On the Ramanujan's equations applied to various sectors of Particle Physics and Cosmology: new possible mathematical connections with the values of Pion mesons and other baryons and mesons.

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Abstract

In this research thesis, we have analyzed further Ramanujan formulas and described new possible mathematical connections with some sectors of Particle Physics (values of Pion mesons and other baryons and mesons) and Cosmology

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

https://biografieonline.it/foto-enrico-fermi

Summary

In this research thesis, we have analyzed further Ramanujan formulas and described new mathematical connections with some sectors of Particle Physics and Cosmology. We have described, as in previous papers, the possible and new connections between different formulas of Ramanujan's mathematics and some formulas concerning particle physics and cosmology. In the course of the discussion we describe and highlight the connections between some developments of Ramanujan equations and particles type solutions such as the mass of the Higgs boson and the masses of proton (or neutron), and other baryons and mesons. Principally solutions of Ramanujan equations, connected with the masses of the π mesons (139.57 and 134.9766 MeV) have been described and highlighted.

Further, we have described the connections between the mathematics of Ramanujan and different equations concerning some areas of theoretical physics and cosmology (see part "Replica Wormholes and the Entropy of Hawking Radiation"). Is our opinion, that the possible connections between the mathematical developments of some Rogers-Ramanujan continued fractions, various mathematical Ramanujan's expressions, the value of the dilaton and that of "the dilaton mass calculated as a type of Higgs boson that is equal about to 125 GeV", the Higgs boson mass itself and the masses of the π mesons (139.57 and 134.9766 MeV) are fundamental.

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

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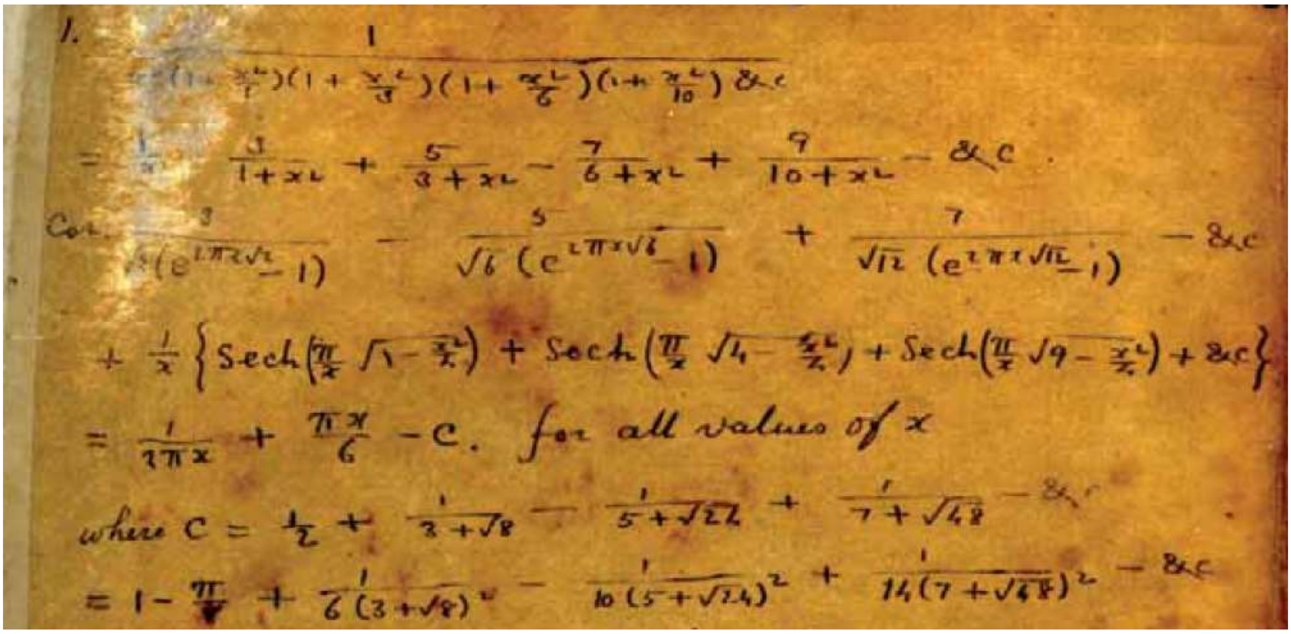


1. $$\frac{1}{x(1+\frac{x^2}{1})(1+\frac{x^2}{3})(1+\frac{x^2}{6})(1+\frac{x^2}{10})\&c}$$
$$= \frac{1}{x} - \frac{3}{1+x^2} + \frac{5}{3+x^2} - \frac{7}{6+x^2} + \frac{9}{10+x^2} - \&c.$$
Cor. $$\frac{3}{\sqrt{2}(e^{2\pi x\sqrt{2}}-1)} - \frac{5}{\sqrt{6}(e^{2\pi x\sqrt{6}}-1)} + \frac{7}{\sqrt{12}(e^{2\pi x\sqrt{12}}-1)} - \&c$$
$$+ \frac{1}{x}\left\{\operatorname{Sech}\left(\frac{\pi}{x}\sqrt{1-\frac{x^2}{4}}\right) + \operatorname{Sech}\left(\frac{\pi}{x}\sqrt{4-\frac{x^2}{4}}\right) + \operatorname{Sech}\left(\frac{\pi}{x}\sqrt{9-\frac{x^2}{4}}\right) + \&c\right\}$$
$$= \frac{1}{2\pi x} + \frac{\pi x}{6} - C.$$ for all values of x
where $$C = \frac{1}{2} + \frac{1}{3+\sqrt{8}} - \frac{1}{5+\sqrt{24}} + \frac{1}{7+\sqrt{48}} - \&c$$
$$= 1 - \frac{\pi}{4} + \frac{1}{6(3+\sqrt{8})^2} - \frac{1}{10(5+\sqrt{24})^2} + \frac{1}{14(7+\sqrt{48})^2} - \&c$$

For x = 0.24, we obtain:

1/0.24^2-3/(1+0.24^2)+5/(3+0.24^2)-7/(6+0.24^2)+9/(10+0.24^2)

Input:

$$\frac{1}{0.24^2} - \frac{3}{1+0.24^2} + \frac{5}{3+0.24^2} - \frac{7}{6+0.24^2} + \frac{9}{10+0.24^2}$$

Result:

15.899041932907448656918909617506641512157260239171813234 20...

15.8990419329...

For x = 1/12 = 0.083, we obtain:

1/0.083^2-3/(1+0.083^2)+5/(3+0.083^2)-7/(6+0.083^2)+9/(10+0.083^2)

Input:

$$\frac{1}{0.083^2} - \frac{3}{1+0.083^2} + \frac{5}{3+0.083^2} - \frac{7}{6+0.083^2} + \frac{9}{10+0.083^2}$$

Result:

143.5763746029481662180096635360300782826003184852433469694...

143.576374602948...

1/0.083^2-3/(1+0.083^2)+5/(3+0.083^2)-7/(6+0.083^2)+9/(10+0.083^2)-4

Where 4 is a Lucas number and the dimensions of a D4-brane

Input:

$$\frac{1}{0.083^2} - \frac{3}{1+0.083^2} + \frac{5}{3+0.083^2} - \frac{7}{6+0.083^2} + \frac{9}{10+0.083^2} - 4$$

Result:

139.5763746029481662180096635360300782826003184852433469694...

139.576374602948... result practically equal to the rest mass of Pion meson 139.57

where $C = \frac{1}{2} + \frac{1}{3+\sqrt{8}} - \frac{1}{5+\sqrt{24}} + \frac{1}{7+\sqrt{48}} - \&c$

1/2+ 1/(3+sqrt8)-1/(5+sqrt24)+1/(7+sqrt48) = C

Input:

$$\frac{1}{2} + \frac{1}{3+\sqrt{8}} - \frac{1}{5+\sqrt{24}} + \frac{1}{7+\sqrt{48}}$$

Result:

$$\frac{1}{2} + \frac{1}{3+2\sqrt{2}} + \frac{1}{7+4\sqrt{3}} - \frac{1}{5+2\sqrt{6}}$$

Decimal approximation:

0.642349130544656924681405334968897159021330195317921598288...

0.64234913054…

Alternate forms:

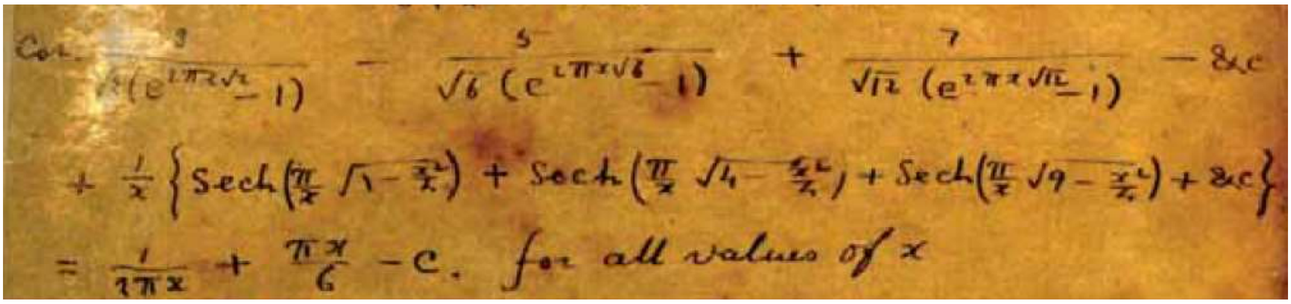
$$\frac{1}{2}\left(11 - 4\sqrt{2} - 8\sqrt{3} + 4\sqrt{6}\right)$$

$$\frac{11}{2} - 2\sqrt{2} - 4\sqrt{3} + 2\sqrt{6}$$

$$\frac{1}{2}\left(11 - 8\sqrt{3} + 8\sqrt{2-\sqrt{3}}\right)$$

Minimal polynomial:

$16x^4 - 352x^3 + 344x^2 + 5224x - 3407$



Cor. $\frac{3}{\sqrt{2}(e^{2\pi x\sqrt{2}}-1)} - \frac{5}{\sqrt{6}(e^{2\pi x\sqrt{6}}-1)} + \frac{7}{\sqrt{12}(e^{2\pi x\sqrt{12}}-1)} - \&c$

$+ \frac{1}{x}\left\{\text{Sech}\left(\frac{\pi}{x}\sqrt{1-\frac{x^2}{2}}\right) + \text{Sech}\left(\frac{\pi}{x}\sqrt{4-\frac{x^2}{2}}\right) + \text{Sech}\left(\frac{\pi}{x}\sqrt{9-\frac{x^2}{2}}\right) + \&c\right\}$

$= \frac{1}{2\pi x} + \frac{\pi x}{6} - c.$ for all values of x

For x = 0.083, we obtain:

1/(2Pi*0.083) + (Pi*0.083)/6 - 0.64234913054

Input interpretation:

$$\frac{1}{2\pi\times 0.083} + \frac{\pi\times 0.083}{6} - 0.64234913054$$

Result:

1.31864...

1.31864…

Alternative representations:

$$\frac{1}{2\pi\, 0.083} + \frac{\pi\, 0.083}{6} - 0.642349130540000 = -0.642349130540000 + \frac{14.94\,°}{6} + \frac{1}{29.88\,°}$$

$$\frac{1}{2\pi\, 0.083} + \frac{\pi\, 0.083}{6} - 0.642349130540000 = -0.642349130540000 - \frac{1}{6}\times 0.083\, i\log(-1) + -\frac{1}{0.166\, i\log(-1)}$$

$$\frac{1}{2\pi\, 0.083} + \frac{\pi\, 0.083}{6} - 0.642349130540000 = -0.642349130540000 + \frac{1}{6}\times 0.083\cos^{-1}(-1) + \frac{1}{0.166\cos^{-1}(-1)}$$

Series representations:

$$\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000=\frac{0.0553333\left(-8.34863+\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)\left(-3.26009+\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000=\frac{0.0276667\left(-17.6973+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)\left(-7.52019+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)}{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000=\frac{0.0553333\left(-8.34863+\sum_{k=1}^{\infty}\tan^{-1}\left(\frac{1}{F_{1+2k}}\right)\right)\left(-3.26009+\sum_{k=1}^{\infty}\tan^{-1}\left(\frac{1}{F_{1+2k}}\right)\right)}{\sum_{k=1}^{\infty}\tan^{-1}\left(\frac{1}{F_{1+2k}}\right)}$$

Integral representations:

$$\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000=\frac{0.0276667\left(-16.6973+\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)\left(-6.52019+\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)}{\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

$$\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000=\frac{0.0276667\left(-16.6973+\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)\left(-6.52019+\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)}{\int_0^{\infty}\frac{\sin(t)}{t}\,dt}$$

$$\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000=\frac{0.0553333\left(-8.34863+\int_0^{1}\sqrt{1-t^2}\,dt\right)\left(-3.26009+\int_0^{1}\sqrt{1-t^2}\,dt\right)}{\int_0^{1}\sqrt{1-t^2}\,dt}$$

((((((1/(2Pi*0.083) + (Pi*0.083)/6 - 0.64234913054)))^2+sqrt2)))*521/10^3

Where 521 is a Lucas number. Note that 521 = 496 + 25, where 496 is the dimension of Lie's Group E_8 X E_8 and 25 corresponding to the dimensions of a D-25 brane

Input interpretation:

$$\left(\left(\frac{1}{2\pi\times 0.083}+\frac{\pi\times 0.083}{6}-0.64234913054\right)^2+\sqrt{2}\right)\times\frac{521}{10^3}$$

Result:

1.642724660893565725916220256844860859141606394336521851856...

1.64272466…≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Series representations:

$$\frac{\left(\left(\frac{1}{2\pi 0.083}+\frac{\pi 0.083}{6}-0.642349130540000\right)^2+\sqrt{2}\right)521}{10^3}=0.301804+\frac{18.907}{\pi^2}-\frac{4.0321}{\pi}-0.00925903\,\pi+0.0000996991\,\pi^2+\frac{521\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}{1000}\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{\left(\left(\frac{1}{2\pi 0.083}+\frac{\pi 0.083}{6}-0.642349130540000\right)^2+\sqrt{2}\right)521}{10^3}=0.301804+\frac{18.907}{\pi^2}-\frac{4.0321}{\pi}-0.00925903\,\pi+0.0000996991\,\pi^2+\frac{521\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{1000}\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{\left(\left(\frac{1}{2\pi 0.083}+\frac{\pi 0.083}{6}-0.642349130540000\right)^2+\sqrt{2}\right)521}{10^3}=0.301804+\frac{18.907}{\pi^2}-\frac{4.0321}{\pi}-0.00925903\,\pi+0.0000996991\,\pi^2+\frac{521\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}{1000}$$

1/10^27*(((((((((1/(2Pi*0.083) + (Pi*0.083)/6 - 0.64234913054)))^2+sqrt2)))*521/10^3 + 29/10^3)))

Input interpretation:

$$\frac{1}{10^{27}}\left(\left(\left(\frac{1}{2\pi\times 0.083}+\frac{\pi\times 0.083}{6}-0.64234913054\right)^2+\sqrt{2}\right)\times\frac{521}{10^3}+\frac{29}{10^3}\right)$$

Where 521 and 29 are Lucas numbers. Note that 521 = 496 + 25, where 496 is the dimension of Lie's Group E_8 X E_8 and 25 corresponding to the dimensions of a D-25 brane

Result:

$1.67172... \times 10^{-27}$

1.67172…*10^{-27} kg

result practically equal to the value of the formula:

$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24}$ gm

that is the holographic proton mass (N. Haramein)

Series representations:

$$\frac{\frac{\left(\left(\frac{1}{2\pi 0.083}+\frac{\pi 0.083}{6}-0.642349130540000\right)^2+\sqrt{2}\right)521}{10^3}+\frac{29}{10^3}}{10^{27}} = 3.30804\times10^{-28}+\frac{1.8907\times10^{-26}}{\pi^2}-\frac{4.0321\times10^{-27}}{\pi}-9.25903\times10^{-30}\pi+9.96991\times10^{-32}\pi^2+5.21\times10^{-28}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (2-z_0)^k z_0^{-k}}{k!}$$

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

$$\frac{\frac{\left(\left(\frac{1}{2\pi 0.083}+\frac{\pi 0.083}{6}-0.642349130540000\right)^2+\sqrt{2}\right)521}{10^3}+\frac{29}{10^3}}{10^{27}} = 3.30804\times10^{-28}+\frac{1.8907\times10^{-26}}{\pi^2}-\frac{4.0321\times10^{-27}}{\pi}-9.25903\times10^{-30}\pi+9.96991\times10^{-32}\pi^2+5.21\times10^{-28}\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

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

$$\frac{\frac{\left(\left(\frac{1}{2\pi 0.083}+\frac{\pi 0.083}{6}-0.642349130540000\right)^2+\sqrt{2}\right)521}{10^3}+\frac{29}{10^3}}{10^{27}} = 3.30804\times10^{-28}+\frac{1.8907\times10^{-26}}{\pi^2}-\frac{4.0321\times10^{-27}}{\pi}-9.25903\times10^{-30}\pi+9.96991\times10^{-32}\pi^2+\frac{521\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

10^2 (((1/(2Pi*0.083) + (Pi*0.083)/6 - 0.64234913054)))+Pi

Where 10 is the number of dimensions in superstring theory

Input interpretation:

$$10^2\left(\frac{1}{2\pi\times 0.083}+\frac{\pi\times 0.083}{6}-0.64234913054\right)+\pi$$

Result:

135.005...

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

Alternative representations:

$$10^2\left(\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000\right)+\pi = 180\,°+10^2\left(-0.642349130540000+\frac{14.94\,°}{6}+\frac{1}{29.88\,°}\right)$$

$$10^2\left(\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000\right)+\pi = -i\log(-1)+10^2\left(-0.642349130540000-\frac{1}{6}\times 0.083\,i\log(-1)+-\frac{1}{0.166\,i\log(-1)}\right)$$

$$10^2\left(\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000\right)+\pi = \cos^{-1}(-1)+10^2\left(-0.642349130540000+\frac{1}{6}\times 0.083\cos^{-1}(-1)+\frac{1}{0.166\cos^{-1}(-1)}\right)$$

Integral representations:

$$10^2\left(\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000\right)+\pi = \frac{4.76667\left(63.1898-13.4759\int_0^\infty \frac{1}{1+t^2}\,dt+\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2\right)}{\int_0^\infty \frac{1}{1+t^2}\,dt}$$

$$10^2\left(\frac{1}{2\pi\,0.083}+\frac{\pi\,0.083}{6}-0.642349130540000\right)+\pi = \frac{4.76667\left(63.1898-13.4759\int_0^\infty \frac{\sin(t)}{t}\,dt+\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2\right)}{\int_0^\infty \frac{\sin(t)}{t}\,dt}$$

$$10^2\left(\frac{1}{2\pi\, 0.083}+\frac{\pi\, 0.083}{6}-0.642349130540000\right)+\pi=$$
$$\frac{9.53333\left(15.7975-6.73793\int_0^1\sqrt{1-t^2}\,dt+\left(\int_0^1\sqrt{1-t^2}\,dt\right)^2\right)}{\int_0^1\sqrt{1-t^2}\,dt}$$

For x = 2, from the following expression, considering the symbol &, we obtain:

1/2^2-3/(1+2^2)+5/(3+2^2)-7/(6+2^2)+9/(10+2^2)+...

Input interpretation:

$$\frac{1}{2^2}-\frac{3}{1+2^2}+\frac{5}{3+2^2}-\frac{7}{6+2^2}+\frac{9}{10+2^2}+\cdots$$

Infinite sum:

$$\sum_{n=1}^{\infty}\frac{(-1)^{n+1}(2n-1)}{\frac{1}{2}(n-1)n+4}=2\pi\operatorname{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)$$

sech(x) is the hyperbolic secant function

Decimal approximation:

0.0019996170576218132600533668545803403067771142364794400058...

0.0019996170576...

Convergence tests:

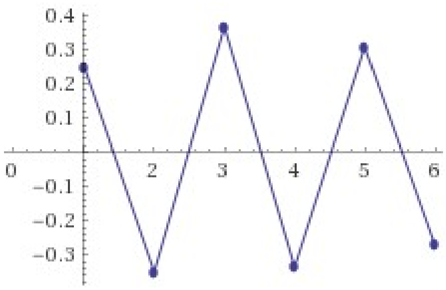
By the alternating series test, the series converges.

Partial sum formula:

$$\sum_{n=1}^{m}\frac{(-1)^{1+n}(-1+2n)}{4+\frac{1}{2}(-1+n)n}=2\left((-1)^{m+1}\Phi\left(-1,1,m+\frac{1}{2}\left(-1-i\sqrt{31}\right)+1\right)+\right.$$
$$(-1)^{m+1}\Phi\left(-1,1,m+\frac{1}{2}\left(-1+i\sqrt{31}\right)+1\right)+$$
$$\left.\Phi\left(-1,1,1+\frac{1}{2}\left(-1+i\sqrt{31}\right)\right)+\Phi\left(-1,1,1+\frac{1}{2}\left(-1-i\sqrt{31}\right)\right)\right)$$

Φ(x, s, a) is the Lerch transcendent

Partial sums:



1/((((1+2^2/1)(1+2^2/3)(1+2^2/6)(1+2^2/10)*...)))

Input interpretation:

$$\frac{1}{(1+2^2)\left(1+\frac{2^2}{3}\right)\left(1+\frac{2^2}{6}\right)\left(\left(1+\frac{2^2}{10}\right)\times\cdots\right)}$$

Result:

$$\frac{9}{175\times\prod_{n=1}^{\infty}\frac{7}{5}}$$

1/((((1+2^2/1)(1+2^2/3)(1+2^2/6)(1+2^2/10)*...))) = 1/2^2-3/(1+2^2)+5/(3+2^2)-7/(6+2^2)+9/(10+2^2)-...

Input interpretation:

$$\frac{1}{(1+2^2)\left(1+\frac{2^2}{3}\right)\left(1+\frac{2^2}{6}\right)\left(\left(1+\frac{2^2}{10}\right)\times\cdots\right)}=\frac{1}{2^2}-\frac{3}{1+2^2}+\frac{5}{3+2^2}-\frac{7}{6+2^2}+\frac{9}{10+2^2}-\cdots$$

Result:

$$\frac{9}{175\times\prod_{n=1}^{\infty}\frac{7}{5}}=2\pi\operatorname{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)$$

Input:

$$2\pi\operatorname{sech}\left(\frac{1}{2}\left(\sqrt{31}\,\pi\right)\right)$$

sech(x) is the hyperbolic secant function

Exact result:

$$2\pi\operatorname{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)$$

Decimal approximation:

0.001999617057621813260053366854580340306777114236479440058...

0.0019996170576…

Alternate forms:

$$\frac{2\pi}{\cosh\left(\frac{\sqrt{31}\,\pi}{2}\right)}$$

$$\frac{4\pi\cosh\left(\frac{\sqrt{31}\,\pi}{2}\right)}{1+\cosh(\sqrt{31}\,\pi)}$$

$$\frac{4\pi}{e^{-(\sqrt{31}\,\pi)/2}+e^{(\sqrt{31}\,\pi)/2}}$$

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

Alternative representations:

$$2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)=\frac{2\pi}{\cosh\left(\frac{\pi\sqrt{31}}{2}\right)}$$

$$2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)=2\pi\csc\left(\frac{\pi}{2}+\frac{1}{2}\,i\,\pi\sqrt{31}\right)$$

$$2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)=\frac{2\pi}{\cos\left(\frac{1}{2}\,i\,\pi\sqrt{31}\right)}$$

Series representations:

$$2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)=2\sum_{k=0}^{\infty}\frac{(-1)^k(1+2k)}{8+k+k^2}$$

$$2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)=-4\pi\sum_{k=1}^{\infty}(-1)^k q^{-1+2k}\quad\text{for } q=e^{(\sqrt{31}\,\pi)/2}$$

$$2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)=4\,e^{-(\sqrt{31}\,\pi)/2}\,\pi\sum_{k=0}^{\infty}(-1)^k e^{-\sqrt{31}\,k\,\pi}$$

Integral representation:

$$2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)=4\int_0^{\infty}\frac{t^{i\sqrt{31}}}{1+t^2}\,dt$$

(1/4)*1/(((2 π sech((sqrt(31) π)/2))))+11+3+1/golden ratio

Where 11 and 3 are Lucas numbers

Input:

$$\frac{1}{4}\times\frac{1}{2\pi\,\text{sech}\left(\frac{1}{2}\left(\sqrt{31}\,\pi\right)\right)}+11+3+\frac{1}{\phi}$$

sech(x) is the hyperbolic secant function

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}+14+\frac{\cosh\left(\frac{\sqrt{31}\,\pi}{2}\right)}{8\pi}$$

cosh(x) is the hyperbolic cosine function

Decimal approximation:

139.64197247091621156996306520936364924319336148605705063 24...

139.64197247…. result practically equal to the rest mass of Pion meson 139.57

Alternate forms:

$$\frac{1}{2}\left(27+\sqrt{5}\right)+\frac{\cosh\left(\frac{\sqrt{31}\,\pi}{2}\right)}{8\pi}$$

$$14+\frac{2}{1+\sqrt{5}}+\frac{\cosh\left(\frac{\sqrt{31}\,\pi}{2}\right)}{8\pi}$$

$$\frac{1}{\phi}+14+\frac{e^{-\left(\sqrt{31}\,\pi\right)/2}}{16\pi}+\frac{e^{\left(\sqrt{31}\,\pi\right)/2}}{16\pi}$$

Alternative representations:

$$\frac{1}{\left(2\pi\,\text{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{1}{\phi}+\frac{1}{\frac{4(2\pi)}{\cosh\left(\frac{\pi\sqrt{31}}{2}\right)}}$$

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{1}{\phi}+\frac{1}{\frac{4(2\pi)}{\cos\left(\frac{1}{2}\,i\,\pi\sqrt{31}\right)}}$$

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{1}{\phi}+\frac{1}{4\left(2\pi\csc\left(\frac{\pi}{2}+\frac{1}{2}\,i\,\pi\sqrt{31}\right)\right)}$$

Series representations:

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{1}{\phi}+\frac{\sum_{k=0}^{\infty}\frac{\left(\frac{31}{4}\right)^k\pi^{2k}}{(2k)!}}{8\pi}$$

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{1}{\phi}+\frac{i\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}\left(-i+\sqrt{31}\right)\pi\right)^{1+2k}}{(1+2k)!}}{8\pi}$$

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{1}{\phi}+\frac{\sum_{k=0}^{\infty}I_{2k}\left(\frac{1}{2}\right)T_{2k}\left(\sqrt{31}\,\pi\right)(2-\delta_k)}{8\pi}$$

Integral representations:

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{1}{\phi}+\frac{1}{8\pi}\int_{\frac{i\pi}{2}}^{\frac{\sqrt{31}\,\pi}{2}}\sinh(t)\,dt$$

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=14+\frac{2}{1+\sqrt{5}}+\frac{1}{8\pi}+\frac{\sqrt{31}}{16}\int_0^1\sinh\left(\frac{1}{2}\sqrt{31}\,\pi\,t\right)dt$$

$$\frac{1}{\left(2\pi\,\mathrm{sech}\left(\frac{\sqrt{31}\,\pi}{2}\right)\right)4}+11+3+\frac{1}{\phi}=$$
$$14+\frac{2}{1+\sqrt{5}}-\frac{i}{16\pi^{3/2}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(31\pi^2)/(16s)+s}}{\sqrt{s}}\,ds\quad\text{for }\gamma>0$$

(((1/2^2-3/(1+2^2)+5/(3+2^2)-7/(6+2^2)+9/(10+2^2)+...)))/(((2 π sech((sqrt(31) π)/2))))

Input interpretation:

$$\frac{\frac{1}{2^2}-\frac{3}{1+2^2}+\frac{5}{3+2^2}-\frac{7}{6+2^2}+\frac{9}{10+2^2}+\cdots}{2\pi\,\text{sech}\left(\frac{1}{2}\left(\sqrt{31}\,\pi\right)\right)}$$

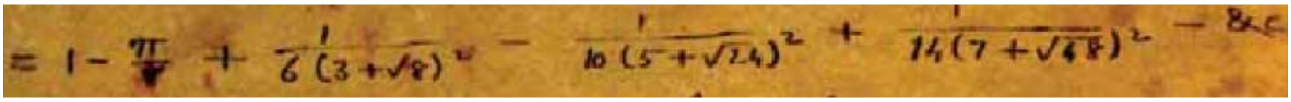
sech(x) is the hyperbolic secant function

Result:

1

1 result that can be interpreted as the photon spin

We have that:



For x = 1/12 = 0.083, we obtain:

1-Pi/2+1/(6(3+sqrt8)^2)-1/(10(5+sqrt24)^2)+1/(14(7+sqrt48)^2)

Input:

$$1-\frac{\pi}{2}+\frac{1}{6\left(3+\sqrt{8}\right)^2}-\frac{1}{10\left(5+\sqrt{24}\right)^2}+\frac{1}{14\left(7+\sqrt{48}\right)^2}$$

Result:

$$1+\frac{1}{6\left(3+2\sqrt{2}\right)^2}+\frac{1}{14\left(7+4\sqrt{3}\right)^2}-\frac{1}{10\left(5+2\sqrt{6}\right)^2}-\frac{\pi}{2}$$

Decimal approximation:

-0.56654243434547778978801159476609237831534974246486940743...

-0.566542434…..

Property:

$1+\frac{1}{6\left(3+2\sqrt{2}\right)^2}+\frac{1}{14\left(7+4\sqrt{3}\right)^2}-\frac{1}{10\left(5+2\sqrt{6}\right)^2}-\frac{\pi}{2}$ is a transcendental number

Alternate forms:

$$\frac{1}{210}\left(1231-420\sqrt{2}-840\sqrt{3}+420\sqrt{6}-105\pi\right)$$

$$\frac{1231}{210}-2\sqrt{2}-4\sqrt{3}+2\sqrt{6}-\frac{\pi}{2}$$

$$\frac{1}{210}\left(1231-840\sqrt{3}+840\sqrt{2-\sqrt{3}}\right)-\frac{\pi}{2}$$

Series representations:

$$1-\frac{\pi}{2}+\frac{1}{6(3+\sqrt{8})^2}-\frac{1}{10(5+\sqrt{24})^2}+\frac{1}{14(7+\sqrt{48})^2}=$$
$$1-\frac{\pi}{2}+\frac{1}{6\left(3+\sqrt{7}\sum_{k=0}^{\infty}7^{-k}\binom{\frac{1}{2}}{k}\right)^2}-\frac{1}{10\left(5+\sqrt{23}\sum_{k=0}^{\infty}23^{-k}\binom{\frac{1}{2}}{k}\right)^2}+\frac{1}{14\left(7+\sqrt{47}\sum_{k=0}^{\infty}47^{-k}\binom{\frac{1}{2}}{k}\right)^2}$$

$$1-\frac{\pi}{2}+\frac{1}{6(3+\sqrt{8})^2}-\frac{1}{10(5+\sqrt{24})^2}+\frac{1}{14(7+\sqrt{48})^2}=$$
$$1-\frac{\pi}{2}+\frac{1}{6\left(3+\sqrt{7}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{7}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}-\frac{1}{10\left(5+\sqrt{23}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{23}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}+\frac{1}{14\left(7+\sqrt{47}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{47}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}$$

$$1-\frac{\pi}{2}+\frac{1}{6(3+\sqrt{8})^2}-\frac{1}{10(5+\sqrt{24})^2}+\frac{1}{14(7+\sqrt{48})^2} =$$

$$1-\frac{\pi}{2}+\frac{1}{6\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(8-z_0)^k z_0^{-k}}{k!}\right)^2} - \frac{1}{10\left(5+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(24-z_0)^k z_0^{-k}}{k!}\right)^2} + \frac{1}{14\left(7+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(48-z_0)^k z_0^{-k}}{k!}\right)^2} \quad \text{for not } ((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \leq 0))$$

-1/(((1-Pi/2+1/(6(3+sqrt8)^2)-1/(10(5+sqrt24)^2)+1/(14(7+sqrt48)^2))))*76+1/golden ratio

Where 76 is a Lucas number

Input:

$$-\frac{76}{1-\frac{\pi}{2}+\frac{1}{6(3+\sqrt{8})^2}-\frac{1}{10(5+\sqrt{24})^2}+\frac{1}{14(7+\sqrt{48})^2}}+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

$$\frac{1}{\phi}-\frac{76}{1+\frac{1}{6(3+2\sqrt{2})^2}+\frac{1}{14(7+4\sqrt{3})^2}-\frac{1}{10(5+2\sqrt{6})^2}-\frac{\pi}{2}}$$

Decimal approximation:

134.7650905773745897871094135928998181319929018953260271255...

134.765090577…. result practically equal to the rest mass of Pion meson 134.976

Property:

$$\frac{1}{\phi}-\frac{76}{1+\frac{1}{6(3+2\sqrt{2})^2}+\frac{1}{14(7+4\sqrt{3})^2}-\frac{1}{10(5+2\sqrt{6})^2}-\frac{\pi}{2}}$$ is a transcendental number

Alternate forms:

$$\left(33151 - 420\sqrt{2} - 840\sqrt{3} - 1231\sqrt{5} + 420\sqrt{6} + 420\sqrt{10} + 840\sqrt{15} - 420\sqrt{30} - 105\pi + 105\sqrt{5}\,\pi\right) \Big/ \left(2\left(-1231 + 420\sqrt{2} + 840\sqrt{3} - 420\sqrt{6} + 105\pi\right)\right)$$

$$\frac{1}{\phi} - \frac{76}{\frac{1231}{210} - 2\sqrt{2} - 4\sqrt{3} + 2\sqrt{6} - \frac{\pi}{2}}$$

$$\frac{1}{\phi} + \frac{76}{-\frac{1231}{210} + 2\sqrt{2} + 4\sqrt{3} - 2\sqrt{6} + \frac{\pi}{2}}$$

Series representations:

$$\frac{76(-1)}{1 - \frac{\pi}{2} + \frac{1}{6\left(3+\sqrt{8}\right)^2} - \frac{1}{10\left(5+\sqrt{24}\right)^2} + \frac{1}{14\left(7+\sqrt{48}\right)^2}} + \frac{1}{\phi} = \frac{1}{\phi} - \frac{76}{1 - \frac{\pi}{2} + \frac{1}{6\left(3+\sqrt{7}\sum_{k=0}^{\infty} 7^{-k}\binom{\frac{1}{2}}{k}\right)^2} - \frac{1}{10\left(5+\sqrt{23}\sum_{k=0}^{\infty} 23^{-k}\binom{\frac{1}{2}}{k}\right)^2} + \frac{1}{14\left(7+\sqrt{47}\sum_{k=0}^{\infty} 47^{-k}\binom{\frac{1}{2}}{k}\right)^2}}$$

$$\frac{76(-1)}{1 - \frac{\pi}{2} + \frac{1}{6\left(3+\sqrt{8}\right)^2} - \frac{1}{10\left(5+\sqrt{24}\right)^2} + \frac{1}{14\left(7+\sqrt{48}\right)^2}} + \frac{1}{\phi} = \frac{1}{\phi} - 76 \Bigg/ \left(1 - \frac{\pi}{2} + \frac{1}{6\left(3 + \sqrt{7}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{7}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)^2} - \frac{1}{10\left(5 + \sqrt{23}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{23}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)^2} + \frac{1}{14\left(7 + \sqrt{47}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{47}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)^2}\right)$$

$$\frac{76(-1)}{1-\frac{\pi}{2}+\frac{1}{6\left(3+\sqrt{8}\right)^2}-\frac{1}{10\left(5+\sqrt{24}\right)^2}+\frac{1}{14\left(7+\sqrt{48}\right)^2}}+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-76\Bigg/\left(1-\frac{\pi}{2}+\frac{1}{6\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(8-z_0)^k z_0^{-k}}{k!}\right)^2}-\frac{1}{10\left(5+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(24-z_0)^k z_0^{-k}}{k!}\right)^2}+\frac{1}{14\left(7+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(48-z_0)^k z_0^{-k}}{k!}\right)^2}\right)$$

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

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$$4.\quad \frac{1}{1^2+x^2+\frac{x^4}{1^2}}+\frac{1}{2^2+x^2+\frac{x^4}{2^2}}+\frac{1}{3^2+x^2+\frac{x^4}{3^2}}+\&c=\frac{\pi}{2x\sqrt{3}}\cdot\frac{\sinh\pi x\sqrt{3}-\sqrt{3}\sin\pi x}{\cosh\pi x\sqrt{3}-\cos\pi x}.$$

For x = 2, we obtain:

Pi/(4sqrt3) * (((sinh(2Pi*sqrt3)-sqrt3*sin(2Pi)))) / (((cosh(2Pi*sqrt3)-cos(2Pi))))

Input:

$$\frac{\pi}{4\sqrt{3}}\times\frac{\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi)}{\cosh(2\pi\sqrt{3})-\cos(2\pi)}$$

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

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

Exact result:

$$\frac{\pi \sinh(2\sqrt{3}\,\pi)}{4\sqrt{3}\,(\cosh(2\sqrt{3}\,\pi)-1)}$$

Decimal approximation:

0.453466871624258724623634815745739322304887984526058956146...

0.4534668716242587….

Alternate forms:

$$\frac{\pi \coth(\sqrt{3}\,\pi)}{4\sqrt{3}}$$

$$\frac{\left(e^{2\sqrt{3}\,\pi}-e^{-2\sqrt{3}\,\pi}\right)\pi}{8\sqrt{3}\left(\frac{1}{2}\left(e^{-2\sqrt{3}\,\pi}+e^{2\sqrt{3}\,\pi}\right)-1\right)}$$

coth(x) is the hyperbolic cotangent function

Alternative representations:

$$\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}=\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)-\frac{\left(-e^{-2i\pi}+e^{2i\pi}\right)\sqrt{3}}{2i}\right)}{\left(-\cosh(-2i\pi)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)(4\sqrt{3})}$$

$$\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}=\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)+\cos\left(\frac{5\pi}{2}\right)\sqrt{3}\right)}{\left(\frac{1}{2}\left(-e^{-2i\pi}-e^{2i\pi}\right)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)(4\sqrt{3})}$$

$$\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}=\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)-\frac{\left(-e^{-2i\pi}+e^{2i\pi}\right)\sqrt{3}}{2i}\right)}{\left(\cos(-2i\pi\sqrt{3})+\frac{1}{2}\left(-e^{-2i\pi}-e^{2i\pi}\right)\right)(4\sqrt{3})}$$

Series representations:

$$\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}=\frac{i\pi\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}\left(-i+4\sqrt{3}\right)\pi\right)^{2k}}{(2k)!}}{4\sqrt{3}\left(-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}\right)}$$

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = \frac{\pi\sum_{k=0}^{\infty}\frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{4\sqrt{3}\left(-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}\right)}$$

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = \frac{\pi\sum_{k=0}^{\infty}\frac{3^{1/2(1+2k)}(2\pi)^{1+2k}}{(1+2k)!}}{4\sqrt{3}\left(-1+i\sum_{k=0}^{\infty}\frac{\left(-\frac{i\pi}{2}+2\sqrt{3}\pi\right)^{1+2k}}{(1+2k)!}\right)}$$

Integral representations:

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = \frac{\pi\int_0^1\cosh(2\sqrt{3}\pi t)\,dt}{4\sqrt{3}\int_0^1\sinh(2\sqrt{3}\pi t)\,dt}$$

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = \frac{\pi^2\int_0^1\cosh(2\sqrt{3}\pi t)\,dt}{2\left(-1+\int_{\frac{i\pi}{2}}^{2\sqrt{3}\pi}\sinh(t)\,dt\right)}$$

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = -\frac{i\sqrt{\frac{\pi}{3}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{(3\pi^2)/s+s}}{s^{3/2}}\,ds}{16\int_0^1\sinh(2\sqrt{3}\pi t)\,dt} \quad \text{for } \gamma > 0$$

Multiple-argument formulas:

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = \frac{\pi\coth(\sqrt{3}\pi)}{4\sqrt{3}}$$

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = \frac{\pi\cosh(\sqrt{3}\pi)\sinh(\sqrt{3}\pi)}{2\sqrt{3}(-2+2\cosh^2(\sqrt{3}\pi))}$$

$$\frac{(\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3}) - \cos(2\pi))(4\sqrt{3})} = \frac{\pi\,\mathrm{csch}^2(\sqrt{3}\pi)\left(3\sinh\left(\frac{2\pi}{\sqrt{3}}\right)+4\sinh^3\left(\frac{2\pi}{\sqrt{3}}\right)\right)}{8\sqrt{3}}$$

(((exp(((Pi/(4sqrt3) * (((sinh(2Pi*sqrt3)-sqrt3*sin(2Pi)))) / (((cosh(2Pi*sqrt3)-cos(2Pi)))))))))^16-29+1/golden ratio

Where 29 is a Lucas number and 16 is the difference between 26 and 10, where in bosonic string theory, spacetime is 26-dimensional, while in superstring theory it is 10-dimensional

Input:

$$\exp^{16}\left(\frac{\pi}{4\sqrt{3}} \times \frac{\sinh(2\pi\sqrt{3}) - \sqrt{3}\sin(2\pi)}{\cosh(2\pi\sqrt{3}) - \cos(2\pi)}\right) - 29 + \frac{1}{\phi}$$

sinh(x) is the hyperbolic sine function

cosh(x) is the hyperbolic cosine function

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi} - 29 + e^{\frac{4\pi\sinh(2\sqrt{3}\pi)}{\sqrt{3}(\cosh(2\sqrt{3}\pi)-1)}}$$

Decimal approximation:

1387.446243586492327751485699773040770815595398403027547115...

1387.4462435…. result practically equal to the rest mass of Sigma baryon 1387.2

Alternate forms:

$$\frac{1}{\phi} - 29 + e^{(4\pi\coth(\sqrt{3}\pi))/\sqrt{3}}$$

$$\frac{1}{2}\left(\sqrt{5} - 59\right) + e^{\frac{4\pi\sinh(2\sqrt{3}\pi)}{\sqrt{3}(\cosh(2\sqrt{3}\pi)-1)}}$$

$$\frac{-29\phi + e^{\frac{4(1+e^{2\sqrt{3}\pi})\pi}{\sqrt{3}(e^{2\sqrt{3}\pi}-1)}}\phi + 1}{\phi}$$

coth(x) is the hyperbolic cotangent function

Alternative representations:

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=$$
$$-29+\frac{1}{\phi}+\exp^{16}\left(\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)-\frac{\left(-e^{-2i\pi}+e^{2i\pi}\right)\sqrt{3}}{2i}\right)}{\left(-\cosh(-2i\pi)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)(4\sqrt{3})}\right)$$

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=$$
$$-29+\frac{1}{\phi}+\exp^{16}\left(\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)+\cos\left(\frac{5\pi}{2}\right)\sqrt{3}\right)}{\left(\frac{1}{2}\left(-e^{-2i\pi}-e^{2i\pi}\right)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)(4\sqrt{3})}\right)$$

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=$$
$$-29+\frac{1}{\phi}+\exp^{16}\left(\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)-\cos\left(-\frac{3\pi}{2}\right)\sqrt{3}\right)}{\left(\frac{1}{2}\left(-e^{-2i\pi}-e^{2i\pi}\right)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)(4\sqrt{3})}\right)$$

Series representations:

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=$$
$$\frac{-27-29\sqrt{5}+\exp\left(\frac{4i\pi\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}\left(-i+4\sqrt{3}\right)\pi\right)^{2k}}{(2k)!}}{\sqrt{3}\left(-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}\right)}\right)+\sqrt{5}\exp\left(\frac{4i\pi\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}\left(-i+4\sqrt{3}\right)\pi\right)^{2k}}{(2k)!}}{\sqrt{3}\left(-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}\right)}\right)}{1+\sqrt{5}}$$

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=$$
$$\frac{-27-29\sqrt{5}+\exp\left(\frac{4\pi\sum_{k=0}^{\infty}\frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{\sqrt{3}\left(-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}\right)}\right)+\sqrt{5}\exp\left(\frac{4\pi\sum_{k=0}^{\infty}\frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{\sqrt{3}\left(-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}\right)}\right)}{1+\sqrt{5}}$$

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=\frac{1}{1+\sqrt{5}}$$

$$\left(-27-29\sqrt{5}+\exp\left(\frac{4\pi\sum_{k=0}^{\infty}\frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{\sqrt{3}\left(-1+i\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}\left(-i+4\sqrt{3}\right)\pi\right)^{1+2k}}{(1+2k)!}\right)}\right)+\sqrt{5}\exp\left(\frac{4\pi\sum_{k=0}^{\infty}\frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{\sqrt{3}\left(-1+i\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}\left(-i+4\sqrt{3}\right)\pi\right)^{1+2k}}{(1+2k)!}\right)}\right)\right)$$

Multiple-argument formulas:

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=-29+e^{\left(4\pi\coth\left(\sqrt{3}\pi\right)\right)/\sqrt{3}}+\frac{1}{\phi}$$

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=$$
$$-29+\exp\left(\frac{2\pi\operatorname{csch}^2\left(\sqrt{3}\pi\right)\left(3\sinh\left(\frac{2\pi}{\sqrt{3}}\right)+4\sinh^3\left(\frac{2\pi}{\sqrt{3}}\right)\right)}{\sqrt{3}}\right)+\frac{1}{\phi}$$

$$\exp^{16}\left(\frac{(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))\pi}{(\cosh(2\pi\sqrt{3})-\cos(2\pi))(4\sqrt{3})}\right)-29+\frac{1}{\phi}=$$
$$-29+\exp\left(\frac{8\pi\cosh\left(\sqrt{3}\pi\right)\sinh\left(\sqrt{3}\pi\right)}{\sqrt{3}\left(-2+2\cosh^2\left(\sqrt{3}\pi\right)\right)}\right)+\frac{1}{\phi}$$

1/10(((exp(((Pi/(4sqrt3) * (((sinh(2Pi*sqrt3)-sqrt3*sin(2Pi)))) / (((cosh(2Pi*sqrt3)-cos(2Pi))))))))))^16-2

Where 10 is the number of dimensions in superstring theory. In bosonic string theory, spacetime is 26-dimensional, while in superstring theory it is 10-dimensional, and in M-theory it is 11-dimensional. Note that 26 – 10 = 16

Input:

$$\frac{1}{10}\exp^{16}\left(\frac{\pi}{4\sqrt{3}}\times\frac{\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi)}{\cosh(2\pi\sqrt{3})-\cos(2\pi)}\right)-2$$

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

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

Exact result:

$$\frac{1}{10}e^{\frac{4\pi\sinh(2\sqrt{3}\pi)}{\sqrt{3}(\cosh(2\sqrt{3}\pi)-1)}}-2$$

Decimal approximation:

139.58282095977424329032811129386751326978750892232217 84253...

139.5828209…. result practically equal to the rest mass of Pion meson 139.57

Alternate forms:

$$\frac{1}{10}e^{(4\pi\coth(\sqrt{3}\pi))/\sqrt{3}}-2$$

$$\frac{1}{10}\left(e^{\frac{4\pi\sinh(2\sqrt{3}\pi)}{\sqrt{3}(\cosh(2\sqrt{3}\pi)-1)}}-20\right)$$

$$\frac{1}{10}\left(e^{\frac{4\left(1+e^{2\sqrt{3}\pi}\right)\pi}{\sqrt{3}\left(e^{2\sqrt{3}\pi}-1\right)}}-20\right)$$

$\coth(x)$ is the hyperbolic cotangent function

Alternative representations:

$$\frac{1}{10}\exp^{16}\left(\frac{\pi(\sinh(2\pi\sqrt{3})-\sqrt{3}\sin(2\pi))}{(4\sqrt{3})(\cosh(2\pi\sqrt{3})-\cos(2\pi))}\right)-2=$$

$$-2+\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)-\frac{\left(-e^{-2i\pi}+e^{2i\pi}\right)\sqrt{3}}{2i}\right)}{\left(-\cosh(-2i\pi)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)(4\sqrt{3})}\right)$$

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2 =$$
$$-2+\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)+\cos\left(\frac{5\pi}{2}\right)\sqrt{3}\right)}{\left(\frac{1}{2}\left(-e^{-2i\pi}-e^{2i\pi}\right)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)\left(4\sqrt{3}\right)}\right)$$

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2 =$$
$$-2+\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\frac{1}{2}\left(-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)-\cos\left(-\frac{3\pi}{2}\right)\sqrt{3}\right)}{\left(\frac{1}{2}\left(-e^{-2i\pi}-e^{2i\pi}\right)+\frac{1}{2}\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\right)\left(4\sqrt{3}\right)}\right)$$

Series representations:

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2 =$$
$$\frac{1}{10}\left(-20+\exp\left(\frac{4\pi\sum_{k=0}^{\infty}\frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{\sqrt{3}\left(-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}\right)}\right)\right)$$

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2 =$$
$$\frac{1}{10}\left(-20+\exp\left(\frac{4\pi\sum_{k=0}^{\infty}\frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{\sqrt{3}\left(-1+i\sum_{k=0}^{\infty}\frac{\left(\frac{1}{2}\left(-i+4\sqrt{3}\right)\pi\right)^{1+2k}}{(1+2k)!}\right)}\right)\right)$$

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2 =$$
$$\frac{1}{10}\left(-20+\exp\left(\frac{4\pi^{5/2}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{(-3)^{-s}\pi^{-2s}\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{-1+\sum_{k=0}^{\infty}\frac{12^k\pi^{2k}}{(2k)!}}\right)\right)$$

Multiple-argument formulas:

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2=-2+\frac{1}{10}e^{\left(4\pi\coth\left(\sqrt{3}\pi\right)\right)/\sqrt{3}}$$

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2=$$
$$-2+\frac{1}{10}\exp\left(\frac{8\pi\cosh\left(\sqrt{3}\pi\right)\sinh\left(\sqrt{3}\pi\right)}{\sqrt{3}\left(-2+2\cosh^2\left(\sqrt{3}\pi\right)\right)}\right)$$

$$\frac{1}{10}\exp^{16}\left(\frac{\pi\left(\sinh\left(2\pi\sqrt{3}\right)-\sqrt{3}\sin(2\pi)\right)}{\left(4\sqrt{3}\right)\left(\cosh\left(2\pi\sqrt{3}\right)-\cos(2\pi)\right)}\right)-2=$$
$$-2+\frac{1}{10}\exp\left(-\frac{4i\pi\operatorname{csch}^2\left(\sqrt{3}\pi\right)\prod_{k=0}^{1}\sinh\left(\left(\sqrt{3}+\frac{ik}{2}\right)\pi\right)}{\sqrt{3}}\right)$$

Or:

1/(1^2+2^2+2^4/1^2)+1/(2^2+2^2+2^4/2^2)+1/(3^2+2^2+2^4/3^2)+...

Input interpretation:

$$\frac{1}{1^2+2^2+\frac{2^4}{1^2}}+\frac{1}{2^2+2^2+\frac{2^4}{2^2}}+\frac{1}{3^2+2^2+\frac{2^4}{3^2}}+\cdots$$

Infinite sum:

$$\sum_{n=1}^{\infty}\frac{1}{n^2+\frac{16}{n^2}+4}=-\frac{\pi\sinh\left(2\sqrt{3}\pi\right)}{16\sqrt{3}\left(1-\cosh\left(2\sqrt{3}\pi\right)\right)}-\frac{\sqrt{3}\pi\sinh\left(2\sqrt{3}\pi\right)}{16\left(1-\cosh\left(2\sqrt{3}\pi\right)\right)}$$

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

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

Decimal approximation:

0.4534668716242587246236348157457393223048879845260589561 46...

0.4534668716242587…..

Convergence tests:

The ratio test is inconclusive.

The root test is inconclusive.

By the comparison test, the series converges.

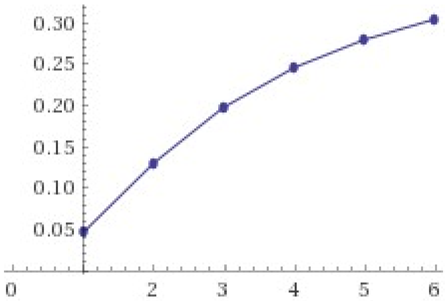
Partial sum formula:

$$\sum_{n=1}^{m} \frac{1}{4+\frac{16}{n^2}+n^2} =$$

$$\Big(i\Big(i\,m^4 - \sqrt{3}\,m^4\,\psi^{(0)}\big(m - i\sqrt{3}\big) + \sqrt{3}\,m^4\,\psi^{(0)}\big(m + i\sqrt{3}\big) - \sqrt{3}\,m^4\,\psi^{(0)}\big(i\sqrt{3}\big) +$$
$$\sqrt{3}\,m^4\,\psi^{(0)}\big(-i\sqrt{3}\big) + 8\,i\,m^3 - 2\sqrt{3}\,m^3\,\psi^{(0)}\big(m - i\sqrt{3}\big) +$$
$$2\sqrt{3}\,m^3\,\psi^{(0)}\big(m + i\sqrt{3}\big) - 2\sqrt{3}\,m^3\,\psi^{(0)}\big(i\sqrt{3}\big) + 2\sqrt{3}\,m^3\,\psi^{(0)}\big(-i\sqrt{3}\big) +$$
$$10\,i\,m^2 - 7\sqrt{3}\,m^2\,\psi^{(0)}\big(m - i\sqrt{3}\big) + 7\sqrt{3}\,m^2\,\psi^{(0)}\big(m + i\sqrt{3}\big) -$$
$$7\sqrt{3}\,m^2\,\psi^{(0)}\big(i\sqrt{3}\big) + 7\sqrt{3}\,m^2\,\psi^{(0)}\big(-i\sqrt{3}\big) + 21\,i\,m -$$
$$6\sqrt{3}\,m\,\psi^{(0)}\big(m - i\sqrt{3}\big) + 6\sqrt{3}\,m\,\psi^{(0)}\big(m + i\sqrt{3}\big) - 6\sqrt{3}\,m\,\psi^{(0)}\big(i\sqrt{3}\big) +$$
$$6\sqrt{3}\,m\,\psi^{(0)}\big(-i\sqrt{3}\big) - 12\sqrt{3}\,\psi^{(0)}\big(m - i\sqrt{3}\big) + 12\sqrt{3}\,\psi^{(0)}\big(m + i\sqrt{3}\big) -$$
$$12\sqrt{3}\,\psi^{(0)}\big(i\sqrt{3}\big) + 12\sqrt{3}\,\psi^{(0)}\big(-i\sqrt{3}\big)\Big)\Big) \Big/ \big(12\,(m^2+3)\,(m^2+2\,m+4)\big)$$

$\psi^{(n)}(x)$ is the n^{th} derivative of the digamma function

Partial sums:



Alternate forms:

$$\frac{\pi\coth(\sqrt{3}\,\pi)}{4\sqrt{3}}$$

$$-\frac{\pi\sinh(2\sqrt{3}\,\pi)}{16\sqrt{3}\,(1-\cosh(2\sqrt{3}\,\pi))} - \frac{\sqrt{3}\,\pi\sinh(2\sqrt{3}\,\pi)}{16\,(1-\cosh(2\sqrt{3}\,\pi))}$$

$$\frac{\left(e^{-\sqrt{3}\,\pi} + e^{\sqrt{3}\,\pi}\right)\pi}{\sqrt{3}\,(\sqrt{3}+-i)\,(\sqrt{3}+i)\left(e^{\sqrt{3}\,\pi} - e^{-\sqrt{3}\,\pi}\right)}$$

coth(x) is the hyperbolic cotangent function

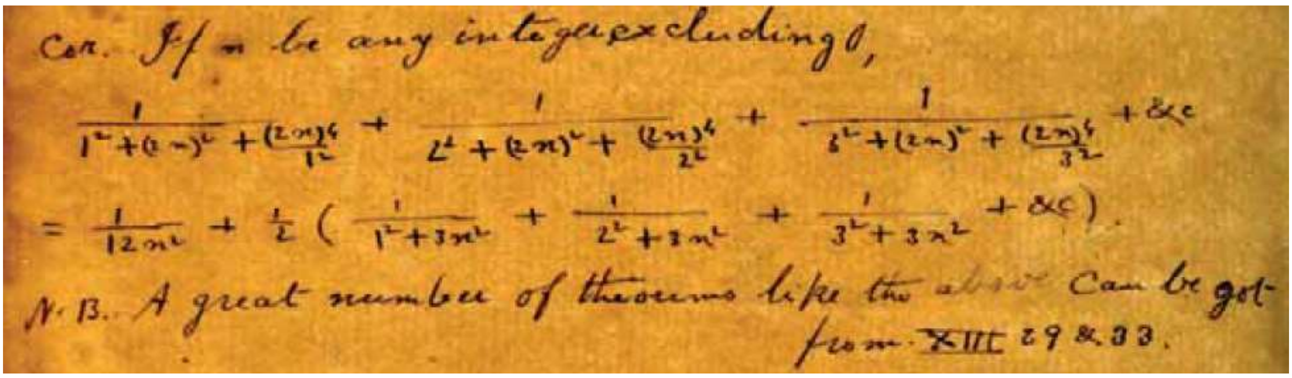
Series representations:

$$-\frac{\pi \sinh(2\sqrt{3}\,\pi)}{16\sqrt{3}\,(1-\cosh(2\sqrt{3}\,\pi))} - \frac{\sqrt{3}\,\pi \sinh(2\sqrt{3}\,\pi)}{16\,(1-\cosh(2\sqrt{3}\,\pi))} = \frac{\pi \sum_{k=0}^{\infty} \frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{4\sqrt{3}\left(-1+\sum_{k=0}^{\infty} \frac{12^k \pi^{2k}}{(2k)!}\right)}$$

$$-\frac{\pi \sinh(2\sqrt{3}\,\pi)}{16\sqrt{3}\,(1-\cosh(2\sqrt{3}\,\pi))} - \frac{\sqrt{3}\,\pi \sinh(2\sqrt{3}\,\pi)}{16\,(1-\cosh(2\sqrt{3}\,\pi))} = \frac{\pi \sum_{k=0}^{\infty} \frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{4\sqrt{3}\left(-1+i\sum_{k=0}^{\infty} \frac{\left(\frac{1}{2}\left(-i+4\sqrt{3}\right)\pi\right)^{1+2k}}{(1+2k)!}\right)}$$

$$-\frac{\pi \sinh(2\sqrt{3}\,\pi)}{16\sqrt{3}\,(1-\cosh(2\sqrt{3}\,\pi))} - \frac{\sqrt{3}\,\pi \sinh(2\sqrt{3}\,\pi)}{16\,(1-\cosh(2\sqrt{3}\,\pi))} = \frac{\pi^{5/2} \sum_{j=0}^{\infty} \operatorname{Res}_{s=-j} \frac{(-3)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}}{4\left(-1+\sum_{k=0}^{\infty} \frac{12^k \pi^{2k}}{(2k)!}\right)}$$

$$-\frac{\pi \sinh(2\sqrt{3}\,\pi)}{16\sqrt{3}\,(1-\cosh(2\sqrt{3}\,\pi))} - \frac{\sqrt{3}\,\pi \sinh(2\sqrt{3}\,\pi)}{16\,(1-\cosh(2\sqrt{3}\,\pi))} = \frac{\pi \sum_{k=0}^{\infty} \frac{3^{1/2+k}(2\pi)^{1+2k}}{(1+2k)!}}{4\sqrt{3}\left(-1+\sqrt{\pi}\sum_{j=0}^{\infty} \operatorname{Res}_{s=-j} \frac{(-3)^{-s}\pi^{-2s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)}$$



Cor. If n be any integer excluding 0,

$$\frac{1}{1^2+(2n)^2+\frac{(2n)^4}{1^2}} + \frac{1}{2^2+(2n)^2+\frac{(2n)^4}{2^2}} + \frac{1}{3^2+(2n)^2+\frac{(2n)^4}{3^2}} + \&c$$

$$= \frac{1}{12n^2} + \frac{1}{2}\left(\frac{1}{1^2+3n^2} + \frac{1}{2^2+3n^2} + \frac{1}{3^2+3n^2} + \&c\right).$$

N. B. A great number of theorems like the above can be got from XIII 29 & 33.

For n = 2, we obtain:

1/(12*2^2) + 1/2*(1/(1^2+3*2^2)+1/(2^2+3*2^2)+1/(3^2+3*2^2)+...)

Input interpretation:

$$\frac{1}{12\times 2^2}+\frac{1}{2}\left(\frac{1}{1^2+3\times 2^2}+\frac{1}{2^2+3\times 2^2}+\frac{1}{3^2+3\times 2^2}+\cdots\right)$$

Result:

$$\frac{1}{48}+\frac{1}{48}\left(2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)-1\right)$$

coth(x) is the hyperbolic cotangent function

Alternate forms:

$$\frac{\pi\coth(2\sqrt{3}\,\pi)}{8\sqrt{3}}$$

$$-\frac{\pi\sinh(4\sqrt{3}\,\pi)}{8\sqrt{3}\,(1-\cosh(4\sqrt{3}\,\pi))}$$

$$\frac{\pi\tanh(\sqrt{3}\,\pi)}{16\sqrt{3}}+\frac{\pi\coth(\sqrt{3}\,\pi)}{16\sqrt{3}}$$

1/48 + 1/48 (-1 + 2 sqrt(3) π coth(2 sqrt(3) π))

Input:

$$\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)$$

coth(x) is the hyperbolic cotangent function

Decimal approximation:

0.22672492068917875134505999443731635209440723777953152075 4...

0.22672492…

Alternate forms:

$$\frac{\pi\coth(2\sqrt{3}\,\pi)}{8\sqrt{3}}$$

$$-\frac{\pi\sinh(4\sqrt{3}\,\pi)}{8\sqrt{3}\,(1-\cosh(4\sqrt{3}\,\pi))}$$

$$\frac{\pi \tanh(\sqrt{3}\,\pi)}{16\sqrt{3}} + \frac{\pi \coth(\sqrt{3}\,\pi)}{16\sqrt{3}}$$

Alternative representations:

$$\frac{1}{48} + \frac{1}{48}\left(-1 + 2\sqrt{3}\,\pi \coth\left(2\sqrt{3}\,\pi\right)\right) = \frac{1}{48} + \frac{1}{48}\left(-1 - 2\,i\,\pi \cot\left(-2\,i\,\pi\sqrt{3}\right)\sqrt{3}\right)$$

$$\frac{1}{48} + \frac{1}{48}\left(-1 + 2\sqrt{3}\,\pi \coth\left(2\sqrt{3}\,\pi\right)\right) = \frac{1}{48} + \frac{1}{48}\left(-1 + 2\,i\,\pi \cot\left(2\,i\,\pi\sqrt{3}\right)\sqrt{3}\right)$$

$$\frac{1}{48} + \frac{1}{48}\left(-1 + 2\sqrt{3}\,\pi \coth\left(2\sqrt{3}\,\pi\right)\right) = \frac{1}{48} + \frac{1}{48}\left(-1 + 2\,\pi\left(1 + \frac{2}{-1 + e^{4\pi\sqrt{3}}}\right)\sqrt{3}\right)$$

Series representations:

$$\frac{1}{48} + \frac{1}{48}\left(-1 + 2\sqrt{3}\,\pi \coth\left(2\sqrt{3}\,\pi\right)\right) = \frac{1}{48} + \frac{1}{2}\sum_{k=1}^{\infty} \frac{1}{12 + k^2}$$

$$\frac{1}{48} + \frac{1}{48}\left(-1 + 2\sqrt{3}\,\pi \coth\left(2\sqrt{3}\,\pi\right)\right) = \frac{1}{4}\,\pi \sum_{k=-\infty}^{\infty} \frac{1}{12\,\pi + k^2\,\pi}$$

$$\frac{1}{48} + \frac{1}{48}\left(-1 + 2\sqrt{3}\,\pi \coth\left(2\sqrt{3}\,\pi\right)\right) = \frac{\pi}{8\sqrt{3}} + \frac{\pi \sum_{k=0}^{\infty} e^{-4\sqrt{3}\,(1+k)\pi}}{4\sqrt{3}}$$

Integral representation:

$$\frac{1}{48} + \frac{1}{48}\left(-1 + 2\sqrt{3}\,\pi \coth\left(2\sqrt{3}\,\pi\right)\right) = -\frac{\pi}{8\sqrt{3}} \int_{\frac{i\pi}{2}}^{2\sqrt{3}\,\pi} \operatorname{csch}^2(t)\,dt$$

(((exp(((1/48 + 1/48 (-1 + 2 sqrt(3) π coth(2 sqrt(3) π))))))))^32-29+1/golden ratio

Where 29 is a Lucas number

Input:

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}$$

$\coth(x)$ is the hyperbolic cotangent function

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}-29+e^{2/3+2/3\left(2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)-1\right)}$$

Decimal approximation:

1387.060505701553890257491110080389692406376704143735732815...

1387.0605057…. result practically equal to the rest mass of Sigma baryon 1387.2

Alternate forms:

$$\frac{1}{2}\left(\sqrt{5}-59\right)+e^{\left(4\pi\coth\left(2\sqrt{3}\,\pi\right)\right)/\sqrt{3}}$$

$$-29+\frac{2}{1+\sqrt{5}}+e^{\left(4\pi\coth\left(2\sqrt{3}\,\pi\right)\right)/\sqrt{3}}$$

$$\frac{1}{\phi}-29+e^{-\frac{4\pi\sinh\left(4\sqrt{3}\,\pi\right)}{\sqrt{3}\left(1-\cosh\left(4\sqrt{3}\,\pi\right)\right)}}$$

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

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

Alternative representations:

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}=$$
$$-29+\frac{1}{\phi}+\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1-2\,i\,\pi\cot\left(-2\,i\,\pi\sqrt{3}\right)\sqrt{3}\right)\right)$$

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}=$$
$$-29+\frac{1}{\phi}+\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\pi\left(1+\frac{2}{-1+e^{4\pi\sqrt{3}}}\right)\sqrt{3}\right)\right)$$

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}=$$
$$-29+\frac{1}{\phi}+\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+\frac{2\pi\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\sqrt{3}}{-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}}\right)\right)$$

Series representations:

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}=$$
$$\frac{-27-29\sqrt{5}+\left(1+\sqrt{5}\right)e^{2/3+16\times\sum_{k=1}^{\infty}1/\left(12+k^2\right)}}{1+\sqrt{5}}$$

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}=$$
$$-29+\exp\left(\frac{2}{3}+\frac{2}{3}\left(-1+12\pi^2\sum_{k=-\infty}^{\infty}\frac{1}{\left(12+k^2\right)\pi^2}\right)\right)+\frac{1}{\phi}$$

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}=$$
$$-\frac{59}{2}+\frac{\sqrt{5}}{2}+e^{8\pi\sum_{k=-\infty}^{\infty}1/\left(12\pi+k^2\pi\right)}$$

Integral representation:

$$\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}=$$
$$-29+\exp\left(\frac{2}{3}+\frac{2}{3}\left(-1-2\sqrt{3}\,\pi\int_{\frac{i\pi}{2}}^{2\sqrt{3}\,\pi}\operatorname{csch}^2(t)\,dt\right)\right)+\frac{1}{\phi}$$

1/10((((((exp(((1/48 + 1/48 (-1 + 2 sqrt(3) π coth(2 sqrt(3) π))))))))^32-29+1/golden ratio)))+1/golden ratio

Where 10 is the numbers of dimensions in superstring theory and 29 is a Lucas number

Input:

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}$$

coth(x) is the hyperbolic cotangent function

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}+\frac{1}{10}\left(\frac{1}{\phi}-29+e^{2/3+2/3\left(2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)-1\right)}\right)$$

Decimal approximation:

139.3240845589052838739536978424046073583579795941793361436...

139.32408455…. result practically equal to the rest mass of Pion meson 139.57

Alternate forms:

$$\frac{11}{10\,\phi}-\frac{29}{10}+\frac{1}{10}\,e^{\left(4\pi\coth\left(2\sqrt{3}\,\pi\right)\right)/\sqrt{3}}$$

$$\frac{1}{20}\left(-69+11\sqrt{5}+2\,e^{\left(4\pi\coth\left(2\sqrt{3}\,\pi\right)\right)/\sqrt{3}}\right)$$

$$-\frac{29}{10}+\frac{11}{5\left(1+\sqrt{5}\right)}+\frac{1}{10}\,e^{\left(4\pi\coth\left(2\sqrt{3}\,\pi\right)\right)/\sqrt{3}}$$

Expanded form:

$$\frac{11}{10\,\phi}-\frac{29}{10}+\frac{1}{10}\,e^{2/3+2/3\left(2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)-1\right)}$$

Alternative representations:

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{1}{10}\left(-29+\frac{1}{\phi}+\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1-2\,i\,\pi\cot\left(-2\,i\,\pi\sqrt{3}\right)\sqrt{3}\right)\right)\right)$$

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{1}{10}\left(-29+\frac{1}{\phi}+\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\pi\left(1+\frac{2}{-1+e^{4\pi\sqrt{3}}}\right)\sqrt{3}\right)\right)\right)$$

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{1}{10}\left(-29+\frac{1}{\phi}+\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+\frac{2\pi\left(e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}\right)\sqrt{3}}{-e^{-2\pi\sqrt{3}}+e^{2\pi\sqrt{3}}}\right)\right)\right)$$

Series representations:

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}=\frac{-7-29\sqrt{5}+\left(1+\sqrt{5}\right)e^{2/3+16\times\sum_{k=1}^{\infty}1/(12+k^2)}}{10\left(1+\sqrt{5}\right)}$$

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}=-\frac{69}{20}+\frac{11}{4\sqrt{5}}+\frac{1}{10}e^{8\pi\sum_{k=-\infty}^{\infty}1/(12\pi+k^2\pi)}$$

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}=-\frac{29}{10}+\frac{1}{10}\exp\left(\frac{2}{3}+\frac{2}{3}\left(-1+12\pi^2\sum_{k=-\infty}^{\infty}\frac{1}{(12+k^2)\pi^2}\right)\right)+\frac{11}{10\phi}$$

Integral representation:

$$\frac{1}{10}\left(\exp^{32}\left(\frac{1}{48}+\frac{1}{48}\left(-1+2\sqrt{3}\,\pi\coth\left(2\sqrt{3}\,\pi\right)\right)\right)-29+\frac{1}{\phi}\right)+\frac{1}{\phi}=-\frac{29}{10}+\frac{1}{10}\exp\left(\frac{2}{3}+\frac{2}{3}\left(-1-2\sqrt{3}\,\pi\int_{\frac{i\pi}{2}}^{2\sqrt{3}\,\pi}\operatorname{csch}^2(t)\,dt\right)\right)+\frac{11}{10\phi}$$

Or:

1/(12*2^2) + 1/2*(1/(1^2+3*2^2)+1/(2^2+3*2^2)+1/(3^2+3*2^2)+1/(4^2+3*2^2)+1/(5^2+3*2^2)+1/(6^2+3*2^2)+1/(7^2+3*2^2))

Input:

$$\frac{1}{12\times 2^2}+\frac{1}{2}\left(\frac{1}{1^2+3\times 2^2}+\frac{1}{2^2+3\times 2^2}+\frac{1}{3^2+3\times 2^2}+\frac{1}{4^2+3\times 2^2}+\frac{1}{5^2+3\times 2^2}+\frac{1}{6^2+3\times 2^2}+\frac{1}{7^2+3\times 2^2}\right)$$

Exact result:

$$\frac{231449}{1408368}$$

Decimal approximation:

0.164338439953194051554707292412210444997330243231882576144...

0.164338439953194...

1/(48) + 1/2*(1/(64+12)+1/(81+12)+1/(100+12)+1/(121+12)+1/(144+12)+1/(169+12)+1/(196+12)+1/(225+12)+1/(256+12)+1/(289+12)+1/(324+12)+1/(361+12)+1/(400+12)+1/(441+12)+1/(496)+1/(541))

Input:

$$\frac{1}{48}+\frac{1}{2}\left(\frac{1}{64+12}+\frac{1}{81+12}+\frac{1}{100+12}+\frac{1}{121+12}+\frac{1}{144+12}+\frac{1}{169+12}+\frac{1}{196+12}+\frac{1}{225+12}+\frac{1}{256+12}+\frac{1}{289+12}+\frac{1}{324+12}+\frac{1}{361+12}+\frac{1}{400+12}+\frac{1}{441+12}+\frac{1}{496}+\frac{1}{541}\right)$$

Exact result:

$$\frac{2950867038919393320551}{47519195324227082625936}$$

Decimal approximation:

0.062098421885837989402622956253925345596783182155262208075...

0.06209842...

0.164338439 + 1/(48) + 1/2*(1/(64+12)+1/(81+12)+1/(100+12)+1/(121+12)+1/(144+12)+1/(169+12)+1/(196+12)+1/(225+12)+1/(256+12)+1/(289+12)+1/(324+12)+1/(361+12)+1/(400+12)+1/(441+12)+1/(496)+1/(541))

Input interpretation:

$$0.164338439+\frac{1}{48}+\frac{1}{2}\left(\frac{1}{64+12}+\frac{1}{81+12}+\frac{1}{100+12}+\frac{1}{121+12}+\frac{1}{144+12}+\frac{1}{169+12}+\frac{1}{196+12}+\frac{1}{225+12}+\frac{1}{256+12}+\frac{1}{289+12}+\frac{1}{324+12}+\frac{1}{361+12}+\frac{1}{400+12}+\frac{1}{441+12}+\frac{1}{496}+\frac{1}{541}\right)$$

Result:

0.226436860885837989402622956253925345596783182155262208075...

0.22643686...

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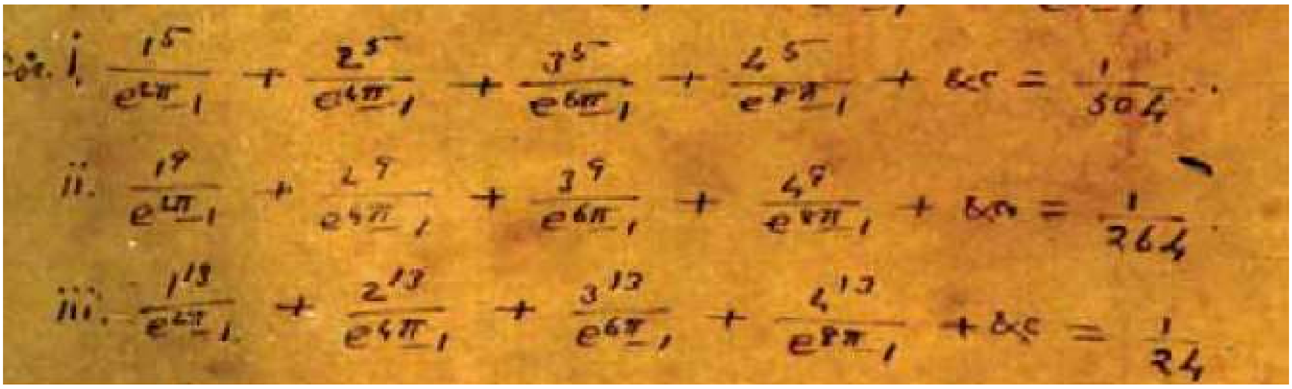

Cor. i. $\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}+\&c=\frac{1}{504}$.

ii. $\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1}+\&c=\frac{1}{264}$.

iii. $\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}+\&c=\frac{1}{24}$

1^5/(e^(2Pi)-1)+2^5/(e^(4Pi)-1)+3^5/(e^(6Pi)-1)+4^5/(e^(8Pi)-1)

Input:

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}$$

Decimal approximation:

0.001984126912823947830626260402638897891829286043471033054...

0.001984126912…

Property:

$$\frac{1}{-1+e^{2\pi}}+\frac{32}{-1+e^{4\pi}}+\frac{243}{-1+e^{6\pi}}+\frac{1024}{-1+e^{8\pi}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\left(-1+\frac{64}{e^{4\pi}-1}+\frac{486}{e^{6\pi}-1}+\frac{2048}{e^{8\pi}-1}+\coth(\pi)\right)$$

$$\frac{177}{e^{\pi}-1}-\frac{177}{1+e^{\pi}}-\frac{272}{1+e^{2\pi}}+\frac{81\,(e^{\pi}-2)}{2\,(1-e^{\pi}+e^{2\pi})}-\frac{81\,(2+e^{\pi})}{2\,(1+e^{\pi}+e^{2\pi})}-\frac{512}{1+e^{4\pi}}$$

$$\frac{1300+1301\,e^{2\pi}+1334\,e^{4\pi}+278\,e^{6\pi}+34\,e^{8\pi}+e^{10\pi}}{(e^{\pi}-1)(1+e^{\pi})(1+e^{2\pi})(1-e^{\pi}+e^{2\pi})(1+e^{\pi}+e^{2\pi})(1+e^{4\pi})}$$

$\coth(x)$ is the hyperbolic cotangent function

Alternative representations:

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}= \frac{1^5}{-1+e^{360^\circ}}+\frac{2^5}{-1+e^{720^\circ}}+\frac{3^5}{-1+e^{1080^\circ}}+\frac{4^5}{-1+e^{1440^\circ}}$$

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}= \frac{4^5}{-1+e^{-8i\log(-1)}}+\frac{3^5}{-1+e^{-6i\log(-1)}}+\frac{2^5}{-1+e^{-4i\log(-1)}}+\frac{1^5}{-1+e^{-2i\log(-1)}}$$

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}= \frac{1^5}{\exp^{2\pi}(z)-1}+\frac{2^5}{\exp^{4\pi}(z)-1}+\frac{3^5}{\exp^{6\pi}(z)-1}+\frac{4^5}{\exp^{8\pi}(z)-1} \quad \text{for } z=1$$

Series representations:

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}= \frac{1}{-1+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{32}{-1+e^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{243}{-1+e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1024}{-1+e^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}= \frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{32}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{243}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1024}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}= \frac{1}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{32}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{243}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1024}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}=\frac{1}{-1+e^{4\int_0^\infty 1/(1+t^2)\,dt}}+\frac{32}{-1+e^{8\int_0^\infty 1/(1+t^2)\,dt}}+\frac{243}{-1+e^{12\int_0^\infty 1/(1+t^2)\,dt}}+\frac{1024}{-1+e^{16\int_0^\infty 1/(1+t^2)\,dt}}$$

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}=\frac{1}{-1+e^{4\int_0^\infty \sin(t)/t\,dt}}+\frac{32}{-1+e^{8\int_0^\infty \sin(t)/t\,dt}}+\frac{243}{-1+e^{12\int_0^\infty \sin(t)/t\,dt}}+\frac{1024}{-1+e^{16\int_0^\infty \sin(t)/t\,dt}}$$

$$\frac{1^5}{e^{2\pi}-1}+\frac{2^5}{e^{4\pi}-1}+\frac{3^5}{e^{6\pi}-1}+\frac{4^5}{e^{8\pi}-1}=\frac{1}{-1+e^{8\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{32}{-1+e^{16\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{243}{-1+e^{24\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{1024}{-1+e^{32\int_0^1 \sqrt{1-t^2}\,dt}}$$

1/504

Input:

$$\frac{1}{504}$$

Exact result:

$$\frac{1}{504}$$ (irreducible)

Decimal approximation:

0.001984126984126984126984126984126984126984126984126984126...

0.001984126984….

1^9/(e^(2Pi)-1)+2^9/(e^(4Pi)-1)+3^9/(e^(6Pi)-1)+4^9/(e^(8Pi)-1)

Input:

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1}$$

Decimal approximation:

0.0037878339998097164244835504388283751814916363672115531 05...

0.0037878339…

Property:

$$\frac{1}{-1+e^{2\pi}}+\frac{512}{-1+e^{4\pi}}+\frac{19683}{-1+e^{6\pi}}+\frac{262144}{-1+e^{8\pi}}$$ is a transcendental number

Alternate forms:

$$\frac{512}{e^{4\pi}-1}+\frac{1}{2}\left(-1+\frac{39366}{e^{6\pi}-1}+\frac{524288}{e^{8\pi}-1}+\coth(\pi)\right)$$

$$\frac{36177}{e^{\pi}-1}-\frac{36177}{1+e^{\pi}}-\frac{65792}{1+e^{2\pi}}+\frac{6561\,(e^{\pi}-2)}{2\left(1-e^{\pi}+e^{2\pi}\right)}-\frac{6561\,(2+e^{\pi})}{2\left(1+e^{\pi}+e^{2\pi}\right)}-\frac{131072}{1+e^{4\pi}}$$

$$\frac{282340+282341\,e^{2\pi}+282854\,e^{4\pi}+20198\,e^{6\pi}+514\,e^{8\pi}+e^{10\pi}}{(e^{\pi}-1)(1+e^{\pi})\left(1+e^{2\pi}\right)\left(1-e^{\pi}+e^{2\pi}\right)\left(1+e^{\pi}+e^{2\pi}\right)\left(1+e^{4\pi}\right)}$$

$\coth(x)$ is the hyperbolic cotangent function

Alternative representations:

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1}=\frac{1^9}{-1+e^{360^\circ}}+\frac{2^9}{-1+e^{720^\circ}}+\frac{3^9}{-1+e^{1080^\circ}}+\frac{4^9}{-1+e^{1440^\circ}}$$

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1}=\frac{4^9}{-1+e^{-8i\log(-1)}}+\frac{3^9}{-1+e^{-6i\log(-1)}}+\frac{2^9}{-1+e^{-4i\log(-1)}}+\frac{1^9}{-1+e^{-2i\log(-1)}}$$

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1}=\frac{1^9}{\exp^{2\pi}(z)-1}+\frac{2^9}{\exp^{4\pi}(z)-1}+\frac{3^9}{\exp^{6\pi}(z)-1}+\frac{4^9}{\exp^{8\pi}(z)-1}\quad \text{for } z=1$$

Series representations:

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1}=\frac{1}{-1+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{512}{-1+e^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{19683}{-1+e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{262144}{-1+e^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1} = \frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{512}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{19683}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{262144}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1} = \frac{1}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{512}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{19683}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{262144}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1} = \frac{1}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{512}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{19683}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{262144}{-1+e^{16\int_0^{\infty}1/(1+t^2)\,dt}}$$

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1} = \frac{1}{-1+e^{4\int_0^{\infty}\sin(t)/t\,dt}}+\frac{512}{-1+e^{8\int_0^{\infty}\sin(t)/t\,dt}}+\frac{19683}{-1+e^{12\int_0^{\infty}\sin(t)/t\,dt}}+\frac{262144}{-1+e^{16\int_0^{\infty}\sin(t)/t\,dt}}$$

$$\frac{1^9}{e^{2\pi}-1}+\frac{2^9}{e^{4\pi}-1}+\frac{3^9}{e^{6\pi}-1}+\frac{4^9}{e^{8\pi}-1} = \frac{1}{-1+e^{8\int_0^{1}\sqrt{1-t^2}\,dt}}+\frac{512}{-1+e^{16\int_0^{1}\sqrt{1-t^2}\,dt}}+\frac{19683}{-1+e^{24\int_0^{1}\sqrt{1-t^2}\,dt}}+\frac{262144}{-1+e^{32\int_0^{1}\sqrt{1-t^2}\,dt}}$$

1/264

Input:

$$\frac{1}{264}$$

Exact result:

$\frac{1}{264}$ (irreducible)

Decimal approximation:

0.003787878787878787878787878787878787878787878787878787878...

0.003787878…

1^13/(e^(2Pi)-1)+2^13/(e^(4Pi)-1)+3^13/(e^(6Pi)-1)+4^13/(e^(8Pi)-1)

Input:

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}$$

Decimal approximation:

0.041638381585443662182517651348977915286722918403784080981...

0.0416383815854……

Property:

$$\frac{1}{-1+e^{2\pi}}+\frac{8192}{-1+e^{4\pi}}+\frac{1594323}{-1+e^{6\pi}}+\frac{67108864}{-1+e^{8\pi}}$$ is a transcendental number

Alternate forms:

$$\frac{8192}{e^{4\pi}-1}+\frac{1594323}{e^{6\pi}-1}+\frac{67108864}{e^{8\pi}-1}+\frac{1}{2}(\coth(\pi)-1)$$

$$\frac{8656377}{e^{\pi}-1}-\frac{8656377}{1+e^{\pi}}-\frac{16781312}{1+e^{2\pi}}+\frac{531441(e^{\pi}-2)}{2(1-e^{\pi}+e^{2\pi})}-\frac{531441(2+e^{\pi})}{2(1+e^{\pi}+e^{2\pi})}-\frac{33554432}{1+e^{4\pi}}$$

$$\frac{68711380+68711381e^{2\pi}+68719574e^{4\pi}+1602518e^{6\pi}+8194e^{8\pi}+e^{10\pi}}{(e^{\pi}-1)(1+e^{\pi})(1+e^{2\pi})(1-e^{\pi}+e^{2\pi})(1+e^{\pi}+e^{2\pi})(1+e^{4\pi})}$$

coth(x) is the hyperbolic cotangent function

Alternative representations:

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}=\frac{1^{13}}{-1+e^{360^\circ}}+\frac{2^{13}}{-1+e^{720^\circ}}+\frac{3^{13}}{-1+e^{1080^\circ}}+\frac{4^{13}}{-1+e^{1440^\circ}}$$

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= \frac{4^{13}}{-1+e^{-8 i \log(-1)}}+\frac{3^{13}}{-1+e^{-6 i \log(-1)}}+\frac{2^{13}}{-1+e^{-4 i \log(-1)}}+\frac{1^{13}}{-1+e^{-2 i \log(-1)}}$$

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= \frac{1^{13}}{\exp^{2\pi}(z)-1}+\frac{2^{13}}{\exp^{4\pi}(z)-1}+\frac{3^{13}}{\exp^{6\pi}(z)-1}+\frac{4^{13}}{\exp^{8\pi}(z)-1} \quad \text{for } z=1$$

Series representations:

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= \frac{1}{-1+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{8192}{-1+e^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1594323}{-1+e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{67108864}{-1+e^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= \frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= \frac{1}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{8192}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1594323}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{67108864}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= \frac{1}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{8192}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{1594323}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{67108864}{-1+e^{16\int_0^{\infty}1/(1+t^2)\,dt}}$$

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1} = \frac{1}{-1+e^{4\int_0^\infty \sin(t)/t\,dt}}+\frac{8192}{-1+e^{8\int_0^\infty \sin(t)/t\,dt}}+\frac{1\,594\,323}{-1+e^{12\int_0^\infty \sin(t)/t\,dt}}+\frac{67\,108\,864}{-1+e^{16\int_0^\infty \sin(t)/t\,dt}}$$

$$\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1} = \frac{1}{-1+e^{8\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{8192}{-1+e^{16\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{1\,594\,323}{-1+e^{24\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{67\,108\,864}{-1+e^{32\int_0^1 \sqrt{1-t^2}\,dt}}$$

1/24

Input:

$$\frac{1}{24}$$

Exact result:

$$\frac{1}{24}$$ (irreducible)

Decimal approximation:

0.041666666666666666666666666666666666666666666666666666…

0.0416666666666…..

We note that:

From:

SUPERSYMMETRY AND STRING THEORY - Beyond the Standard Model
MICHAEL DINE
University of California, Santa Cruz - First published in print format 2006 - © M. Dine 2007

First, we give a general formula for the normal ordering constant. This is related to the algebra of the energy-momentum tensor we have discussed in Section 21.4. For a left- or right-moving boson, with modes which differ from an integer by η (e.g. modes are $1-\eta$, $2-\eta$, etc.), the contribution to the normal ordering constant is:

$$\Delta = -\frac{1}{24} + \frac{1}{4}\eta(1-\eta). \tag{22.30}$$

For fermions, the contribution is the opposite. So we can recover some familiar results. In the bosonic string, with 24 transverse degrees of freedom, we see that the normal ordering constant is -1. For the superstring, in the NS–NS sector, we have a contribution of $-1/24$ for each boson, and $1/24 - 1/16$ for each of the eight fermions on the left (and similarly on the right). So the normal ordering constant is $-1/2$. For the RR sector, the normal ordering vanishes.

Thence 24 can be identified with the number of the transverse degrees of freedom in the bosonic string

We have that:

(((1^5/(e^(2Pi)-1)+2^5/(e^(4Pi)-1)+3^5/(e^(6Pi)-1)+4^5/(e^(8Pi)-1))))+(((1^9/(e^(2Pi)-1)+2^9/(e^(4Pi)-1)+3^9/(e^(6Pi)-1)+4^9/(e^(8Pi)-1))))

Input:

$$\left(\frac{1^5}{e^{2\pi}-1} + \frac{2^5}{e^{4\pi}-1} + \frac{3^5}{e^{6\pi}-1} + \frac{4^5}{e^{8\pi}-1}\right) + \left(\frac{1^9}{e^{2\pi}-1} + \frac{2^9}{e^{4\pi}-1} + \frac{3^9}{e^{6\pi}-1} + \frac{4^9}{e^{8\pi}-1}\right)$$

Exact result:

$$\frac{2}{e^{2\pi}-1} + \frac{544}{e^{4\pi}-1} + \frac{19\,926}{e^{6\pi}-1} + \frac{263\,168}{e^{8\pi}-1}$$

Decimal approximation:

0.005771960912633664255109810841467273073320922410682586159...

0.0057719609126336… Partial Result

Property:

$$\frac{2}{-1+e^{2\pi}} + \frac{544}{-1+e^{4\pi}} + \frac{19\,926}{-1+e^{6\pi}} + \frac{263\,168}{-1+e^{8\pi}}$$ is a transcendental number

0.005771960912633664255 1098 + 1^13/(e^(2Pi)-1)+2^13/(e^(4Pi)-1)+3^13/(e^(6Pi)-1)+4^13/(e^(8Pi)-1)

Input interpretation:

$$0.005771960912633664255 1098+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}$$

Result:

0.047410342498077326437 6275...

0.047410342498…..

Alternative representations:

$$0.0057719609126336642551098 0000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= 0.0057719609126336642551098 0000+\frac{1^{13}}{-1+e^{360\,°}}+\frac{2^{13}}{-1+e^{720\,°}}+\frac{3^{13}}{-1+e^{1080\,°}}+\frac{4^{13}}{-1+e^{1440\,°}}$$

$$0.0057719609126336642551098 0000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= 0.0057719609126336642551098 0000+\frac{4^{13}}{-1+e^{-8i\log(-1)}}+\frac{3^{13}}{-1+e^{-6i\log(-1)}}+\frac{2^{13}}{-1+e^{-4i\log(-1)}}+\frac{1^{13}}{-1+e^{-2i\log(-1)}}$$

$$0.0057719609126336642551098 0000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}= 0.0057719609126336642551098 0000+\frac{1^{13}}{\exp^{2\pi}(z)-1}+\frac{2^{13}}{\exp^{4\pi}(z)-1}+\frac{3^{13}}{\exp^{6\pi}(z)-1}+\frac{4^{13}}{\exp^{8\pi}(z)-1} \text{ for } z=1$$

Series representations:

$$0.00577196091263366425510980000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}=$$
$$0.00577196091263366425510980000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$0.00577196091263366425510980000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}=$$
$$0.00577196091263366425510980000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}$$

$$0.00577196091263366425510980000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}=$$
$$0.00577196091263366425510980000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\times\sum_{k=1}^{\infty}4^{-k}(-1+3^k)\zeta(1+k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4\times\sum_{k=1}^{\infty}4^{-k}(-1+3^k)\zeta(1+k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6\times\sum_{k=1}^{\infty}4^{-k}(-1+3^k)\zeta(1+k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\times\sum_{k=1}^{\infty}4^{-k}(-1+3^k)\zeta(1+k)}}$$

We observe that:

1/((((0.00577196091263 + 1^13/(e^(2Pi)-1)+2^13/(e^(4Pi)-1)+3^13/(e^(6Pi)-1)+4^13/(e^(8Pi)-1)))))

Input interpretation:

$$\frac{1}{0.00577196091263+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}$$

Result:

21.09244412315...

21.09244412315…

Alternative representations:

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = \frac{1}{0.005771960912630000+\frac{1^{13}}{-1+e^{360^\circ}}+\frac{2^{13}}{-1+e^{720^\circ}}+\frac{3^{13}}{-1+e^{1080^\circ}}+\frac{4^{13}}{-1+e^{1440^\circ}}}$$

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = \frac{1}{0.005771960912630000+\frac{1^{13}}{\exp^{2\pi}(z)-1}+\frac{2^{13}}{\exp^{4\pi}(z)-1}+\frac{3^{13}}{\exp^{6\pi}(z)-1}+\frac{4^{13}}{\exp^{8\pi}(z)-1}} \text{ for } z=1$$

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = 1\Big/\left(0.005771960912630000+\frac{4^{13}}{-1+e^{-8i\log(-1)}}+\frac{3^{13}}{-1+e^{-6i\log(-1)}}+\frac{2^{13}}{-1+e^{-4i\log(-1)}}+\frac{1^{13}}{-1+e^{-2i\log(-1)}}\right)$$

Series representations:

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = 1\Big/\left(0.005771960912630000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}\right)$$

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = 1\Bigg/\left(0.005771960912630000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}\right)$$

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = 1\Bigg/\left(0.005771960912630000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^{k}\right)\zeta(1+k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^{k}\right)\zeta(1+k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^{k}\right)\zeta(1+k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^{k}\right)\zeta(1+k)}}\right)$$

Integral representations:

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = 1\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{4\int_0^{\infty}\sin(t)/t\,dt}}+\frac{8192}{-1+e^{8\int_0^{\infty}\sin(t)/t\,dt}}+\frac{1594323}{-1+e^{12\int_0^{\infty}\sin(t)/t\,dt}}+\frac{67108864}{-1+e^{16\int_0^{\infty}\sin(t)/t\,dt}}\right)$$

$$\frac{1}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}} = 1\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{8192}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{1594323}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{67108864}{-1+e^{16\int_0^{\infty}1/(1+t^2)\,dt}}\right)$$

$$\frac{1}{0.005771960912630000 + \frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \frac{4^{13}}{e^{8\pi}-1}} =$$

$$1 \Big/ \left(0.005771960912630000 + \frac{1}{-1 + e^{8\int_0^1 \sqrt{1-t^2}\,dt}} + \frac{8192}{-1 + e^{16\int_0^1 \sqrt{1-t^2}\,dt}} + \frac{1594323}{-1 + e^{24\int_0^1 \sqrt{1-t^2}\,dt}} + \frac{67108864}{-1 + e^{32\int_0^1 \sqrt{1-t^2}\,dt}}\right)$$

6/((((0.00577196091263 + 1^13/(e^(2Pi)-1)+2^13/(e^(4Pi)-1)+3^13/(e^(6Pi)-1)+4^13/(e^(8Pi)-1)))))-golden ratio

Input interpretation:

$$\frac{6}{0.00577196091263 + \frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \frac{4^{13}}{e^{8\pi}-1}} - \phi$$

ϕ is the golden ratio

Result:

124.9366307501...

124.936630…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternative representations:

$$\frac{6}{0.005771960912630000 + \frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \frac{4^{13}}{e^{8\pi}-1}} - \phi = -2\cos\left(\frac{\pi}{5}\right) + \frac{6}{0.005771960912630000 + \frac{1^{13}}{-1+e^{360^\circ}} + \frac{2^{13}}{-1+e^{720^\circ}} + \frac{3^{13}}{-1+e^{1080^\circ}} + \frac{4^{13}}{-1+e^{1440^\circ}}}$$

$$\frac{6}{0.00577196091263000 + \frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \frac{4^{13}}{e^{8\pi}-1}} - \phi =$$

$$\frac{6}{0.00577196091263000 + \frac{1^{13}}{-1+e^{2\pi}} + \frac{2^{13}}{-1+e^{4\pi}} + \frac{3^{13}}{-1+e^{6\pi}} + \frac{4^{13}}{-1+e^{8\pi}}} - \text{root of } -1-x+x^2 \text{ near } x = 1.61803$$

$$\frac{6}{0.00577196091263000 + \frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \frac{4^{13}}{e^{8\pi}-1}} - \phi =$$

$$\frac{6}{0.00577196091263000 + \frac{1^{13}}{-1+e^{360°}} + \frac{2^{13}}{-1+e^{720°}} + \frac{3^{13}}{-1+e^{1080°}} + \frac{4^{13}}{-1+e^{1440°}}} - \text{root of } -1-x+x^2 \text{ near } x = 1.61803$$

Series representations:

$$\frac{6}{0.00577196091263000 + \frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \frac{4^{13}}{e^{8\pi}-1}} - \phi =$$

$$-\phi + 6 \Bigg/ \left(0.00577196091263000 + \frac{1}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{8 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}} + \frac{8192}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{16 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}} + \frac{1594323}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{24 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}} + \frac{67108864}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{32 \sum_{k=0}^{\infty} (-1)^k/(1+2k)}}\right)$$

$$\frac{6}{0.00577196091263000 + \frac{1^{13}}{e^{2\pi}-1} + \frac{2^{13}}{e^{4\pi}-1} + \frac{3^{13}}{e^{6\pi}-1} + \frac{4^{13}}{e^{8\pi}-1}} - \phi =$$

$$-\phi + 6 \Bigg/ \left(0.00577196091263000 + \frac{1}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{8 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}} + \frac{8192}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{16 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}} + \frac{1594323}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{24 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}} + \frac{67108864}{-1+\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{32 \sum_{k=1}^{\infty} \tan^{-1}(1/F_{1+2k})}}\right)$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}-\phi=$$

$$-\phi+6\Bigg/\left(0.005771960912630000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}\right)$$

Integral representations:

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}-\phi=$$

$$6\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{4\int_0^{\infty}\sin(t)/t\,dt}}+\frac{8192}{-1+e^{8\int_0^{\infty}\sin(t)/t\,dt}}+\frac{1594323}{-1+e^{12\int_0^{\infty}\sin(t)/t\,dt}}+\frac{67108864}{-1+e^{16\int_0^{\infty}\sin(t)/t\,dt}}\right)-\phi$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}-\phi=$$

$$6\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{8192}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{1594323}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{67108864}{-1+e^{16\int_0^{\infty}1/(1+t^2)\,dt}}\right)-\phi$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}-\phi=$$

$$6\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{8\int_0^{1}\sqrt{1-t^2}\,dt}}+\frac{8192}{-1+e^{16\int_0^{1}\sqrt{1-t^2}\,dt}}+\frac{1594323}{-1+e^{24\int_0^{1}\sqrt{1-t^2}\,dt}}+\frac{67108864}{-1+e^{32\int_0^{1}\sqrt{1-t^2}\,dt}}\right)-\phi$$

6/((((0.00577196091263 + 1^13/(e^(2Pi)-1)+2^13/(e^(4Pi)-1)+3^13/(e^(6Pi)-1)+4^13/(e^(8Pi)-1)))))+11+golden ratio

Where 11 is a Lucas number and are the number of dimensions of bulk in M-theory (hyperspace) and 6 are the extra dimensions (compactified toroidal dimensions) of the superstring theory in 10 D

Input interpretation:

$$\frac{6}{0.00577196091263+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi$$

ϕ is the golden ratio

Result:

139.1726987276...

139.1726987276…. result practically equal to the rest mass of Pion meson 139.57

Alternative representations:

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi=11+2\cos\left(\frac{\pi}{5}\right)+\frac{6}{0.005771960912630000+\frac{1^{13}}{-1+e^{360^\circ}}+\frac{2^{13}}{-1+e^{720^\circ}}+\frac{3^{13}}{-1+e^{1080^\circ}}+\frac{4^{13}}{-1+e^{1440^\circ}}}$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi=11+\frac{6}{0.005771960912630000+\frac{1^{13}}{-1+e^{2\pi}}+\frac{2^{13}}{-1+e^{4\pi}}+\frac{3^{13}}{-1+e^{6\pi}}+\frac{4^{13}}{-1+e^{8\pi}}}+\left(\text{root of } -1-x+x^2 \text{ near } x=1.61803\right)$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi=11+\frac{6}{0.005771960912630000+\frac{1^{13}}{-1+e^{360^\circ}}+\frac{2^{13}}{-1+e^{720^\circ}}+\frac{3^{13}}{-1+e^{1080^\circ}}+\frac{4^{13}}{-1+e^{1440^\circ}}}+\left(\text{root of } -1-x+x^2 \text{ near } x=1.61803\right)$$

Series representations:

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi=$$

$$11+\phi+6\Bigg/\left(0.005771960912630000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}\right)$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi=$$

$$11+\phi+6\Bigg/\left(0.005771960912630000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{32\sum_{k=1}^{\infty}\tan^{-1}(1/F_{1+2k})}}\right)$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi=$$

$$11+\phi+6\Bigg/\left(0.005771960912630000+\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}+\frac{8192}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}+\frac{1594323}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}+\frac{67108864}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)}}\right)$$

Integral representations:

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi =$$
$$11+6\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{4\int_0^\infty \sin(t)/t\,dt}}+\frac{8192}{-1+e^{8\int_0^\infty \sin(t)/t\,dt}}+\frac{1594323}{-1+e^{12\int_0^\infty \sin(t)/t\,dt}}+\frac{67108864}{-1+e^{16\int_0^\infty \sin(t)/t\,dt}}\right)+\phi$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi =$$
$$11+6\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{4\int_0^\infty 1/(1+t^2)\,dt}}+\frac{8192}{-1+e^{8\int_0^\infty 1/(1+t^2)\,dt}}+\frac{1594323}{-1+e^{12\int_0^\infty 1/(1+t^2)\,dt}}+\frac{67108864}{-1+e^{16\int_0^\infty 1/(1+t^2)\,dt}}\right)+\phi$$

$$\frac{6}{0.005771960912630000+\frac{1^{13}}{e^{2\pi}-1}+\frac{2^{13}}{e^{4\pi}-1}+\frac{3^{13}}{e^{6\pi}-1}+\frac{4^{13}}{e^{8\pi}-1}}+11+\phi =$$
$$11+6\Bigg/\left(0.005771960912630000+\frac{1}{-1+e^{8\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{8192}{-1+e^{16\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{1594323}{-1+e^{24\int_0^1 \sqrt{1-t^2}\,dt}}+\frac{67108864}{-1+e^{32\int_0^1 \sqrt{1-t^2}\,dt}}\right)+\phi$$

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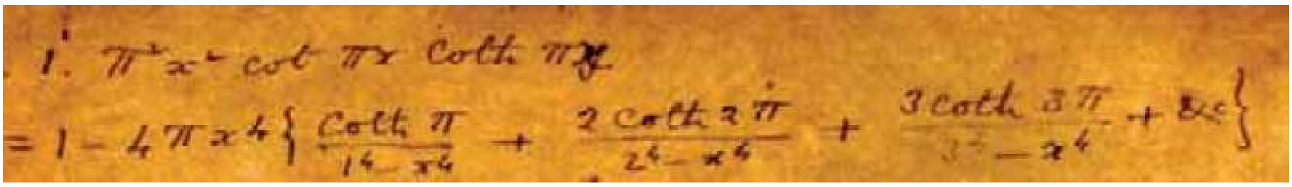


$$1.\ \pi^2x^2\cot\pi x\coth\pi x = 1-4\pi x^4\left\{\frac{\coth\pi}{1^4-x^4}+\frac{2\coth 2\pi}{2^4-x^4}+\frac{3\coth 3\pi}{3^4-x^4}+\&c\right\}$$

For x = 0.5, we obtain:

1-0.5^4*4*Pi(((((coth(Pi)/(1^4-0.5^4)+(2coth(2Pi))/(2^4-0.5^4)+(3coth(3Pi))/(3^4-0.5^4))))))

Input:

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)$$

coth(x) is the hyperbolic cotangent function

Result:

0.0314354...

0.0314354…

Alternative representations:

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)=1-4\pi\,0.5^4\left(\frac{i\cot(i\pi)}{-0.5^4+1^4}+\frac{2\,i\cot(2\,i\pi)}{-0.5^4+2^4}+\frac{3\,i\cot(3\,i\pi)}{-0.5^4+3^4}\right)$$

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)=1-4\pi\,0.5^4\left(-\frac{i\cot(-i\pi)}{-0.5^4+1^4}-\frac{2\,i\cot(-2\,i\pi)}{-0.5^4+2^4}-\frac{3\,i\cot(-3\,i\pi)}{-0.5^4+3^4}\right)$$

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)=1-4\pi\,0.5^4\left(\frac{1+\frac{2}{-1+e^{2\pi}}}{-0.5^4+1^4}+\frac{2\left(1+\frac{2}{-1+e^{4\pi}}\right)}{-0.5^4+2^4}+\frac{3\left(1+\frac{2}{-1+e^{6\pi}}\right)}{-0.5^4+3^4}\right)$$

Series representations:

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)=0.714558+\sum_{k=1}^{\infty}\left(-\frac{0.533333}{1+k^2}-\frac{0.12549}{4+k^2}-\frac{0.0555985}{9+k^2}\right)$$

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)=1+\sum_{k=-\infty}^{\infty}\frac{-10.2759-4.23311\,k^2-0.357211\,k^4}{36+49\,k^2+14\,k^4+k^6}$$

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)=0.714558+\sum_{k=-\infty}^{\infty}\left(\begin{cases}-\frac{(0.357211\,i)(5.16175-(4.6687\,i)k-k^2)}{(-3+i\,k)(-2+i\,k)(-1+i\,k)k} & k\neq 0\\ 0 & \text{otherwise}\end{cases}\right)$$

Integral representation:

$$1-0.5^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.5^4}+\frac{2\coth(2\pi)}{2^4-0.5^4}+\frac{3\coth(3\pi)}{3^4-0.5^4}\right)= 1+\int_{\frac{i\pi}{2}}^{3\pi}\frac{1}{-6+i}\pi\left((-0.0555985+0.00926641\,i)\operatorname{csch}^2(t)+(-0.12549+0.0313725\,i)\operatorname{csch}^2\left(\frac{-i\pi-4t+it}{-6+i}\right)+(-0.533333+0.266667\,i)\operatorname{csch}^2\left(\frac{-2i\pi-2t+it}{-6+i}\right)\right)dt$$

For x = 1/12 = 0.083..., we obtain:

(((1-0.083^4*4*Pi(((((coth(Pi)/(1^4-0.083^4)+(2coth(2Pi))/(2^4-0.083^4)+(3coth(3Pi))/(3^4-0.083^4)))))))))^16

Input:

$$\left(1-0.083^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-0.083^4}+\frac{2\coth(2\pi)}{2^4-0.083^4}+\frac{3\coth(3\pi)}{3^4-0.083^4}\right)\right)^{16}$$

coth(x) is the hyperbolic cotangent function

Result:

0.9889334...

0.9889334.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ**

For x = 12, we obtain:

1-12^4*4*Pi(((((coth(Pi)/(1^4-12^4)+(2coth(2Pi))/(2^4-12^4)+(3coth(3Pi))/(3^4-12^4))))))

Input:

$$1 - 12^4 \times 4\pi\left(\frac{\coth(\pi)}{1^4 - 12^4} + \frac{2\coth(2\pi)}{2^4 - 12^4} + \frac{3\coth(3\pi)}{3^4 - 12^4}\right)$$

$\coth(x)$ is the hyperbolic cotangent function

Exact result:

$$1 - 82\,944\,\pi\left(-\frac{\coth(\pi)}{20\,735} - \frac{\coth(2\pi)}{10\,360} - \frac{\coth(3\pi)}{6885}\right)$$

Decimal approximation:

76.613276863961154760338771815400691630170906113601422007 94...

76.6132768639…

Alternate forms:

$$\frac{1}{91\,296\,205}(91\,296\,205 + 365\,202\,432\,\pi\coth(\pi) + 730\,933\,632\,\pi\coth(2\pi) + 1\,099\,850\,752\,\pi\coth(3\pi))$$

$$1 + \frac{82\,944\,\pi\coth(\pi)}{20\,735} + \frac{10\,368\,\pi\coth(2\pi)}{1295} + \frac{1024}{85}\pi\coth(3\pi)$$

$$\frac{5\,370\,365 + 21\,482\,496\,\pi\coth(\pi) + 42\,996\,096\,\pi\coth(2\pi)}{5\,370\,365} + \frac{1024}{85}\pi\coth(3\pi)$$

Alternative representations:

$$1 - 12^4 \times 4\pi\left(\frac{\coth(\pi)}{1^4 - 12^4} + \frac{2\coth(2\pi)}{2^4 - 12^4} + \frac{3\coth(3\pi)}{3^4 - 12^4}\right) = 1 - 4\pi\,12^4\left(\frac{i\cot(i\pi)}{1^4 - 12^4} + \frac{2\,i\cot(2\,i\pi)}{2^4 - 12^4} + \frac{3\,i\cot(3\,i\pi)}{3^4 - 12^4}\right)$$

$$1 - 12^4 \times 4\pi\left(\frac{\coth(\pi)}{1^4 - 12^4} + \frac{2\coth(2\pi)}{2^4 - 12^4} + \frac{3\coth(3\pi)}{3^4 - 12^4}\right) = 1 - 4\pi\,12^4\left(-\frac{i\cot(-i\pi)}{1^4 - 12^4} - \frac{2\,i\cot(-2\,i\pi)}{2^4 - 12^4} - \frac{3\,i\cot(-3\,i\pi)}{3^4 - 12^4}\right)$$

$$1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)=$$
$$1-4\pi\,12^4\left(\frac{1+\frac{2}{-1+e^{2\pi}}}{1^4-12^4}+\frac{2\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2^4-12^4}+\frac{3\left(1+\frac{2}{-1+e^{6\pi}}\right)}{3^4-12^4}\right)$$

Series representations:

$$1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)=$$
$$1+\sum_{k=-\infty}^{\infty}\frac{768\,(51\,435\,289+46\,698\,002\,k^2+6\,675\,289\,k^4)}{91\,296\,205\,(1+k^2)(4+k^2)(9+k^2)}$$

$$1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)=$$
$$\frac{3\,565\,747\,111}{273\,888\,615}+\sum_{k=1}^{\infty}\left(\frac{165\,888}{20\,735\,(1+k^2)}+\frac{41\,472}{1295\,(4+k^2)}+\frac{6144}{85\,(9+k^2)}\right)$$

$$1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)=1+\frac{2\,195\,986\,816\,\pi}{91\,296\,205}+$$
$$\sum_{k=0}^{\infty}\frac{256\,e^{-6(1+k)\pi}\left(8\,592\,584+5\,710\,419\,e^{2(1+k)\pi}+2\,853\,144\,e^{4(1+k)\pi}\right)\pi}{91\,296\,205}$$

Integral representation:

$$1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)=$$
$$1+\int_{\frac{i\pi}{2}}^{3\pi}\left(-\frac{1024}{85}\pi\,\text{csch}^2(t)+\left(\frac{13}{37}-\frac{4i}{37}\right)\left(-\frac{82\,944\,\pi\,\text{csch}^2\left(\frac{\left(\frac{12}{37}+\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)}{\pi}\right)}{20\,735}-\left(\frac{93\,312}{6475}+\frac{20\,736\,i}{6475}\right)\pi\,\text{csch}^2\left(\frac{\left(\frac{4}{5}+\frac{2i}{5}\right)\left(\frac{i\pi^2}{2}+\left(\frac{25}{37}-\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)\right)}{\pi}\right)\right)\right)dt$$

8/5*(((1-12^4*4*Pi(((((coth(Pi)/(1^4-12^4)+(2coth(2Pi))/(2^4-12^4)+(3coth(3Pi))/(3^4-12^4)))))))))+Pi

Input:

$$\frac{8}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)+\pi$$

coth(x) is the hyperbolic cotangent function

Exact result:

$$\pi+\frac{8}{5}\left(1-82\,944\,\pi\left(-\frac{\coth(\pi)}{20\,735}-\frac{\coth(2\pi)}{10\,360}-\frac{\coth(3\pi)}{6885}\right)\right)$$

Decimal approximation:

125.72283563592764085500467828792060949247061918113738103360...

125.72283563…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternate forms:

$$\frac{8}{5}+\pi+\frac{663\,552\,\pi\coth(\pi)}{103\,675}+\frac{82\,944\,\pi\coth(2\pi)}{6475}+\frac{8192}{425}\pi\coth(3\pi)$$

$$\frac{1}{456\,481\,025}(730\,369\,640+456\,481\,025\,\pi+2\,921\,619\,456\,\pi\coth(\pi)+5\,847\,469\,056\,\pi\coth(2\pi)+8\,798\,806\,016\,\pi\coth(3\pi))$$

$$\frac{8}{5}+\pi\left(1+\frac{663\,552\coth(\pi)}{103\,675}+\frac{82\,944\coth(2\pi)}{6475}+\frac{8192}{425}\coth(3\pi)\right)$$

Alternative representations:

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi=\pi+\frac{8}{5}\left(1-4\pi\,12^4\left(\frac{i\cot(i\pi)}{1^4-12^4}+\frac{2\,i\cot(2\,i\pi)}{2^4-12^4}+\frac{3\,i\cot(3\,i\pi)}{3^4-12^4}\right)\right)$$

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi=\pi+\frac{8}{5}\left(1-4\pi\,12^4\left(-\frac{i\cot(-i\pi)}{1^4-12^4}-\frac{2\,i\cot(-2\,i\pi)}{2^4-12^4}-\frac{3\,i\cot(-3\,i\pi)}{3^4-12^4}\right)\right)$$

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi = \pi+\frac{8}{5}\left(1-4\pi\,12^4\left(\frac{1+\frac{2}{-1+e^{2\pi}}}{1^4-12^4}+\frac{2\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2^4-12^4}+\frac{3\left(1+\frac{2}{-1+e^{6\pi}}\right)}{3^4-12^4}\right)\right)$$

Series representations:

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi = \frac{8}{5}+\pi+\sum_{k=-\infty}^{\infty}\frac{6144\,(51\,435\,289+46\,698\,002\,k^2+6\,675\,289\,k^4)}{456\,481\,025\,(1+k^2)(4+k^2)(9+k^2)}$$

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi = \frac{28\,525\,976\,888}{1\,369\,443\,075}+\pi+\sum_{k=1}^{\infty}\left(\frac{1\,327\,104}{103\,675\,(1+k^2)}+\frac{331\,776}{6475\,(4+k^2)}+\frac{49\,152}{425\,(9+k^2)}\right)$$

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi = \frac{8}{5}+\frac{18\,024\,375\,553\,\pi}{456\,481\,025}+\sum_{k=0}^{\infty}\frac{2048\,e^{-6(1+k)\pi}\left(8\,592\,584+5\,710\,419\,e^{2(1+k)\pi}+2\,853\,144\,e^{4(1+k)\pi}\right)\pi}{456\,481\,025}$$

Integral representation:

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi = \frac{8}{5}+\pi+\int_{\frac{i\pi}{2}}^{3\pi}\left(-\frac{8192}{425}\pi\operatorname{csch}^2(t)+\left(\frac{13}{37}-\frac{4i}{37}\right)\left(-\frac{663\,552\,\pi\operatorname{csch}^2\left(\frac{\left(\frac{12}{37}+\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)}{\pi}\right)}{103\,675}-\left(\frac{746\,496}{32\,375}+\frac{165\,888\,i}{32\,375}\right)\pi\operatorname{csch}^2\left(\frac{\left(\frac{4}{5}+\frac{2i}{5}\right)\left(\frac{i\pi^2}{2}+\left(\frac{25}{37}-\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)\right)}{\pi}\right)\right)\right)dt$$

8/5*(((1-12^4*4*Pi(((((coth(Pi)/(1^4-12^4)+(2coth(2Pi))/(2^4-12^4)+(3coth(3Pi))/(3^4-12^4)))))))))+Pi+11+3

Where 11 and 3 are Lucas number (furthermore 11 is also the number of dimensions of M-Theory)

Input:

$$\frac{8}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)+\pi+11+3$$

coth(x) is the hyperbolic cotangent function

Exact result:

$$14+\pi+\frac{8}{5}\left(1-82\,944\,\pi\left(-\frac{\coth(\pi)}{20\,735}-\frac{\coth(2\pi)}{10\,360}-\frac{\coth(3\pi)}{6885}\right)\right)$$

Decimal approximation:

139.72283563592764085500467828792060949247061918113738 10336...

139.72283563…. result practically equal to the rest mass of Pion meson 139.57

Alternate forms:

$$\frac{78}{5}+\pi+\frac{663\,552\,\pi\coth(\pi)}{103\,675}+\frac{82\,944\,\pi\coth(2\pi)}{6475}+\frac{8192}{425}\pi\coth(3\pi)$$

$$\frac{1}{456\,481\,025}(7\,121\,103\,990+456\,481\,025\,\pi+2\,921\,619\,456\,\pi\coth(\pi)+5\,847\,469\,056\,\pi\coth(2\pi)+8\,798\,806\,016\,\pi\coth(3\pi))$$

$$\frac{78}{5}+\pi\left(1+\frac{663\,552\coth(\pi)}{103\,675}+\frac{82\,944\coth(2\pi)}{6475}+\frac{8192}{425}\coth(3\pi)\right)$$

Alternative representations:

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi+11+3=14+\pi+\frac{8}{5}\left(1-4\pi\,12^4\left(\frac{i\cot(i\pi)}{1^4-12^4}+\frac{2i\cot(2i\pi)}{2^4-12^4}+\frac{3i\cot(3i\pi)}{3^4-12^4}\right)\right)$$

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi+11+3=14+\pi+\frac{8}{5}\left(1-4\pi\,12^4\left(-\frac{i\cot(-i\pi)}{1^4-12^4}-\frac{2i\cot(-2i\pi)}{2^4-12^4}-\frac{3i\cot(-3i\pi)}{3^4-12^4}\right)\right)$$

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi+11+3 = 14+\pi+\frac{8}{5}\left(1-4\pi\,12^4\left(\frac{1+\frac{2}{-1+e^{2\pi}}}{1^4-12^4}+\frac{2\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2^4-12^4}+\frac{3\left(1+\frac{2}{-1+e^{6\pi}}\right)}{3^4-12^4}\right)\right)$$

Series representations:

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi+11+3 = \frac{78}{5}+\pi+\sum_{k=-\infty}^{\infty}\frac{6144\,(51\,435\,289+46\,698\,002\,k^2+6\,675\,289\,k^4)}{456\,481\,025\,(1+k^2)(4+k^2)(9+k^2)}$$

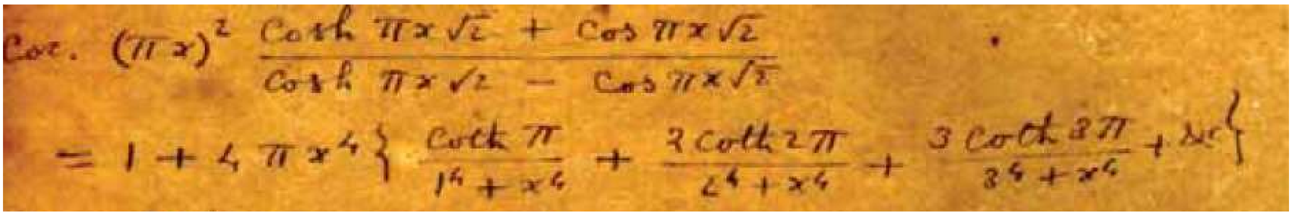
$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi+11+3 = \frac{47\,698\,179\,938}{1\,369\,443\,075}+\pi+\sum_{k=1}^{\infty}\left(\frac{1\,327\,104}{103\,675\,(1+k^2)}+\frac{331\,776}{6475\,(4+k^2)}+\frac{49\,152}{425\,(9+k^2)}\right)$$

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi+11+3 = \frac{78}{5}+\frac{18\,024\,375\,553\,\pi}{456\,481\,025}+\sum_{k=0}^{\infty}\frac{2048\,e^{-6(1+k)\pi}\left(8\,592\,584+5\,710\,419\,e^{2(1+k)\pi}+2\,853\,144\,e^{4(1+k)\pi}\right)\pi}{456\,481\,025}$$

Integral representation:

$$\frac{1}{5}\left(1-12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4-12^4}+\frac{2\coth(2\pi)}{2^4-12^4}+\frac{3\coth(3\pi)}{3^4-12^4}\right)\right)8+\pi+11+3 = \frac{78}{5}+\pi+\int_{\frac{i\pi}{2}}^{3\pi}\left(-\frac{8192}{425}\pi\operatorname{csch}^2(t)+\left(\frac{13}{37}-\frac{4i}{37}\right)\left(-\frac{663\,552\,\pi\operatorname{csch}^2\left(\frac{\left(\frac{12}{37}+\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)}{\pi}\right)}{103\,675}-\left(\frac{746\,496}{32\,375}+\frac{165\,888\,i}{32\,375}\right)\pi\operatorname{csch}^2\left(\frac{\left(\frac{4}{5}+\frac{2i}{5}\right)\left(\frac{i\pi^2}{2}+\left(\frac{25}{37}-\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)\right)}{\pi}\right)\right)\right)dt$$

Now, we have that:


$$\text{Cor. } (\pi x)^2 \frac{\cosh \pi x\sqrt{2} + \cos \pi x\sqrt{2}}{\cosh \pi x\sqrt{2} - \cos \pi x\sqrt{2}} = 1 + 4\pi x^4 \left\{ \frac{\coth \pi}{1^4+x^4} + \frac{2\coth 2\pi}{2^4+x^4} + \frac{3\coth 3\pi}{3^4+x^4} + \&c \right\}$$

1+12^4*4*Pi(((((coth(Pi)/(1^4+12^4)+(2coth(2Pi))/(2^4+12^4)+(3coth(3Pi))/(3^4+12^4))))))

Input:

$$1 + 12^4 \times 4\pi \left(\frac{\coth(\pi)}{1^4 + 12^4} + \frac{2\coth(2\pi)}{2^4 + 12^4} + \frac{3\coth(3\pi)}{3^4 + 12^4} \right)$$

coth(x) is the hyperbolic cotangent function

Exact result:

$$1 + 82\,944\,\pi \left(\frac{\coth(\pi)}{20\,737} + \frac{\coth(2\pi)}{10\,376} + \frac{\coth(3\pi)}{6939} \right)$$

Decimal approximation:

76.278746097118779537124824782449155180161782037600897142 70...

76.278746097….

Alternate forms:

$$\frac{1}{6\,912\,243\,473} (6\,912\,243\,473 + 27\,647\,640\,576\,\pi \coth(\pi) + 55\,255\,312\,512\,\pi \coth(2\pi) + 82\,624\,171\,008\,\pi \coth(3\pi))$$

$$1 + \frac{82\,944\,\pi \coth(\pi)}{20\,737} + \frac{10\,368\,\pi \coth(2\pi)}{1297} + \frac{3072}{257}\pi \coth(3\pi)$$

$$\frac{26\,895\,889 + 107\,578\,368\,\pi \coth(\pi) + 215\,001\,216\,\pi \coth(2\pi)}{26\,895\,889} + \frac{3072}{257}\pi \coth(3\pi)$$

Alternative representations:

$$1 + 12^4 \times 4\pi \left(\frac{\coth(\pi)}{1^4 + 12^4} + \frac{2\coth(2\pi)}{2^4 + 12^4} + \frac{3\coth(3\pi)}{3^4 + 12^4} \right) = 1 + 4\pi\, 12^4 \left(\frac{i\cot(i\pi)}{1^4 + 12^4} + \frac{2\, i\cot(2\, i\pi)}{2^4 + 12^4} + \frac{3\, i\cot(3\, i\pi)}{3^4 + 12^4} \right)$$

$$1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)= 1+4\pi\,12^4\left(-\frac{i\cot(-i\pi)}{1^4+12^4}-\frac{2i\cot(-2i\pi)}{2^4+12^4}-\frac{3i\cot(-3i\pi)}{3^4+12^4}\right)$$

$$1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)= 1+4\pi\,12^4\left(\frac{1+\frac{2}{-1+e^{2\pi}}}{1^4+12^4}+\frac{2\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2^4+12^4}+\frac{3\left(1+\frac{2}{-1+e^{6\pi}}\right)}{3^4+12^4}\right)$$

Series representations:

$$1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)= 1+\sum_{k=-\infty}^{\infty}\left(\frac{82\,944}{20\,737(1+k^2)}+\frac{20\,736}{1297(4+k^2)}+\frac{9216}{257(9+k^2)}\right)$$

$$1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)= \frac{89\,728\,930\,641}{6\,912\,243\,473}+\sum_{k=1}^{\infty}\left(\frac{165\,888}{20\,737(1+k^2)}+\frac{41\,472}{1297(4+k^2)}+\frac{18\,432}{257(9+k^2)}\right)$$

$$1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)=1+\frac{165\,527\,124\,096\,\pi}{6\,912\,243\,473}+ \sum_{k=0}^{\infty}\left(\frac{6144}{257}e^{-6(1+k)\pi}\pi+\frac{20\,736\,e^{-4(1+k)\pi}\pi}{1297}+\frac{165\,888\,e^{-2(1+k)\pi}\pi}{20\,737}\right)$$

Integral representation:

$$1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)= 1+\int_{\frac{i\pi}{2}}^{3\pi}\left(-\frac{3072}{257}\pi\,\operatorname{csch}^2(t)+\left(\frac{13}{37}-\frac{4i}{37}\right)\left(-\frac{82\,944\,\pi\,\operatorname{csch}^2\left(\frac{\left(\frac{12}{37}+\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)}{\pi}\right)}{20\,737}-\left(\frac{93\,312}{6485}+\frac{20\,736\,i}{6485}\right)\pi\,\operatorname{csch}^2\left(\frac{\left(\frac{4}{5}+\frac{2i}{5}\right)\left(\frac{i\pi^2}{2}+\left(\frac{25}{37}-\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)\right)}{\pi}\right)\right)\right)dt$$

((((1+12^4*4*Pi(((((coth(Pi)/(1^4+12^4)+(2coth(2Pi))/(2^4+12^4)+(3coth(3Pi))/(3^4+12^4)))))))))+47+golden ratio

Where 47 is a Lucas number

Input:

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi$$

$\coth(x)$ is the hyperbolic cotangent function

ϕ is the golden ratio

Exact result:

$$\phi+48+82\,944\,\pi\left(\frac{\coth(\pi)}{20\,737}+\frac{\coth(2\pi)}{10\,376}+\frac{\coth(3\pi)}{6939}\right)$$

Decimal approximation:

124.89678008586867438532941161681479329788209121740666000048...

124.89678008586…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternate forms:

$$\frac{1}{13\,824\,486\,946}\left(670\,487\,616\,881+6\,912\,243\,473\sqrt{5}+55\,295\,281\,152\,\pi\coth(\pi)+110\,510\,625\,024\,\pi\coth(2\pi)+165\,248\,342\,016\,\pi\coth(3\pi)\right)$$

$$\frac{97}{2}+\frac{\sqrt{5}}{2}+\frac{82\,944\,\pi\coth(\pi)}{20\,737}+\frac{10\,368\,\pi\coth(2\pi)}{1297}+\frac{3072}{257}\pi\coth(3\pi)$$

$$\frac{1}{2}\left(97+\sqrt{5}\right)+\frac{384\,\pi\,(71\,999\,064\coth(\pi)+143\,894\,043\coth(2\pi)+215\,167\,112\coth(3\pi))}{6\,912\,243\,473}$$

Alternative representations:

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi=$$
$$48+\phi+4\pi\,12^4\left(\frac{i\cot(i\pi)}{1^4+12^4}+\frac{2\,i\cot(2\,i\pi)}{2^4+12^4}+\frac{3\,i\cot(3\,i\pi)}{3^4+12^4}\right)$$

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi = 48+\phi+4\pi\,12^4\left(-\frac{i\cot(-i\pi)}{1^4+12^4}-\frac{2\,i\cot(-2\,i\pi)}{2^4+12^4}-\frac{3\,i\cot(-3\,i\pi)}{3^4+12^4}\right)$$

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi = 48+\phi+4\pi\,12^4\left(\frac{1+\frac{2}{-1+e^{2\pi}}}{1^4+12^4}+\frac{2\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2^4+12^4}+\frac{3\left(1+\frac{2}{-1+e^{6\pi}}\right)}{3^4+12^4}\right)$$

Series representations:

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi = 48+\phi+\sum_{k=-\infty}^{\infty}\frac{2304\left(1\,294\,010\,737+1\,173\,562\,562\,k^2+167\,548\,081\,k^4\right)}{6\,912\,243\,473\left(1+k^2\right)\left(4+k^2\right)\left(9+k^2\right)}$$

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi = \frac{414\,604\,373\,872}{6\,912\,243\,473}+\phi+\sum_{k=1}^{\infty}\left(\frac{165\,888}{20\,737\left(1+k^2\right)}+\frac{41\,472}{1297\left(4+k^2\right)}+\frac{18\,432}{257\left(9+k^2\right)}\right)$$

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi = 48+\phi+\frac{165\,527\,124\,096\,\pi}{6\,912\,243\,473}+\sum_{k=0}^{\infty}\left(\frac{6144}{257}\,e^{-6(1+k)\pi}\,\pi+\frac{20\,736\,e^{-4(1+k)\pi}\,\pi}{1297}+\frac{165\,888\,e^{-2(1+k)\pi}\,\pi}{20\,737}\right)$$

Integral representation:

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)+47+\phi =$$

$$48+\phi+\int_{\frac{i\pi}{2}}^{3\pi}\left(-\frac{3072}{257}\pi\operatorname{csch}^2(t)+\left(\frac{13}{37}-\frac{4i}{37}\right)\left(-\frac{82944\pi\operatorname{csch}^2\left(\frac{\left(\frac{12}{37}+\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)}{\pi}\right)}{20737}-\left(\frac{93312}{6485}+\frac{20736i}{6485}\right)\pi\operatorname{csch}^2\left(\frac{\left(\frac{4}{5}+\frac{2i}{5}\right)\left(\frac{i\pi^2}{2}+\left(\frac{25}{37}-\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)\right)}{\pi}\right)\right)\right)dt$$

((((1+12^4*4*Pi(((((coth(Pi)/(1^4+12^4)+(2coth(2Pi))/(2^4+12^4)+(3coth(3Pi))/(3^4+12^4)))))))))*2-13

Where 13 is a Fibonacci number

Input:

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)\times 2-13$$

$\coth(x)$ is the hyperbolic cotangent function

Exact result:

$$2\left(1+82944\pi\left(\frac{\coth(\pi)}{20737}+\frac{\coth(2\pi)}{10376}+\frac{\coth(3\pi)}{6939}\right)\right)-13$$

Decimal approximation:

139.5574921942375590742496495648983103603235640752017942854...

139.557492…. result practically equal to the rest mass of Pion meson 139.57

Alternate forms:

$$\frac{1}{6912243473}(-76034678203+55295281152\pi\coth(\pi)+110510625024\pi\coth(2\pi)+165248342016\pi\coth(3\pi))$$

$$-11+\frac{165\,888\,\pi\coth(\pi)}{20\,737}+\frac{20\,736\,\pi\coth(2\,\pi)}{1297}+\frac{6144}{257}\,\pi\coth(3\,\pi)$$

$$\frac{-295\,854\,779+215\,156\,736\,\pi\coth(\pi)+430\,002\,432\,\pi\coth(2\,\pi)}{26\,895\,889}+\frac{6144}{257}\,\pi\coth(3\,\pi)$$

Alternative representations:

$$\left(1+12^4\times 4\,\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\,\pi)}{2^4+12^4}+\frac{3\coth(3\,\pi)}{3^4+12^4}\right)\right)2-13=$$
$$-13+2\left(1+4\,\pi\,12^4\left(\frac{i\cot(i\,\pi)}{1^4+12^4}+\frac{2\,i\cot(2\,i\,\pi)}{2^4+12^4}+\frac{3\,i\cot(3\,i\,\pi)}{3^4+12^4}\right)\right)$$

$$\left(1+12^4\times 4\,\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\,\pi)}{2^4+12^4}+\frac{3\coth(3\,\pi)}{3^4+12^4}\right)\right)2-13=$$
$$-13+2\left(1+4\,\pi\,12^4\left(-\frac{i\cot(-i\,\pi)}{1^4+12^4}-\frac{2\,i\cot(-2\,i\,\pi)}{2^4+12^4}-\frac{3\,i\cot(-3\,i\,\pi)}{3^4+12^4}\right)\right)$$

$$\left(1+12^4\times 4\,\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\,\pi)}{2^4+12^4}+\frac{3\coth(3\,\pi)}{3^4+12^4}\right)\right)2-13=$$
$$-13+2\left(1+4\,\pi\,12^4\left(\frac{1+\frac{2}{-1+e^{2\pi}}}{1^4+12^4}+\frac{2\left(1+\frac{2}{-1+e^{4\pi}}\right)}{2^4+12^4}+\frac{3\left(1+\frac{2}{-1+e^{6\pi}}\right)}{3^4+12^4}\right)\right)$$

Series representations:

$$\left(1+12^4\times 4\,\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\,\pi)}{2^4+12^4}+\frac{3\coth(3\,\pi)}{3^4+12^4}\right)\right)2-13=$$
$$-11+\sum_{k=-\infty}^{\infty}\left(\frac{165\,888}{20\,737\,(1+k^2)}+\frac{41\,472}{1297\,(4+k^2)}+\frac{18\,432}{257\,(9+k^2)}\right)$$

$$\left(1+12^4\times 4\,\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\,\pi)}{2^4+12^4}+\frac{3\coth(3\,\pi)}{3^4+12^4}\right)\right)2-13=$$
$$\frac{89\,598\,696\,133}{6\,912\,243\,473}+\sum_{k=1}^{\infty}\left(\frac{331\,776}{20\,737\,(1+k^2)}+\frac{82\,944}{1297\,(4+k^2)}+\frac{36\,864}{257\,(9+k^2)}\right)$$

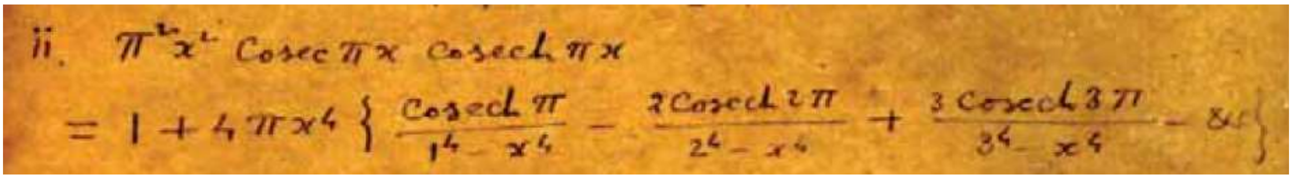
$$\left(1+12^4\times 4\,\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\,\pi)}{2^4+12^4}+\frac{3\coth(3\,\pi)}{3^4+12^4}\right)\right)2-13=$$
$$-11+\frac{331\,054\,248\,192\,\pi}{6\,912\,243\,473}+$$
$$\sum_{k=0}^{\infty}\left(\frac{12\,288}{257}\,e^{-6(1+k)\pi}\,\pi+\frac{41\,472\,e^{-4(1+k)\pi}\,\pi}{1297}+\frac{331\,776\,e^{-2(1+k)\pi}\,\pi}{20\,737}\right)$$

Integral representation:

$$\left(1+12^4\times 4\pi\left(\frac{\coth(\pi)}{1^4+12^4}+\frac{2\coth(2\pi)}{2^4+12^4}+\frac{3\coth(3\pi)}{3^4+12^4}\right)\right)2-13=$$

$$-11+\int_{\frac{i\pi}{2}}^{3\pi}\left(-\frac{6144}{257}\pi\operatorname{csch}^2(t)+\left(\frac{13}{37}-\frac{4i}{37}\right)\left(-\frac{165\,888\,\pi\operatorname{csch}^2\left(\frac{\left(\frac{12}{37}+\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)}{\pi}\right)}{20\,737}-\left(\frac{186\,624}{6485}+\frac{41\,472\,i}{6485}\right)\pi\operatorname{csch}^2\left(\frac{\left(\frac{4}{5}+\frac{2i}{5}\right)\left(\frac{i\pi^2}{2}+\left(\frac{25}{37}-\frac{2i}{37}\right)\left(-i\pi^2-\left(1-\frac{i}{2}\right)\pi t\right)\right)}{\pi}\right)\right)\right)dt$$

And:



1+12^4*4*Pi(((((cosech(Pi)/(1^4-12^4)-(2cosech(2Pi))/(2^4-12^4)+(3cosech(3Pi))/(3^4-12^4))))))

Input:

$$1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)$$

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

Exact result:

$$1+82\,944\,\pi\left(-\frac{\operatorname{csch}(\pi)}{20\,735}+\frac{\operatorname{csch}(2\pi)}{10\,360}-\frac{\operatorname{csch}(3\pi)}{6885}\right)$$

Decimal approximation:

−0.000336436347395678996981558119733954434376402619348558 99...

-0.000336436347…

Alternate forms:

$$\frac{1}{91\,296\,205}(91\,296\,205 - 365\,202\,432\,\pi\,\text{csch}(\pi) + 730\,933\,632\,\pi\,\text{csch}(2\,\pi) - 1\,099\,850\,752\,\pi\,\text{csch}(3\,\pi))$$

$$1 - \frac{82\,944\,\pi\,\text{csch}(\pi)}{20\,735} + \frac{10\,368\,\pi\,\text{csch}(2\,\pi)}{1295} - \frac{1024}{85}\,\pi\,\text{csch}(3\,\pi)$$

$$\frac{5\,370\,365 - 21\,482\,496\,\pi\,\text{csch}(\pi) + 42\,996\,096\,\pi\,\text{csch}(2\,\pi)}{5\,370\,365} - \frac{1024}{85}\,\pi\,\text{csch}(3\,\pi)$$

Alternative representations:

$$1 + 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4 - 12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4 - 12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4 - 12^4}\right) = 1 + 4\,\pi\,12^4\left(\frac{i\,\text{csc}(i\,\pi)}{1^4 - 12^4} - \frac{2\,i\,\text{csc}(2\,i\,\pi)}{2^4 - 12^4} + \frac{3\,i\,\text{csc}(3\,i\,\pi)}{3^4 - 12^4}\right)$$

$$1 + 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4 - 12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4 - 12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4 - 12^4}\right) = 1 + 4\,\pi\,12^4\left(-\frac{i\,\text{csc}(-i\,\pi)}{1^4 - 12^4} + \frac{2\,i\,\text{csc}(-2\,i\,\pi)}{2^4 - 12^4} - \frac{3\,i\,\text{csc}(-3\,i\,\pi)}{3^4 - 12^4}\right)$$

$$1 + 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4 - 12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4 - 12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4 - 12^4}\right) = 1 + 4\,\pi\,12^4\left(\frac{2\,e^{\pi}}{(1^4 - 12^4)(-1 + e^{2\,\pi})} - \frac{4\,e^{2\,\pi}}{(2^4 - 12^4)(-1 + e^{4\,\pi})} + \frac{6\,e^{3\,\pi}}{(3^4 - 12^4)(-1 + e^{6\,\pi})}\right)$$

Series representations:

$$1 + 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4 - 12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4 - 12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4 - 12^4}\right) = 1 + \sum_{k=-\infty}^{\infty} -\frac{768\,(-1)^k\,(17\,172\,775 + 8\,628\,542\,k^2 + 2\,868\,343\,k^4)}{91\,296\,205\,(1 + k^2)(4 + k^2)(9 + k^2)}$$

$$1 + 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4 - 12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4 - 12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4 - 12^4}\right) = -\frac{165\,033\,797}{54\,777\,723} + \sum_{k=1}^{\infty} \frac{1536\,(-1)^k\left(-\frac{475\,524}{1+k^2} + \frac{1\,903\,473}{4+k^2} - \frac{4\,296\,292}{9+k^2}\right)}{91\,296\,205}$$

$$1 + 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4 - 12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4 - 12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4 - 12^4}\right) = 1 + \sum_{k=0}^{\infty} -\frac{256\,e^{-3(\pi + 2\,k\,\pi)}\left(8\,592\,584 - 5\,710\,419\,e^{\pi + 2\,k\,\pi} + 2\,853\,144\,e^{2\,\pi + 4\,k\,\pi}\right)\pi}{91\,296\,205}$$

-1/(((((1+12^4*4*Pi(((((cosech(Pi)/(1^4-12^4)-(2cosech(2Pi))/(2^4-12^4)+(3cosech(3Pi))/(3^4-12^4))))))))))+11

Where 11 is a Lucas number and the number of dimensions of M-Theory

Input:

$$-\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11$$

csch(x) is the hyperbolic cosecant function

Exact result:

$$11-\frac{1}{1+82\,944\,\pi\left(-\frac{\operatorname{csch}(\pi)}{20\,735}+\frac{\operatorname{csch}(2\pi)}{10\,360}-\frac{\operatorname{csch}(3\pi)}{6885}\right)}$$

Decimal approximation:

2983.330450443011345236626372998106078723434944496179850604...

2983.330450443… result very near to the rest mass of Charmed eta meson 2980.3

Alternate forms:

$$11+91\,296\,205/(-91\,296\,205+365\,202\,432\,\pi\operatorname{csch}(\pi)-730\,933\,632\,\pi\operatorname{csch}(2\pi)+1\,099\,850\,752\,\pi\operatorname{csch}(3\pi))$$

$$11-\frac{1}{1+82\,944\,\pi\left(\operatorname{csch}(\pi)\left(\frac{\operatorname{sech}(\pi)}{20\,720}-\frac{1}{20\,735}\right)-\frac{\operatorname{csch}(3\pi)}{6885}\right)}$$

$$11-\frac{1}{1-\frac{82944\,\pi\operatorname{csch}(\pi)}{20\,735}-\frac{1024\,\pi}{85\left(\sinh^3(\pi)+3\sinh(\pi)\cosh^2(\pi)\right)}+\frac{5184\,\pi\operatorname{csch}(\pi)\operatorname{sech}(\pi)}{1295}}$$

Alternative representations:

$$-\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11=$$
$$11-\frac{1}{1+4\pi\,12^4\left(\frac{i\csc(i\pi)}{1^4-12^4}-\frac{2i\csc(2i\pi)}{2^4-12^4}+\frac{3i\csc(3i\pi)}{3^4-12^4}\right)}$$

$$-\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11=$$
$$11-\frac{1}{1+4\pi\,12^4\left(-\frac{i\csc(-i\pi)}{1^4-12^4}+\frac{2i\csc(-2i\pi)}{2^4-12^4}-\frac{3i\csc(-3i\pi)}{3^4-12^4}\right)}$$

$$-\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11 =$$
$$11-\frac{1}{1+4\pi\,12^4\left(\frac{2e^{\pi}}{(1^4-12^4)(-1+e^{2\pi})}-\frac{4e^{2\pi}}{(2^4-12^4)(-1+e^{4\pi})}+\frac{6e^{3\pi}}{(3^4-12^4)(-1+e^{6\pi})}\right)}$$

Series representations:

$$-\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11 =$$
$$11-\frac{1}{1+82\,944\,\pi\sum_{k=-\infty}^{\infty}-\frac{(-1)^k\left(17\,172\,775+8\,628\,542\,k^2+2\,868\,343\,k^4\right)}{9\,859\,990\,140\,(1+k^2)(4+k^2)(9+k^2)\pi}}$$

$$-\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11 =$$
$$11-\frac{1}{1+82\,944\,\pi\sum_{k=0}^{\infty}\left(-\frac{2e^{-3\pi-6k\pi}}{6885}+\frac{e^{-2\pi-4k\pi}}{5180}-\frac{2e^{-\pi-2k\pi}}{20\,735}\right)}$$

$$-\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11 =$$
$$11-1\Bigg/\left(1+82\,944\,\pi\sum_{k=0}^{\infty}-\left(\left(\left(\operatorname{Li}_{-k}(-e^{z_0})-\operatorname{Li}_{-k}(e^{z_0})\right)\left(2\,853\,144\,(\pi-z_0)^k-5\,710\,419\,(2\pi-z_0)^k+8\,592\,584\,(3\pi-z_0)^k\right)\right)\Big/(59\,159\,940\,840\,k!)\right)\right) \quad \text{for } \frac{i z_0}{\pi}\notin\mathbb{Z}$$

-1/24* 1/(((((1+12^4*4*Pi(((((cosech(Pi)/(1^4-12^4)-(2cosech(2Pi))/(2^4-12^4)+(3cosech(3Pi))/(3^4-12^4))))))))))+11

Where 11 is a Lucas number and the number of dimensions of M-Theory and 24 can be identified with the number of the transverse degrees of freedom in the bosonic string

Input:

$$-\frac{1}{24}\times\frac{1}{1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)}+11$$

csch(x) is the hyperbolic cosecant function

Exact result:

$$11-\frac{1}{24\left(1+82\,944\,\pi\left(-\frac{\operatorname{csch}(\pi)}{20\,735}+\frac{\operatorname{csch}(2\pi)}{10\,360}-\frac{\operatorname{csch}(3\pi)}{6885}\right)\right)}$$

Decimal approximation:

134.8471021017921393848594322082544199468097893540074937751...

134.847102101… result practically equal to the rest mass of Pion meson 134.9766

Alternate forms:

$$11+91\,296\,205/(24(-91\,296\,205+365\,202\,432\,\pi\operatorname{csch}(\pi)-730\,933\,632\,\pi\operatorname{csch}(2\pi)+1\,099\,850\,752\,\pi\operatorname{csch}(3\pi)))$$

$$11-\frac{1}{24\left(1+82\,944\,\pi\left(\operatorname{csch}(\pi)\left(\frac{\operatorname{sech}(\pi)}{20\,720}-\frac{1}{20\,735}\right)-\frac{\operatorname{csch}(3\pi)}{6885}\right)\right)}$$

$$11-\frac{1}{24\left(1-\frac{82944\,\pi\operatorname{csch}(\pi)}{20\,735}-\frac{1024\,\pi}{85\left(\sinh^3(\pi)+3\sinh(\pi)\cosh^2(\pi)\right)}+\frac{5184\,\pi\operatorname{csch}(\pi)\operatorname{sech}(\pi)}{1295}\right)}$$

Alternative representations:

$$-\frac{1}{\left(1+12^4\times4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)\right)24}+11=11-\frac{1}{24\left(1+4\pi\,12^4\left(\frac{i\csc(i\pi)}{1^4-12^4}-\frac{2i\csc(2i\pi)}{2^4-12^4}+\frac{3i\csc(3i\pi)}{3^4-12^4}\right)\right)}$$

$$-\frac{1}{\left(1+12^4\times4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)\right)24}+11=11-\frac{1}{24\left(1+4\pi\,12^4\left(-\frac{i\csc(-i\pi)}{1^4-12^4}+\frac{2i\csc(-2i\pi)}{2^4-12^4}-\frac{3i\csc(-3i\pi)}{3^4-12^4}\right)\right)}$$

$$-\frac{1}{\left(1+12^4\times4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)\right)24}+11=11-\frac{1}{24\left(1+4\pi\,12^4\left(\frac{2e^{\pi}}{(1^4-12^4)(-1+e^{2\pi})}-\frac{4e^{2\pi}}{(2^4-12^4)(-1+e^{4\pi})}+\frac{6e^{3\pi}}{(3^4-12^4)(-1+e^{6\pi})}\right)\right)}$$

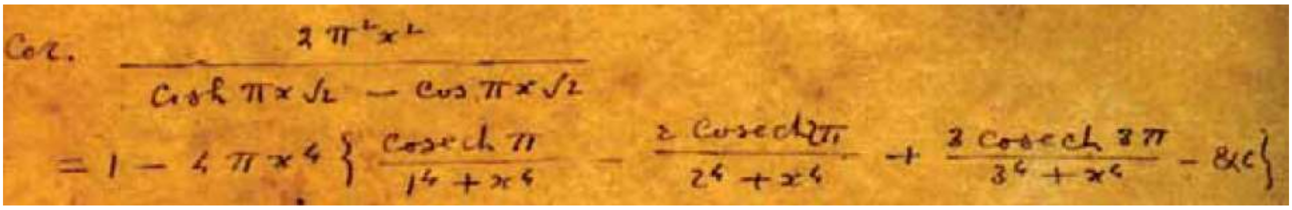
Series representations:

$$-\frac{1}{\left(1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)\right)24}+11 = 11+\frac{91\,296\,205}{8\left(825\,168\,985+\sum_{k=1}^{\infty}\frac{4608(-1)^k\left(17\,172\,775+8\,628\,542\,k^2+2\,868\,343\,k^4\right)}{(1+k^2)(4+k^2)(9+k^2)}\right)}$$

$$-\frac{1}{\left(1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)\right)24}+11 = 11-\frac{1}{24\left(1+82\,944\,\pi\sum_{k=-\infty}^{\infty}-\frac{(-1)^k\left(17\,172\,775+8\,628\,542\,k^2+2\,868\,343\,k^4\right)}{9\,859\,990\,140\,(1+k^2)(4+k^2)(9+k^2)\pi}\right)}$$

$$-\frac{1}{\left(1+12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4-12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4-12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4-12^4}\right)\right)24}+11 = 11-\frac{1}{24\left(1+82\,944\,\pi\sum_{k=0}^{\infty}\left(-\frac{2e^{-3\pi-6k\pi}}{6885}+\frac{e^{-2\pi-4k\pi}}{5180}-\frac{2e^{-\pi-2k\pi}}{20\,735}\right)\right)}$$

And:


Cor. $\frac{2\pi^2x^2}{\cosh \pi x\sqrt{2} - \cos \pi x\sqrt{2}}$
$= 1 - 4\pi x^4 \left\{ \frac{\operatorname{cosech} \pi}{1^4+x^4} - \frac{2\operatorname{cosech} 2\pi}{2^4+x^4} + \frac{3\operatorname{cosech} 3\pi}{3^4+x^4} - \&c \right\}$

1-12^4*4*Pi(((((cosech(Pi)/(1^4+12^4)-(2cosech(2Pi))/(2^4+12^4)+(3cosech(3Pi))/(3^4+12^4))))))

Input:

$$1-12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4+12^4}\right)$$

csch(x) is the hyperbolic cosecant function

Exact result:

$$1-82\,944\,\pi\left(\frac{\operatorname{csch}(\pi)}{20\,737}-\frac{\operatorname{csch}(2\pi)}{10\,376}+\frac{\operatorname{csch}(3\pi)}{6939}\right)$$

Decimal approximation:

-0.00032880867775530301888073140480179229202636145261724743...

-0.000328808677…

Alternate forms:

$$\frac{1}{6912243473}(6912243473 - 27647640576\,\pi\,\text{csch}(\pi) + 55255312512\,\pi\,\text{csch}(2\,\pi) - 82624171008\,\pi\,\text{csch}(3\,\pi))$$

$$1 - \frac{82944\,\pi\,\text{csch}(\pi)}{20737} + \frac{10368\,\pi\,\text{csch}(2\,\pi)}{1297} - \frac{3072}{257}\,\pi\,\text{csch}(3\,\pi)$$

$$\frac{26895889 - 107578368\,\pi\,\text{csch}(\pi) + 215001216\,\pi\,\text{csch}(2\,\pi)}{26895889} - \frac{3072}{257}\,\pi\,\text{csch}(3\,\pi)$$

Alternative representations:

$$1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right) = 1 - 4\,\pi\,12^4\left(\frac{i\,\text{csc}(i\,\pi)}{1^4+12^4} - \frac{2\,i\,\text{csc}(2\,i\,\pi)}{2^4+12^4} + \frac{3\,i\,\text{csc}(3\,i\,\pi)}{3^4+12^4}\right)$$

$$1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right) = 1 - 4\,\pi\,12^4\left(-\frac{i\,\text{csc}(-i\,\pi)}{1^4+12^4} + \frac{2\,i\,\text{csc}(-2\,i\,\pi)}{2^4+12^4} - \frac{3\,i\,\text{csc}(-3\,i\,\pi)}{3^4+12^4}\right)$$

$$1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right) = 1 - 4\,\pi\,12^4\left(\frac{2\,e^{\pi}}{(1^4+12^4)(-1+e^{2\,\pi})} - \frac{4\,e^{2\,\pi}}{(2^4+12^4)(-1+e^{4\,\pi})} + \frac{6\,e^{3\,\pi}}{(3^4+12^4)(-1+e^{6\,\pi})}\right)$$

Series representations:

$$1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right) = 1 + \sum_{k=-\infty}^{\infty}\left(-\frac{82944\,(-1)^k}{20737\,(1+k^2)} + \frac{20736\,(-1)^k}{1297\,(4+k^2)} - \frac{9216\,(-1)^k}{257\,(9+k^2)}\right)$$

$$1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right) = -\frac{20649131183}{6912243473} + \sum_{k=1}^{\infty}\left(-\frac{165888\,(-1)^k}{20737\,(1+k^2)} + \frac{41472\,(-1)^k}{1297\,(4+k^2)} - \frac{18432\,(-1)^k}{257\,(9+k^2)}\right)$$

$$1-12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4+12^4}\right)=$$
$$1+\sum_{k=0}^{\infty}\left(-\frac{6144}{257}e^{-3\pi-6k\pi}\pi+\frac{20736\,e^{-2\pi-4k\pi}\pi}{1297}-\frac{165888\,e^{-\pi-2k\pi}\pi}{20737}\right)$$

-1/((((1-12^4*4*Pi(((((cosech(Pi)/(1^4+12^4)-(2cosech(2Pi))/(2^4+12^4)+(3cosech(3Pi))/(3^4+12^4)))))))))+47+7+golden ratio

Input:

$$-\frac{1}{1-12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4+12^4}\right)}+47+7+\phi$$

csch(x) is the hyperbolic cosecant function

ϕ is the golden ratio

Exact result:

$$\phi+54-\frac{1}{1-82944\pi\left(\frac{\operatorname{csch}(\pi)}{20737}-\frac{\operatorname{csch}(2\pi)}{10376}+\frac{\operatorname{csch}(3\pi)}{6939}\right)}$$

Decimal approximation:

3096.900298273126807801702180739848133876304011281727955975...

3096.90029827… result practically equal to the rest mass of J/Psi meson 3096.916

Alternate forms:

$$\phi+54-\frac{1}{1-82944\pi\left(\frac{\operatorname{csch}(3\pi)}{6939}+\operatorname{csch}(\pi)\left(\frac{1}{20737}-\frac{\operatorname{sech}(\pi)}{20752}\right)\right)}$$

$$\frac{1}{2}\left(109+\sqrt{5}\right)+6912243473/(-6912243473+27647640576\,\pi\operatorname{csch}(\pi)-55255312512\,\pi\operatorname{csch}(2\pi)+82624171008\,\pi\operatorname{csch}(3\pi))$$

$$54+\phi-\frac{1}{1-82944\pi\left(\frac{1}{20737\sinh(\pi)}-\frac{1}{10376\sinh(2\pi)}+\frac{1}{6939\sinh(3\pi)}\right)}\quad (2)$$

Alternative representations:

$$-\frac{1}{1-12^4\times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4+12^4}\right)}+47+7+\phi=$$
$$54+\phi-\frac{1}{1-4\pi\,12^4\left(\frac{i\csc(i\pi)}{1^4+12^4}-\frac{2i\csc(2i\pi)}{2^4+12^4}+\frac{3i\csc(3i\pi)}{3^4+12^4}\right)}$$

$$-\frac{1}{1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)}+47+7+\phi = 54+\phi-\frac{1}{1-4\pi\,12^4\left(-\frac{i\csc(-i\pi)}{1^4+12^4}+\frac{2\,i\csc(-2\,i\pi)}{2^4+12^4}-\frac{3\,i\csc(-3\,i\pi)}{3^4+12^4}\right)}$$

$$-\frac{1}{1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)}+47+7+\phi = 54+\phi-\frac{1}{1-4\pi\,12^4\left(\frac{2e^{\pi}}{(1^4+12^4)(-1+e^{2\pi})}-\frac{4e^{2\pi}}{(2^4+12^4)(-1+e^{4\pi})}+\frac{6e^{3\pi}}{(3^4+12^4)(-1+e^{6\pi})}\right)}$$

Series representations:

$$-\frac{1}{1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)}+47+7+\phi = 54+\phi-\frac{1}{1-82\,944\,\pi\sum_{k=-\infty}^{\infty}\frac{(-1)^k\left(430\,646\,479+214\,268\,942\,k^2+71\,618\,719\,k^4\right)}{248\,840\,765\,028\,(1+k^2)(4+k^2)(9+k^2)\,\pi}}$$

$$-\frac{1}{1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)}+47+7+\phi = 54+\phi-\frac{1}{1-82\,944\,\pi\sum_{k=0}^{\infty}\left(\frac{2e^{-3\pi-6k\pi}}{6939}-\frac{e^{-2\pi-4k\pi}}{5188}+\frac{2e^{-\pi-2k\pi}}{20\,737}\right)}$$

$$-\frac{1}{1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)}+47+7+\phi = 54+\phi-1\Bigg/\left(1-82\,944\,\pi\sum_{k=0}^{\infty}\left(\left(\text{Li}_{-k}(-e^{z_0})-\text{Li}_{-k}(e^{z_0})\right)\left(71\,999\,064\,(\pi-z_0)^k-143\,894\,043\,(2\pi-z_0)^k+215\,167\,112\,(3\pi-z_0)^k\right)\right)\Big/(1\,493\,044\,590\,168\,k!)\right) \quad \text{for } \frac{i z_0}{\pi}\notin\mathbb{Z}$$

-1/24*1/((((1-12^4*4*Pi(((((cosech(Pi)/(1^4+12^4)-(2cosech(2Pi))/(2^4+12^4)+(3cosech(3Pi))/(3^4+12^4)))))))))-1

Input:

$$-\frac{1}{24}\times\frac{1}{1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)}-1$$

csch(x) is the hyperbolic cosecant function

Exact result:

$$-1-\frac{1}{24\left(1-82\,944\,\pi\left(\frac{\operatorname{csch}(\pi)}{20\,737}-\frac{\operatorname{csch}(2\,\pi)}{10\,376}+\frac{\operatorname{csch}(3\,\pi)}{6939}\right)\right)}$$

Decimal approximation:

125.7200943451823713730623997460617706566076542542467580463...

125.7200943451… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternate forms:

$$6\,912\,243\,473\,/\,(24\,(-6\,912\,243\,473+27\,647\,640\,576\,\pi\operatorname{csch}(\pi)-55\,255\,312\,512\,\pi\operatorname{csch}(2\,\pi)+82\,624\,171\,008\,\pi\operatorname{csch}(3\,\pi)))-1$$

$$-1-\frac{1}{24\left(1-82\,944\,\pi\left(\frac{\operatorname{csch}(3\,\pi)}{6939}+\operatorname{csch}(\pi)\left(\frac{1}{20\,737}-\frac{\operatorname{sech}(\pi)}{20\,752}\right)\right)\right)}$$

$$-1-\frac{1}{24\left(1-\frac{82944\,\pi\operatorname{csch}(\pi)}{20\,737}-\frac{3072\,\pi}{257\left(\sinh^3(\pi)+3\sinh(\pi)\cosh^2(\pi)\right)}+\frac{5184\,\pi\operatorname{csch}(\pi)\operatorname{sech}(\pi)}{1297}\right)}$$

Alternative representations:

$$-\frac{1}{\left(1-12^4\times4\,\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\,\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\,\pi)}{3^4+12^4}\right)\right)24}-1=-1-\frac{1}{24\left(1-4\,\pi\,12^4\left(\frac{i\csc(i\,\pi)}{1^4+12^4}-\frac{2\,i\csc(2\,i\,\pi)}{2^4+12^4}+\frac{3\,i\csc(3\,i\,\pi)}{3^4+12^4}\right)\right)}$$

$$-\frac{1}{\left(1-12^4\times4\,\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\,\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\,\pi)}{3^4+12^4}\right)\right)24}-1=-1-\frac{1}{24\left(1-4\,\pi\,12^4\left(-\frac{i\csc(-i\,\pi)}{1^4+12^4}+\frac{2\,i\csc(-2\,i\,\pi)}{2^4+12^4}-\frac{3\,i\csc(-3\,i\,\pi)}{3^4+12^4}\right)\right)}$$

$$-\frac{1}{\left(1-12^4\times4\,\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\,\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\,\pi)}{3^4+12^4}\right)\right)24}-1=-1-\frac{1}{24\left(1-4\,\pi\,12^4\left(\frac{2\,e^{\pi}}{(1^4+12^4)(-1+e^{2\,\pi})}-\frac{4\,e^{2\,\pi}}{(2^4+12^4)(-1+e^{4\,\pi})}+\frac{6\,e^{3\,\pi}}{(3^4+12^4)(-1+e^{6\,\pi})}\right)\right)}$$

Series representations:

$$-\frac{1}{\left(1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)\right)24}-1 = -1-\frac{1}{24\left(1-82944\pi\sum_{k=-\infty}^{\infty}\frac{(-1)^k\left(430646479+214268942k^2+71618719k^4\right)}{248840765028\left(1+k^2\right)\left(4+k^2\right)\left(9+k^2\right)\pi}\right)}$$

$$-\frac{1}{\left(1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)\right)24}-1 = -1-\frac{1}{24\left(1-82944\pi\sum_{k=0}^{\infty}\left(\frac{2e^{-3\pi-6k\pi}}{6939}-\frac{e^{-2\pi-4k\pi}}{5188}+\frac{2e^{-\pi-2k\pi}}{20737}\right)\right)}$$

$$-\frac{1}{\left(1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)\right)24}-1 = -1-1\Big/\left(24\left(1-82944\pi\sum_{k=0}^{\infty}\left(\left(\text{Li}_{-k}\left(-e^{z_0}\right)-\text{Li}_{-k}\left(e^{z_0}\right)\right)\left(71999064(\pi-z_0)^k-143894043(2\pi-z_0)^k+215167112(3\pi-z_0)^k\right)\right)\Big/\left(1493044590168\,k!\right)\right)\right) \quad \text{for } \frac{i z_0}{\pi}\notin\mathbb{Z}$$

-12^4*4*Pi(((((cosech(Pi)/(1^4+12^4)-(2cosech(2Pi))/(2^4+12^4)+(3cosech(3Pi))/(3^4+12^4)))))))))+13

Input:

$$-\frac{1}{24}\times\frac{1}{1-12^4\times 4\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4}-\frac{2\,\text{csch}(2\pi)}{2^4+12^4}+\frac{3\,\text{csch}(3\pi)}{3^4+12^4}\right)}+13$$

csch(x) is the hyperbolic cosecant function

Exact result:

$$13-\frac{1}{24\left(1-82944\pi\left(\frac{\text{csch}(\pi)}{20737}-\frac{\text{csch}(2\pi)}{10376}+\frac{\text{csch}(3\pi)}{6939}\right)\right)}$$

Decimal approximation:

139.7200943451823713730623997460617706566076542542467580463...

139.7200943451… result practically equal to the rest mass of Pion meson 139.57

Alternate forms:

$$13 + 6\,912\,243\,473 / (24\,(-6\,912\,243\,473 + 27\,647\,640\,576\,\pi\,\text{csch}(\pi) - 55\,255\,312\,512\,\pi\,\text{csch}(2\,\pi) + 82\,624\,171\,008\,\pi\,\text{csch}(3\,\pi)))$$

$$13 - \frac{1}{24\left(1 - 82\,944\,\pi\left(\frac{\text{csch}(3\,\pi)}{6939} + \text{csch}(\pi)\left(\frac{1}{20\,737} - \frac{\text{sech}(\pi)}{20\,752}\right)\right)\right)}$$

$$13 - \frac{1}{24\left(1 - \frac{82944\,\pi\,\text{csch}(\pi)}{20\,737} - \frac{3072\,\pi}{257\left(\sinh^3(\pi)+3\sinh(\pi)\cosh^2(\pi)\right)} + \frac{5184\,\pi\,\text{csch}(\pi)\,\text{sech}(\pi)}{1297}\right)}$$

Alternative representations:

$$-\frac{1}{\left(1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right)\right)24} + 13 = 13 - \frac{1}{24\left(1 - 4\,\pi\,12^4\left(\frac{i\csc(i\,\pi)}{1^4+12^4} - \frac{2\,i\csc(2\,i\,\pi)}{2^4+12^4} + \frac{3\,i\csc(3\,i\,\pi)}{3^4+12^4}\right)\right)}$$

$$-\frac{1}{\left(1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right)\right)24} + 13 = 13 - \frac{1}{24\left(1 - 4\,\pi\,12^4\left(-\frac{i\csc(-i\,\pi)}{1^4+12^4} + \frac{2\,i\csc(-2\,i\,\pi)}{2^4+12^4} - \frac{3\,i\csc(-3\,i\,\pi)}{3^4+12^4}\right)\right)}$$

$$-\frac{1}{\left(1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right)\right)24} + 13 = 13 - \frac{1}{24\left(1 - 4\,\pi\,12^4\left(\frac{2\,e^{\pi}}{(1^4+12^4)(-1+e^{2\,\pi})} - \frac{4\,e^{2\,\pi}}{(2^4+12^4)(-1+e^{4\,\pi})} + \frac{6\,e^{3\,\pi}}{(3^4+12^4)(-1+e^{6\,\pi})}\right)\right)}$$

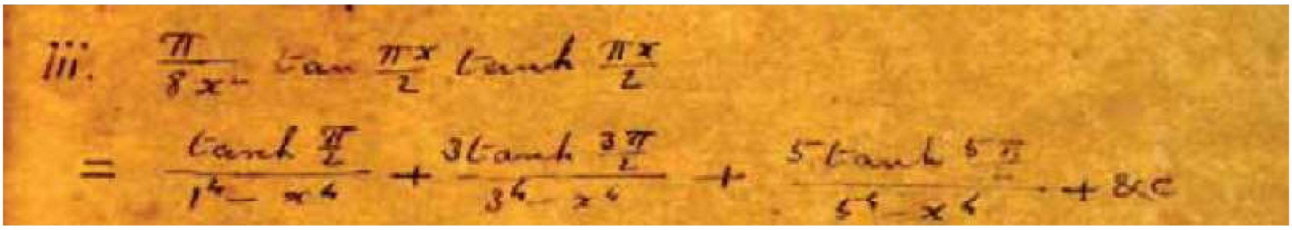
Series representations:

$$-\frac{1}{\left(1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right)\right)24} + 13 = 13 - \frac{1}{24\left(1 - 82\,944\,\pi\sum_{k=-\infty}^{\infty}\frac{(-1)^k\left(430\,646\,479+214\,268\,942\,k^2+71\,618\,719\,k^4\right)}{248\,840\,765\,028\,(1+k^2)(4+k^2)(9+k^2)\,\pi}\right)}$$

$$-\frac{1}{\left(1 - 12^4 \times 4\,\pi\left(\frac{\text{csch}(\pi)}{1^4+12^4} - \frac{2\,\text{csch}(2\,\pi)}{2^4+12^4} + \frac{3\,\text{csch}(3\,\pi)}{3^4+12^4}\right)\right)24} + 13 = 13 - \frac{1}{24\left(1 - 82\,944\,\pi\sum_{k=0}^{\infty}\left(\frac{2\,e^{-3\,\pi-6\,k\,\pi}}{6939} - \frac{e^{-2\,\pi-4\,k\,\pi}}{5188} + \frac{2\,e^{-\pi-2\,k\,\pi}}{20\,737}\right)\right)}$$

$$-\frac{1}{\left(1-12^4 \times 4\pi\left(\frac{\operatorname{csch}(\pi)}{1^4+12^4}-\frac{2\operatorname{csch}(2\pi)}{2^4+12^4}+\frac{3\operatorname{csch}(3\pi)}{3^4+12^4}\right)\right)24}+13 =$$

$$13 - 1\Bigg/\left(24\left(1-82\,944\,\pi\sum_{k=0}^{\infty}\left(\left(\operatorname{Li}_{-k}\left(-e^{z_0}\right)-\operatorname{Li}_{-k}\left(e^{z_0}\right)\right)\left(71\,999\,064\,(\pi-z_0)^k - 143\,894\,043\,(2\pi-z_0)^k + 215\,167\,112\,(3\pi-z_0)^k\right)\right)\Big/\left(1\,493\,044\,590\,168\,k!\right)\right)\right) \text{ for } \frac{i z_0}{\pi} \notin \mathbb{Z}$$



((((tanh(Pi/2)/(1^4-12^4)+((3tanh(3Pi)/2))/(3^4-12^4)+((5tanh(5Pi)/2))/(5^4-12^4))))

Input:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\left(\frac{1}{2}\tanh(3\pi)\right)}{3^4-12^4}+\frac{5\left(\frac{1}{2}\tanh(5\pi)\right)}{5^4-12^4}$$

tanh(x) is the hyperbolic tangent function

Exact result:

$$-\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,735}-\frac{\tanh(3\pi)}{13\,770}-\frac{5\tanh(5\pi)}{40\,222}$$

Decimal approximation:

−0.00024116380692975031845195053018781805637144094896405406...

-0.0002411638…

Property:

$$-\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,735}-\frac{\tanh(3\pi)}{13\,770}-\frac{5\tanh(5\pi)}{40\,222}$$ is a transcendental number

Alternate forms:

$$\frac{-250\,614\tanh\left(\frac{\pi}{2}\right)-377\,377\tanh(3\pi)-645\,975\tanh(5\pi)}{5\,196\,481\,290}$$

$$\frac{-2754\tanh\left(\frac{\pi}{2}\right) - 4147\tanh(3\pi)}{57\,104\,190} - \frac{5\tanh(5\pi)}{40\,222}$$

$$-\frac{\sinh(\pi)}{20\,735\,(1+\cosh(\pi))} - \frac{\sinh(6\pi)}{13\,770\,(1+\cosh(6\pi))} - \frac{5\sinh(10\pi)}{40\,222\,(1+\cosh(10\pi))}$$

Alternative representations:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4} + \frac{3\tanh(3\pi)}{(3^4-12^4)\,2} + \frac{5\tanh(5\pi)}{(5^4-12^4)\,2} = \frac{5\left(-1+\frac{2}{1+e^{-10\pi}}\right)}{2\,(5^4-12^4)} + \frac{3\left(-1+\frac{2}{1+e^{-6\pi}}\right)}{2\,(3^4-12^4)} + \frac{-1+\frac{2}{1+e^{-\pi}}}{1^4-12^4}$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4} + \frac{3\tanh(3\pi)}{(3^4-12^4)\,2} + \frac{5\tanh(5\pi)}{(5^4-12^4)\,2} = \frac{1}{\coth\left(\frac{\pi}{2}\right)(1^4-12^4)} + \frac{3}{2\coth(3\pi)\,(3^4-12^4)} + \frac{5}{2\coth(5\pi)\,(5^4-12^4)}$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4} + \frac{3\tanh(3\pi)}{(3^4-12^4)\,2} + \frac{5\tanh(5\pi)}{(5^4-12^4)\,2} = \frac{\coth\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)}{1^4-12^4} + \frac{3\coth\left(3\pi-\frac{i\pi}{2}\right)}{2\,(3^4-12^4)} + \frac{5\coth\left(5\pi-\frac{i\pi}{2}\right)}{2\,(5^4-12^4)}$$

Series representations:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4} + \frac{3\tanh(3\pi)}{(3^4-12^4)\,2} + \frac{5\tanh(5\pi)}{(5^4-12^4)\,2} = \sum_{k=1}^{\infty} -\frac{\frac{4}{20\,735\,(1+(1-2k)^2)} + \frac{4}{2295\,(37-4k+4k^2)} + \frac{100}{20\,111\,(101-4k+4k^2)}}{\pi}$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4} + \frac{3\tanh(3\pi)}{(3^4-12^4)\,2} + \frac{5\tanh(5\pi)}{(5^4-12^4)\,2} = -\frac{636\,983}{2\,598\,240\,645} + \sum_{k=0}^{\infty}\left(\frac{e^{(-6-(6-i)k)\pi}}{6885} + \frac{2\,e^{(-1-(1-i)k)\pi}}{20\,735} + \frac{5\,(-1)^k\,e^{-10\,(1+k)\pi}}{20\,111}\right)$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\tanh(3\pi)}{(3^4-12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4-12^4)\,2}=$$
$$\sum_{k=0}^{\infty}\left(\frac{\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2 z_0}\right)}{k!}\right)\left(\frac{\pi}{2}-z_0\right)^k}{20\,735}+\frac{\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2 z_0}\right)}{k!}\right)(3\pi-z_0)^k}{13\,770}+\frac{5\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2 z_0}\right)}{k!}\right)(5\pi-z_0)^k}{40\,222}\right) \text{ for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\tanh(3\pi)}{(3^4-12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4-12^4)\,2}=\int_0^{5\pi}\left(\frac{1}{10}\left(-\frac{\mathrm{sech}^2\left(\frac{t}{10}\right)}{20\,735}-\frac{\mathrm{sech}^2\left(\frac{3t}{5}\right)}{2295}\right)-\frac{5\,\mathrm{sech}^2(t)}{40\,222}\right)dt$$

(((-1/(((((tanh(Pi/2)/(1^4-12^4)+((3tanh(3Pi)/2))/(3^4-12^4)+((5tanh(5Pi)/2))/(5^4-12^4)))))))))-521-4

Where 521 and 4 are Lucas numbers. Note that 521 = 496 + 25, where 496 is the dimension of Lie's Group E_8 X E_8 and 25 corresponding to the dimensions of a D-25 brane

Input:

$$-\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\left(\frac{1}{2}\tanh(3\pi)\right)}{3^4-12^4}+\frac{5\left(\frac{1}{2}\tanh(5\pi)\right)}{5^4-12^4}}-521-4$$

tanh(x) is the hyperbolic tangent function

Exact result:

$$-525-\frac{1}{-\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,735}-\frac{\tanh(3\pi)}{13\,770}-\frac{5\tanh(5\pi)}{40\,222}}$$

Decimal approximation:

3621.559190331965785566481981872280066466747509278894151676...

3621.55919… result practically equal to the rest mass of double charmed Xi baryon 3621.40

Property:

$$-525-\frac{1}{-\frac{\tanh\left(\frac{\pi}{2}\right)}{20735}-\frac{\tanh(3\pi)}{13770}-\frac{5\tanh(5\pi)}{40222}}$$ is a transcendental number

Alternate forms:

$$\frac{5196481290}{250614\tanh\left(\frac{\pi}{2}\right)+377377\tanh(3\pi)+645975\tanh(5\pi)}-525$$

$$\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)}{20735}+\frac{\tanh(3\pi)}{13770}+\frac{5\tanh(5\pi)}{40222}}-525$$

$$-\frac{105\left(-49490298+1253070\tanh\left(\frac{\pi}{2}\right)+1886885\tanh(3\pi)+3229875\tanh(5\pi)\right)}{250614\tanh\left(\frac{\pi}{2}\right)+377377\tanh(3\pi)+645975\tanh(5\pi)}$$

Alternative representations:

$$-\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\tanh(3\pi)}{(3^4-12^4)2}+\frac{5\tanh(5\pi)}{(5^4-12^4)2}}-521-4=-525-\frac{1}{\frac{1}{\coth\left(\frac{\pi}{2}\right)(1^4-12^4)}+\frac{3}{2\coth(3\pi)(3^4-12^4)}+\frac{5}{2\coth(5\pi)(5^4-12^4)}}$$

$$-\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\tanh(3\pi)}{(3^4-12^4)2}+\frac{5\tanh(5\pi)}{(5^4-12^4)2}}-521-4=-525-\frac{1}{\frac{5\left(-1+\frac{2}{1+e^{-10\pi}}\right)}{2(5^4-12^4)}+\frac{3\left(-1+\frac{2}{1+e^{-6\pi}}\right)}{2(3^4-12^4)}+\frac{-1+\frac{2}{1+e^{-\pi}}}{1^4-12^4}}$$

$$-\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\tanh(3\pi)}{(3^4-12^4)2}+\frac{5\tanh(5\pi)}{(5^4-12^4)2}}-521-4=-525-\frac{1}{\frac{\coth\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)}{1^4-12^4}+\frac{3\coth\left(3\pi-\frac{i\pi}{2}\right)}{2(3^4-12^4)}+\frac{5\coth\left(5\pi-\frac{i\pi}{2}\right)}{2(5^4-12^4)}}$$

1/golden ratio+1/29*(((((-1/(((((tanh(Pi/2)/(1^4-12^4)+((3tanh(3Pi)/2))/(3^4-12^4)+((5tanh(5Pi)/2))/(5^4-12^4))))))))-521-4))

Where 29 is a Lucas numbers

Input:

$$\frac{1}{\phi}+\frac{1}{29}\left(-\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\left(\frac{1}{2}\tanh(3\pi)\right)}{3^4-12^4}+\frac{5\left(\frac{1}{2}\tanh(5\pi)\right)}{5^4-12^4}}-521-4\right)$$

tanh(x) is the hyperbolic tangent function

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi}+\frac{1}{29}\left(-525-\frac{1}{-\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,735}-\frac{\tanh(3\pi)}{13\,770}-\frac{5\tanh(5\pi)}{40\,222}}\right)$$

Decimal approximation:

125.49938537950733572980741379547874385795298191356073360 96...

125.49938537… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Property:

$$\frac{1}{\phi}+\frac{1}{29}\left(-525-\frac{1}{-\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,735}-\frac{\tanh(3\pi)}{13\,770}-\frac{5\tanh(5\pi)}{40\,222}}\right)$$ is a transcendental number

8+2+1/29*(((((-1/(((((tanh(Pi/2)/(1^4-12^4)+((3tanh(3Pi)/2))/(3^4-12^4)+((5tanh(5Pi)/2))/(5^4-12^4))))))))-521-4))

Where 8 and 2 are Fibonacci numbers

Input:

$$8+2+\frac{1}{29}\left(-\frac{1}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4-12^4}+\frac{3\left(\frac{1}{2}\tanh(3\pi)\right)}{3^4-12^4}+\frac{5\left(\frac{1}{2}\tanh(5\pi)\right)}{5^4-12^4}}-521-4\right)$$

tanh(x) is the hyperbolic tangent function

Exact result:

$$10+\frac{1}{29}\left(-525-\frac{1}{-\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,735}-\frac{\tanh(3\pi)}{13\,770}-\frac{5\tanh(5\pi)}{40\,222}}\right)$$

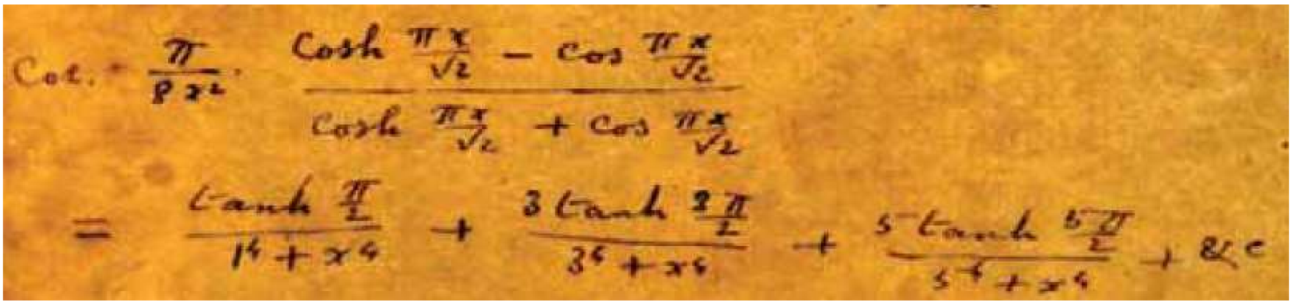
Decimal approximation:

134.881351390757440881602826961113105740232672733754970747 4...

134.88135139… result practically equal to the rest mass of Pion meson 134.9766

Property:

$$10+\frac{1}{29}\left(-525-\frac{1}{-\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,735}-\frac{\tanh(3\pi)}{13\,770}-\frac{5\tanh(5\pi)}{40\,222}}\right)$$ is a transcendental number



$$\text{Cot.}\ \frac{\pi}{8x^2}\cdot\frac{\cosh\frac{\pi x}{\sqrt{2}}-\cos\frac{\pi x}{\sqrt{2}}}{\cosh\frac{\pi x}{\sqrt{2}}+\cos\frac{\pi x}{\sqrt{2}}} = \frac{\tanh\frac{\pi}{2}}{1^4+x^4}+\frac{3\tanh\frac{3\pi}{2}}{3^4+x^4}+\frac{5\tanh\frac{5\pi}{2}}{5^4+x^4}+\&c$$

(((((tanh(Pi/2)/(1^4+12^4)+((3tanh(3Pi)/2))/(3^4+12^4)+((5tanh(5Pi)/2))/(5^4+12^4)
)))

Input:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\left(\frac{1}{2}\tanh(3\pi)\right)}{3^4+12^4}+\frac{5\left(\frac{1}{2}\tanh(5\pi)\right)}{5^4+12^4}$$

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

Exact result:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,737}+\frac{\tanh(3\pi)}{13\,878}+\frac{5\tanh(5\pi)}{42\,722}$$

Decimal approximation:

0.000233320032211875296176516082527934356176673416489630365...

0.0002333200322...

Property:

$\frac{\tanh\left(\frac{\pi}{2}\right)}{20\,737}+\frac{\tanh(3\pi)}{13\,878}+\frac{5\tanh(5\pi)}{42\,722}$ is a transcendental number

Alternate forms:

$$\frac{296\,447\,958\tanh\left(\frac{\pi}{2}\right)+442\,963\,057\tanh(3\pi)+719\,470\,215\tanh(5\pi)}{6\,147\,441\,305\,046}$$

$$\frac{13\,878\tanh\left(\frac{\pi}{2}\right)+20\,737\tanh(3\pi)}{287\,788\,086}+\frac{5\tanh(5\pi)}{42\,722}$$

$$\frac{\sinh(\pi)}{20\,737\,(1+\cosh(\pi))}+\frac{\sinh(6\pi)}{13\,878\,(1+\cosh(6\pi))}+\frac{5\sinh(10\pi)}{42\,722\,(1+\cosh(10\pi))}$$

Alternative representations:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4+12^4)\,2}=\frac{5\left(-1+\frac{2}{1+e^{-10\pi}}\right)}{2\,(5^4+12^4)}+\frac{3\left(-1+\frac{2}{1+e^{-6\pi}}\right)}{2\,(3^4+12^4)}+\frac{-1+\frac{2}{1+e^{-\pi}}}{1^4+12^4}$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4+12^4)\,2}=\frac{1}{\coth\left(\frac{\pi}{2}\right)(1^4+12^4)}+\frac{3}{2\coth(3\pi)\,(3^4+12^4)}+\frac{5}{2\coth(5\pi)\,(5^4+12^4)}$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4+12^4)\,2}=\frac{\coth\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)}{1^4+12^4}+\frac{3\coth\left(3\pi-\frac{i\pi}{2}\right)}{2\,(3^4+12^4)}+\frac{5\coth\left(5\pi-\frac{i\pi}{2}\right)}{2\,(5^4+12^4)}$$

Series representations:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4+12^4)\,2}=\sum_{k=1}^{\infty}\frac{\frac{4}{20\,737\left(1+(1-2k)^2\right)}+\frac{4}{2313\left(37-4k+4k^2\right)}+\frac{100}{21\,361\left(101-4k+4k^2\right)}}{\pi}$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4+12^4)\,2}=\frac{729\,440\,615}{3\,073\,720\,652\,523}+\sum_{k=0}^{\infty}\left(-\frac{e^{(-6-(6-i)k)\pi}}{6939}-\frac{2\,e^{(-1-(1-i)k)\pi}}{20\,737}-\frac{5\,(-1)^k\,e^{-10\,(1+k)\pi}}{21\,361}\right)$$

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4+12^4)\,2}=\sum_{k=0}^{\infty}\left(-\frac{\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)\left(\frac{\pi}{2}-z_0\right)^k}{20\,737}-\frac{\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(3\pi-z_0)^k}{13\,878}-\frac{5\left(\delta_k+\frac{2^{1+k}\operatorname{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(5\pi-z_0)^k}{42\,722}\right)\quad\text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)\,2}+\frac{5\tanh(5\pi)}{(5^4+12^4)\,2}=\int_0^{5\pi}\left(\frac{1}{10}\left(\frac{\operatorname{sech}^2\left(\frac{t}{10}\right)}{20\,737}+\frac{\operatorname{sech}^2\left(\frac{3t}{5}\right)}{2313}\right)+\frac{5\operatorname{sech}^2(t)}{42\,722}\right)dt$$

0.256/((((((tanh(Pi/2)/(1^4+12^4)+((3tanh(3Pi)/2))/(3^4+12^4)+((5tanh(5Pi)/2))/(5^4+12^4)))))))+18

Where 18 is a Lucas number and $0.256 = (64*4)/10^3$

Input:

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\left(\frac{1}{2}\tanh(3\pi)\right)}{3^4+12^4}+\frac{5\left(\frac{1}{2}\tanh(5\pi)\right)}{5^4+12^4}}+18$$

tanh(x) is the hyperbolic tangent function

Result:

1115.21...

1115.21… result practically equal to the rest mass of Lambda baryon 1115.683

Alternative representations:

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)2}+\frac{5\tanh(5\pi)}{(5^4+12^4)2}}+18 = 18+\frac{0.256}{\frac{1}{\coth\left(\frac{\pi}{2}\right)(1^4+12^4)}+\frac{3}{2\coth(3\pi)(3^4+12^4)}+\frac{5}{2\coth(5\pi)(5^4+12^4)}}$$

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)2}+\frac{5\tanh(5\pi)}{(5^4+12^4)2}}+18 = 18+\frac{0.256}{\frac{5\left(-1+\frac{2}{1+e^{-10\pi}}\right)}{2(5^4+12^4)}+\frac{3\left(-1+\frac{2}{1+e^{-6\pi}}\right)}{2(3^4+12^4)}+\frac{-1+\frac{2}{1+e^{-\pi}}}{1^4+12^4}}$$

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)2}+\frac{5\tanh(5\pi)}{(5^4+12^4)2}}+18 = 18+\frac{0.256}{\frac{\coth\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)}{1^4+12^4}+\frac{3\coth\left(3\pi-\frac{i\pi}{2}\right)}{2(3^4+12^4)}+\frac{5\coth\left(5\pi-\frac{i\pi}{2}\right)}{2(5^4+12^4)}}$$

Series representations:

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)2}+\frac{5\tanh(5\pi)}{(5^4+12^4)2}}+18 = 18-\frac{1093.68}{-1.01386+\sum_{k=0}^{\infty}(-1)^k e^{-10(1+k)\pi}\left(1+0.615679\, e^{4(1+k)\pi}+0.412036\, e^{9(1+k)\pi}\right)}$$

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)2}+\frac{5\tanh(5\pi)}{(5^4+12^4)2}}+18 = 18+\frac{1327.17}{\pi\sum_{k=1}^{\infty}\frac{\frac{1}{1+(1-2k)^2}+\frac{6.06742}{25.25-k+k^2}+\frac{8.96541}{37-4k+4k^2}}{\pi^2}}$$

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)2}+\frac{5\tanh(5\pi)}{(5^4+12^4)2}}+18 = 18+\frac{0.256}{\sum_{k=0}^{\infty}-\frac{\left(k!\,\delta_k+2^{1+k}\operatorname{Li}_{-k}\left(-e^{2z_0}\right)\right)\left(296447958\left(\frac{\pi}{2}-z_0\right)^k+442963057(3\pi-z_0)^k+719470215(5\pi-z_0)^k\right)}{6147441305046\,k!}}$$

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

Integral representation:

$$\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{(3^4+12^4)2}+\frac{5\tanh(5\pi)}{(5^4+12^4)2}}+18 = 18+\frac{5308.67}{\int_0^{5\pi}\left(0.1\operatorname{sech}^2\left(\frac{t}{10}\right)+0.896541\operatorname{sech}^2\left(\frac{3t}{5}\right)+2.42697\operatorname{sech}^2(t)\right)dt}$$

1/7*(((0.256/((((((tanh(Pi/2)/(1^4+12^4)+((3tanh(3Pi)/2))/(3^4+12^4)+((5tanh(5Pi)/2))/(5^4+12^4))))))-76-2)))-11

Where 7, 76, 2 and 11 are Lucas numbers (11 is also the number of dimensions of M-Theory)

Input:

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\left(\frac{1}{2}\tanh(3\pi)\right)}{3^4+12^4}+\frac{5\left(\frac{1}{2}\tanh(5\pi)\right)}{5^4+12^4}}-76-2\right)-11$$

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

Result:

134.601...

134.601… result practically equal to the rest mass of Pion meson 134.9766

Percent decrease:

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2(3^4+12^4)}+\frac{5\tanh(5\pi)}{2(5^4+12^4)}}-76-2\right)-11 = 134.601 \text{ is } 7.55491$$

$$\% \text{ smaller than } \frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2(3^4+12^4)}+\frac{5\tanh(5\pi)}{2(5^4+12^4)}}-76-2\right) = 145.601.$$

Alternative representations:

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2\left(3^4+12^4\right)}+\frac{5\tanh(5\pi)}{2\left(5^4+12^4\right)}}-76-2\right)-11 = -11+\frac{1}{7}\left(-78+\frac{0.256}{\frac{1}{\coth\left(\frac{\pi}{2}\right)\left(1^4+12^4\right)}+\frac{3}{2\coth(3\pi)\left(3^4+12^4\right)}+\frac{5}{2\coth(5\pi)\left(5^4+12^4\right)}}\right)$$

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2\left(3^4+12^4\right)}+\frac{5\tanh(5\pi)}{2\left(5^4+12^4\right)}}-76-2\right)-11 = -11+\frac{1}{7}\left(-78+\frac{0.256}{\frac{5\left(-1+\frac{2}{1+e^{-10\pi}}\right)}{2\left(5^4+12^4\right)}+\frac{3\left(-1+\frac{2}{1+e^{-6\pi}}\right)}{2\left(3^4+12^4\right)}+\frac{-1+\frac{2}{1+e^{-\pi}}}{1^4+12^4}}\right)$$

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2\left(3^4+12^4\right)}+\frac{5\tanh(5\pi)}{2\left(5^4+12^4\right)}}-76-2\right)-11 = -11+\frac{1}{7}\left(-78+\frac{0.256}{\frac{\coth\left(\frac{\pi}{2}-\frac{i\pi}{2}\right)}{1^4+12^4}+\frac{3\coth\left(3\pi-\frac{i\pi}{2}\right)}{2\left(3^4+12^4\right)}+\frac{5\coth\left(5\pi-\frac{i\pi}{2}\right)}{2\left(5^4+12^4\right)}}\right)$$

Series representations:

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2\left(3^4+12^4\right)}+\frac{5\tanh(5\pi)}{2\left(5^4+12^4\right)}}-76-2\right)-11 = -\frac{155}{7}-\frac{156.24}{-1.01386+\sum_{k=0}^{\infty}(-1)^k e^{-10(1+k)\pi}\left(1+0.615679\, e^{4(1+k)\pi}+0.412036\, e^{9(1+k)\pi}\right)}$$

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2\left(3^4+12^4\right)}+\frac{5\tanh(5\pi)}{2\left(5^4+12^4\right)}}-76-2\right)-11 = -\frac{155}{7}+\frac{0.0365714}{\sum_{k=1}^{\infty}\frac{\frac{2}{20\,737\left(1-2k+2k^2\right)}+\frac{4}{2313\left(37-4k+4k^2\right)}+\frac{100}{21\,361\left(101-4k+4k^2\right)}}{\pi}}$$

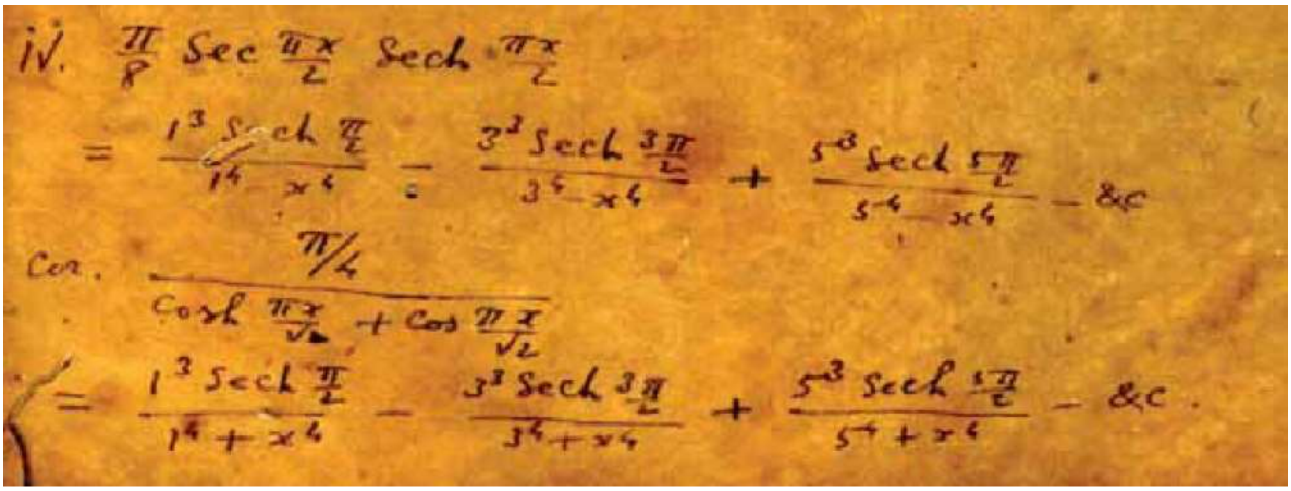
$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2\left(3^4+12^4\right)}+\frac{5\tanh(5\pi)}{2\left(5^4+12^4\right)}}-76-2\right)-11 = -\frac{155}{7}+\frac{0.0365714}{\sum_{k=0}^{\infty}-\frac{\left(k!\,\delta_k+2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)\right)\left(296\,447\,958\left(\frac{\pi}{2}-z_0\right)^k+442\,963\,057\,(3\pi-z_0)^k+719\,470\,215\,(5\pi-z_0)^k\right)}{6\,147\,441\,305\,046\,k!}}$$

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

Integral representation:

$$\frac{1}{7}\left(\frac{0.256}{\frac{\tanh\left(\frac{\pi}{2}\right)}{1^4+12^4}+\frac{3\tanh(3\pi)}{2\left(3^4+12^4\right)}+\frac{5\tanh(5\pi)}{2\left(5^4+12^4\right)}}-76-2\right)-11 = -\frac{155}{7}+\frac{758.382}{\int_0^{5\pi}\left(0.1\,\mathrm{sech}^2\left(\frac{t}{10}\right)+0.896541\,\mathrm{sech}^2\left(\frac{3t}{5}\right)+2.42697\,\mathrm{sech}^2(t)\right)dt}$$

Now, we have that:


iv. $\frac{\pi}{8}\sec\frac{\pi x}{2}\,\mathrm{sech}\frac{\pi x}{2} = \frac{1^3\,\mathrm{sech}\frac{\pi}{2}}{1^4-x^4}-\frac{3^3\,\mathrm{sech}\frac{3\pi}{2}}{3^4-x^4}+\frac{5^3\,\mathrm{sech}\frac{5\pi}{2}}{5^4-x^4}-\&c$

Cor. $\frac{\pi/4}{\cosh\frac{\pi x}{\sqrt{2}}+\cos\frac{\pi x}{\sqrt{2}}} = \frac{1^3\,\mathrm{sech}\frac{\pi}{2}}{1^4+x^4}-\frac{3^3\,\mathrm{sech}\frac{3\pi}{2}}{3^4+x^4}+\frac{5^3\,\mathrm{sech}\frac{5\pi}{2}}{5^4+x^4}-\&c.$

(((((1^3sech(Pi/2)/(1^4-12^4)-((3^3sech(3Pi)/2))/(3^4-12^4)+((5^3sech(5Pi)/2))/(5^4-12^4))))))

Input:

$$1^3 \times \frac{\text{sech}\left(\frac{\pi}{2}\right)}{1^4 - 12^4} - \frac{3^3 \left(\frac{1}{2}\,\text{sech}(3\pi)\right)}{3^4 - 12^4} + \frac{5^3 \left(\frac{1}{2}\,\text{sech}(5\pi)\right)}{5^4 - 12^4}$$

sech(x) is the hyperbolic secant function

Exact result:

$$-\frac{\text{sech}\left(\frac{\pi}{2}\right)}{20735} + \frac{\text{sech}(3\pi)}{1530} - \frac{125\,\text{sech}(5\pi)}{40222}$$

Decimal approximation:

−0.00001911593496126075908503136511058224125590211372808061...

-0.00001911593496126….

Property:

$$-\frac{\text{sech}\left(\frac{\pi}{2}\right)}{20735} + \frac{\text{sech}(3\pi)}{1530} - \frac{125\,\text{sech}(5\pi)}{40222} \text{ is a transcendental number}$$

Alternate forms:

$$\frac{-27846\,\text{sech}\left(\frac{\pi}{2}\right) + 377377\,\text{sech}(3\pi) - 1794375\,\text{sech}(5\pi)}{577386810}$$

$$\frac{4147\,\text{sech}(3\pi) - 306\,\text{sech}\left(\frac{\pi}{2}\right)}{6344910} - \frac{125\,\text{sech}(5\pi)}{40222}$$

$$-\frac{1}{20735\cosh\left(\frac{\pi}{2}\right)} + \frac{1}{1530\cosh(3\pi)} - \frac{125}{40222\cosh(5\pi)}$$

cosh(x) is the hyperbolic cosine function

Alternative representations:

$$\frac{1^3\,\text{sech}\left(\frac{\pi}{2}\right)}{1^4 - 12^4} - \frac{3^3\,\text{sech}(3\pi)}{2\left(3^4 - 12^4\right)} + \frac{5^3\,\text{sech}(5\pi)}{\left(5^4 - 12^4\right)2} = \frac{1}{\cosh\left(\frac{\pi}{2}\right)\left(1^4 - 12^4\right)} - \frac{27}{2\cosh(3\pi)\left(3^4 - 12^4\right)} + \frac{5^3}{2\cosh(5\pi)\left(5^4 - 12^4\right)}$$

$$\frac{1^3\,\text{sech}\left(\frac{\pi}{2}\right)}{1^4-12^4}-\frac{3^3\,\text{sech}(3\pi)}{2\left(3^4-12^4\right)}+\frac{5^3\,\text{sech}(5\pi)}{\left(5^4-12^4\right)2}=$$
$$\frac{1}{\cos\left(\frac{i\pi}{2}\right)\left(1^4-12^4\right)}-\frac{27}{2\cos(3i\pi)\left(3^4-12^4\right)}+\frac{5^3}{2\cos(5i\pi)\left(5^4-12^4\right)}$$

$$\frac{1^3\,\text{sech}\left(\frac{\pi}{2}\right)}{1^4-12^4}-\frac{3^3\,\text{sech}(3\pi)}{2\left(3^4-12^4\right)}+\frac{5^3\,\text{sech}(5\pi)}{\left(5^4-12^4\right)2}=$$
$$\frac{\csc\left(\frac{\pi}{2}+\frac{i\pi}{2}\right)}{1^4-12^4}-\frac{27\csc\left(\frac{\pi}{2}+3i\pi\right)}{2\left(3^4-12^4\right)}+\frac{\csc\left(\frac{\pi}{2}+5i\pi\right)5^3}{2\left(5^4-12^4\right)}$$

Series representations:

$$\frac{1^3\,\text{sech}\left(\frac{\pi}{2}\right)}{1^4-12^4}-\frac{3^3\,\text{sech}(3\pi)}{2\left(3^4-12^4\right)}+\frac{5^3\,\text{sech}(5\pi)}{\left(5^4-12^4\right)2}=$$
$$\sum_{k=0}^{\infty}\frac{2(-1)^k(1+2k)\left(-\frac{13923}{1+2k+2k^2}+\frac{377377}{37+4k+4k^2}-\frac{1794375}{101+4k+4k^2}\right)}{288693405\,\pi}$$

$$\frac{1^3\,\text{sech}\left(\frac{\pi}{2}\right)}{1^4-12^4}-\frac{3^3\,\text{sech}(3\pi)}{2\left(3^4-12^4\right)}+\frac{5^3\,\text{sech}(5\pi)}{\left(5^4-12^4\right)2}=$$
$$\sum_{k=0}^{\infty}-\frac{e^{(-5-(10-i)k)\pi}\left(1794375-377377\,e^{2\pi+4k\pi}+27846\,e^{(9\pi)/2+9k\pi}\right)}{288693405}$$

$$\frac{1^3\,\text{sech}\left(\frac{\pi}{2}\right)}{1^4-12^4}-\frac{3^3\,\text{sech}(3\pi)}{2\left(3^4-12^4\right)}+\frac{5^3\,\text{sech}(5\pi)}{\left(5^4-12^4\right)2}=$$
$$\sum_{k=0}^{\infty}-\frac{1}{577386810\,k!}\,i\left(\text{Li}_{-k}\left(-i\,e^{z_0}\right)-\text{Li}_{-k}\left(i\,e^{z_0}\right)\right)$$
$$\left(27846\left(\frac{\pi}{2}-z_0\right)^k-377377\,(3\pi-z_0)^k+1794375\,(5\pi-z_0)^k\right)\quad\text{for}\ \frac{1}{2}+\frac{i\,z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$\frac{1^3\,\text{sech}\left(\frac{\pi}{2}\right)}{1^4-12^4}-\frac{3^3\,\text{sech}(3\pi)}{2\left(3^4-12^4\right)}+\frac{5^3\,\text{sech}(5\pi)}{\left(5^4-12^4\right)2}=$$
$$\int_0^{\infty}-\frac{\left(27846-377377\,t^{5i}+1794375\,t^{9i}\right)t^i}{288693405\,\pi\left(1+t^2\right)}\,dt$$

(((((1^3sech(Pi/2)/(1^4+12^4)-((3^3sech(3Pi)/2))/(3^4+12^4)+((5^3sech(5Pi)/2))/(5^4+12^4))))))

Input:

$$1^3 \times \frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4} - \frac{3^3\left(\frac{1}{2}\operatorname{sech}(3\pi)\right)}{3^4+12^4} + \frac{5^3\left(\frac{1}{2}\operatorname{sech}(5\pi)\right)}{5^4+12^4}$$

sech(*x*) is the hyperbolic secant function

Exact result:

$$\frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{20\,737} - \frac{\operatorname{sech}(3\pi)}{1542} + \frac{125\operatorname{sech}(5\pi)}{42\,722}$$

Decimal approximation:

0.000019114847340277282671102750452267872320911492891002346...

0.000019114847340 27……

Property:

$$\frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{20\,737} - \frac{\operatorname{sech}(3\pi)}{1542} + \frac{125\operatorname{sech}(5\pi)}{42\,722}$$ is a transcendental number

Alternate forms:

$$\frac{32\,938\,662\operatorname{sech}\left(\frac{\pi}{2}\right) - 442\,963\,057\operatorname{sech}(3\pi) + 1\,998\,528\,375\operatorname{sech}(5\pi)}{683\,049\,033\,894}$$

$$\frac{1542\operatorname{sech}\left(\frac{\pi}{2}\right) - 20\,737\operatorname{sech}(3\pi)}{31\,976\,454} + \frac{125\operatorname{sech}(5\pi)}{42\,722}$$

$$\frac{1}{20\,737\cosh\left(\frac{\pi}{2}\right)} - \frac{1}{1542\cosh(3\pi)} + \frac{125}{42\,722\cosh(5\pi)}$$

cosh(*x*) is the hyperbolic cosine function

Alternative representations:

$$\frac{1^3\,\mathrm{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\,\mathrm{sech}(3\,\pi)}{2\,(3^4+12^4)}+\frac{5^3\,\mathrm{sech}(5\,\pi)}{(5^4+12^4)\,2}=\frac{1}{\cosh\left(\frac{\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cosh(3\,\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cosh(5\,\pi)\left(5^4+12^4\right)}$$

$$\frac{1^3\,\mathrm{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\,\mathrm{sech}(3\,\pi)}{2\,(3^4+12^4)}+\frac{5^3\,\mathrm{sech}(5\,\pi)}{(5^4+12^4)\,2}=\frac{1}{\cos\left(\frac{i\,\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cos(3\,i\,\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cos(5\,i\,\pi)\left(5^4+12^4\right)}$$

$$\frac{1^3\,\mathrm{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\,\mathrm{sech}(3\,\pi)}{2\,(3^4+12^4)}+\frac{5^3\,\mathrm{sech}(5\,\pi)}{(5^4+12^4)\,2}=\frac{\csc\left(\frac{\pi}{2}+\frac{i\,\pi}{2}\right)}{1^4+12^4}-\frac{27\csc\left(\frac{\pi}{2}+3\,i\,\pi\right)}{2\left(3^4+12^4\right)}+\frac{\csc\left(\frac{\pi}{2}+5\,i\,\pi\right)5^3}{2\left(5^4+12^4\right)}$$

Series representations:

$$\frac{1^3\,\mathrm{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\,\mathrm{sech}(3\,\pi)}{2\,(3^4+12^4)}+\frac{5^3\,\mathrm{sech}(5\,\pi)}{(5^4+12^4)\,2}=\sum_{k=0}^{\infty}\left(\frac{125\,e^{(-5-(10-i)k)\pi}}{21\,361}-\frac{1}{771}\,e^{(-3-(6-i)k)\pi}+\frac{2\,e^{(-1/2-(1-i)k)\pi}}{20\,737}\right)$$

$$\frac{1^3\,\mathrm{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\,\mathrm{sech}(3\,\pi)}{2\,(3^4+12^4)}+\frac{5^3\,\mathrm{sech}(5\,\pi)}{(5^4+12^4)\,2}=\sum_{k=0}^{\infty}\frac{2\,(-1)^k\,(1+2\,k)\left(\frac{16\,469\,331}{1+2\,k+2\,k^2}-\frac{442\,963\,057}{37+4\,k+4\,k^2}+\frac{1\,998\,528\,375}{101+4\,k+4\,k^2}\right)}{341\,524\,516\,947\,\pi}$$

$$\frac{1^3\,\mathrm{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\,\mathrm{sech}(3\,\pi)}{2\,(3^4+12^4)}+\frac{5^3\,\mathrm{sech}(5\,\pi)}{(5^4+12^4)\,2}=\sum_{k=0}^{\infty}\frac{1}{683\,049\,033\,894\,k!}\,i\left(\mathrm{Li}_{-k}\left(-i\,e^{z_0}\right)-\mathrm{Li}_{-k}\left(i\,e^{z_0}\right)\right)\left(32\,938\,662\left(\frac{\pi}{2}-z_0\right)^k-442\,963\,057\,(3\,\pi-z_0)^k+1\,998\,528\,375\,(5\,\pi-z_0)^k\right)\quad\text{for }\frac{1}{2}+\frac{i\,z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$\frac{1^3 \operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4} - \frac{3^3 \operatorname{sech}(3\pi)}{2(3^4+12^4)} + \frac{5^3 \operatorname{sech}(5\pi)}{(5^4+12^4)2} = \int_0^\infty \frac{(32\,938\,662 - 442\,963\,057\, t^{5i} + 1\,998\,528\,375\, t^{9i})\, t^i}{341\,524\,516\,947\,\pi\,(1+t^2)}\, dt$$

1/24*1/(((((1^3sech(Pi/2)/(1^4+12^4)-((3^3sech(3Pi)/2))/(3^4+12^4)+((5^3sech(5Pi)/2))/(5^4+12^4))))))-64-Pi

Where 24 can be identified with the number of the transverse degrees of freedom in the bosonic string

Input:

$$\frac{1}{24} \times \frac{1}{1^3 \times \frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4} - \frac{3^3\left(\frac{1}{2}\operatorname{sech}(3\pi)\right)}{3^4+12^4} + \frac{5^3\left(\frac{1}{2}\operatorname{sech}(5\pi)\right)}{5^4+12^4}} - 64 - \pi$$

sech(x) is the hyperbolic secant function

Exact result:

$$-64 - \pi + \frac{1}{24\left(\frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{20\,737} - \frac{\operatorname{sech}(3\pi)}{1542} + \frac{125\operatorname{sech}(5\pi)}{42\,722}\right)}$$

Decimal approximation:

2112.664812541705066184005071570661311862410928268875704164...

2112.66481254….. result practically equal to the rest mass of strange D meson 2112.3

Alternate forms:

$$-64 - \pi + \frac{113\,841\,505\,649}{4\left(32\,938\,662\operatorname{sech}\left(\frac{\pi}{2}\right) - 442\,963\,057\operatorname{sech}(3\pi) + 1\,998\,528\,375\operatorname{sech}(5\pi)\right)}$$

$$-64 - \pi + \frac{1}{\frac{24\operatorname{sech}\left(\frac{\pi}{2}\right)}{20\,737} - \frac{4}{257}\operatorname{sech}(3\pi) + \frac{1500\operatorname{sech}(5\pi)}{21\,361}}$$

$$-64-\pi+\frac{1}{24\left(\frac{1}{20\,737\cosh\left(\frac{\pi}{2}\right)}-\frac{1}{1542\cosh(3\pi)}+\frac{125}{42\,722\cosh(5\pi)}\right)}$$

cosh(x) is the hyperbolic cosine function

Alternative representations:

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)24}-64-\pi=$$
$$-64-\pi+\frac{1}{24\left(\frac{1}{\cosh\left(\frac{\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cosh(3\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cosh(5\pi)\left(5^4+12^4\right)}\right)}$$

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)24}-64-\pi=$$
$$-64-\pi+\frac{1}{24\left(\frac{1}{\cos\left(\frac{i\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cos(3i\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cos(5i\pi)\left(5^4+12^4\right)}\right)}$$

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)24}-64-\pi=$$
$$-64-\pi+\frac{1}{24\left(\frac{1}{\cos\left(-\frac{i\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cos(-3i\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cos(-5i\pi)\left(5^4+12^4\right)}\right)}$$

Series representations:

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)24}-64-\pi=$$
$$-64-\pi+\frac{1}{24\sum_{k=0}^{\infty}\frac{2(-1)^k(1+2k)\left(\frac{16469\,331}{1+2k+2k^2}-\frac{442\,963\,057}{37+4k+4k^2}+\frac{1\,998\,528\,375}{101+4k+4k^2}\right)}{341\,524\,516\,947\,\pi}}$$

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)24}-64-\pi=$$
$$-64-\pi+\frac{1}{24\sum_{k=0}^{\infty}\left(\frac{125(-1)^k e^{-5\pi-10k\pi}}{21361}-\frac{1}{771}(-1)^k e^{-3\pi-6k\pi}+\frac{2(-1)^k e^{-\pi/2-k\pi}}{20\,737}\right)}$$

$$\frac{1}{\left(\frac{1^3 \operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4} - \frac{3^3 \operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)} + \frac{5^3 \operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)24} - 64 - \pi =$$

$$-64 - \pi + 1 \Big/ \left(24 \sum_{k=0}^{\infty} \left(i \left(\operatorname{Li}_{-k}\left(-i e^{z_0}\right) - \operatorname{Li}_{-k}\left(i e^{z_0}\right)\right) \left(32\,938\,662 \left(\frac{\pi}{2} - z_0\right)^k - 442\,963\,057 (3\pi - z_0)^k + 1\,998\,528\,375 (5\pi - z_0)^k\right)\right) \Big/ (683\,049\,033\,894\, k!)\right) \quad \text{for } \frac{1}{2} + \frac{i z_0}{\pi} \notin \mathbb{Z}$$

Integral representation:

$$\frac{1}{\left(\frac{1^3 \operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4} - \frac{3^3 \operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)} + \frac{5^3 \operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)24} - 64 - \pi =$$

$$-64 - \pi + \frac{1}{24 \int_0^{\infty} \frac{\left(32\,938\,662 - 442\,963\,057\, t^{5i} + 1\,998\,528\,375\, t^{9i}\right) t^i}{341\,524\,516\,947\, \pi \left(1+t^2\right)}\, dt}$$

1/(256)*1/(((((1^3sech(Pi/2)/(1^4+12^4)-((3^3sech(3Pi)/2))/(3^4+12^4)+((5^3sech(5Pi)/2))/(5^4+12^4))))))-64-1/golden ratio

Input:

$$\frac{1}{256} \times \frac{1}{1^3 \times \frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4} - \frac{3^3 \left(\frac{1}{2} \operatorname{sech}(3\pi)\right)}{3^4+12^4} + \frac{5^3 \left(\frac{1}{2} \operatorname{sech}(5\pi)\right)}{5^4+12^4}} - 64 - \frac{1}{\phi}$$

$\operatorname{sech}(x)$ is the hyperbolic secant function

ϕ is the golden ratio

Exact result:

$$-\frac{1}{\phi} - 64 + \frac{1}{256 \left(\frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{20\,737} - \frac{\operatorname{sech}(3\pi)}{1542} + \frac{125 \operatorname{sech}(5\pi)}{42\,722}\right)}$$

Decimal approximation:

139.7388164983089982226517614425663132647741999765927505739...

139.738816498… result practically equal to the rest mass of Pion meson 139.57

Property:

$$-64-\frac{1}{\phi}+\frac{1}{256\left(\frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{20737}-\frac{\operatorname{sech}(3\pi)}{1542}+\frac{125\operatorname{sech}(5\pi)}{42722}\right)}$$ is a transcendental number

Alternate forms:

$$-\frac{1}{\phi}-64+\frac{1}{\frac{256\operatorname{sech}\left(\frac{\pi}{2}\right)}{20737}-\frac{128}{771}\operatorname{sech}(3\pi)+\frac{16000\operatorname{sech}(5\pi)}{21361}}$$

$$\frac{1}{2}\left(-127-\sqrt{5}\right)+\frac{1}{256\left(\frac{\operatorname{sech}\left(\frac{\pi}{2}\right)}{20737}-\frac{\operatorname{sech}(3\pi)}{1542}+\frac{125\operatorname{sech}(5\pi)}{42722}\right)}$$

$$-64-\frac{1}{\phi}+\frac{1}{256\left(\frac{1}{20737\cosh\left(\frac{\pi}{2}\right)}-\frac{1}{1542\cosh(3\pi)}+\frac{125}{42722\cosh(5\pi)}\right)}$$

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

Alternative representations:

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)256}-64-\frac{1}{\phi}=$$
$$-64-\frac{1}{\phi}+\frac{1}{256\left(\frac{1}{\cosh\left(\frac{\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cosh(3\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cosh(5\pi)\left(5^4+12^4\right)}\right)}$$

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)256}-64-\frac{1}{\phi}=$$
$$-64-\frac{1}{\phi}+\frac{1}{256\left(\frac{1}{\cos\left(\frac{i\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cos(3i\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cos(5i\pi)\left(5^4+12^4\right)}\right)}$$

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)256}-64-\frac{1}{\phi}=$$
$$-64-\frac{1}{\phi}+\frac{1}{256\left(\frac{1}{\cos\left(-\frac{i\pi}{2}\right)\left(1^4+12^4\right)}-\frac{27}{2\cos(-3i\pi)\left(3^4+12^4\right)}+\frac{5^3}{2\cos(-5i\pi)\left(5^4+12^4\right)}\right)}$$

Series representations:

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)256}-64-\frac{1}{\phi}=$$
$$-64-\frac{1}{\phi}+\frac{1}{256\sum_{k=0}^{\infty}\frac{2(-1)^k(1+2k)\left(\frac{16469331}{1+2k+2k^2}-\frac{442963057}{37+4k+4k^2}+\frac{1998528375}{101+4k+4k^2}\right)}{341524516947\pi}}$$

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)256}-64-\frac{1}{\phi}=$$
$$-64-\frac{1}{\phi}+\frac{1}{256\sum_{k=0}^{\infty}\left(\frac{125(-1)^k e^{-5\pi-10k\pi}}{21361}-\frac{1}{771}(-1)^k e^{-3\pi-6k\pi}+\frac{2(-1)^k e^{-\pi/2-k\pi}}{20737}\right)}$$

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)256}-64-\frac{1}{\phi}=$$
$$-64-\frac{1}{\phi}+1\Bigg/\left(256\sum_{k=0}^{\infty}\left(i\left(\operatorname{Li}_{-k}\left(-i e^{z_0}\right)-\operatorname{Li}_{-k}\left(i e^{z_0}\right)\right)\left(32938662\left(\frac{\pi}{2}-z_0\right)^k-442963057(3\pi-z_0)^k+1998528375(5\pi-z_0)^k\right)\right)\Big/(683049033894\,k!)\right)\quad\text{for }\frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$\frac{1}{\left(\frac{1^3\operatorname{sech}\left(\frac{\pi}{2}\right)}{1^4+12^4}-\frac{3^3\operatorname{sech}(3\pi)}{2\left(3^4+12^4\right)}+\frac{5^3\operatorname{sech}(5\pi)}{2\left(5^4+12^4\right)}\right)256}-64-\frac{1}{\phi}=$$
$$-64-\frac{1}{\phi}+\frac{1}{256\int_0^{\infty}\frac{\left(32938662-442963057t^{5i}+1998528375t^{9i}\right)t^i}{341524516947\pi\left(1+t^2\right)}dt}$$

From the sum of the results, we obtain:

(76.6132768639 + 76.278746097 -0.000336436347 -0.000328808677 -0.0002411638 + 0.0002333200322 -0.00001911593496126 + 0.00001911484734027)

Input interpretation:

$76.6132768639 + 76.278746097 - 0.000336436347 - 0.000328808677 - 0.0002411638 + 0.0002333200322 - 0.00001911593496126 + 0.00001911484734027$

Result:

152.89134987102057901

152.891349871......

(76.6132768639 + 76.278746097 -0.000336436347 -0.000328808677 -0.0002411638 + 0.0002333200322 -0.00001911593496126 + 0.00001911484734027)-18-7-golden ratio^2

Where 18 and 7 are Lucas numbers

Input interpretation:

$(76.6132768639 + 76.278746097 - 0.000336436347 - 0.000328808677 - 0.0002411638 + 0.0002333200322 - 0.00001911593496126 + 0.00001911484734027) - 18 - 7 - \phi^2$

ϕ is the golden ratio

Result:

125.27331588...

125.27331588… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternative representations:

$$(76.61327686390000 + 76.2787460970000 - 0.000336436 - 0.000328809 - 0.000241164 + 0.00023332 - 0.00001911593496126000 + 0.00001911484734027000) - 18 - 7 - \phi^2 = 127.891 - (2\sin(54°))^2$$

$$(76.61327686390000 + 76.2787460970000 - 0.000336436 - 0.000328809 - 0.000241164 + 0.00023332 - 0.00001911593496126000 + 0.00001911484734027000) - 18 - 7 - \phi^2 = 127.891 - (-2\cos(216°))^2$$

$$(76.61327686390000 + 76.2787460970000 - 0.000336436 - 0.000328809 - 0.000241164 + 0.00023332 - 0.00001911593496126000 + 0.00001911484734027000) - 18 - 7 - \phi^2 = 127.891 - (-2\sin(666°))^2$$

(76.6132768639 + 76.278746097 -0.000336436347 -0.000328808677 -0.0002411638 + 0.0002333200322 -0.00001911593496126 + 0.00001911484734027)-11-golden ratio^2

Input interpretation:

$$(76.6132768639 + 76.278746097 - 0.000336436347 - 0.000328808677 - 0.0002411638 + 0.0002333200322 - 0.00001911593496126 + 0.00001911484734027) - 11 - \phi^2$$

ϕ is the golden ratio

Result:

139.27331588...

139.27331588… result practically equal to the rest mass of Pion meson 139.57

Alternative representations:

$$(76.61327686390000 + 76.2787460970000 - 0.000336436 - 0.000328809 - 0.000241164 + 0.00023332 - 0.0000191159349612600 + 0.0000191148473402700) - 11 - \phi^2 = 141.891 - (2\sin(54°))^2$$

$$(76.61327686390000 + 76.2787460970000 - 0.000336436 - 0.000328809 - 0.000241164 + 0.00023332 - 0.0000191159349612600 + 0.0000191148473402700) - 11 - \phi^2 = 141.891 - (-2\cos(216°))^2$$

$$(76.61327686390000 + 76.2787460970000 - 0.000336436 - 0.000328809 - 0.000241164 + 0.00023332 - 0.0000191159349612600 + 0.0000191148473402700) - 11 - \phi^2 = 141.891 - (-2\sin(666°))^2$$

(sqrt10-3)(1/76.6132768639 *1/ 76.278746097 *1/ -0.000336436347 *1/ -0.000328808677 *1/ -0.0002411638 *1/ 0.0002333200322 *1/ -0.00001911593496126 * 1/ 0.00001911484734027)

Input interpretation:

$$\left(\sqrt{10} - 3\right)\left(\frac{1}{76.6132768639} \times \frac{1}{76.278746097}\left(-\frac{1}{0.000336436347}\right)\left(-\frac{1}{0.000328808677}\right)\left(-\frac{1}{0.0002411638}\right) \times \frac{1}{0.0002333200322}\left(-\frac{1}{0.00001911593496126}\right) \times \frac{1}{0.00001911484734027}\right)$$

Result:

$1.220884\ldots \times 10^{19}$

1.220884...*10^{19} ≈ 1.2209*10^{19} GeV that is the value of Planck energy

Example of Ramanujan mathematics applied to the physics

From:

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

From chapter "Geometry of the black hole", is described the following formula:

$$S_{\text{gen}}([-a,b]) = S_0 + \frac{2\pi\phi_r}{\beta}\frac{1}{\tanh\left(\frac{2\pi a}{\beta}\right)} + \frac{c}{6}\log\left(\frac{2\beta\sinh^2\left(\frac{\pi}{\beta}(a+b)\right)}{\pi\epsilon\sinh\left(\frac{2\pi a}{\beta}\right)}\right) \quad (3.10)$$

From the previous Ramanujan expressions

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\,\pi)}+\frac{1}{6939\sinh(3\,\pi)}\right)}$$

$$\frac{296\,447\,958\tanh\left(\frac{\pi}{2}\right)+442\,963\,057\tanh(3\,\pi)+719\,470\,215\tanh(5\,\pi)}{6\,147\,441\,305\,046}$$

We obtain:

1/tanh((((296447958 (π/2) + 442963057 (3 π) + 719470215 (5 π))/6147441305046)))

Input:

$$\frac{1}{\frac{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}}$$

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

Exact result:

$$\frac{6147441305046}{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}$$

Decimal approximation:

4285.958605954208213734361862548850123878070152765655347630...

4285.9586

Property:

$$\frac{6147441305046}{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}$$

is a transcendental number

Alternate forms:

$$\frac{6147441305046}{296447958\tanh\left(\frac{\pi}{2}\right)+20737\,(21361\tanh(3\pi)+34695\tanh(5\pi))}$$

$$\frac{6147441305046}{\frac{296447958\sinh(\pi)}{1+\cosh(\pi)}+\frac{442963057\sinh(6\pi)}{1+\cosh(6\pi)}+\frac{719470215\sinh(10\pi)}{1+\cosh(10\pi)}}$$

$$\frac{6147441305046}{\frac{296447958\sinh\left(\frac{\pi}{2}\right)}{\cosh\left(\frac{\pi}{2}\right)}+\frac{442963057\sinh(3\pi)}{\cosh(3\pi)}+\frac{719470215\sinh(5\pi)}{\cosh(5\pi)}}$$

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

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

Alternative representations:

$$\frac{1}{\frac{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}}=\frac{1}{\frac{\frac{296447958}{\coth\left(\frac{\pi}{2}\right)}+\frac{442963057}{\coth(3\pi)}+\frac{719470215}{\coth(5\pi)}}{6147441305046}}$$

$$\frac{1}{\frac{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}} = \frac{1}{\frac{719470215\left(-1+\frac{2}{1+e^{-10\pi}}\right)+442963057\left(-1+\frac{2}{1+e^{-6\pi}}\right)+296447958\left(-1+\frac{2}{1+e^{-\pi}}\right)}{6147441305046}}$$

$$\frac{1}{\frac{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}} = \frac{1}{\frac{-\frac{296447958\,i}{\cot\left(\frac{i\pi}{2}\right)}-\frac{442963057\,i}{\cot(3\,i\,\pi)}-\frac{719470215\,i}{\cot(5\,i\,\pi)}}{6147441305046}}$$

Series representations:

$$\frac{1}{\frac{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}} = -\left(3073720652523\Big/\left(-729440615+\sum_{k=0}^{\infty}\left(442963057\,e^{(-6-(6-i)k)\pi}+296447958\,e^{(-1-(1-i)k)\pi}+719470215\,(-1)^k\,e^{-10(1+k)\pi}\right)\right)\right)$$

$$\frac{1}{\frac{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}} = \frac{1024573550841}{4\pi\sum_{k=1}^{\infty}\frac{\frac{49407993}{1+(1-2k)^2}+20737\left(\frac{21361}{37-4k+4k^2}+\frac{57825}{101-4k+4k^2}\right)}{\pi^2}}$$

$$\frac{1}{\frac{296447958\tanh\left(\frac{\pi}{2}\right)+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}} = 6147441305046\Big/\left(\sum_{k=0}^{\infty}\left(-296447958\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)\left(\frac{\pi}{2}-z_0\right)^k-442963057\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(3\pi-z_0)^k-719470215\left(\delta_k+\frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(5\pi-z_0)^k\right)\right) \quad \text{for } \frac{1}{2}+\frac{i z_0}{\pi}\notin\mathbb{Z}$$

Integral representation:

$$\frac{1}{\frac{296447958\tanh(\frac{\pi}{2})+442963057\tanh(3\pi)+719470215\tanh(5\pi)}{6147441305046}} = \frac{6147441305046}{\int_0^{\frac{\pi}{2}}(296447958\operatorname{sech}^2(t)+124422(21361\operatorname{sech}^2(6t)+57825\operatorname{sech}^2(10t)))\,dt}$$

sech(x) is the hyperbolic secant function

54 + golden ratio - 1/(1 - 82944 π (1/(20737 sinh(π)) - 1/(10376 sinh(2 π)) + 1/(6939 sinh(3 π))))

Input:

$$54+\phi-\frac{1}{1-82944\pi\left(\frac{1}{20737\sinh(\pi)}-\frac{1}{10376\sinh(2\pi)}+\frac{1}{6939\sinh(3\pi)}\right)}$$

sinh(x) is the hyperbolic sine function

ϕ is the golden ratio

Exact result:

$$\phi+54-\frac{1}{1-82944\pi\left(\frac{\operatorname{csch}(\pi)}{20737}-\frac{\operatorname{csch}(2\pi)}{10376}+\frac{\operatorname{csch}(3\pi)}{6939}\right)}$$

csch(x) is the hyperbolic cosecant function

Decimal approximation:

3096.900298273126807801702180739848133876304011281727955975...

3096.9002982… result practically equal to the rest mass of J/Psi meson 3096.916

Alternate forms:

$$\phi+54-\frac{1}{1-82944\pi\left(\frac{\operatorname{csch}(3\pi)}{6939}+\operatorname{csch}(\pi)\left(\frac{1}{20737}-\frac{\operatorname{sech}(\pi)}{20752}\right)\right)}$$

$$\frac{1}{2}\left(109+\sqrt{5}\right)+6912243473/(-6912243473+27647640576\pi\operatorname{csch}(\pi)-55255312512\pi\operatorname{csch}(2\pi)+82624171008\pi\operatorname{csch}(3\pi))$$

$$54+\frac{1}{2}\left(1+\sqrt{5}\right)-\frac{1}{1-82\,944\,\pi\left(\frac{\operatorname{csch}(\pi)}{20\,737}-\frac{\operatorname{csch}(2\,\pi)}{10\,376}+\frac{\operatorname{csch}(3\,\pi)}{6939}\right)}$$

sech(x) is the hyperbolic secant function

Alternative representations:

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\,\pi)}+\frac{1}{6939\sinh(3\,\pi)}\right)}=54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{\frac{20\,737}{\operatorname{csch}(\pi)}}-\frac{1}{\frac{10\,376}{\operatorname{csch}(2\,\pi)}}+\frac{1}{\frac{6939}{\operatorname{csch}(3\,\pi)}}\right)}$$

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\,\pi)}+\frac{1}{6939\sinh(3\,\pi)}\right)}=54+\phi-\frac{1}{1-82\,944\,\pi\left(-\frac{1}{\frac{20\,737\,i}{\csc(i\,\pi)}}--\frac{1}{\frac{10\,376\,i}{\csc(2\,i\,\pi)}}+-\frac{1}{\frac{6939\,i}{\csc(3\,i\,\pi)}}\right)}$$

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\,\pi)}+\frac{1}{6939\sinh(3\,\pi)}\right)}=54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{\frac{20\,737}{2}\left(-e^{-\pi}+e^{\pi}\right)}-\frac{1}{5188\left(-e^{-2\,\pi}+e^{2\,\pi}\right)}+\frac{1}{\frac{6939}{2}\left(-e^{-3\,\pi}+e^{3\,\pi}\right)}\right)}$$

Series representations:

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\,\pi)}+\frac{1}{6939\sinh(3\,\pi)}\right)}=54+\phi-\frac{1}{1-82\,944\,\pi\sum_{k=-\infty}^{\infty}\frac{(-1)^k\left(430\,646\,479+214\,268\,942\,k^2+71\,618\,719\,k^4\right)}{248\,840\,765\,028\left(1+k^2\right)\left(4+k^2\right)\left(9+k^2\right)\pi}}$$

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\,\pi)}+\frac{1}{6939\sinh(3\,\pi)}\right)}=54+\phi-\frac{1}{1-82\,944\,\pi\sum_{k=0}^{\infty}\left(\frac{2\,e^{-3\,\pi-6\,k\,\pi}}{6939}-\frac{e^{-2\,\pi-4\,k\,\pi}}{5188}+\frac{2\,e^{-\pi-2\,k\,\pi}}{20\,737}\right)}$$

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\pi)}+\frac{1}{6939\sinh(3\pi)}\right)}=$$

$$54+\phi-1\Bigg/\left(1-82\,944\,\pi\sum_{k=0}^{\infty}\left(\left(\mathrm{Li}_{-k}\left(-e^{z_0}\right)-\mathrm{Li}_{-k}\left(e^{z_0}\right)\right)\left(71\,999\,064\,(\pi-z_0)^k-143\,894\,043\,(2\pi-z_0)^k+215\,167\,112\,(3\pi-z_0)^k\right)\right)\Big/(1\,493\,044\,590\,168\,k!)\right)\quad\text{for }\frac{i\,z_0}{\pi}\notin\mathbb{Z}$$

Integral representations:

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\pi)}+\frac{1}{6939\sinh(3\pi)}\right)}=$$

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\,\pi\int_0^1\cosh(\pi t)\,dt}-\frac{1}{20\,752\,\pi\int_0^1\cosh(2\pi t)\,dt}+\frac{1}{20\,817\,\pi\int_0^1\cosh(3\pi t)\,dt}\right)}$$

$$54+\phi-\frac{1}{1-82\,944\,\pi\left(\frac{1}{20\,737\sinh(\pi)}-\frac{1}{10\,376\sinh(2\pi)}+\frac{1}{6939\sinh(3\pi)}\right)}=54+\phi-$$

$$1\Bigg/\left(1-82\,944\,\pi\left(\frac{4\,i}{20\,737\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^2/(4s)+s}}{s^{3/2}}\,ds}-\frac{i}{5188\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{\pi^2/s+s}}{s^{3/2}}\,ds}+\frac{4\,i}{20\,817\sqrt{\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{(9\pi^2)/(4s)+s}}{s^{3/2}}\,ds}\right)\right)\quad\text{for }\gamma>0$$

If we put:

$$\left(\frac{1}{\tanh\left(\frac{2\pi a}{\beta}\right)}\right)=\left(\frac{1}{\frac{296\,447\,958\tanh\left(\frac{\pi}{2}\right)+442\,963\,057\tanh(3\pi)+719\,470\,215\tanh(5\pi)}{6\,147\,441\,305\,046}}\right)=4285.9586$$

and

$$\left(\left(\frac{2\beta \sinh^2\left(\frac{\pi}{\beta}(a+b)\right)}{\pi\epsilon \sinh\left(\frac{2\pi a}{\beta}\right)} \right) \right) = \left(\phi + 54 - \frac{1}{1 - 82\,944\,\pi\left(\frac{\operatorname{csch}(\pi)}{20\,737} - \frac{\operatorname{csch}(2\pi)}{10\,376} + \frac{\operatorname{csch}(3\pi)}{6939}\right)} \right) =$$

= 3096.9002982…

We obtain from

$$S_0 + \frac{2\pi\phi_r}{\beta} \frac{1}{\tanh\left(\frac{2\pi a}{\beta}\right)} + \frac{c}{6} \log\left(\frac{2\beta \sinh^2\left(\frac{\pi}{\beta}(a+b)\right)}{\pi\epsilon \sinh\left(\frac{2\pi a}{\beta}\right)} \right)$$

For

$\phi_r/(\beta c) \gtrsim 1$ = 0.98911 or 1.0864055

$\frac{\text{Area}}{4G_N} = S_0 + \phi.$

$4G_N = 1$

S_0 = 4Pi – 0.98911

c = 1

S_0 + 2Pi*0.98911* 4285.9586 + $\frac{c}{6}$ ln (3096.9002982)

4Pi-0.98911+2Pi*0.98911*4285.9586+1/6*ln(3096.9002982)

Input interpretation:

$4\pi - 0.98911 + 2\pi \times 0.98911 \times 4285.9586 + \frac{1}{6} \log(3096.9002982)$

Result:

26649.1…

26649.1…

Alternative representations:

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi + \frac{\log_e(3096.90029820000)}{6}$$

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi + \frac{1}{6}\log(a)\log_a(3096.90029820000)$$

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi - \frac{\text{Li}_1(-3095.90029820000)}{6}$$

Series representations:

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi + \frac{\log(3095.90029820000)}{6} - \frac{1}{6}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-8.03783403076730k}}{k}$$

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi + \frac{1}{3} i\pi\left\lfloor\frac{\arg(3096.90029820000 - x)}{2\pi}\right\rfloor + \frac{\log(x)}{6} - \frac{1}{6}\sum_{k=1}^{\infty}\frac{(-1)^k (3096.90029820000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi + \frac{1}{6}\left\lfloor\frac{\arg(3096.90029820000 - z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right) + \frac{\log(z_0)}{6} + \frac{1}{6}\left\lfloor\frac{\arg(3096.90029820000 - z_0)}{2\pi}\right\rfloor\log(z_0) - \frac{1}{6}\sum_{k=1}^{\infty}\frac{(-1)^k (3096.90029820000 - z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi + \frac{1}{6}\int_1^{3096.90029820000}\frac{1}{t}\,dt$$

$$4\pi - 0.98911 + 2\pi\, 0.98911 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 8482.57\pi + \frac{1}{12 i \pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-8.03783403076730 s}\, \Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

Inserting the entropy value 26649.1 in the Hawking radiation calculator, we obtain:

Mass = 0.00000100229

Radius = 1.48856E-33

Temperature = 1.22416E29

Entropy = 26649.1

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(0.00000100229)* sqrt[[-((((1.22416e+29 * 4*Pi*(1.48856e-33)^3-(1.48856e-33)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{1 \Bigg/ \left(\frac{4 \times 1.962364415 \times 10^{19}}{5 \times 0.0864055^2} \times \frac{1}{1.00229 \times 10^{-6}} \sqrt{-\frac{1.22416 \times 10^{29} \times 4\pi (1.48856 \times 10^{-33})^3 - (1.48856 \times 10^{-33})^2}{6.67 \times 10^{-11}}} \right)}$$

Result:

1.618081735392146230436561397898828941494902451109365297284...

1.61808173539…

And:

1/sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(0.00000100229)* sqrt[[-((((1.22416e+29 * 4*Pi*(1.48856e-33)^3-(1.48856e-33)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\frac{1}{\sqrt{\frac{1}{\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{1.00229\times 10^{-6}}\sqrt{-\frac{1.22416\times 10^{29}\times 4\pi\left(1.48856\times 10^{-33}\right)^3-\left(1.48856\times 10^{-33}\right)^2}{6.67\times 10^{-11}}}}}}$$

Result:

0.618015751693561668331267490642891547545081526820311348060...

0.61801575169…

Practically we obtain the values of the golden ratio and his conjugate

Or:

4Pi-0.98911+2Pi*1.0864055*4285.9586+1/6*ln(3096.9002982)

Input interpretation:

$$4\pi - 0.98911 + 2\pi\times 1.0864055\times 4285.9586 + \frac{1}{6}\log(3096.9002982)$$

log(x) is the natural logarithm

Result:

29269.244...

29269.244…

Alternative representations:

$$4\pi - 0.98911 + 2\pi\, 1.08641\times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\,\pi + \frac{\log_e(3096.90029820000)}{6}$$

$$4\pi - 0.98911 + 2\pi\, 1.08641\times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\,\pi + \frac{1}{6}\log(a)\log_a(3096.90029820000)$$

$$4\pi - 0.98911 + 2\pi\, 1.08641\times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\,\pi - \frac{\mathrm{Li}_1(-3095.90029820000)}{6}$$

Series representations:

$$4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\pi + \frac{\log(3095.90029820000)}{6} - \frac{1}{6}\sum_{k=1}^{\infty} \frac{(-1)^k e^{-8.03783403076730\,k}}{k}$$

$$4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\pi + \frac{1}{3} i\pi \left\lfloor \frac{\arg(3096.90029820000 - x)}{2\pi} \right\rfloor + \frac{\log(x)}{6} - \frac{1}{6}\sum_{k=1}^{\infty} \frac{(-1)^k (3096.90029820000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\pi + \frac{1}{6}\left\lfloor \frac{\arg(3096.90029820000 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \frac{\log(z_0)}{6} + \frac{1}{6}\left\lfloor \frac{\arg(3096.90029820000 - z_0)}{2\pi} \right\rfloor \log(z_0) - \frac{1}{6}\sum_{k=1}^{\infty} \frac{(-1)^k (3096.90029820000 - z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\pi + \frac{1}{6}\int_1^{3096.90029820000} \frac{1}{t}\, dt$$

$$4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6} = -0.98911 + 9316.58\pi + \frac{1}{12 i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{-8.03783403076730\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

Inserting the entropy value 29269.244 in the Hawking radiation calculator, we obtain:

Mass = 0.00000105040

Radius = 1.56002e-33

Temperature = 1.16808e+29

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(0.00000105040)* sqrt[[-((((1.16808e+29 * 4*Pi*(1.56002e-33)^3-(1.56002e-33)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{\left(1/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{1.05040\times 10^{-6}}\sqrt{-\frac{1.16808\times 10^{29}\times 4\pi\left(1.56002\times 10^{-33}\right)^3-\left(1.56002\times 10^{-33}\right)^2}{6.67\times 10^{-11}}}\right)\right)}$$

Result:

1.618077063491289140603706176247888824149668700084618992874...

1.618077063…

We have also that:

(((4Pi-0.98911+2Pi*1.0864055*4285.9586+1/6*ln(3096.9002982))))^1/2 - 29 - golden ratio^2

Input interpretation:

$$\sqrt{4\pi-0.98911+2\pi\times 1.0864055\times 4285.9586+\frac{1}{6}\log(3096.9002982)}-29-\phi^2$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

139.46453...

139.46453… result practically equal to the rest mass of Pion meson 139.57

Alternative representations:

$$\sqrt{4\pi-0.98911+2\pi\,1.08641\times 4285.96+\frac{\log(3096.90029820000)}{6}}-29-\phi^2=$$

$$-29-\phi^2+\sqrt{-0.98911+9316.58\pi+\frac{\log_e(3096.90029820000)}{6}}$$

$$\sqrt{4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6}} - 29 - \phi^2 = -29 - \phi^2 + \sqrt{-0.98911 + 9316.58\pi + \frac{1}{6}\log(a)\log_a(3096.90029820000)}$$

$$\sqrt{4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6}} - 29 - \phi^2 = -29 - \phi^2 + \sqrt{-0.98911 + 9316.58\pi - \frac{\text{Li}_1(-3095.90029820000)}{6}}$$

Series representations:

$$\sqrt{4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6}} - 29 - \phi^2 = -29 - \phi^2 + \frac{\sqrt{-5.93466 + 55\,899.5\pi + \log(3095.90029820000) - \sum_{k=1}^{\infty} \frac{(-1)^k e^{-8.03783403076730\,k}}{k}}}{\sqrt{6}}$$

$$\sqrt{4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6}} - 29 - \phi^2 = -29 - \phi^2 + \sqrt{\left(-0.98911 + 9316.58\pi + \frac{1}{6}\left(2 i \pi \left\lfloor \frac{\arg(3096.90029820000 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (3096.90029820000 - x)^k x^{-k}}{k}\right)\right)} \quad \text{for } x < 0$$

$$\sqrt{4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6}} - 29 - \phi^2 = -29 - \phi^2 + \sqrt{\left(-0.98911 + 9316.58\pi + \frac{1}{6}\left(\log(z_0) + \left\lfloor \frac{\arg(3096.90029820000 - z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (3096.90029820000 - z_0)^k z_0^{-k}}{k}\right)\right)}$$

Integral representations:

$$\sqrt{4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6}} - 29 - \phi^2 =$$
$$-29 - \phi^2 + \sqrt{-0.98911 + 9316.58\,\pi + \frac{1}{6}\int_1^{3096.90029820000} \frac{1}{t}\,dt}$$

$$\sqrt{4\pi - 0.98911 + 2\pi\, 1.08641 \times 4285.96 + \frac{\log(3096.90029820000)}{6}} - 29 - \phi^2 =$$
$$-29 - \phi^2 + \sqrt{-0.98911 + 9316.58\,\pi + \frac{1}{12\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{-8.03783403076730\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}$$
for $-1 < \gamma < 0$

solve this equation, we must impose the same condition on the right-hand side. The $k = 1$ mode requires

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

Doing the integrals, this gives the condition

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

For

$a, b > 0$

a = 5, b = 2, c = 1 we obtain, from (3.30):

(((1/(sinh (5)))))/((((1/(6*0.98911)*(sinh(3/2)/sinh(7/2)))))

Input:

$$\frac{\frac{1}{\sinh(5)}}{\frac{1}{6\times 0.98911}\times\frac{\sinh\left(\frac{3}{2}\right)}{\sinh\left(\frac{7}{2}\right)}}$$

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

Result:

0.621362...

0.621362…

Alternative representations:

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = \frac{1}{\frac{\frac{1}{\operatorname{csch}(5)\left(5.93466\operatorname{csch}\left(\frac{3}{2}\right)\right)}}{\operatorname{csch}\left(\frac{7}{2}\right)}}$$

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = \frac{1}{\frac{\left(-\frac{1}{e^5}+e^5\right)\left(-\frac{1}{e^{3/2}}+e^{3/2}\right)}{\frac{2}{2}\left(2\times 5.93466\left(-\frac{1}{e^{7/2}}+e^{7/2}\right)\right)}}$$

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = -\frac{1}{\frac{\frac{i(-i)}{\csc(5i)\left(5.93466\csc\left(\frac{3i}{2}\right)(-i)\right)}}{\csc\left(\frac{7i}{2}\right)}}$$

Series representations:

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = \frac{5.93466\sum_{k=0}^{\infty}\frac{\left(\frac{7}{2}\right)^{1+2k}}{(1+2k)!}}{\left(\sum_{k=0}^{\infty}\frac{\left(\frac{3}{2}\right)^{1+2k}}{(1+2k)!}\right)\sum_{k=0}^{\infty}\frac{5^{1+2k}}{(1+2k)!}}$$

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = \frac{2.96733\sum_{k=0}^{\infty}I_{1+2k}\left(\frac{7}{2}\right)}{\left(\sum_{k=0}^{\infty}I_{1+2k}\left(\frac{3}{2}\right)\right)\sum_{k=0}^{\infty}I_{1+2k}(5)}$$

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = \frac{5.93466\sum_{k=0}^{\infty}\frac{\left(\frac{7}{2}-\frac{i\pi}{2}\right)^{2k}}{(2k)!}}{i\left(\sum_{k=0}^{\infty}\frac{\left(\frac{3}{2}-\frac{i\pi}{2}\right)^{2k}}{(2k)!}\right)\sum_{k=0}^{\infty}\frac{\left(5-\frac{i\pi}{2}\right)^{2k}}{(2k)!}}$$

Integral representations:

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = \frac{2.76951\int_0^1\cosh\left(\frac{7t}{2}\right)dt}{\left(\int_0^1\cosh\left(\frac{3t}{2}\right)dt\right)\int_0^1\cosh(5t)\,dt}$$

$$\frac{1}{\frac{\sinh\left(\frac{3}{2}\right)\sinh(5)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)}} = \frac{11.078\, i\, \pi \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{49/(16\,s)+s}}{s^{3/2}}\, d\,s}{\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{9/(16\,s)+s}}{s^{3/2}}\, d\,s\right)\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{e^{25/(4\,s)+s}}{s^{3/2}}\, d\,s\right)\sqrt{\pi}} \quad \text{for } \gamma > 0$$

0.62136239751766*(((1/(6*0.98911)*(sinh(3/2)/sinh(7/2)))))

Input interpretation:

$$0.62136239751766\left(\frac{1}{6\times 0.98911}\times\frac{\sinh\left(\frac{3}{2}\right)}{\sinh\left(\frac{7}{2}\right)}\right)$$

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

Result:

0.0134765...

0.0134765…

Alternative representations:

$$\frac{0.62136239751766000\,\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\,\sinh\left(\frac{7}{2}\right)} = \frac{0.62136239751766000}{\frac{5.93466\,\text{csch}\left(\frac{3}{2}\right)}{\text{csch}\left(\frac{7}{2}\right)}}$$

$$\frac{0.62136239751766000\,\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\,\sinh\left(\frac{7}{2}\right)} = \frac{0.31068119875883000\left(-\frac{1}{e^{3/2}}+e^{3/2}\right)}{\frac{1}{2}\times 5.93466\left(-\frac{1}{e^{7/2}}+e^{7/2}\right)}$$

$$\frac{0.62136239751766000\,\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\,\sinh\left(\frac{7}{2}\right)} = -\frac{0.62136239751766000\, i}{\frac{5.93466\,\csc\left(\frac{3\,i}{2}\right)(-i)}{\csc\left(\frac{7\,i}{2}\right)}}$$

Series representations:

$$\frac{0.62136239751766000\,\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\,\sinh\left(\frac{7}{2}\right)} = \frac{0.104701\sum_{k=0}^{\infty}\frac{\left(\frac{3}{2}\right)^{1+2\,k}}{(1+2\,k)!}}{\sum_{k=0}^{\infty}\frac{\left(\frac{7}{2}\right)^{1+2\,k}}{(1+2\,k)!}}$$

$$\frac{0.62136239751766000\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)} = \frac{0.104701\sum_{k=0}^{\infty} I_{1+2k}\left(\frac{3}{2}\right)}{\sum_{k=0}^{\infty} I_{1+2k}\left(\frac{7}{2}\right)}$$

$$\frac{0.62136239751766000\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)} = \frac{0.104701\sum_{k=0}^{\infty} \frac{\left(\frac{3}{2}-\frac{i\pi}{2}\right)^{2k}}{(2k)!}}{\sum_{k=0}^{\infty} \frac{\left(\frac{7}{2}-\frac{i\pi}{2}\right)^{2k}}{(2k)!}}$$

Integral representations:

$$\frac{0.62136239751766000\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)} = \frac{0.0448717\int_0^1 \cosh\left(\frac{3t}{2}\right)dt}{\int_0^1 \cosh\left(\frac{7t}{2}\right)dt}$$

$$\frac{0.62136239751766000\sinh\left(\frac{3}{2}\right)}{(6\times 0.98911)\sinh\left(\frac{7}{2}\right)} = \frac{0.0448717\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{9/(16s)+s}}{s^{3/2}}\,ds}{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^{49/(16s)+s}}{s^{3/2}}\,ds} \quad \text{for } \gamma > 0$$

(((1/(sinh (5)))))

Input:

$$\frac{1}{\sinh(5)}$$

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

Exact result:

$\operatorname{csch}(5)$

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

Decimal approximation:

0.013476505830589086655381881284337964618035455336483814697...

0.013476505…

Property:

$\operatorname{csch}(5)$ is a transcendental number

Alternate forms:

$$\frac{2 e^5}{e^{10} - 1}$$

$$\frac{2}{e^5 - \frac{1}{e^5}}$$

$$-\frac{2 \sinh(5)}{1 - \cosh(10)}$$

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

Alternative representations:

$$\frac{1}{\sinh(5)} = \frac{1}{\frac{1}{\operatorname{csch}(5)}}$$

$$\frac{1}{\sinh(5)} = \frac{1}{\frac{1}{2}\left(-\frac{1}{e^5} + e^5\right)}$$

$$\frac{1}{\sinh(5)} = -\frac{1}{\frac{i}{\csc(5 i)}}$$

Series representations:

$$\frac{1}{\sinh(5)} = \frac{2 \sum_{k=0}^{\infty} e^{-10 k}}{e^5}$$

$$\frac{1}{\sinh(5)} = -2 \sum_{k=1}^{\infty} q^{-1+2 k} \quad \text{for } q = e^5$$

$$\frac{1}{\sinh(5)} = 5 \sum_{k=-\infty}^{\infty} \frac{(-1)^k}{25 + k^2 \pi^2}$$

Integral representations:

$$\frac{1}{\sinh(5)} = \frac{1}{5 \int_0^1 \cosh(5 t) \, dt}$$

$$\frac{1}{\sinh(5)} = \frac{4 i \pi}{5 \sqrt{\pi} \int_{-i \infty+\gamma}^{i \infty+\gamma} \frac{e^{25/(4 s)+s}}{s^{3/2}} \, ds} \quad \text{for } \gamma > 0$$

The fundamental result in this expression is 0.62136239751766. Note that the inverse of this value is 1.6093667785417...: these are "golden numbers"

at $t = 0$. The generalized entropy, including the island, is

$$S_{\text{gen}}(I \cup R) = \frac{\phi_r}{a} + \frac{c}{6} \log \frac{(a+b)^2}{a} \ . \tag{4.3}$$

Setting $\partial_a S_{\text{gen}} = 0$ gives the position of the QES,

$$a = \frac{1}{2}(k + b + \sqrt{b^2 + 6bk + k^2}) \ , \quad k \equiv \frac{6\phi_r}{c} \ . \tag{4.4}$$

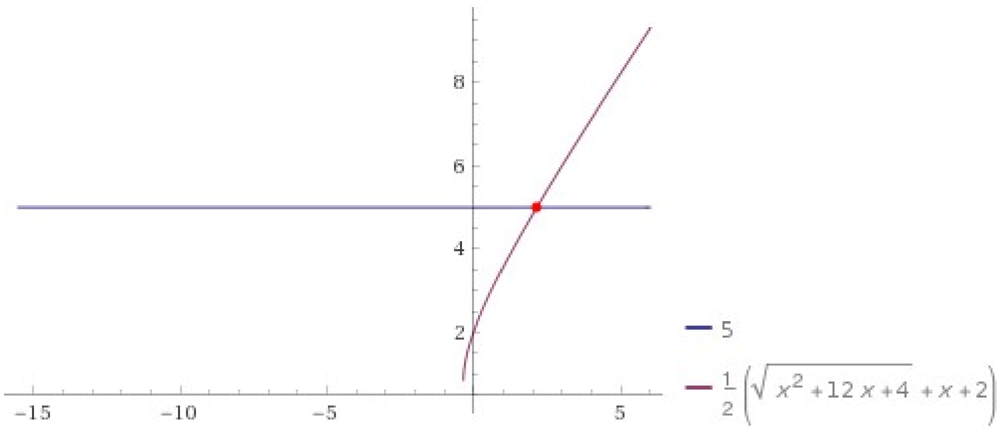
For a = 5, b = 2

5 = 1/2(x+2+sqrt(4+12x+x^2))

Input:

$$5 = \frac{1}{2}\left(x + 2 + \sqrt{4 + 12x + x^2}\right)$$

Plot:



Alternate forms:

$$\sqrt{x^2 + 12x + 4} + x = 8$$

$$5 = \frac{1}{2}\left(x + \sqrt{x(x+12) + 4} + 2\right)$$

Alternate form assuming x is positive:

$$x + \sqrt{x(x+12) + 4} = 8$$

Expanded form:

$$5 = \frac{1}{2}\sqrt{x^2 + 12x + 4} + \frac{x}{2} + 1$$

Solution:

$$x = \frac{15}{7}$$

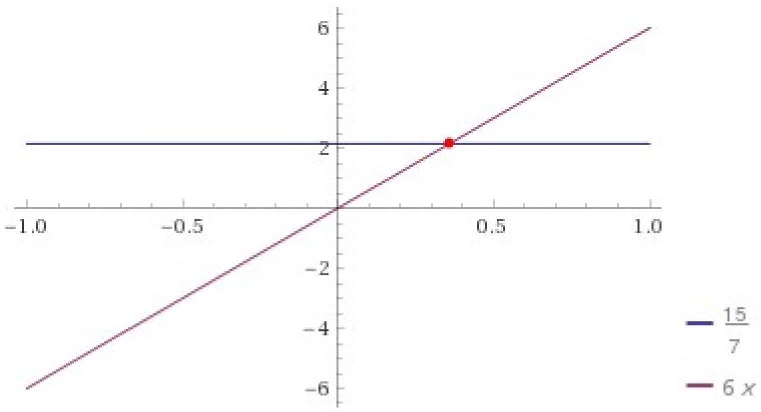
15/7 = k

15/7 = 6x

Input:

$$\frac{15}{7} = 6x$$

Plot:



Alternate form:

$$\frac{15}{7} - 6x = 0$$

Solution:

$$x = \frac{5}{14}$$

5/14 = ϕ_r

a = 5, b = 2

$$S_{\text{gen}}(I \cup R) = \frac{\phi_r}{a} + \frac{c}{6}\log\frac{(a+b)^2}{a}$$

5/14*1/5 + 1/6 *ln(49/5)

Input:

$$\frac{5}{14} \times \frac{1}{5} + \frac{1}{6} \log\left(\frac{49}{5}\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{1}{14} + \frac{1}{6} \log\left(\frac{49}{5}\right)$$

Decimal approximation:

0.4518256357079924678397529303719333985295232555777722044 05...

0.451825635…

Property:

$\frac{1}{14} + \frac{1}{6} \log\left(\frac{49}{5}\right)$ is a transcendental number

Alternate forms:

$$\frac{1}{42} \left(3 + 7 \log\left(\frac{49}{5}\right)\right)$$

$$\frac{1}{14} - \frac{\log(5)}{6} + \frac{\log(7)}{3}$$

$$\frac{1}{42} (3 - 7 \log(5) + 14 \log(7))$$

Alternative representations:

$$\frac{5}{5 \times 14} + \frac{1}{6} \log\left(\frac{49}{5}\right) = \frac{\log_e\left(\frac{49}{5}\right)}{6} + \frac{5}{5 \times 14}$$

$$\frac{5}{5 \times 14} + \frac{1}{6} \log\left(\frac{49}{5}\right) = \frac{1}{6} \log(a) \log_a\left(\frac{49}{5}\right) + \frac{5}{5 \times 14}$$

$$\frac{5}{5 \times 14} + \frac{1}{6} \log\left(\frac{49}{5}\right) = -\frac{1}{6} \operatorname{Li}_1\left(1 - \frac{49}{5}\right) + \frac{5}{5 \times 14}$$

Series representations:

$$\frac{5}{5 \times 14} + \frac{1}{6} \log\left(\frac{49}{5}\right) = \frac{1}{14} + \frac{1}{6} \log\left(\frac{44}{5}\right) - \frac{1}{6} \sum_{k=1}^{\infty} \frac{\left(-\frac{5}{44}\right)^k}{k}$$

$$\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)=\frac{1}{14}+\frac{1}{3}i\pi\left\lfloor\frac{\arg\left(\frac{49}{5}-x\right)}{2\pi}\right\rfloor+\frac{\log(x)}{6}-\frac{1}{6}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{49}{5}-x\right)^k x^{-k}}{k}$$

for $x < 0$

$$\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)=\frac{1}{14}+\frac{1}{6}\left\lfloor\frac{\arg\left(\frac{49}{5}-z_0\right)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\frac{\log(z_0)}{6}+\frac{1}{6}\left\lfloor\frac{\arg\left(\frac{49}{5}-z_0\right)}{2\pi}\right\rfloor\log(z_0)-\frac{1}{6}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{49}{5}-z_0\right)^k z_0^{-k}}{k}$$

Integral representations:

$$\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)=\frac{1}{14}+\frac{1}{6}\int_1^{\frac{49}{5}}\frac{1}{t}\,dt$$

$$\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)=\frac{1}{14}-\frac{i}{12\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{5}{44}\right)^s\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

Note that:

64/(((5/14*1/5 + 1/6 *ln(49/5))))-16

Input:

$$\frac{64}{\frac{5}{14}\times\frac{1}{5}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{64}{\frac{1}{14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16$$

Decimal approximation:

125.64756255964669339735437355985654932714242564962638021 18...

125.64756255… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Property:

$$-16+\frac{64}{\frac{1}{14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}\text{ is a transcendental number}$$

Alternate forms:

$$\frac{2688}{3+7\log\left(\frac{49}{5}\right)}-16$$

$$-\frac{16\left(7\log\left(\frac{49}{5}\right)-165\right)}{3+7\log\left(\frac{49}{5}\right)}$$

$$-\frac{16\,(165+7\log(5)-14\log(7))}{-3+7\log(5)-14\log(7)}$$

Alternative representations:

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=-16+\frac{64}{\frac{\log_e\left(\frac{49}{5}\right)}{6}+\frac{5}{5\times 14}}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=-16+\frac{64}{\frac{1}{6}\log(a)\log_a\left(\frac{49}{5}\right)+\frac{5}{5\times 14}}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=-16+\frac{64}{-\frac{1}{6}\operatorname{Li}_1\left(1-\frac{49}{5}\right)+\frac{5}{5\times 14}}$$

Series representations:

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=-16+\frac{2688}{3+7\log\left(\frac{44}{5}\right)-7\sum_{k=1}^{\infty}\frac{\left(-\frac{5}{44}\right)^k}{k}}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=$$

$$-16+\frac{64}{\frac{1}{14}+\frac{1}{6}\left(2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{49}{5}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{49}{5}-x\right)^k x^{-k}}{k}\right)}\quad\text{for } x<0$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=$$
$$-16+\frac{64}{\frac{1}{14}+\frac{1}{6}\left(\log(z_0)+\left\lfloor\frac{\arg\left(\frac{49}{5}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{49}{5}-z_0\right)^k z_0^{-k}}{k}\right)}$$

Integral representations:

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=-16+\frac{2688}{3+7\int_1^{\frac{49}{5}}\frac{1}{t}\,dt}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-16=-16+\frac{5376\pi}{6\pi-7i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{5}{44}\right)^s\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\quad\text{for } -1<\gamma<0$$

And:

64/(((5/14*1/5 + 1/6 *ln(49/5))))-sqrt5

Input:

$$\frac{64}{\frac{5}{14}\times\frac{1}{5}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{64}{\frac{1}{14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}$$

Decimal approximation:

139.4114945821469037009451998911252730917018072900148544875...

139.41149458… result practically equal to the rest mass of Pion meson 139.57

Property:

$$-\sqrt{5}+\frac{64}{\frac{1}{14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}\text{ is a transcendental number}$$

Alternate forms:

$$\frac{2688}{3+7\log\left(\frac{49}{5}\right)}-\sqrt{5}$$

$$-\frac{-2688+3\sqrt{5}+7\sqrt{5}\log\left(\frac{49}{5}\right)}{3+7\log\left(\frac{49}{5}\right)}$$

$$-\frac{2688-3\sqrt{5}+7\sqrt{5}\log(5)-14\sqrt{5}\log(7)}{-3+7\log(5)-14\log(7)}$$

Alternative representations:

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=\frac{64}{\frac{\log_e\left(\frac{49}{5}\right)}{6}+\frac{5}{5\times 14}}-\sqrt{5}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=\frac{64}{\frac{1}{6}\log(a)\log_a\left(\frac{49}{5}\right)+\frac{5}{5\times 14}}-\sqrt{5}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=\frac{64}{-\frac{1}{6}\operatorname{Li}_1\left(1-\frac{49}{5}\right)+\frac{5}{5\times 14}}-\sqrt{5}$$

Series representations:

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=-\sqrt{5}+\frac{2688}{3+7\log\left(\frac{44}{5}\right)-7\sum_{k=1}^{\infty}\frac{\left(-\frac{5}{44}\right)^k}{k}}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=$$
$$-\sqrt{5}+\frac{64}{\frac{1}{14}+\frac{1}{6}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{49}{5}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{49}{5}-x\right)^k x^{-k}}{k}\right)}\quad\text{for } x<0$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=$$
$$-\sqrt{5}+\frac{2688}{3+7\log(z_0)+7\left\lfloor\frac{\arg\left(\frac{49}{5}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-7\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{49}{5}-z_0\right)^k z_0^{-k}}{k}}$$

Integral representations:

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=-\sqrt{5}+\frac{2688}{3+7\int_1^{\frac{49}{5}}\frac{1}{t}\,dt}$$

$$\frac{64}{\frac{5}{5\times 14}+\frac{1}{6}\log\left(\frac{49}{5}\right)}-\sqrt{5}=-\sqrt{5}+\frac{5376\,\pi}{6\,\pi-7\,i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\left(\frac{5}{44}\right)^s\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\quad\text{for } -1<\gamma<0$$

Inserting the entropy value 0.451826 in the Hawking radiation calculator, we obtain:

Mass = 4.12701e-9

Radius = 6.12930e-36

Temperature = 2.97299e+31

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(4.12701e-9)* sqrt[[-((((2.97299e+31* 4*Pi*(6.12930e-36)^3-(6.12930e-36)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{\left(1\Bigg/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{4.12701\times 10^{-9}}\sqrt{-\frac{2.97299\times 10^{31}\times 4\,\pi\left(6.12930\times 10^{-36}\right)^3-\left(6.12930\times 10^{-36}\right)^2}{6.67\times 10^{-11}}}\right)\right)}$$

Result:

1.618077245318552386950716639328104478879882410161156440606...

1.618077245…

And:

1/sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(4.12701e-9)* sqrt[[-((((2.97299e+31* 4*Pi*(6.12930e-36)^3-(6.12930e-36)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\frac{1}{\sqrt{\frac{1}{\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times \frac{1}{4.12701\times 10^{-9}}\sqrt{-\frac{2.97299\times 10^{31}\times 4\pi(6.12930\times 10^{-36})^3-(6.12930\times 10^{-36})^2}{6.67\times 10^{-11}}}}}}$$

Result:

0.618017466652606600879908700049928924823645848704609289180...

0.61801746…

From:

$$S_{\text{fermions}}(I\cup R)=\frac{c}{3}\log\left[\frac{2\cosh t_a\cosh t_b\,|\cosh(t_a-t_b)-\cosh(a+b)|}{\sinh a\cosh(\frac{a+b-t_a-t_b}{2})\cosh(\frac{a+b+t_a+t_b}{2})}\right]$$

we obtain:

1/3 ln (((2-cosh(5+2))/(sinh(5)cosh(7/2)cosh(7/2))))

Input:

$$\frac{1}{3}\log\left(\frac{2-\cosh(5+2)}{\sinh(5)\cosh\left(\frac{7}{2}\right)\cosh\left(\frac{7}{2}\right)}\right)$$

Exact result:

$$\frac{1}{3}\left(\log\left(-(2-\cosh(7))\operatorname{csch}(5)\operatorname{sech}^2\left(\frac{7}{2}\right)\right)+i\pi\right)$$

Decimal approximation:

− 1.2063788441890901037158798352081118020154307200752687721... +
1.0471975511965977461542144610931676280657231331250352736... i

Polar coordinates:

$r \approx 1.59749$ (radius), $\theta \approx 139.04°$ (angle)

1.59749

Alternate forms:

$$\frac{1}{3}\left(\log\left((\cosh(7)-2)\operatorname{csch}(5)\operatorname{sech}^2\left(\frac{7}{2}\right)\right)+i\pi\right)$$

$$\frac{1}{3}\log\left((\cosh(7)-2)\operatorname{csch}(5)\operatorname{sech}^2\left(\frac{7}{2}\right)\right)+\frac{i\pi}{3}$$

$$\frac{1}{3}\left(i\pi + 2\log\left(\operatorname{sech}\left(\frac{7}{2}\right)\right) + \log(\cosh(7) - 2) + \log(\operatorname{csch}(5))\right)$$

Alternative representations:

$$\frac{1}{3}\log\left(\frac{2-\cosh(5+2)}{\sinh(5)\cosh\left(\frac{7}{2}\right)\cosh\left(\frac{7}{2}\right)}\right) = \frac{1}{3}\log_e\left(\frac{2-\cosh(7)}{\cosh^2\left(\frac{7}{2}\right)\sinh(5)}\right)$$

$$\frac{1}{3}\log\left(\frac{2-\cosh(5+2)}{\sinh(5)\cosh\left(\frac{7}{2}\right)\cosh\left(\frac{7}{2}\right)}\right) = \frac{1}{3}\log(a)\log_a\left(\frac{2-\cosh(7)}{\cosh^2\left(\frac{7}{2}\right)\sinh(5)}\right)$$

$$\frac{1}{3}\log\left(\frac{2-\cosh(5+2)}{\sinh(5)\cosh\left(\frac{7}{2}\right)\cosh\left(\frac{7}{2}\right)}\right) = \frac{1}{3}\log\left(\frac{2-\cos(7i)}{\frac{1}{2}\cos^2\left(\frac{7i}{2}\right)\left(-\frac{1}{e^5}+e^5\right)}\right)$$

Series representation:

$$\frac{1}{3}\log\left(\frac{2-\cosh(5+2)}{\sinh(5)\cosh\left(\frac{7}{2}\right)\cosh\left(\frac{7}{2}\right)}\right) =$$
$$\frac{i\pi}{3} - \frac{1}{3}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+(-2+\cosh(7))\operatorname{csch}(5)\operatorname{sech}^2\left(\frac{7}{2}\right)\right)^k}{k}$$

Integral representation:

$$\frac{1}{3}\log\left(\frac{2-\cosh(5+2)}{\sinh(5)\cosh\left(\frac{7}{2}\right)\cosh\left(\frac{7}{2}\right)}\right) = \frac{i\pi}{3} + \frac{1}{3}\int_1^{(-2+\cosh(7))\operatorname{csch}(5)\operatorname{sech}^2\left(\frac{7}{2}\right)}\frac{1}{t}\,dt$$

We have that:

$$S_{\text{gen}}^{\text{island}} = 2S_0 + \frac{2\phi_r}{\tanh a} + \frac{c}{3}\log\left(\frac{4\tanh^2\frac{a+b}{2}}{\sinh a}\right) . \qquad (5.10)$$

2*(4Pi-0.98911) + (((2*0.98911)/(tanh(5)))) + 1/3 * ln((((4tanh^2(7/2))/(sinh(5))))

Input:

$$2(4\pi - 0.98911) + \frac{2\times 0.98911}{\tanh(5)} + \frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)$$

Result:

24.15820...

24.15820... result very near to the black hole entropy 24.2477 (see Table)

Alternative representations:

$$2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)=$$
$$2(-0.98911+4\pi)+\frac{1}{3}\log_e\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)+\frac{1.97822}{-1+\frac{2}{1+\frac{1}{e^{10}}}}$$

$$2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)=$$
$$2(-0.98911+4\pi)+\frac{1}{3}\log(a)\log_a\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)+\frac{1.97822}{-1+\frac{2}{1+\frac{1}{e^{10}}}}$$

$$2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)=$$
$$2(-0.98911+4\pi)+\frac{1}{3}\log\left(\frac{4\left(-1+\frac{2}{1+\frac{1}{e^7}}\right)^2}{\frac{1}{2}\left(-\frac{1}{e^5}+e^5\right)}\right)+\frac{1.97822}{-1+\frac{2}{1+\frac{1}{e^{10}}}}$$

Series representations:

$$2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)=$$
$$\frac{1}{\sum_{k=1}^{\infty}\frac{1}{100+(1-2k)^2\pi^2}}\,8\left(0.00618194-0.247278\sum_{k=1}^{\infty}\frac{1}{100+(1-2k)^2\pi^2}+\right.$$
$$\left.\pi\sum_{k=1}^{\infty}\frac{1}{100+(1-2k)^2\pi^2}-0.0416667\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_2}\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^{k_2}}{\left(100+\pi^2(1-2k_1)^2\right)k_2}\right)$$

$$2(4\pi - 0.98911) + \frac{2\times 0.98911}{\tanh(5)} + \frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right) =$$

$$\left(8\left(-0.247278 + 0.5\pi - 0.247278\sum_{k=1}^{\infty}(-1)^k q^{2k} + \pi\sum_{k=1}^{\infty}(-1)^k q^{2k} - 0.0208333\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^k}{k} - 0.0416667\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1+k_2} q^{2k_1}\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^{k_2}}{k_2}\right)\right) \Big/ \left(0.5 + \sum_{k=1}^{\infty}(-1)^k q^{2k}\right) \text{ for } q = e^5$$

$$2(4\pi - 0.98911) + \frac{2\times 0.98911}{\tanh(5)} + \frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right) =$$

$$\left(8\left(-0.247278 - 0.247278\sum_{k=0}^{\infty}\left(\delta_k + \frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(5-z_0)^k + \pi\sum_{k=0}^{\infty}\left(\delta_k + \frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(5-z_0)^k - 0.0416667\sum_{k_1=0}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_2}\left(\delta_{k_1} + \frac{2^{1+k_1}\operatorname{Li}_{-k_1}(-e^{2z_0})}{k_1!}\right)(5-z_0)^{k_1}\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^{k_2}}{k_2}\right)\right) \Big/ \left(\sum_{k=0}^{\infty}\left(\delta_k + \frac{2^{1+k}\operatorname{Li}_{-k}(-e^{2z_0})}{k!}\right)(5-z_0)^k\right) \text{ for } \frac{1}{2} + \frac{i z_0}{\pi} \notin \mathbb{Z}$$

From:

Three-dimensional AdS gravity and extremal CFTs at c = 8m

Spyros D. Avramis, Alex Kehagiasb and Constantina Mattheopoulou

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m	L_0	d	S	S_{BH}
3	1	196883	12.1904	12.5664
	2	21296876	16.8741	17.7715
	3	842609326	20.5520	21.7656
4	2/3	139503	11.8458	11.8477
	5/3	69193488	18.0524	18.7328
	8/3	6928824200	22.6589	23.6954
5	1/3	20619	9.9340	9.3664
	4/3	86645620	18.2773	18.7328
	7/3	24157197490	23.9078	24.7812

m	L_0	d	S	S_{BH}
6	1	42987519	17.5764	17.7715
	2	40448921875	24.4233	25.1327
	3	8463511703277	29.7668	30.7812
7	2/3	7402775	15.8174	15.6730
	5/3	33934039437	24.2477	24.7812
	8/3	16953652012291	30.4615	31.3460
8	1/3	278511	12.5372	11.8477
	4/3	13996384631	23.3621	23.6954
	7/3	19400406113385	30.5963	31.3460

Table 1: Degeneracies, microscopic entropies and semiclassical entropies for the first few values of m and L_0.

5*((2*(4Pi-0.98911) + (((2*0.98911)/(tanh(5)))) + 1/3 * ln((((4tanh^2(7/2))/(sinh(5)))))))+18+1/golden ratio

Input:

$$5\left(2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)\right)+18+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.4090...

139.4090… result practically equal to the rest mass of Pion meson 139.57

Alternative representations:

$$5\left(2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)\right)+18+\frac{1}{\phi}=$$

$$18+\frac{1}{\phi}+5\left(2(-0.98911+4\pi)+\frac{1}{3}\log_e\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)+\frac{1.97822}{-1+\frac{2}{1+\frac{1}{e^{10}}}}\right)$$

$$5\left(2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)\right)+18+\frac{1}{\phi}=$$
$$18+\frac{1}{\phi}+5\left(2(-0.98911+4\pi)+\frac{1}{3}\log(a)\log_a\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)+\frac{1.97822}{-1+\frac{2}{1+\frac{1}{e^{10}}}}\right)$$

$$5\left(2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)\right)+18+\frac{1}{\phi}=$$
$$18+\frac{1}{\phi}+5\left(2(-0.98911+4\pi)+\frac{1}{3}\log\left(\frac{4\left(-1+\frac{2}{1+\frac{1}{e^7}}\right)^2}{\frac{1}{2}\left(-\frac{1}{e^5}+e^5\right)}\right)+\frac{1.97822}{-1+\frac{2}{1+\frac{1}{e^{10}}}}\right)$$

Series representations:

$$5\left(2(4\pi-0.98911)+\frac{2\times 0.98911}{\tanh(5)}+\frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)\right)+18+\frac{1}{\phi}=$$
$$\left(40\left(0.00618194\,\phi+0.025\sum_{k=1}^{\infty}\frac{1}{100+(1-2k)^2\pi^2}+\right.\right.$$
$$0.202723\,\phi\sum_{k=1}^{\infty}\frac{1}{100+(1-2k)^2\pi^2}+\phi\,\pi\sum_{k=1}^{\infty}\frac{1}{100+(1-2k)^2\pi^2}-0.0416667$$
$$\left.\left.\phi\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_2}\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^{k_2}}{\left(100+\pi^2(1-2k_1)^2\right)k_2}\right)\right)\Big/\left(\phi\sum_{k=1}^{\infty}\frac{1}{100+(1-2k)^2\pi^2}\right)$$

$$5\left(2(4\pi - 0.98911) + \frac{2\times 0.98911}{\tanh(5)} + \frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)\right) + 18 + \frac{1}{\phi} =$$

$$\left(40\left(0.0125 - 0.0222775\,\phi + 0.5\,\phi\,\pi + 0.025\sum_{k=1}^{\infty}(-1)^k q^{2k} + 0.202723\,\phi\sum_{k=1}^{\infty}(-1)^k q^{2k} + \phi\,\pi\sum_{k=1}^{\infty}(-1)^k q^{2k} - 0.0208333\,\phi\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^k}{k} - 0.0416667\,\phi\sum_{k_1=1}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1+k_2} q^{2k_1}\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^{k_2}}{k_2}\right)\right) \Big/ \left(\phi\left(0.5+\sum_{k=1}^{\infty}(-1)^k q^{2k}\right)\right) \text{ for } q = e^5$$

$$5\left(2(4\pi - 0.98911) + \frac{2\times 0.98911}{\tanh(5)} + \frac{1}{3}\log\left(\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)\right) + 18 + \frac{1}{\phi} =$$

$$\left(40\left(-0.247277\,\phi + 0.025\sum_{k=0}^{\infty}\left(\delta_k + \frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(5-z_0)^k + 0.202723\,\phi\sum_{k=0}^{\infty}\left(\delta_k + \frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(5-z_0)^k + \phi\,\pi\sum_{k=0}^{\infty}\left(\delta_k + \frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(5-z_0)^k - 0.0416667\,\phi\sum_{k_1=0}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_2}\left(\delta_{k_1} + \frac{2^{1+k_1}\,\mathrm{Li}_{-k_1}\left(-e^{2z_0}\right)}{k_1!}\right)(5-z_0)^{k_1}\left(-1+\frac{4\tanh^2\left(\frac{7}{2}\right)}{\sinh(5)}\right)^{k_2}}{k_2}\right)\right) \Big/ \left(\phi\sum_{k=0}^{\infty}\left(\delta_k + \frac{2^{1+k}\,\mathrm{Li}_{-k}\left(-e^{2z_0}\right)}{k!}\right)(5-z_0)^k\right) \text{ for } \frac{1}{2} + \frac{i z_0}{\pi} \notin \mathbb{Z}$$

Now, we have that:

$$S_{\text{matter}}(I \cup R) \approx 2S_{\text{matter}}([P_1, P_2]) - \frac{c}{3}\log\left(\frac{2|\cosh(a+b) - \cosh(t_a - t_b)|}{\sinh a}\right)$$

1/3 ln ((((2 cosh(5+2)-cosh(0)))/((sinh (5)))))

Input:

$$\frac{1}{3}\log\left(\frac{2\cosh(5+2) - \cosh(0)}{\sinh(5)}\right)$$

Exact result:

$$\frac{1}{3}\log((2\cosh(7) - 1)\operatorname{csch}(5))$$

csch(x) is the hyperbolic cosecant function

Decimal approximation:

0.8974270386082658654795828779131524940540975090456303568 25...

0.8974270386082….

Alternate forms:

$$\frac{1}{3}(\log(2\cosh(7) - 1) + \log(\operatorname{csch}(5)))$$

$$\frac{1}{3}\log\left(\frac{2\left(-1 + \frac{1}{e^7} + e^7\right)}{e^5 - \frac{1}{e^5}}\right)$$

$$\frac{1}{3}\left(-2 + \log(2) - \log\left(e^{10} - 1\right) + \log\left(1 - e^7 + e^{14}\right)\right)$$

Alternative representations:

$$\frac{1}{3}\log\left(\frac{2\cosh(5+2) - \cosh(0)}{\sinh(5)}\right) = \frac{1}{3}\log\left(\frac{-1 + \frac{1}{e^7} + e^7}{\frac{1}{2}\left(-\frac{1}{e^5} + e^5\right)}\right)$$

$$\frac{1}{3}\log\left(\frac{2\cosh(5+2) - \cosh(0)}{\sinh(5)}\right) = \frac{1}{3}\log_e\left(\frac{-\cosh(0) + 2\cosh(7)}{\sinh(5)}\right)$$

$$\frac{1}{3}\log\left(\frac{2\cosh(5+2) - \cosh(0)}{\sinh(5)}\right) = \frac{1}{3}\log(a)\log_a\left(\frac{-\cosh(0) + 2\cosh(7)}{\sinh(5)}\right)$$

Series representation:

$$\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)=$$

$$\frac{1}{3}\log(-1+(-1+2\cosh(7))\operatorname{csch}(5))-\frac{1}{3}\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{-1+(-1+2\cosh(7))\operatorname{csch}(5)}\right)^k}{k}$$

Integral representations:

$$\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)=\frac{1}{3}\int_1^{(-1+2\cosh(7))\operatorname{csch}(5)}\frac{1}{t}\,dt$$

$$\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)=$$

$$-\frac{i}{6\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{(-1+(-1+2\cosh(7))\operatorname{csch}(5))^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

((((1/3 ln ((((2 cosh(5+2)-cosh(0)))/((sinh (5))))))))))^1/16

Input:

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)}$$

Exact result:

$$\sqrt[16]{\frac{1}{3}\log((2\cosh(7)-1)\operatorname{csch}(5))}$$

csch(x) is the hyperbolic cosecant function

Decimal approximation:

0.9932588581313420012483941673692247559846320417997236860 55...

0.993258858131342….. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ**

Alternate forms:

$$\sqrt[16]{\frac{1}{3}\left(\log(2\cosh(7)-1)+\log(\operatorname{csch}(5))\right)}$$

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\left(-1+\frac{1}{e^7}+e^7\right)}{e^5-\frac{1}{e^5}}\right)}$$

$$\frac{1}{\sqrt[16]{\frac{3}{-2-\log\left(\frac{e^{10}-1}{2\left(1-e^7+e^{14}\right)}\right)}}}$$

All 16th roots of 1/3 log((2 cosh(7) - 1) csch(5)):

$e^0\sqrt[16]{\frac{1}{3}\log((2\cosh(7)-1)\operatorname{csch}(5))} \approx 0.99326$ (real, principal root)

$e^{(i\pi)/8}\sqrt[16]{\frac{1}{3}\log((2\cosh(7)-1)\operatorname{csch}(5))} \approx 0.91765+0.38010\,i$

$e^{(i\pi)/4}\sqrt[16]{\frac{1}{3}\log((2\cosh(7)-1)\operatorname{csch}(5))} \approx 0.70234+0.70234\,i$

$e^{(3i\pi)/8}\sqrt[16]{\frac{1}{3}\log((2\cosh(7)-1)\operatorname{csch}(5))} \approx 0.38010+0.91765\,i$

$e^{(i\pi)/2}\sqrt[16]{\frac{1}{3}\log((2\cosh(7)-1)\operatorname{csch}(5))} \approx 0.99326\,i$

Alternative representations:

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)} = \sqrt[16]{\frac{1}{3}\log\left(\frac{-1+\frac{1}{e^7}+e^7}{\frac{1}{2}\left(-\frac{1}{e^5}+e^5\right)}\right)}$$

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)} = \sqrt[16]{\frac{1}{3}\log_e\left(\frac{-\cosh(0)+2\cosh(7)}{\sinh(5)}\right)}$$

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)} = \sqrt[16]{\frac{1}{3}\log(a)\log_a\left(\frac{-\cosh(0)+2\cosh(7)}{\sinh(5)}\right)}$$

Series representation:

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)} = \frac{\sqrt[16]{\log(-1+(-1+2\cosh(7))\operatorname{csch}(5))-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{-1+(-1+2\cosh(7))\operatorname{csch}(5)}\right)^k}{k}}}{\sqrt[16]{3}}$$

Integral representations:

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)} = \frac{\sqrt[16]{\int_1^{(-1+2\cosh(7))\operatorname{csch}(5)}\frac{1}{t}\,dt}}{\sqrt[16]{3}}$$

$$\sqrt[16]{\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)} = \frac{\sqrt[16]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{(-1+(-1+2\cosh(7))\operatorname{csch}(5))^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}}{\sqrt[16]{6\pi}}$$

for $-1<\gamma<0$

8 log base 0.9932588581313420((((1/3 ln ((((2 cosh(5+2)-cosh(0)))/((sinh (5))))))))))-Pi+1/golden ratio

Where 8 is a Fibonacci number

Input interpretation:

$$8 \log_{0.993258858131342}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi}$$

Result:

125.4764413352...

125.4764413352... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18

Alternative representations:

$$8 \log_{0.9932588581313420000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} = -\pi + 8 \log_{0.9932588581313420000}\left(\frac{1}{3} \log\left(\frac{-1 + \frac{1}{e^7} + e^7}{\frac{1}{2}\left(-\frac{1}{e^5} + e^5\right)}\right)\right) + \frac{1}{\phi}$$

$$8 \log_{0.9932588581313420000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} = -\pi + 8 \log_{0.9932588581313420000}\left(\frac{1}{3} \log_e\left(\frac{-\cosh(0) + 2 \cosh(7)}{\sinh(5)}\right)\right) + \frac{1}{\phi}$$

$$8 \log_{0.9932588581313420000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{8 \log\left(\frac{1}{3} \log\left(\frac{-\cosh(0)+2\cosh(7)}{\sinh(5)}\right)\right)}{\log(0.9932588581313420000)}$$

Series representations:

$$8 \log_{0.9932588581313420000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{8 \sum_{k=1}^{\infty} \frac{\left(-\frac{1}{3}\right)^k \left(-3+\log\left(-\frac{\cosh(0)-2\cosh(7)}{\sinh(5)}\right)\right)^k}{k}}{\log(0.9932588581313420000)}$$

$$8 \log_{0.993258858131342000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi + 8 \log_{0.993258858131342000}\left(\frac{1}{3}\left(\log\left(-\frac{\cosh(0) - 2\cosh(7) + \sinh(5)}{\sinh(5)}\right) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(-\frac{\cosh(0)-2\cosh(7)+\sinh(5)}{\sinh(5)}\right)^{-k}}{k}\right)\right)$$

Integral representations:

$$8 \log_{0.993258858131342000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} =$$
$$\frac{1}{\phi} - \pi + 8 \log_{0.993258858131342000}\left(\frac{1}{3} \int_1^{-\frac{\cosh(0)-2\cosh(7)}{\sinh(5)}} \frac{1}{t}\, dt\right)$$

$$8 \log_{0.993258858131342000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} =$$
$$-\frac{-1 + \phi\pi - 8\phi \log_{0.993258858131342000}\left(\frac{1}{3} \log\left(\frac{1+14 \int_0^1 \sinh(7t)\, dt}{5 \int_0^1 \cosh(5t)\, dt}\right)\right)}{\phi}$$

$$8 \log_{0.993258858131342000}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) - \pi + \frac{1}{\phi} =$$
$$-\frac{-1 + \phi\pi - 8\phi \log_{0.993258858131342000}\left(\frac{1}{3} \log\left(-\frac{\sqrt{\pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{e^s - 2e^{49/(4s)+s}}{\sqrt{s}}\, ds}{10 i \pi \int_0^1 \cosh(5t)\, dt}\right)\right)}{\phi} \quad \text{for } \gamma > 0$$

8 log base 0.993258858131342((((1/3 ln ((((2 cosh(5+2)-cosh(0)))/((sinh (5))))))))))+11+1/golden ratio

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

Input interpretation:

$$8 \log_{0.993258858131342}\left(\frac{1}{3} \log\left(\frac{2 \cosh(5+2) - \cosh(0)}{\sinh(5)}\right)\right) + 11 + \frac{1}{\phi}$$

Result:

139.6180339887...

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

Alternative representations:

$$8\log_{0.9932588581313420000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi}=$$
$$11+8\log_{0.9932588581313420000}\left(\frac{1}{3}\log\left(\frac{-1+\frac{1}{e^7}+e^7}{\frac{1}{2}\left(-\frac{1}{e^5}+e^5\right)}\right)\right)+\frac{1}{\phi}$$

$$8\log_{0.9932588581313420000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi}=$$
$$11+8\log_{0.9932588581313420000}\left(\frac{1}{3}\log_e\left(\frac{-\cosh(0)+2\cosh(7)}{\sinh(5)}\right)\right)+\frac{1}{\phi}$$

$$8\log_{0.9932588581313420000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{8\log\left(\frac{1}{3}\log\left(\frac{-\cosh(0)+2\cosh(7)}{\sinh(5)}\right)\right)}{\log(0.9932588581313420000)}$$

Series representations:

$$8\log_{0.9932588581313420000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}-\frac{8\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{3}\right)^k\left(-3+\log\left(-\frac{\cosh(0)-2\cosh(7)}{\sinh(5)}\right)\right)^k}{k}}{\log(0.9932588581313420000)}$$

$$8\log_{0.9932588581313420000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+8\log_{0.9932588581313420000}\left(\frac{1}{3}\left(\log\left(-\frac{\cosh(0)-2\cosh(7)+\sinh(5)}{\sinh(5)}\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{\cosh(0)-2\cosh(7)+\sinh(5)}{\sinh(5)}\right)^{-k}}{k}\right)\right)$$

Integral representations:

$$8\log_{0.99325885813134200000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi} = 11+\frac{1}{\phi}+8\log_{0.99325885813134200000}\left(\frac{1}{3}\int_1^{-\frac{\cosh(0)-2\cosh(7)}{\sinh(5)}}\frac{1}{t}\,dt\right)$$

$$8\log_{0.99325885813134200000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi} = \frac{1+11\phi+8\phi\log_{0.99325885813134200000}\left(\frac{1}{3}\log\left(\frac{1+14\int_0^1\sinh(7t)\,dt}{5\int_0^1\cosh(5t)\,dt}\right)\right)}{\phi}$$

$$8\log_{0.99325885813134200000}\left(\frac{1}{3}\log\left(\frac{2\cosh(5+2)-\cosh(0)}{\sinh(5)}\right)\right)+11+\frac{1}{\phi} = \frac{1+11\phi+8\phi\log_{0.99325885813134200000}\left(\frac{1}{3}\log\left(-\frac{\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s}-2e^{49/(4s)+s}}{\sqrt{s}}\,ds}{10i\pi\int_0^1\cosh(5t)\,dt}\right)\right)}{\phi} \quad \text{for } \gamma>0$$

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