma} - \gamma - 1\right]$$

ln(((2 cosh((16.635532333438*4)/2))))+((16.635532333438*4)/8) tanh((16.635532333438*4)/2)*(((ln(2sinh0.357129)+1/(tanh0.357129)-0.357129-1)))

Input interpretation:

$$\log\left(2\cosh\left(\frac{16.635532333438\times 4}{2}\right)\right) + \frac{16.635532333438\times 4}{8}\tanh\left(\frac{16.635532333438\times 4}{2}\right)\left(\log(2\sinh(0.357129)) + \frac{1}{\tanh(0.357129)} - 0.357129 - 1\right)$$

cosh(x) is the hyperbolic cosine function

log(x) is the natural logarithm

tanh(x) is the hyperbolic tangent function

sinh(x) is the hyperbolic sine function

Result:

43.6323...

43.6323…

Alternative representations:

$$\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)=\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-\frac{1}{e^{0.357129}}+e^{0.357129}\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)$$

$$\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)=\log_e(2\cosh(33.2710646668760000))+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log_e(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)$$

$$\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)=\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-2\,i\cos\left(-0.357129\,i+\frac{\pi}{2}\right)\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)$$

Integral representations:

$$\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)=\frac{1}{\int_0^{0.357129}\operatorname{sech}^2(t)\,dt}$$
$$8.31777\left(\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+0.120225\log\left(2+66.5421293337520000\int_0^1\sinh(33.2710646668760000\,t)\,dt\right)\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)=\frac{1}{\int_0^{0.357129}\operatorname{sech}^2(t)\,dt}$$
$$8.31777\left(\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+0.120225\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(2\int_{\frac{i\pi}{2}}^{33.2710646668760000}\sinh(t)\,dt\right)\right)$$

$$\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)=\frac{1}{\int_0^{0.357129}\operatorname{sech}^2(t)\,dt}$$
$$8.31777\left(\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+0.120225\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(\frac{\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{276.740936016861149/s+s}}{\sqrt{s}}\,ds\right)\right)\quad\text{for }\gamma>0$$

3[ln(((2 cosh((16.635532333438*4)/2))))+((16.635532333438*4)/8) tanh((16.635532333438*4)/2)*(((ln(2sinh0.357129)+1/(tanh0.357129)-0.357129-1)))]+3+Pi

Input interpretation:

$$3\left(\log\left(2\cosh\left(\frac{16.635532333438\times 4}{2}\right)\right)+\frac{16.635532333438\times 4}{8}\tanh\left(\frac{16.635532333438\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)+3+\pi$$

cosh(x) is the hyperbolic cosine function

log(x) is the natural logarithm

tanh(x) is the hyperbolic tangent function

sinh(x) is the hyperbolic sine function

Result:

137.039...

137.039…

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

Alternative representations:

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+3+\pi=$$

$$3+\pi+3\left(\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-\frac{1}{e^{0.357129}}+e^{0.357129}\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+3+\pi=$$

$$3+\pi+3\left(\log_e(2\cosh(33.2710646668760000))+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log_e(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+3+\pi=$$

$$3+\pi+3\left(\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-2\,i\cos\left(-0.357129\,i+\frac{\pi}{2}\right)\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

Integral representations:

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+3+\pi=\frac{1}{\int_0^{0.357129}\operatorname{sech}^2(t)\,dt}\left(3\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\pi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+24.9533\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+3\log\left(2+66.5421293337520000\int_0^1\sinh(33.2710646668760000\,t)\,dt\right)\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+3+\pi=\frac{1}{\int_0^{0.357129}\operatorname{sech}^2(t)\,dt}\left(3\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\pi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+24.9533\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+3\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(2\int_{\frac{i\pi}{2}}^{33.2710646668760000}\sinh(t)\,dt\right)\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+3+\pi=\frac{1}{\int_0^{0.357129}\operatorname{sech}^2(t)\,dt}\left(3\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\pi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+24.9533\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+3\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(\frac{\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{276.740936016861149/s+s}}{\sqrt{s}}\,ds\right)\right)\quad\text{for }\gamma>0$$

3[ln(((2 cosh((16.635532333438*4)/2))))+((16.635532333438*4)/8) tanh((16.635532333438*4)/2)*(((ln(2sinh0.357129)+1/(tanh0.357129)-0.357129-1)))]-5-1/golden ratio

Input interpretation:

$$3\left(\log\left(2\cosh\left(\frac{16.635532333438\times4}{2}\right)\right)+\frac{16.635532333438\times4}{8}\tanh\left(\frac{16.635532333438\times4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)-5-\frac{1}{\phi}$$

cosh(x) is the hyperbolic cosine function

log(x) is the natural logarithm

tanh(x) is the hyperbolic tangent function

sinh(x) is the hyperbolic sine function

ϕ is the golden ratio

Result:

125.279…

125.279… 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:

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times4)\right)-5-\frac{1}{\phi}=$$

$$-5-\frac{1}{\phi}+3\left(\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-\frac{1}{e^{0.357129}}+e^{0.357129}\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)-5-\frac{1}{\phi}=$$

$$-5-\frac{1}{\phi}+3\left(\log_e(2\cosh(33.2710646668760000))+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log_e(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)-5-\frac{1}{\phi}=$$

$$-5-\frac{1}{\phi}+3\left(\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-2\,i\cos\left(-0.357129\,i+\frac{\pi}{2}\right)\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

Integral representations:

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)-5-\frac{1}{\phi}=$$

$$\left(24.9533\left(-0.0400749\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.200374\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\phi\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+0.120225\,\phi\log\left(2+66.5421293337520000\int_0^1\sinh(33.2710646668760000\,t)\,dt\right)\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\right)\Big/\left(\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)-5-\frac{1}{\phi}=$$

$$\left(24.9533\left(-0.0400749\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.200374\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\phi\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+0.120225\,\phi\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(2\int_{\frac{i\pi}{2}}^{33.2710646668760000}\sinh(t)\,dt\right)\right)\right)\Big/\left(\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times4)\right)-5-\frac{1}{\phi}=$$

$$\left(24.9533\left(-0.0400749\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.200374\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\phi\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+0.120225\,\phi\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(\frac{\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{276.740936016861149/s+s}}{\sqrt{s}}\,ds\right)\right)\right)\Big/\left(\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\quad\text{for }\gamma>0$$

3[ln(((2 cosh((16.635532333438*4)/2))))+((16.635532333438*4)/8) tanh((16.635532333438*4)/2)*(((ln(2sinh0.357129)+1/(tanh0.357129)-0.357129-1)))]+5+Pi+1/golden ratio

Input interpretation:

$$3\left(\log\left(2\cosh\left(\frac{16.635532333438\times4}{2}\right)\right)+\frac{16.635532333438\times4}{8}\tanh\left(\frac{16.635532333438\times4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)+5+\pi+\frac{1}{\phi}$$

$\cosh(x)$ is the hyperbolic cosine function

$\log(x)$ is the natural logarithm

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

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

ϕ is the golden ratio

Result:

139.657...

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

Alternative representations:

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+5+\pi+\frac{1}{\phi}=$$

$$5+\pi+\frac{1}{\phi}+3\left(\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-\frac{1}{e^{0.357129}}+e^{0.357129}\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+5+\pi+\frac{1}{\phi}=$$

$$5+\pi+\frac{1}{\phi}+3\left(\log_e(2\cosh(33.2710646668760000))+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log_e(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+5+\pi+\frac{1}{\phi}=$$

$$5+\pi+\frac{1}{\phi}+3\left(\log\left(\frac{1}{e^{33.2710646668760000}}+e^{33.2710646668760000}\right)+\frac{1}{8}\times 66.5421293337520000\left(-1+\frac{2}{1+\frac{1}{e^{66.5421293337520000}}}\right)\left(-1.35713+\log\left(-2\,i\cos\left(-0.357129\,i+\frac{\pi}{2}\right)\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

Integral representations:

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+5+\pi+\frac{1}{\phi}=$$

$$\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+5\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\phi\,\pi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+24.9533\,\phi\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+3\,\phi\log\left(2+66.5421293337520000\int_0^1\sinh(33.2710646668760000\,t)\,dt\right)\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\Big/\left(\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+5+\pi+\frac{1}{\phi}=$$

$$\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+5\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\phi\,\pi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+24.9533\,\phi\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+3\,\phi\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(2\int_{\frac{i\pi}{2}}^{33.2710646668760000}\sinh(t)\,dt\right)\right)\Big/\left(\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$3\left(\log\left(2\cosh\left(\frac{16.6355323334380000\times 4}{2}\right)\right)+\frac{1}{8}\left(\tanh\left(\frac{16.6355323334380000\times 4}{2}\right)\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)(16.6355323334380000\times 4)\right)+5+\pi+\frac{1}{\phi}=$$

$$\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+5\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\phi\,\pi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+24.9533\,\phi\int_0^{33.2710646668760000}\operatorname{sech}^2(t)\,dt+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(33.2710646668760000\,t_2)\,dt_2\,dt_1+3\,\phi\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(\frac{\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{276.740936016861149/s+s}}{\sqrt{s}}\,ds\right)\right)\Big/\left(\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\quad\text{for } \gamma>0$$

Now, we have that:

Instead we will notice that from the effective action (5.73) we can write

$$\begin{aligned}\mathcal{J}\partial_{\mathcal{J}}\ell &= \beta\int_0^\beta d\tau\mathcal{J}^2(e^{g_{LL}}+e^{g_{LR}})=\frac{\beta\hat{\mu}}{q^2}\left[\frac{1}{\tanh\gamma\tanh\tilde{\gamma}}-1\right]\\ \mu\partial_\mu\ell &= -i\beta\mu G_{LR}(0)=\frac{\beta\hat{\mu}}{q^2}\left[\frac{q}{2}+\log\left(\frac{\sinh\gamma}{\cosh\tilde{\gamma}}\right)\right]\end{aligned}\qquad\text{(A.134)}$$

γ = 0.357129 Thence μ = 4 and $\epsilon = 0.125$

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

q = 8

$$\gamma, \sigma \ll 1$$

$$\tilde{\alpha} = \alpha \ , \qquad \tilde{\gamma} = \gamma + \sigma$$

$$\tilde{\gamma} = \gamma + \sigma = 0.357129 + 0.0864055 = 0.4435345$$

$\sigma = 3.38585... \times 10^{-69}$

3.38585e-69

ν = 9.602230

β = 16.635532333438

We have:

$$\frac{\beta\hat{\mu}}{q^2}\left[\frac{1}{\tanh\gamma\tanh\tilde{\gamma}} - 1\right]$$

(16.635532333438*0.5)/64 (1/(tanh0.357129 tanh0.4435345)-1)

Input interpretation:

$$\frac{16.635532333438 \times 0.5}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.4435345)} - 1\right)$$

tanh(x) is the hyperbolic tangent function

Result:

0.780465...

0.780465…

Alternative representations:

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times0.5)=$$
$$\frac{1}{64}\times8.31777\left(-1+\frac{1}{\frac{1}{\coth(0.357129)\coth(0.443535)}}\right)$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times0.5)=$$
$$\frac{1}{64}\times8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times0.5)=$$
$$\frac{1}{64}\times8.31777\left(-1+\frac{1}{\frac{i^2}{\cot(0.357129\,i)\cot(0.443535\,i)}}\right)$$

Series representations:

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times0.5)=$$
$$-\frac{0.129965\left(-0.0986433+\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{1}{\left(0.510164+\pi^2(1-2k_1)^2\right)\left(0.786891+\pi^2(1-2k_2)^2\right)}\right)}{\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}}$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times0.5)=$$
$$-\left(\left(0.129965\left(-0.5\sum_{k=0}^{\infty}(-1)^k e^{-0.887069(1+k)}-0.5\sum_{k=0}^{\infty}(-1)^k e^{-0.714258(1+k)}+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(-1)^{k_1+k_2}e^{-0.887069(1+k_1)-0.714258(1+k_2)}\right)\right)\Big/\left(\left(-0.5+\sum_{k=0}^{\infty}(-1)^k e^{-0.887069(1+k)}\right)\left(-0.5+\sum_{k=0}^{\infty}(-1)^k e^{-0.714258(1+k)}\right)\right)\right)$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)=$$
$$-0.129965+0.129965\Big/\left(\left(\frac{1}{0.357129-\frac{i\pi}{2}}+\sum_{k=1}^{\infty}\frac{4^k\left(0.357129-\frac{i\pi}{2}\right)^{-1+2k}B_{2k}}{(2k)!}\right)\left(\frac{1}{0.443535-\frac{i\pi}{2}}+\sum_{k=1}^{\infty}\frac{4^k\left(0.443535-\frac{i\pi}{2}\right)^{-1+2k}B_{2k}}{(2k)!}\right)\right)$$

Integral representation:

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)=$$
$$-\frac{0.129965\left(-1+\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}$$

$$\frac{\beta\hat{\mu}}{q^2}\left[\frac{q}{2}+\log\left(\frac{\sinh\gamma}{\cosh\tilde{\gamma}}\right)\right]$$

(16.635532333438*0.5)/64 ((4+ln (sinh0.357129 / cosh0.4435345)))

Input interpretation:

$$\frac{16.635532333438\times 0.5}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)$$

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

$\cosh(x)$ is the hyperbolic cosine function

$\log(x)$ is the natural logarithm

Result:

0.376407...

0.376407…

Alternative representations:

$$\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$\frac{1}{64}\times 8.31777\left(4+\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)$$

$$\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$\frac{1}{64}\times 8.31777\left(4+\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)$$

$$\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$\frac{1}{64}\times 8.31777\left(4+\log\left(\frac{-\frac{1}{e^{0.357129}}+e^{0.357129}}{2\cos(0.443535\,i)}\right)\right)$$

Series representation:

$$\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$0.51986-0.129965\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^k}{k}$$

Integral representations:

$$\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$0.51986+0.129965\int_1^{\frac{\sinh(0.357129)}{\cosh(0.443535)}}\frac{1}{t}\,dt$$

$$\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$0.129965\left(4+\log\left(\frac{0.357129}{1+0.443535\int_0^1\sinh(0.443535\,t)\,dt}\int_0^1\cosh(0.357129\,t)\,dt\right)\right)$$

$$\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$0.129965\left(4+\log\left(\frac{0.357129\int_0^1\cosh(0.357129\,t)\,dt}{\int_{\frac{i\pi}{2}}^{0.443535}\sinh(t)\,dt}\right)\right)$$

From the sum of two results, we obtain:

(16.635532333438*0.5)/64 (1/(tanh0.357129 tanh0.4435345)-1) + (16.635532333438*0.5)/64 ((4+ln (sinh0.357129 / cosh0.4435345)))

Input interpretation:

$$\frac{16.635532333438 \times 0.5}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.4435345)}-1\right)+\frac{16.635532333438 \times 0.5}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)$$

tanh(x) is the hyperbolic tangent function

sinh(x) is the hyperbolic sine function

cosh(x) is the hyperbolic cosine function

log(x) is the natural logarithm

Result:

1.15687...

1.15687…

Alternative representations:

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000 \times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000 \times 0.5)=\frac{1}{64}\times 8.31777\left(4+\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=\frac{1}{64}\times 8.31777\left(4+\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=\frac{1}{64}\times 8.31777\left(4+\log\left(\frac{-\frac{1}{e^{0.357129}}+e^{0.357129}}{\frac{2}{2}\left(\frac{1}{e^{0.443535}}+e^{0.443535}\right)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)$$

Series representations:

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=-\left(\left(0.129965\left(-0.0986433-3\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{1}{(0.510164+\pi^2(1-2k_1)^2)(0.786891+\pi^2(1-2k_2)^2)}+\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\sum_{k_3=1}^{\infty}\frac{(-1)^{k_3}\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}}{(0.510164+\pi^2(1-2k_1)^2)(0.786891+\pi^2(1-2k_2)^2)k_3}\right)\right)\Big/\left(\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}\right)\right)$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=$$
$$-\left(\left(0.129965\left(-1-3\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\left(\delta_{k_1}+\frac{2^{1+k_1}\operatorname{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\operatorname{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)(0.357129-z_0)^{k_1}(0.443535-z_0)^{k_2}+\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=1}^{\infty}\frac{1}{k_3}(-1)^{k_3}\left(\delta_{k_1}+\frac{2^{1+k_1}\operatorname{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)\left(\delta_{k_2}+\frac{2^{1+k_2}\operatorname{Li}_{-k_2}(-e^{2z_0})}{k_2!}\right)\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^{k_3}(0.357129-z_0)^{k_1}(0.443535-z_0)^{k_2}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.357129-z_0)^k\right)\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.443535-z_0)^k\right)\right)\quad\text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=\frac{0.129965\left(1+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)=\frac{0.129965\left(1+2\int_0^1\int_0^1\operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1\right)}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}\quad\text{for }\gamma>0$$

$$\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+ \frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5) = \left(0.129965 \left(1+\int_0^1\int_0^1 \operatorname{sech}^2(0.357129\,t_1)\operatorname{sech}^2(0.443535\,t_2)\,dt_2\,dt_1-\cosh(0.443535)\int_0^1\int_0^1\int_0^1 \frac{\operatorname{sech}^2(0.357129\,t_2)\operatorname{sech}^2(0.443535\,t_3)}{-\cosh(0.443535)+(\cosh(0.443535)-\sinh(0.357129))\,t_1}\,dt_3\,dt_2\,dt_1\right)\right)\Big/\left(\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt\right)$$

From which:

1+1/((((16.635532333438*0.5)/64 (1/(tanh0.357129 tanh0.4435345)-1) + (16.635532333438*0.5)/64 ((4+ln (sinh0.357129 / cosh0.4435345))))))^3

Input interpretation:

$$1+1\Big/\left(\frac{16.635532333438\times 0.5}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.4435345)}-1\right)+\frac{16.635532333438\times 0.5}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)\right)^3$$

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

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

$\cosh(x)$ is the hyperbolic cosine function

$\log(x)$ is the natural logarithm

Result:

1.645868806536914980499429645517971936576719434495664236762...

$1.6458688065\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternative representations:

$$1+1/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3 =$$

$$1+1/\left(\frac{1}{64}\times 8.31777\left(4+\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)\right)^3$$

$$1+1/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3 =$$

$$1+1/\left(\frac{1}{64}\times 8.31777\left(4+\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)\right)^3$$

$$1+1/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3 =$$

$$1+1/\left(\frac{1}{64}\times 8.31777\left(4+\log\left(\frac{-\frac{1}{e^{0.357129}}+e^{0.357129}}{\frac{2}{2}\left(\frac{1}{e^{0.443535}}+e^{0.443535}\right)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)\right)^3$$

Series representations:

$$1+1\Big/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3 =$$

$$1+1\Big/\left(0.389895+\frac{0.0128202}{\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}}-0.129965\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^k}{k}\right)^3$$

$$1+1\Big/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3 =$$

$$1+1\Big/\left(0.389895-0.129965\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^k}{k}+0.129965\Big/\left(\left(\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.357129-z_0)^k\right)\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-e^{2z_0})}{k!}\right)(0.443535-z_0)^k\right)\right)^3 \quad \text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$1+1\Big/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3 =$$

$$1+\frac{1}{\left(0.389895+0.129965\int_1^{\frac{\sinh(0.357129)}{\cosh(0.443535)}}\frac{1}{t}\,dt+\frac{0.129965}{\left(\int_0^{0.357129}\mathrm{sech}^2(t)\,dt\right)\int_0^{0.443535}\mathrm{sech}^2(t)\,dt}\right)^3}$$

$$1+1\Big/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3 =$$

$$1+1\Big/\left(0.389895+\frac{0.129965}{\left(\int_0^{0.357129}\mathrm{sech}^2(t)\,dt\right)\int_0^{0.443535}\mathrm{sech}^2(t)\,dt}+0.129965\log\left(\frac{0.357129}{1+0.443535\int_0^1\sinh(0.443535\,t)\,dt}\int_0^1\cosh(0.357129\,t)\,dt\right)\right)^3$$

$$1+1\Big/\left(\frac{1}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)(16.6355323334380000\times 0.5)+\frac{1}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)(16.6355323334380000\times 0.5)\right)^3=$$

$$1+1\Big/\left(0.389895+\frac{0.129965}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}+0.129965\log\left(\frac{0.357129\int_0^1\cosh(0.357129\,t)\,dt}{\int_{\frac{i\pi}{2}}^{0.443535}\sinh(t)\,dt}\right)\right)^3$$

((1/((((16.635532333438*0.5)/64 (1/(tanh0.357129 tanh0.4435345)-1) + (16.635532333438*0.5)/64 ((4+ln (sinh0.357129 / cosh0.4435345))))))))^1/192

Input interpretation:

$$\left(1\Big/\left(\frac{16.635532333438\times 0.5}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.4435345)}-1\right)+\frac{16.635532333438\times 0.5}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)\right)\right)\hat{}\,(1/192)$$

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

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

$\cosh(x)$ is the hyperbolic cosine function

$\log(x)$ is the natural logarithm

Result:

0.99924133...

0.99924133... 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 $\mathbf{0.989117352243}=\boldsymbol{\phi}$

2/3log base 0.99924133((1/((((16.635532333438*0.5)/64 (1/(tanh0.357129 tanh0.4435345)-1) + (16.635532333438*0.5)/64 ((4+ln (sinh0.357129 / cosh0.4435345))))))))-Pi+1/golden ratio

Input interpretation:

$$\frac{2}{3}\log_{0.99924133}\left(1\Big/\left(\frac{16.635532333438\times 0.5}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.4435345)}-1\right)+\frac{16.635532333438\times 0.5}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)\right)\right)-\pi+\frac{1}{\phi}$$

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

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

$\cosh(x)$ is the hyperbolic cosine function

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

125.476...

125.476... 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:

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{2\log\left(\frac{1}{\frac{1}{64}\times 8.31777\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}\right)}\right)}{3\log(0.999241)}$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=-\pi+\frac{2}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}\times 8.31777\left(4+\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)\right)\right)+\frac{1}{\phi}$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=-\pi+\frac{2}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}\times 8.31777\left(4+\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)\right)\right)+\frac{1}{\phi}$$

Series representations:

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{2\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{0.389895+0.129965\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{0.129965}{\tanh(0.357129)\tanh(0.443535)}}\right)^k}{k}}{3\log(0.999241)}$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=-\frac{1}{3\phi}\left(-3+3\phi\pi-2\phi\log_{0.999241}\left(1\Big/\left(0.389895+\frac{0.0128202}{\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}}-0.129965\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^k}{k}\right)\right)\right)$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=-\frac{1}{3\phi}\left(-3+3\phi\pi-2\phi\log_{0.999241}\left(1\Big/\left(0.129965\left(-1+\frac{0.0986433}{\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}}\right)+0.129965\left(4-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^k}{k}\right)\right)\right)\right)$$

Integral representations:

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=-\frac{1}{3\phi}\left(-3+3\phi\pi-2\phi\log_{0.999241}\left(1\Big/\left(0.389895+0.129965\int_1^{\frac{\sinh(0.357129)}{\cosh(0.443535)}}\frac{1}{t}\,dt+\frac{0.129965}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}\right)\right)\right)$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=-\frac{1}{3\phi}\left(-3+3\phi\pi-2\phi\log_{0.999241}\left(1\Big/\left(0.389895+\frac{0.129965}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}+0.129965\log\left(\frac{0.357129}{1+0.443535\int_0^1\sinh(0.443535\,t)\,dt}\int_0^1\cosh(0.357129\,t)\,dt\right)\right)\right)\right)$$

$$\frac{1}{3}\log_{0.999241}\left(1\bigg/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2-\pi+\frac{1}{\phi}=-\frac{1}{3\phi}\left(-3+3\phi\pi-2\phi\log_{0.999241}\left(1\bigg/\left(0.389895+\frac{0.129965}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}+0.129965\log\left(\frac{0.357129\int_0^1\cosh(0.357129\,t)\,dt}{\int_{\frac{i\pi}{2}}^{0.443535}\sinh(t)\,dt}\right)\right)\right)\right)$$

2/3log base 0.99924133((1/((((16.635532333438*0.5)/64 (1/(tanh0.357129 tanh0.4435345)-1) + (16.635532333438*0.5)/64 ((4+ln (sinh0.357129 / cosh0.4435345)))))))+11+1/golden ratio

Input interpretation:

$$\frac{2}{3}\log_{0.99924133}\left(1\bigg/\left(\frac{16.635532333438\times 0.5}{64}\left(\frac{1}{\tanh(0.357129)\tanh(0.4435345)}-1\right)+\frac{16.635532333438\times 0.5}{64}\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right)\right)\right)\right)+11+\frac{1}{\phi}$$

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

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

$\cosh(x)$ is the hyperbolic cosine function

$\log(x)$ is the natural logarithm

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

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:

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}+\frac{2\log\left(\frac{1}{\frac{1}{64}\times 8.31777\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\tanh(0.357129)\tanh(0.443535)}\right)}\right)}{3\log(0.999241)}$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2+11+$$

$$\frac{1}{\phi}=11+\frac{2}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}\times 8.31777\left(4+\log_e\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)\right)\right)+\frac{1}{\phi}$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2+11+$$

$$\frac{1}{\phi}=11+\frac{2}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}\times 8.31777\left(4+\log(a)\log_a\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)+\frac{1}{64}\times 8.31777\left(-1+\frac{1}{\left(-1+\frac{2}{1+\frac{1}{e^{0.887069}}}\right)\left(-1+\frac{2}{1+\frac{1}{e^{0.714258}}}\right)}\right)\right)\right)+\frac{1}{\phi}$$

Series representations:

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}-\frac{2\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{0.389895+0.129965\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)+\frac{0.129965}{\tanh(0.357129)\tanh(0.443535)}}\right)^k}{k}}{3\log(0.999241)}$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times 0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times 0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)$$

$$2+11+\frac{1}{\phi}=\frac{1}{3\phi}\left(3+33\phi+2\phi\log_{0.999241}\left(1\Big/\left(0.389895+\frac{0.0128202}{\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}}-0.129965\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^k}{k}\right)\right)\right)$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)$$

$$2+11+\frac{1}{\phi}=\frac{1}{3\phi}\left(3+33\phi+2\phi\log_{0.999241}\left(1\Big/\left(0.129965\left(-1+\frac{0.0986433}{\left(\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\sum_{k=1}^{\infty}\frac{1}{0.786891+(1-2k)^2\pi^2}}\right)+0.129965\left(4-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)^k}{k}\right)\right)\right)\right)$$

Integral representations:

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)2+11+\frac{1}{\phi}=\frac{1}{3\phi}\left(3+33\phi+2\phi\log_{0.999241}\left(1\Big/\left(0.389895+0.129965\int_1^{\frac{\sinh(0.357129)}{\cosh(0.443535)}}\frac{1}{t}\,dt+\frac{0.129965}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}\right)\right)\right)$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)$$

$$2+11+\frac{1}{\phi}=\frac{1}{3\phi}\left(3+33\phi+2\phi\log_{0.999241}\left(1\Big/\left(0.389895+\frac{0.129965}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}+0.129965\log\left(\frac{0.357129}{1+0.443535\int_0^1\sinh(0.443535\,t)\,dt}\int_0^1\cosh(0.357129\,t)\,dt\right)\right)\right)\right)$$

$$\frac{1}{3}\log_{0.999241}\left(1\Big/\left(\frac{1}{64}(16.6355323334380000\times0.5)\left(\frac{1}{\tanh(0.357129)\tanh(0.443535)}-1\right)+\frac{1}{64}(16.6355323334380000\times0.5)\left(4+\log\left(\frac{\sinh(0.357129)}{\cosh(0.443535)}\right)\right)\right)\right)$$

$$2+11+\frac{1}{\phi}=\frac{1}{3\phi}\left(3+33\phi+2\phi\log_{0.999241}\left(1\Big/\left(0.389895+\frac{0.129965}{\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\int_0^{0.443535}\operatorname{sech}^2(t)\,dt}+0.129965\log\left(\frac{0.357129\int_0^1\cosh(0.357129\,t)\,dt}{\int_{\frac{i\pi}{2}}^{0.443535}\sinh(t)\,dt}\right)\right)\right)\right)$$

Now, we have that:

$$\ell=\frac{\tanh\tilde{\gamma}\log(q/\sigma)}{q}\left[\frac{q}{2}-1+\frac{1}{\tanh\gamma\tanh\tilde{\gamma}}+\log\frac{\sinh\gamma}{\cosh\tilde{\gamma}}+\frac{\sigma}{\tanh\tilde{\gamma}}\right]+\frac{\sigma}{q} \qquad (A.137)$$

Using the energy (A.133) we can also write the entropy

$$S/N=\ell-\beta\partial_\beta\ell=\frac{\sigma}{q}\left(1+\log\frac{q}{\sigma}\right)=e^{-\nu\beta}(1+\beta\nu) \qquad (A.138)$$

$\gamma = 0.357129$ Thence $\mu = 4$ and $\epsilon = 0.125$

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

q = 8

$\gamma,\sigma \ll 1$

$\tilde{\alpha}=\alpha\ , \qquad \tilde{\gamma}=\gamma+\sigma$

$\tilde{\gamma}=\gamma+\sigma=0.357129+0.0864055=0.4435345$

$\sigma = 3.38585\ldots\times10^{-69}$

3.38585e-69

ν = 9.602230

β = 16.635532333438

$$S/N = \ell - \beta\partial_\beta \ell = \frac{\sigma}{q}\left(1 + \log\frac{q}{\sigma}\right) = e^{-\nu\beta}(1 + \beta\nu)$$

We have that:

$$\ell = \frac{\tanh\tilde{\gamma}\log(q/\sigma)}{q}\left[\frac{q}{2} - 1 + \frac{1}{\tanh\gamma\tanh\tilde{\gamma}} + \log\frac{\sinh\gamma}{\cosh\tilde{\gamma}} + \frac{\sigma}{\tanh\tilde{\gamma}}\right] + \frac{\sigma}{q}$$

(tanh0.4435345 ln(8/3.38585e-69))/8 (((8/2-1+1/(tanh0.357129 tanh0.4435345)+ln(sinh0.357129 / cosh0.4435345)+ 3.38585e-69/tanh0.4435345)))+ 3.38585e-69/8

Input interpretation:

$$\left(\frac{1}{8}\left(\tanh(0.4435345)\log\left(\frac{8}{3.38585\times 10^{-69}}\right)\right)\right)\left(\frac{8}{2} - 1 + \frac{1}{\tanh(0.357129)\tanh(0.4435345)} + \log\left(\frac{\sinh(0.357129)}{\cosh(0.4435345)}\right) + \frac{3.38585\times 10^{-69}}{\tanh(0.4435345)}\right) + \frac{3.38585\times 10^{-69}}{8}$$

tanh(x) is the hyperbolic tangent function
log(x) is the natural logarithm
sinh(x) is the hyperbolic sine function
cosh(x) is the hyperbolic cosine function

Result:

74.0398...

74.0398…

From the formula of coefficients of the '5th order' mock theta function ψ_1(q): (A053261 OEIS Sequence)

sqrt(golden ratio) * exp(Pi*sqrt(n/15)) / (2*5^(1/4)*sqrt(n)) for n = 83 and adding 3/2, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(83/15)) / (2*5^(1/4)*sqrt(83))-3/2

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi\sqrt{\frac{83}{15}}\right)}{2\sqrt[4]{5}\sqrt{83}} - \frac{3}{2}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{83/15}\,\pi}\sqrt{\frac{\phi}{83}}}{2\sqrt[4]{5}} - \frac{3}{2}$$

Decimal approximation:

74.11535702415867069069038720979990776319057937230491337163...

74.115357024…

Property:

$-\frac{3}{2} + \frac{e^{\sqrt{83/15}\,\pi}\sqrt{\frac{\phi}{83}}}{2\sqrt[4]{5}}$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\sqrt{\frac{1}{830}\left(5+\sqrt{5}\right)}\, e^{\sqrt{83/15}\,\pi} - \frac{3}{2}$$

$$\frac{5^{3/4}\sqrt{166\left(1+\sqrt{5}\right)}\, e^{\sqrt{83/15}\,\pi} - 2490}{1660}$$

$$\frac{\sqrt{\frac{1}{166}\left(1+\sqrt{5}\right)}\, e^{\sqrt{83/15}\,\pi}}{2\sqrt[4]{5}} - \frac{3}{2}$$

Series representations:

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{83}{15}}\right)}{2\sqrt[4]{5}\sqrt{83}}-\frac{3}{2}=\left(-15\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(83-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{83}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(83-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{83}{15}}\right)}{2\sqrt[4]{5}\sqrt{83}}-\frac{3}{2}=\left(-15\exp\left(i\pi\left\lfloor\frac{\arg(83-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(83-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{83}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{83}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(83-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(83-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{83}{15}}\right)}{2\sqrt[4]{5}\sqrt{83}}-\frac{3}{2}=\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(83-z_0)/(2\pi)\rfloor}z_0^{-1/2\lfloor\arg(83-z_0)/(2\pi)\rfloor}\left(-15\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(83-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(83-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(83-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{83}{15}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{83}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{83}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(83-z_0)^k z_0^{-k}}{k!}\right)$$

From:

$$S/N = \ell - \beta\partial_\beta\ell = \frac{\sigma}{q}\left(1 + \log\frac{q}{\sigma}\right) = e^{-\nu\beta}(1 + \beta\nu)$$

we obtain:

Input interpretation:

$$\frac{3.38585 \times 10^{-69}}{8}\left(1 + \log\left(\frac{8}{3.38585 \times 10^{-69}}\right)\right)$$

log(x) is the natural logarithm

Result:

$6.80294... \times 10^{-68}$

$6.80294...*10^{-68}$

and:

e^(-9.602230*16.635532333438) (1+16.635532333438*9.602230)

Input interpretation:

$$e^{-9.602230\times16.635532333438}\,(1 + 16.635532333438 \times 9.602230)$$

Result:

$6.80295... \times 10^{-68}$

$6.80295...*10^{-68}$

Alternative representation:

$$e^{16.6355323334380000\,(-1)\,9.60223}\,(1 + 16.6355323334380000 \times 9.60223) = \exp^{16.6355323334380000\,(-1)\,9.60223}(z)\,(1 + 16.6355323334380000 \times 9.60223) \text{ for } z = 1$$

Series representations:

$$e^{16.6355323334380000\,(-1)\,9.60223}\,(1 + 16.6355323334380000 \times 9.60223) = \frac{160.738}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{159.738}}$$

$$e^{16.6355323334380000\,(-1)\,9.60223}\,(1+16.6355323334380000\times 9.60223) = \frac{1.95935\times 10^{50}}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{159.738}}$$

$$e^{16.6355323334380000\,(-1)\,9.60223}\,(1+16.6355323334380000\times 9.60223) = \frac{160.738}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{159.738}}$$

From which, as previously calculated:

((((6.80294*10^-68))))^1/4 *1/10^18

Input interpretation:

$$\sqrt[4]{6.80294\times 10^{-68}}\times\frac{1}{10^{18}}$$

Result:

$1.615006\ldots\times 10^{-35}$

$1.615006\ldots*10^{-35}$ result very near to the value of the Planck length as bove

And for

$$S/N = \ell - \beta\partial_\beta\ell = \frac{\sigma}{q}\left(1+\log\frac{q}{\sigma}\right) = e^{-\nu\beta}(1+\beta\nu)$$

$$\ell \equiv \log Z/N$$

we obtain:

Input interpretation:

$$\frac{\log(x)}{y} = 74.0398$$

log(x) is the natural logarithm

Alternate form:

$y = 0.0135062\log(x)$

Alternate form assuming x and y are positive:

$y = 0.0135062\log(x)$

Solution:

$\log(x)\neq 0\,,\quad y = \frac{5000\log(x)}{370\,199}$

Solution for the variable y:

$y \approx 0.0135062 \log(x)$

N = 0.0135062 lnx

x / (0.0135062 lnx) = (((e^(-9.602230*16.635532333438)(1+16.635532333438*9.602230))))

Input interpretation:

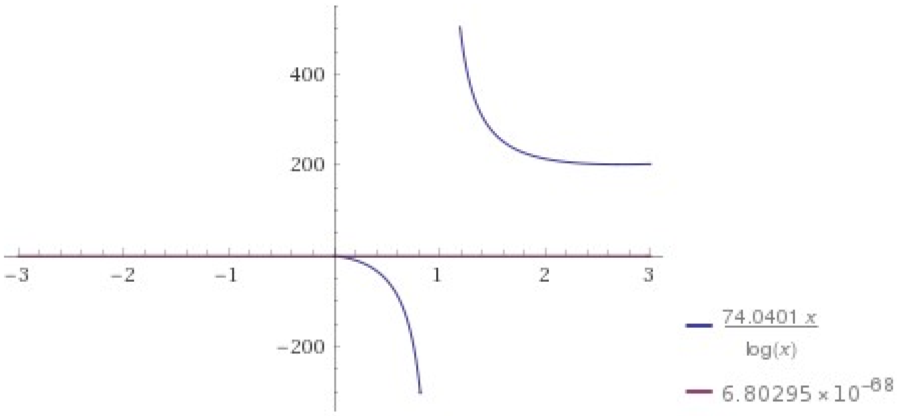
$$\frac{x}{0.0135062 \log(x)} = e^{-9.602230\times 16.635532333438}(1 + 16.635532333438 \times 9.602230)$$

log(x) is the natural logarithm

Result:

$$\frac{74.0401\,x}{\log(x)} = 6.80295\times 10^{-68}$$

Plot:



Alternate form assuming x is real:

$$\frac{x}{\log(x)} = 9.18819\times 10^{-70}$$

Complex solutions:

$x = -1.41431\times 10^{-67} - 2.86793\times 10^{-69}\,i$ (assuming a complex-valued logarithm)

$x = -1.41431\times 10^{-67} + 2.86793\times 10^{-69}\,i$ (assuming a complex-valued logarithm)

Input interpretation:

$-1.41431\times 10^{-67} - 2.86793\times 10^{-69}\,i$

i is the imaginary unit

Result:

$-1.41431... \times 10^{-67} -$
$2.86793... \times 10^{-69}\,i$

Polar coordinates:

$r = 1.4146 \times 10^{-67}$ (radius), $\theta = -178.838°$ (angle)

$1.4146 * 10^{-67} = S$

We have the following data obtained from the entropy S (Hawking radiation calculator):

Mass: 2.30923e-42

Radius: 3.42959e-69

Temperature: 5.31327e+64

from the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/((((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(2.30923e-42)* sqrt[[-((((5.31327e+64 * 4*Pi*(3.42959e-69)^3-(3.42959e-69)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{\left(1\middle/\left(\frac{4\times1.962364415\times10^{19}}{5\times0.0864055^2}\times\frac{1}{2.30923\times10^{-42}}\sqrt{-\frac{5.31327\times10^{64}\times4\pi(3.42959\times10^{-69})^3-(3.42959\times10^{-69})^2}{6.67\times10^{-11}}}\right)\right)}$$

Result:

1.61808...

1.61808…

and:

1/ sqrt[[[[1/((((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(2.30923e-42)* sqrt[[-((((5.31327e+64 * 4*Pi*(3.42959e-69)^3-(3.42959e-69)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\frac{1}{\sqrt{\frac{1}{\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{2.30923\times 10^{-42}}\sqrt{-\frac{5.31327\times 10^{64}\times 4\pi(3.42959\times 10^{-69})^3-(3.42959\times 10^{-69})^2}{6.67\times 10^{-11}}}}}}$$

Result:

0.618017...

0.618017…

Now, we have that:

$$\ell \sim \frac{\beta\mu}{2}+e^{-\beta\mu}+\frac{\beta\mu}{2}\left[\log(2\sinh\gamma)+\frac{1}{\tanh\gamma}-\gamma-1\right], \quad \sigma\gg 1 \quad (A.139)$$

$\gamma = 0.357129$ Thence $\mu = 4$ and $\epsilon = 0.125$

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

q = 8

$\gamma, \sigma \ll 1$

$\tilde{\alpha} = \alpha\ , \qquad \tilde{\gamma} = \gamma + \sigma$

$\tilde{\gamma} = \gamma + \sigma = 0.357129 + 0.0864055 = 0.4435345$

$\sigma = 3.38585... \times 10^{-69}$

3.38585e-69

$\nu = 9.602230$

$\beta = 16.635532333438$

From:

$$\ell \sim \frac{\beta\mu}{2}+e^{-\beta\mu}+\frac{\beta\mu}{2}\left[\log(2\sinh\gamma)+\frac{1}{\tanh\gamma}-\gamma-1\right], \quad \sigma\gg 1 \quad (A.139)$$

we obtain:

(16.635532333438*4)/2+e^(-16.635532333438*4)+(16.635532333438*4)/2 * ((ln(2sinh 0.357129)+1/(tanh 0.357129)-0.357129-1))

Input interpretation:

$$\frac{16.635532333438\times 4}{2}+e^{-16.635532333438\times 4}+\frac{16.635532333438\times 4}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)$$

sinh(x) is the hyperbolic sine function

log(x) is the natural logarithm

tanh(x) is the hyperbolic tangent function

Result:

74.7161...

74.7161… result very near to the previous

Alternative representations:

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)\,16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log\left(-\frac{1}{e^{0.357129}}+e^{0.357129}\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)$$

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)\,16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log_e(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)$$

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)\,16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log(a)\log_a(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)$$

Series representations:

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)\,16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=-\left(\left(33.2711\left(-0.0150281+0.678565\,e^{66.5421293337520000}-0.0300561\sum_{k=1}^{\infty}(-1)^k q^{2k}+0.357129\,e^{66.5421293337520000}\sum_{k=1}^{\infty}(-1)^k q^{2k}+0.5\,e^{66.5421293337520000}\sum_{k=1}^{\infty}\frac{(-1)^k(-1+2\sinh(0.357129))^k}{k}+e^{66.5421293337520000}\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1+k_2}q^{2k_1}(-1+2\sinh(0.357129))^{k_2}}{k_2}\right)\right)\Big/\left(e^{66.5421293337520000}\left(0.5+\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)\right)\right)\quad\text{for } q=1.42922$$

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=-\left(\left(33.2711\left(-0.350014\,e^{66.5421293337520000}-0.0300561\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}+0.357129\,e^{66.5421293337520000}\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}+e^{66.5421293337520000}\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_2}(-1+2\sinh(0.357129))^{k_2}}{(0.510164+\pi^2(1-2k_1)^2)k_2}\right)\right)\Big/\left(e^{66.5421293337520000}\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\right)$$

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=-\left(\left(33.2711\left(e^{66.5421293337520000}-0.0300561\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-\mathcal{A}^{2z_0})}{k!}\right)(0.357129-z_0)^k+0.357129\,e^{66.5421293337520000}\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-\mathcal{A}^{2z_0})}{k!}\right)(0.357129-z_0)^k+e^{66.5421293337520000}\sum_{k_1=0}^{\infty}\sum_{k_2=1}^{\infty}\frac{1}{k_2}(-1)^{k_2}\left(\delta_{k_1}+\frac{2^{1+k_1}\,\mathrm{Li}_{-k_1}(-\mathcal{A}^{2z_0})}{k_1!}\right)(-1+2\sinh(0.357129))^{k_2}(0.357129-z_0)^{k_1}\right)\right)\Big/\left(e^{66.5421293337520000}\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-\mathcal{A}^{2z_0})}{k!}\right)(0.357129-z_0)^k\right)\right)$$

$$\text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=\left(33.2711\left(e^{66.5421293337520000}+0.0300561\int_0^{0.357129}\text{sech}^2(t)\,dt-0.357129\,e^{66.5421293337520000}\int_0^{0.357129}\text{sech}^2(t)\,dt+e^{66.5421293337520000}\left(\int_0^{0.357129}\text{sech}^2(t)\,dt\right)\log\left(0.714258\int_0^1\cosh(0.357129\,t)\,dt\right)\right)\right)/\left(e^{66.5421293337520000}\int_0^{0.357129}\text{sech}^2(t)\,dt\right)$$

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=\left(33.2711\left(e^{66.5421293337520000}+0.0300561\int_0^{0.357129}\text{sech}^2(t)\,dt-0.357129\,e^{66.5421293337520000}\int_0^{0.357129}\text{sech}^2(t)\,dt+\int_0^1\int_0^1\frac{\text{sech}^2(0.357129\,t_2)}{1+(-1+2\sinh(0.357129))\,t_1}\,dt_2\,dt_1\right)\right)/\left(e^{66.5421293337520000}\int_0^{0.357129}\text{sech}^2(t)\,dt\right)$$

$$\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)=\left(33.2711\left(e^{66.5421293337520000}+0.0300561\int_0^{0.357129}\text{sech}^2(t)\,dt-0.357129\,e^{66.5421293337520000}\int_0^{0.357129}\text{sech}^2(t)\,dt+e^{66.5421293337520000}\left(\int_0^{0.357129}\text{sech}^2(t)\,dt\right)\log\left(\frac{0.178565\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\mathcal{A}^{0.0318853/s+s}}{s^{3/2}}\,ds\right)\right)\right)/\left(e^{66.5421293337520000}\int_0^{0.357129}\text{sech}^2(t)\,dt\right)\text{ for }\gamma>0$$

From which:

2((((16.635532333438*4)/2+e^(-16.635532333438*4)+(16.635532333438*4)/2 * ((ln(2sinh 0.357129)+1/(tanh 0.357129)-0.357129-1)))))-11+1/golden ratio

Input interpretation:

$$2\left(\frac{16.635532333438\times 4}{2}+e^{-16.635532333438\times 4}+\frac{16.635532333438\times 4}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)-11+\frac{1}{\phi}$$

sinh(x) is the hyperbolic sine function

log(x) is the natural logarithm

tanh(x) is the hyperbolic tangent function

ϕ is the golden ratio

Result:

139.050...

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

Alternative representations:

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$-11+\frac{1}{\phi}+2\left(33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log\left(-\frac{1}{e^{0.357129}}+e^{0.357129}\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$-11+\frac{1}{\phi}+2\left(33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log_e(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$-11+\frac{1}{\phi}+2\left(33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log(a)\log_a(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

Series representations:

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$-34.7641+\frac{2}{e^{66.5421293337520000}}+\frac{1}{\phi}-66.5421293337520000\sum_{k=1}^{\infty}\frac{(-1)^k(-1+2\sinh(0.357129))^k}{k}-\frac{66.5421293337520000}{\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}\left(-\mathcal{A}^2 z_0\right)}{k!}\right)(0.357129-z_0)^k}\quad \text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$-\left(\left(66.5421\left(-0.350014\,e^{66.5421293337520000}\,\phi-0.0150281\,e^{66.5421293337520000}\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}-0.0300561\,\phi\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}+0.522438\,e^{66.5421293337520000}\,\phi\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}+e^{66.5421293337520000}\,\phi\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_2}(-1+2\sinh(0.357129))^{k_2}}{\left(0.510164+\pi^2(1-2k_1)^2\right)k_2}\right)\right)\Big/\left(e^{66.5421293337520000}\,\phi\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$-\left(\left(66.5421\left(-0.00751404\,e^{66.5421293337520000}-0.0150281\,\phi+0.761219\,e^{66.5421293337520000}\,\phi-0.0150281\,e^{66.5421293337520000}\sum_{k=1}^{\infty}(-1)^k q^{2k}-0.0300561\,\phi\sum_{k=1}^{\infty}(-1)^k q^{2k}+0.522438\,e^{66.5421293337520000}\,\phi\sum_{k=1}^{\infty}(-1)^k q^{2k}+0.5\,e^{66.5421293337520000}\,\phi\sum_{k=1}^{\infty}\frac{(-1)^k(-1+2\sinh(0.357129))^k}{k}+e^{66.5421293337520000}\,\phi\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1+k_2}q^{2k_1}(-1+2\sinh(0.357129))^{k_2}}{k_2}\right)\right)\Big/\left(e^{66.5421293337520000}\,\phi\left(0.5+\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)\right)\right)\quad \text{for } q=1.42922$$

Integral representations:

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$\left(66.5421\left(e^{66.5421293337520000}\phi+0.0150281\,e^{66.5421293337520000}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+0.0300561\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.522438\,e^{66.5421293337520000}\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\int_0^1\int_0^1\frac{\operatorname{sech}^2(0.357129\,t_2)}{1+(-1+2\sinh(0.357129))\,t_1}\,dt_2\,dt_1\right)\right)\Big/\left(e^{66.5421293337520000}\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$\left(66.5421\left(e^{66.5421293337520000}\phi+0.0150281\,e^{66.5421293337520000}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+0.0300561\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.522438\,e^{66.5421293337520000}\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+e^{66.5421293337520000}\phi\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(0.714258\int_0^1\cosh(0.357129\,t)\,dt\right)\right)\right)\Big/\left(e^{66.5421293337520000}\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)\,16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-11+\frac{1}{\phi}=$$

$$\left(66.5421\left(e^{66.5421293337520000}\,\phi+0.0150281\,e^{66.5421293337520000}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+0.0300561\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.522438\,e^{66.5421293337520000}\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+e^{66.5421293337520000}\,\phi\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(\frac{0.178565\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\mathcal{A}^{0.0318853/s+s}}{s^{3/2}}\,ds\right)\right)\right)\Big/\left(e^{66.5421293337520000}\,\phi\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\ \text{for}\ \gamma>0$$

2((((16.635532333438*4)/2+e^(-16.635532333438*4)+(16.635532333438*4)/2 * ((ln(2sinh 0.357129)+1/(tanh 0.357129)-0.357129-1)))))-24

Input interpretation:

$$2\left(\frac{16.635532333438\times 4}{2}+e^{-16.635532333438\times 4}+\frac{16.635532333438\times 4}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)\right)-24$$

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

$\log(x)$ is the natural logarithm

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

Result:

125.432...

125.432… 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:

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24=$$

$$-24+2\left(33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log\left(-\frac{1}{e^{0.357129}}+e^{0.357129}\right)+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24=$$

$$-24+2\left(33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log_e(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24=$$

$$-24+2\left(33.2710646668760000+\frac{1}{e^{66.5421293337520000}}+33.2710646668760000\left(-1.35713+\log(a)\log_a(2\sinh(0.357129))+\frac{1}{-1+\frac{2}{1+\frac{1}{e^{0.714258}}}}\right)\right)$$

Series representations:

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)\,16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24 = -\left(\left(66.5421\left(-0.0150281+0.858901\,e^{66.5421293337520000}-0.0300561\sum_{k=1}^{\infty}(-1)^k q^{2k}+0.717803\,e^{66.5421293337520000}\sum_{k=1}^{\infty}(-1)^k q^{2k}+0.5\,e^{66.5421293337520000}\sum_{k=1}^{\infty}\frac{(-1)^k(-1+2\sinh(0.357129))^k}{k}+e^{66.5421293337520000}\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1+k_2}q^{2k_1}(-1+2\sinh(0.357129))^{k_2}}{k_2}\right)\right)\Big/\left(e^{66.5421293337520000}\left(0.5+\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)\right)\right) \text{ for } q = 1.42922$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)\,16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24 = -\left(\left(66.5421\left(-0.350014\,e^{66.5421293337520000}-0.0300561\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}+0.717803\,e^{66.5421293337520000}\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}+e^{66.5421293337520000}\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_2}(-1+2\sinh(0.357129))^{k_2}}{(0.510164+\pi^2(1-2k_1)^2)k_2}\right)\right)\Big/\left(e^{66.5421293337520000}\sum_{k=1}^{\infty}\frac{1}{0.510164+(1-2k)^2\pi^2}\right)\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24=$$

$$-\left(\left(66.5421\left(e^{66.5421293337520000}-0.0300561\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-\mathcal{A}^{2z_0})}{k!}\right)(0.357129-z_0)^k+0.717803\,e^{66.5421293337520000}\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-\mathcal{A}^{2z_0})}{k!}\right)(0.357129-z_0)^k+e^{66.5421293337520000}\sum_{k_1=0}^{\infty}\sum_{k_2=1}^{\infty}\frac{1}{k_2}(-1)^{k_2}\left(\delta_{k_1}+\frac{2^{1+k_1}\,\mathrm{Li}_{-k_1}(-\mathcal{A}^{2z_0})}{k_1!}\right)(-1+2\sinh(0.357129))^{k_2}(0.357129-z_0)^{k_1}\right)\right)\Big/\left(e^{66.5421293337520000}\sum_{k=0}^{\infty}\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}(-\mathcal{A}^{2z_0})}{k!}\right)(0.357129-z_0)^k\right)\right)$$

$$\text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24=$$

$$\left(66.5421\left(e^{66.5421293337520000}+0.0300561\int_0^{0.357129}\mathrm{sech}^2(t)\,dt-0.717803\,e^{66.5421293337520000}\int_0^{0.357129}\mathrm{sech}^2(t)\,dt+e^{66.5421293337520000}\left(\int_0^{0.357129}\mathrm{sech}^2(t)\,dt\right)\log\left(0.714258\int_0^1\cosh(0.357129\,t)\,dt\right)\right)\right)\Big/\left(e^{66.5421293337520000}\int_0^{0.357129}\mathrm{sech}^2(t)\,dt\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24=$$

$$\left(66.5421\left(e^{66.5421293337520000}+0.0300561\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.717803\,e^{66.5421293337520000}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+\int_0^1\int_0^1\frac{\operatorname{sech}^2(0.357129\,t_2)}{1+(-1+2\sinh(0.357129))\,t_1}\,dt_2\,dt_1\right)\right)\Big/\left(e^{66.5421293337520000}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)$$

$$2\left(\frac{16.6355323334380000\times 4}{2}+e^{4(-1)16.6355323334380000}+\frac{1}{2}\left(\log(2\sinh(0.357129))+\frac{1}{\tanh(0.357129)}-0.357129-1\right)(16.6355323334380000\times 4)\right)-24=$$

$$\left(66.5421\left(e^{66.5421293337520000}+0.0300561\int_0^{0.357129}\operatorname{sech}^2(t)\,dt-0.717803\,e^{66.5421293337520000}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt+e^{66.5421293337520000}\left(\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\log\left(\frac{0.178565\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\mathcal{A}^{0.0318853/s+s}}{s^{3/2}}\,ds\right)\right)\right)\Big/\left(e^{66.5421293337520000}\int_0^{0.357129}\operatorname{sech}^2(t)\,dt\right)\quad\text{for }\gamma>0$$

Now, if

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

for q = 8, we place $\mathcal{J}$ = 2

From

$$\ell\sim\log 2+\frac{(\beta\mu)^2}{8}+\frac{2\beta\mathcal{J}}{q^2}+\frac{(\beta\mu)^2}{2q}\log\left(\frac{(\mu\beta)^2}{4q\mathcal{J}}\right)+\cdots$$

We obtain:

ln 2 + (16.635532333438*4)^2/8+(2*16.635532333438*2)/64+(16.635532333438*4)^2/16 ln ((((((4*16.635532333438)^2)/(4*8*2)))))

Input interpretation:

$$\log(2)+\frac{1}{8}(16.635532333438\times 4)^2+\frac{1}{64}(2\times 16.635532333438\times 2)+\left(\frac{1}{16}(16.635532333438\times 4)^2\right)\log\left(\frac{(4\times 16.635532333438)^2}{4\times 8\times 2}\right)$$

log(x) is the natural logarithm

Result:

1727.7072669307...

1727.7072669307…

Alternative representations:

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2=\log_e(2)+\frac{66.5421293337520000}{64}+\frac{66.5421293337520000^2}{8}+\frac{1}{16}\log_e\left(\frac{66.5421293337520000^2}{64}\right)66.5421293337520000^2$$

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2=\log(a)\log_a(2)+\frac{66.5421293337520000}{64}+\frac{66.5421293337520000^2}{8}+\frac{1}{16}\log(a)\log_a\left(\frac{66.5421293337520000^2}{64}\right)66.5421293337520000^2$$

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2=-\mathrm{Li}_1(-1)+\frac{66.5421293337520000}{64}+\frac{66.5421293337520000^2}{8}-\frac{1}{16}\mathrm{Li}_1\left(1-\frac{66.5421293337520000^2}{64}\right)66.5421293337520000^2$$

Series representations:

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2 = 554.52159280456217+2 i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+553.48187203372230 i\pi\left\lfloor\frac{\arg(69.185234004215287-x)}{2\pi}\right\rfloor+277.740936016861149\log(x)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1.0000000000000000(2-x)^k-276.7409360168611(69.185234004215287-x)^k\right)x^{-k} \quad \text{for } x<0$$

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2 = 554.52159280456217+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+276.740936016861149\left\lfloor\frac{\arg(69.185234004215287-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+277.740936016861149\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log(z_0)+276.740936016861149\left\lfloor\frac{\arg(69.185234004215287-z_0)}{2\pi}\right\rfloor\log(z_0)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1.0000000000000000(2-z_0)^k-276.7409360168611(69.185234004215287-z_0)^k\right)z_0^{-k}$$

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2 = 554.52159280456217+2 i\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{2}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+553.48187203372230 i\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{69.185234004215287}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+277.740936016861149\log(z_0)+\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1.0000000000000000(2-z_0)^k-276.7409360168611(69.185234004215287-z_0)^k\right)z_0^{-k}$$

Integral representation:

$$\log(2) + \frac{1}{8}(16.6355323334380000 \times 4)^2 + \frac{2(16.6355323334380000 \times 2)}{64} + \frac{1}{16}\log\left(\frac{(4 \times 16.6355323334380000)^2}{4 \times 8 \times 2}\right)(16.6355323334380000 \times 4)^2 = 554.52159280456 + \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{1}{i\pi\Gamma(1-s)} 0.50000000000000\, e^{-4.22222803120557708\, s} \left(276.740936016861 + 1.00000000000000\, e^{4.22222803120557708\, s}\right) \Gamma(-s)^2\, \Gamma(1+s)\, ds \quad \text{for } -1 < \gamma < 0$$

ln 2 + (16.635532333438*4)^2/8+(2*16.635532333438*2)/64+(16.635532333438*4)^2/ 16 ln ((((((4*16.635532333438)^2)/(4*8*2)))))+1.333425959

where 1.333425959 is the following 5th order Ramanujan mock theta function:

1+0.449329/(1+0.449329)+0.449329^4/(((1+0.449329)(1+0.449329^2))))

Input interpretation:

$$1 + \frac{0.449329}{1+0.449329} + \frac{0.449329^4}{(1+0.449329)(1+0.449329^2)}$$

Result:

1.333425959911272680899883774926957939703837145947480074487...

f(q) = 1.333425959...

Input interpretation:

$$\log(2) + \frac{1}{8}(16.635532333438 \times 4)^2 + \frac{1}{64}(2 \times 16.635532333438 \times 2) + \left(\frac{1}{16}(16.635532333438 \times 4)^2\right)\log\left(\frac{(4 \times 16.635532333438)^2}{4 \times 8 \times 2}\right) + 1.333425959$$

log(x) is the natural logarithm

Result:

1729.040692890...

1729.04069289…

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:

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2+1.33343=1.33343+\log_e(2)+\frac{66.5421293337520000}{64}+\frac{66.5421293337520000^2}{8}+\frac{1}{16}\log_e\left(\frac{66.5421293337520000^2}{64}\right)66.5421293337520000^2$$

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2+1.33343=1.33343+\log(a)\log_a(2)+\frac{66.5421293337520000}{64}+\frac{66.5421293337520000^2}{8}+\frac{1}{16}\log(a)\log_a\left(\frac{66.5421293337520000^2}{64}\right)66.5421293337520000^2$$

$$\log(2)+\frac{1}{8}(16.6355323334380000\times 4)^2+\frac{2(16.6355323334380000\times 2)}{64}+\frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2+1.33343=1.33343-\text{Li}_1(-1)+\frac{66.5421293337520000}{64}+\frac{66.5421293337520000^2}{8}-\frac{1}{16}\text{Li}_1\left(1-\frac{66.5421293337520000^2}{64}\right)66.5421293337520000^2$$

Series representations:

$$\log(2) + \frac{1}{8}(16.6355323334380000 \times 4)^2 + \frac{2(16.6355323334380000 \times 2)}{64} + \frac{1}{16}\log\left(\frac{(4 \times 16.6355323334380000)^2}{4 \times 8 \times 2}\right)(16.6355323334380000 \times 4)^2 + 1.33343 = 555.855 + 2 i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + 553.48187203372230 i \pi \left\lfloor \frac{\arg(69.185234004215287 - x)}{2\pi} \right\rfloor + 277.740936016861149 \log(x) + \sum_{k=1}^{\infty} \frac{1}{k}(-1)^k \left(-1.0000000000000000 (2-x)^k - 276.7409360168611 (69.185234004215287 - x)^k\right) x^{-k} \quad \text{for } x < 0$$

$$\log(2) + \frac{1}{8}(16.6355323334380000 \times 4)^2 + \frac{2(16.6355323334380000 \times 2)}{64} + \frac{1}{16}\log\left(\frac{(4 \times 16.6355323334380000)^2}{4 \times 8 \times 2}\right)(16.6355323334380000 \times 4)^2 + 1.33343 = 555.855 + \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + 276.740936016861149 \left\lfloor \frac{\arg(69.185234004215287 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + 277.740936016861149 \log(z_0) + \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \log(z_0) + 276.740936016861149 \left\lfloor \frac{\arg(69.185234004215287 - z_0)}{2\pi} \right\rfloor \log(z_0) + \sum_{k=1}^{\infty} \frac{1}{k}(-1)^k \left(-1.0000000000000000 (2-z_0)^k - 276.7409360168611 (69.185234004215287 - z_0)^k\right) z_0^{-k}$$

$$\log(2) + \frac{1}{8}(16.6355323334380000 \times 4)^2 + \frac{2(16.6355323334380000 \times 2)}{64} + \frac{1}{16}\log\left(\frac{(4 \times 16.6355323334380000)^2}{4 \times 8 \times 2}\right)(16.6355323334380000 \times 4)^2 + 1.33343 = 555.855 + 2 i \pi \left\lfloor -\frac{-\pi + \arg\left(\frac{2}{z_0}\right) + \arg(z_0)}{2\pi} \right\rfloor + 553.48187203372230 i \pi \left\lfloor -\frac{-\pi + \arg\left(\frac{69.185234004215287}{z_0}\right) + \arg(z_0)}{2\pi} \right\rfloor + 277.740936016861149 \log(z_0) + \sum_{k=1}^{\infty} \frac{1}{k}(-1)^k \left(-1.0000000000000000 (2-z_0)^k - 276.7409360168611 (69.185234004215287 - z_0)^k\right) z_0^{-k}$$

Integral representation:

$$\log(2) + \frac{1}{8}(16.6355323334380000\times 4)^2 + \frac{2(16.6355323334380000\times 2)}{64} + \frac{1}{16}\log\left(\frac{(4\times 16.6355323334380000)^2}{4\times 8\times 2}\right)(16.6355323334380000\times 4)^2 + 1.33343 = 555.855 + \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{0.5\, e^{-4.22222803120557708\, s}\left(276.741 + e^{4.22222803120557708\, s}\right)\Gamma(-s)^2\,\Gamma(1+s)}{i\pi\,\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

From:

$$\ell - \ell_{\mu=0} = \frac{\mu^2}{2}\int d\tau_1 d\tau_2 G_{LL}(\tau_{12})G_{RR}(\tau_{12}) = \frac{(\beta\mu)^2}{8}$$

we obtain:

(16.635532333438*4)^2/8

Input interpretation:

$$\frac{1}{8}(16.635532333438\times 4)^2$$

Result:

553.481872033722298425799688

553.481872033722298425799688

From the formula of coefficients of the '5th order' mock theta function $\psi_1(q)$: (A053261 OEIS Sequence)

sqrt(golden ratio) * exp(Pi*sqrt(n/15)) / (2*5^(1/4)*sqrt(n))

for n = 141 and adding 7, that is a Lucas number, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(141/15)) / (2*5^(1/4)*sqrt(141))+7

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{141}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{141}} + 7$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{47/5}\,\pi}\sqrt{\frac{\phi}{141}}}{2\sqrt[4]{5}}+7$$

Decimal approximation:

553.0223965560843749827374026150347221372284172615781992041...

553.02239655608…

Property:

$$7+\frac{e^{\sqrt{47/5}\,\pi}\sqrt{\frac{\phi}{141}}}{2\sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$7+\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{1410}}\,e^{\sqrt{47/5}\,\pi}$$

$$7+\frac{\sqrt{\frac{1}{282}\left(1+\sqrt{5}\right)}\,e^{\sqrt{47/5}\,\pi}}{2\sqrt[4]{5}}$$

$$\frac{19\,740+5^{3/4}\sqrt{282\left(1+\sqrt{5}\right)}\,e^{\sqrt{47/5}\,\pi}}{2820}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{141}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{141}}+7=\left(70\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(141-z_0)^k\,z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{47}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k\,z_0^{-k}}{k!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(141-z_0)^k\,z_0^{-k}}{k!}\right)\quad\text{for not }\left(\left(z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0\right)\right)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{141}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{141}}+7=\left(70\exp\left(i\pi\left\lfloor\frac{\arg(141-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(141-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{47}{5}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{47}{5}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(\phi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(141-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(141-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{141}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{141}}+7=\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(141-z_0)/(2\pi)\rfloor}z_0^{-1/2\lfloor\arg(141-z_0)/(2\pi)\rfloor}\left(70\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(141-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(141-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(141-z_0)^k\,z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{47}{5}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{47}{5}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{47}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k\,z_0^{-k}}{k!}\right)\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(141-z_0)^k\,z_0^{-k}}{k!}\right)$$

(16.635532333438*4)^2/8 -5 - 1/golden ratio

Input interpretation:

$$\frac{1}{8}(16.635532333438\times 4)^2-5-\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

547.86383804497...

547.86383804497… result practically equal to the rest mass of Eta meson 547.862

Alternative representations:

$$\frac{1}{8}(16.6355323334380000\times 4)^2-5-\frac{1}{\phi}=-5+\frac{66.5421293337520000^2}{8}-\frac{1}{2\sin(54^\circ)}$$

$$\frac{1}{8}(16.6355323334380000\times 4)^2-5-\frac{1}{\phi}=-5+\frac{66.5421293337520000^2}{8}--\frac{1}{2\cos(216^\circ)}$$

$$\frac{1}{8}(16.6355323334380000\times 4)^2-5-\frac{1}{\phi}=-5+\frac{66.5421293337520000^2}{8}--\frac{1}{2\sin(666^\circ)}$$

We have that:

$$-\partial_\sigma(\sin^2\sigma\partial_\sigma\phi)=-\frac{N}{2\pi}\epsilon(1-\epsilon)\sin^2\sigma \quad\longrightarrow\quad \phi=N\frac{\epsilon(1-\epsilon)}{4\pi}\left[\frac{(\frac{\pi}{2}-\sigma)}{\tan\sigma}+1\right]+\frac{c}{24\pi}$$

for

$$-\frac{1}{2}\leq\epsilon\leq\frac{1}{2}$$

for N = 8, c = 1, ϵ = 0.0864055 and σ = 3, we obtain:

8*((0.0864055(1-0.0864055)))/4*3 [(((Pi/2-3)/(tan 3)))+1]+1/(24Pi)

Where 0.0864055 is a Ramanujan mock theta function value

Input interpretation:

$$8\left(\frac{1}{4}(0.0864055(1-0.0864055))\right)\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)+\frac{1}{24\pi}$$

Result:

5.23570...

5.2357…

Alternative representations:

$$\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}=\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\frac{1}{\cot(3)}}\right)$$

$$\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}=\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\cot\left(-3+\frac{\pi}{2}\right)}\right)$$

$$\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}=\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+-\frac{-3+\frac{\pi}{2}}{\cot\left(3+\frac{\pi}{2}\right)}\right)$$

Series representations:

$$\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}=0.473638+\frac{1}{24\,\pi}+\frac{-1.42091+0.236819\,\pi}{i\left(1+2\sum_{k=1}^{\infty}(-1)^k\,q^{2k}\right)}\ \text{for } q=e^{3i}$$

$$\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}=0.473638+\frac{1}{24\,\pi}+\frac{-1.42091+0.236819\,\pi}{i\sum_{k=-\infty}^{\infty}(-1)^k\,e^{6ik}\,\text{sgn}(k)}$$

$$\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}=0.473638+\frac{1}{24\,\pi}+\frac{-0.0592047+0.00986745\,\pi}{\sum_{k=1}^{\infty}\frac{1}{-36+(1-2k)^2\,\pi^2}}$$

Integral representation:

$$\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}=$$
$$\frac{0.236819\left(-6.\,\pi+\pi^2+0.175943\int_0^3\sec^2(t)\,dt+2\,\pi\int_0^3\sec^2(t)\,dt\right)}{\pi\int_0^3\sec^2(t)\,dt}$$

From which:

golden ratio^2*(((8*((0.0864055(1-0.0864055)))/4*3 [(((Pi/2-3)/(tan 3)))+1]+1/(24Pi))))

Input interpretation:

$$\phi^2\left(8\left(\frac{1}{4}\,(0.0864055\,(1-0.0864055))\right)\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)+\frac{1}{24\,\pi}\right)$$

ϕ is the golden ratio

Result:

13.7072...

13.7072…

In atomic physics, **Rydberg unit of energy**, symbol Ry, corresponds to the energy of the photon whose wavenumber is the Rydberg constant, i.e. the ionization energy of the hydrogen atom.

$$1\ \mathrm{Ry}\equiv hcR_\infty=\frac{m_e e^4}{8\varepsilon_0^2 h^2}=13.605\ 693\ 009(84)\ \mathrm{eV}\approx 2.179\times 10^{-18}\,\mathrm{J}.$$

Alternative representations:

$$\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\frac{1}{\cot(3)}}\right)\right)$$

$$\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\cot\left(-3+\frac{\pi}{2}\right)}\right)\right)$$

$$\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+-\frac{-3+\frac{\pi}{2}}{\cot\left(3+\frac{\pi}{2}\right)}\right)\right)$$

Series representations:

$$\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$\phi^2\left(0.473638+\frac{1}{24\,\pi}+\frac{-1.42091+0.236819\,\pi}{i\left(1+2\sum_{k=1}^{\infty}(-1)^k\,q^{2k}\right)}\right)\ \text{for } q=e^{3i}$$

$$\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$\phi^2\left(0.473638+\frac{1}{24\,\pi}+\frac{-1.42091+0.236819\,\pi}{i\sum_{k=-\infty}^{\infty}(-1)^k\,e^{6ik}\,\mathrm{sgn}(k)}\right)$$

$$\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$\phi^2\left(0.473638+\frac{1}{24\,\pi}+\frac{-0.0592047+0.00986745\,\pi}{\sum_{k=1}^{\infty}\frac{1}{-36+(1-2k)^2\,\pi^2}}\right)$$

Integral representation:

$$\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$\phi^2\left(0.473638+\frac{1}{24\,\pi}+\frac{-1.42091+0.236819\,\pi}{\int_0^3\sec^2(t)\,dt}\right)$$

and:

10*golden ratio^2*(((8*((0.0864055(1-0.0864055)))/4*3 [(((Pi/2-3)/(tan 3)))+1]+1/(24Pi))))

Input interpretation:

$$10\,\phi^2\left(8\left(\frac{1}{4}\,(0.0864055\,(1-0.0864055))\right)\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)+\frac{1}{24\,\pi}\right)$$

ϕ is the golden ratio

Result:

137.072...

137.072…

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

Alternative representations:

$$10\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\pi}\right)=10\phi^2\left(\frac{1}{24\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\frac{1}{\cot(3)}}\right)\right)$$

$$10\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\pi}\right)=10\phi^2\left(\frac{1}{24\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\cot\left(-3+\frac{\pi}{2}\right)}\right)\right)$$

$$10\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\pi}\right)=10\phi^2\left(\frac{1}{24\pi}+\frac{1}{4}\times 1.89455\left(1+-\frac{-3+\frac{\pi}{2}}{\cot\left(3+\frac{\pi}{2}\right)}\right)\right)$$

Series representations:

$$10\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\pi}\right)=10\phi^2\left(0.473638+\frac{1}{24\pi}+\frac{-1.42091+0.236819\pi}{i\left(1+2\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)}\right)\quad \text{for } q=e^{3i}$$

$$10\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\pi}\right)=10\phi^2\left(0.473638+\frac{1}{24\pi}+\frac{-1.42091+0.236819\pi}{i\sum_{k=-\infty}^{\infty}(-1)^k e^{6ik}\,\mathrm{sgn}(k)}\right)$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$10\,\phi^2\left(0.473638+\frac{1}{24\,\pi}+\frac{-0.0592047+0.00986745\,\pi}{\sum_{k=1}^{\infty}\frac{1}{-36+(1-2k)^2\,\pi^2}}\right)$$

Integral representation:

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)=$$
$$10\,\phi^2\left(0.473638+\frac{1}{24\,\pi}+\frac{-1.42091+0.236819\,\pi}{\int_0^3\sec^2(t)\,dt}\right)$$

10*golden ratio^2*(((8*((0.0864055(1-0.0864055)))/4*3 [(((Pi/2-3)/(tan 3)))+1]+1/(24Pi))))-12

Input interpretation:

$$10\,\phi^2\left(8\left(\frac{1}{4}\,(0.0864055\,(1-0.0864055))\right)\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)+\frac{1}{24\,\pi}\right)-12$$

ϕ is the golden ratio

Result:

125.072...

125.072… 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:

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)-12=$$
$$-12+10\,\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\frac{1}{\cot(3)}}\right)\right)$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)-12 = -12+10\,\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\cot\left(-3+\frac{\pi}{2}\right)}\right)\right)$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)-12 = -12+10\,\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+-\frac{-3+\frac{\pi}{2}}{\cot\left(3+\frac{\pi}{2}\right)}\right)\right)$$

Series representations:

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)-12 = -12+\phi^2\left(4.73638+\frac{0.416667}{\pi}\right)+\frac{\phi^2\,(-14.2091+2.36819\,\pi)}{i\sum_{k=-\infty}^{\infty}(-1)^k\,e^{6\,i\,k}\,\operatorname{sgn}(k)}$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)-12 = -12+\phi^2\left(4.73638+\frac{0.416667}{\pi}\right)+\frac{\phi^2\,(-0.592047+0.0986745\,\pi)}{\sum_{k=1}^{\infty}\frac{1}{-36+(1-2\,k)^2\,\pi^2}}$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)-12 = -12+10\,\phi^2\left(\frac{1}{24\,\pi}+0.473638\left(1+\frac{-3+\frac{\pi}{2}}{\sum_{k=0}^{\infty}\left(-i\,\delta_k+\frac{2^{1+k}\,(-i)^{1+k}\,\mathrm{Li}_{-k}\left(-e^{-2\,i\,z_0}\right)}{k!}\right)(3-z_0)^k}\right)\right)$$

$$\text{for } \frac{1}{2}+\frac{z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)-12 = \frac{1}{\pi\int_0^3\sec^2(t)\,dt}2.36819\left(-6\,\phi^2\,\pi+\phi^2\,\pi^2+0.175943\,\phi^2\int_0^3\sec^2(t)\,dt-5.06717\,\pi\int_0^3\sec^2(t)\,dt+2\,\phi^2\,\pi\int_0^3\sec^2(t)\,dt\right)$$

10*golden ratio^2*(((8*((0.0864055(1-0.0864055)))/4*3 [(((Pi/2-3)/(tan 3)))+1]+1/(24Pi))))+e

Input interpretation:

$$10\,\phi^2\left(8\left(\frac{1}{4}(0.0864055\,(1-0.0864055))\right)\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)+\frac{1}{24\,\pi}\right)+e$$

ϕ is the golden ratio

Result:

139.791...

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

Alternative representations:

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)+e=$$
$$e+10\,\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\frac{1}{\cot(3)}}\right)\right)$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)+e=$$
$$e+10\,\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+\frac{-3+\frac{\pi}{2}}{\cot\left(-3+\frac{\pi}{2}\right)}\right)\right)$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)+e=$$
$$e+10\,\phi^2\left(\frac{1}{24\,\pi}+\frac{1}{4}\times 1.89455\left(1+-\frac{-3+\frac{\pi}{2}}{\cot\left(3+\frac{\pi}{2}\right)}\right)\right)$$

Series representations:

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)+e=$$
$$e+\frac{\phi^2\,(0.416667+4.73638\,\pi)}{\pi}+\frac{\phi^2\,(-14.2091+2.36819\,\pi)}{i\sum_{k=-\infty}^{\infty}(-1)^k\,\mathcal{A}^{6ik}\,\mathrm{sgn}(k)}$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)+e = e+\frac{\phi^2\,(0.416667+4.73638\,\pi)}{\pi}+\frac{\phi^2\,(-0.592047+0.0986745\,\pi)}{\sum_{k=1}^{\infty}\frac{1}{-36+(1-2k)^2\,\pi^2}}$$

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)+e = e+10\,\phi^2\left(\frac{1}{24\,\pi}+0.473638\left(1+\frac{-3+\frac{\pi}{2}}{\sum_{k=0}^{\infty}\left(-i\,\delta_k+\frac{2^{1+k}\,(-i)^{1+k}\,\mathrm{Li}_{-k}\left(-e^{-2\,i\,z_0}\right)}{k!}\right)(3-z_0)^k}\right)\right)$$

$$\text{for } \frac{1}{2}+\frac{z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$10\,\phi^2\left(\frac{1}{4}\left(8\times 3\left(\frac{\frac{\pi}{2}-3}{\tan(3)}+1\right)\right)0.0864055\,(1-0.0864055)+\frac{1}{24\,\pi}\right)+e = \frac{1}{\pi\int_0^3\sec^2(t)\,dt}\left(-14.2091\,\phi^2\,\pi+2.36819\,\phi^2\,\pi^2+0.416667\,\phi^2\int_0^3\sec^2(t)\,dt+e\,\pi\int_0^3\sec^2(t)\,dt+4.73638\,\phi^2\,\pi\int_0^3\sec^2(t)\,dt\right)$$

Conclusions

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

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

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

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 $-6C+\phi$ 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:

$1.6272016226072509292942156739117979541838581136954016\ldots\times10^{-6}$

$1.6272016\ldots * 10^{-6}$

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:

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

Note that:

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

Hence

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

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

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

Thence:

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

And

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

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.

References

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