On some equations concerning Weak Gravity Conjecture and Swampland. Mathematical connections with some Ramanujan formulas, Riemann zeta function and some sectors of String Theory

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Abstract

In this research thesis, we analyze some equations concerning Weak Gravity Conjecture and Swampland. Furthermore, we obtain various mathematical connections with some Ramanujan formulas, Riemann zeta function and several sectors of String Theory

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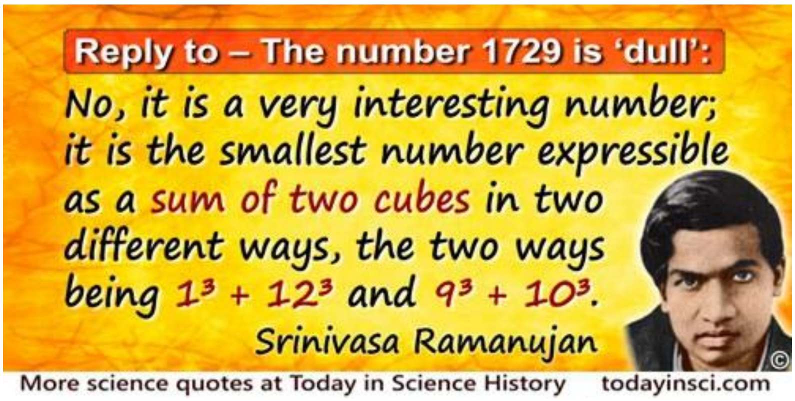
[2] A. Nardelli studies at the Università degli Studi di Napoli Federico II - Dipartimento di Studi Umanistici – **Sezione Filosofia - scholar of Theoretical Philosophy**



Vesuvius landscape with gorse – Naples

https://www.pinterest.it/pin/95068242114589901/

We want to highlight that the development of the various equations was carried out according an our possible logical and original interpretation

From:

On the Zeros of the Davenport Heilbronn Function
S. A. Gritsenko - Received May 15, 2016 - ISSN 0081-5438, Proceedings of the Steklov Institute of Mathematics, 2017, Vol. 296, pp. 65–87.

We have:

Let

$$\varkappa = \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

and χ_1 be a character modulo 5 such that $\chi_1(2) = i$.

The Davenport–Heilbronn function $f(s)$ is defined by the equality

$$f(s) = \frac{1-i\varkappa}{2}L(s,\chi_1) + \frac{1+i\varkappa}{2}L(s,\overline{\chi}_1), \qquad \text{where} \quad L(s,\chi) = \sum_{n=1}^{\infty}\frac{\chi(n)}{n^s}.$$

The function $f(s)$ satisfies the Riemann-type functional equation

$$g(s) = g(1-s), \qquad \text{where} \quad g(s) = \left(\frac{\pi}{5}\right)^{-s/2}\Gamma\left(\frac{s+1}{2}\right)f(s),$$

but there is no Euler product for it.

$$(\sqrt{10-2\sqrt{5}}-2)/(\sqrt{5}-1) = \kappa$$

Input:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

Decimal approximation:

0.2840790438404122960282918323931261690910880884457375827591626661

...

0.28407904384…. = κ

Alternate forms:

$$\frac{1}{4}\left(\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2\right)$$

$$\frac{1}{4}\left(1+\sqrt{5}\right)\left(\sqrt{10-2\sqrt{5}}-2\right)$$

$$\frac{1}{2}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

Minimal polynomial:

$$x^4+2x^3-6x^2-2x+1$$

Expanded forms:

$$\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-\frac{2}{\sqrt{5}-1}$$

$$\frac{1}{4}\sqrt{10-2\sqrt{5}}+\frac{1}{4}\sqrt{5\left(10-2\sqrt{5}\right)}+\frac{1}{2}\left(-1-\sqrt{5}\right)$$

For ((((√(10-2√5) -2))/((√5-1)))) = 8πG; G = 0.011303146014

Indeed:

((((√(10-2√5) -2))/((√5-1))))/(8π)

Input:

$$\frac{\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}}{8\pi}$$

Result:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{8\left(\sqrt{5}-1\right)\pi}$$

Decimal approximation:

0.0113031460140052147973750129442035744685760313920017808594909667...

0.01130314…. = g (gravitational coupling constant)

Property:

$$\frac{-2+\sqrt{10-2\sqrt{5}}}{8\left(-1+\sqrt{5}\right)\pi}$$ is a transcendental number

Alternate forms:

$$\frac{\sqrt{10-2\sqrt{5}} - 2\sqrt{5} + \sqrt{5(10-2\sqrt{5})} - 2}{32\pi}$$

$$-\frac{1+\sqrt{5} - \sqrt{2(5+\sqrt{5})}}{16\pi}$$

$$\frac{-1-\sqrt{5} + \sqrt{2(5+\sqrt{5})}}{16\pi}$$

Expanded forms:

$$-\frac{1}{16\pi} - \frac{\sqrt{5}}{16\pi} + \frac{\sqrt{10-2\sqrt{5}}}{32\pi} + \frac{\sqrt{5(10-2\sqrt{5})}}{32\pi}$$

$$\frac{\sqrt{10-2\sqrt{5}}}{8(\sqrt{5}-1)\pi} - \frac{1}{4(\sqrt{5}-1)\pi}$$

Series representations:

$$\frac{\sqrt{10-2\sqrt{5}} - 2}{(8\pi)(\sqrt{5}-1)} = \frac{-2+\sqrt{9-2\sqrt{5}}\ \sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}(9-2\sqrt{5})^{-k}}{8\pi\left(-1+\sqrt{4}\ \sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)\left(\sqrt{5}-1\right)} = \frac{-2+\sqrt{9-2\sqrt{5}}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}}{8\pi\left(-1+\sqrt{4}\ \sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)\left(\sqrt{5}-1\right)} = \frac{-2+\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}}{8\pi\left(-1+\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5-z_0\right)^k z_0^{-k}}{k!}\right)}$$

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

We note that:

(((√(10-2√5) -2))/((√5-1)))*((2 i (sqrt(5) - 1) t + sqrt(5) - 1)/(2 (sqrt(2 (5 - sqrt(5))) - 2)))

Input:

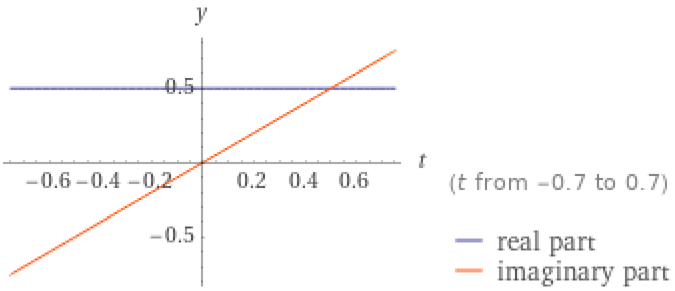
$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} \times \frac{2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}$$

i is the imaginary unit

Exact result:

$$\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{2\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}$$

Plot:



Alternate form assuming t>0:

$$\frac{i\sqrt{10-2\sqrt{5}}\,t}{\sqrt{2\left(5-\sqrt{5}\right)}-2}-\frac{2\,i\,t}{\sqrt{2\left(5-\sqrt{5}\right)}-2}+\frac{\sqrt{5\left(10-2\sqrt{5}\right)}}{2\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}-\frac{\sqrt{10-2\sqrt{5}}}{2\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}-\frac{\sqrt{5}}{\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}+\frac{1}{\left(\sqrt{5}-1\right)\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}$$

Alternate forms:

$$\frac{1}{8}\left(1+\sqrt{5}\right)\left(2\,i\sqrt{2\left(3-\sqrt{5}\right)}\,t+\sqrt{5}-1\right)$$

$$\frac{1}{2}(1+2\,i\,t)$$

$$\frac{1}{2}+i\,t$$

1/2+it = real part of every nontrivial zero of the Riemann zeta function

Derivative:

$$\frac{d}{dt}\left(\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{\left(\sqrt{5}-1\right)\left(2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)\right)}\right)=i$$

Indefinite integral:

$$\int\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{\left(\sqrt{5}-1\right)\left(2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)\right)}\,dt=\frac{t}{2}+\frac{i\,t^2}{2}+\text{constant}$$

And again:

(((√(10-2√5) -2))⁄((2x)))*((2 i (sqrt(5) - 1) t + sqrt(5) - 1)/(2 (sqrt(2 (5 - sqrt(5))) - 2))) = (1/2+it)

Input:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{2\,x}\times\frac{2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)}=\frac{1}{2}+i\,t$$

i is the imaginary unit

Exact result:

$$\frac{\left(\sqrt{10-2\sqrt{5}}-2\right)\left(2\,i\left(\sqrt{5}-1\right)t+\sqrt{5}-1\right)}{4\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}=\frac{1}{2}+i\,t$$

Alternate form assuming t and x are real:

$$\frac{\sqrt{5}-1}{x}=2$$

Alternate form:

$$\frac{\left(\sqrt{5}-1\right)(1+2\,i\,t)}{4\,x}=\frac{1}{2}+i\,t$$

Alternate form assuming t and x are positive:

$2\,x+1=\sqrt{5}$

Expanded forms:

$$\frac{i\sqrt{5\left(10-2\sqrt{5}\right)}\,t}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}-\frac{i\sqrt{10-2\sqrt{5}}\,t}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}-\frac{i\sqrt{5}\,t}{\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}+\frac{i\,t}{\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}+\frac{\sqrt{5\left(10-2\sqrt{5}\right)}}{4\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}-\frac{\sqrt{10-2\sqrt{5}}}{4\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}-\frac{\sqrt{5}}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}+\frac{1}{2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)x}=\frac{1}{2}+i\,t$$

$$\frac{i\sqrt{5}\,t}{2\,x}-\frac{i\,t}{2\,x}+\frac{\sqrt{5}}{4\,x}-\frac{1}{4\,x}=\frac{1}{2}+i\,t$$

Solutions:

$t = \frac{i}{2}, \quad x \neq 0$

$x = \frac{\sqrt{5}}{2} - \frac{1}{2}$

Input:

$\frac{\sqrt{5}}{2} - \frac{1}{2}$

Decimal approximation:

0.6180339887498948482045868343656381177203091798057628621354486227
…

0.6180339887…. $= \frac{1}{\phi}$

Solution for the variable x:

$$x = \frac{-2 i \sqrt{5}\, t + 2 i t - \sqrt{5} + 1}{-2 - 4 i t}$$

Implicit derivatives:

$$\frac{\partial x(t)}{\partial t} = \frac{2\left(-1 + \sqrt{5} - 2x\right) x}{\left(-1 + \sqrt{5}\right)(-i + 2t)}$$

$$\frac{\partial t(x)}{\partial x} = \frac{\left(-1 + \sqrt{5}\right)(-i + 2t)}{2\left(-1 + \sqrt{5} - 2x\right) x}$$

From:

AdS-phobia, the WGC, the Standard Model and Supersymmetry
Eduardo Gonzalo, Alvaro Herraez and Luis E. Ibanez - arXiv:1803.08455v2 [hep-th]
4 May 2018

We have that:

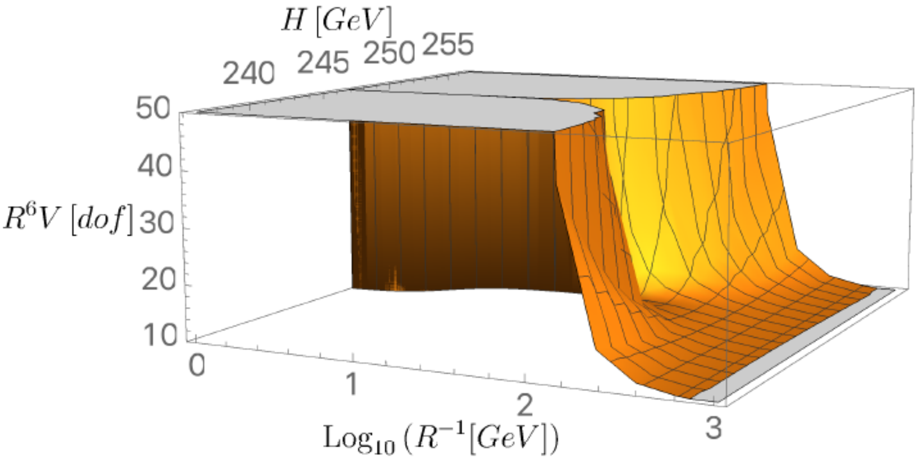


Figure 2: Effective potential with the Wilson lines fixed to zero, as a function of the Radion and the Higgs. The tree level potential dominates and the Higgs is not displaced from its tree level minimum by the one-loop corrections. This behavior is independent of the particular value of the Wilson lines Although not very visible in the plot, the Higgs minimum remains at the same location as R^{-1} increases.

From:

$$
\begin{aligned}
V_{\mathcal{C}}[a,0] &= \frac{1}{(2\pi a)^2}\left[\frac{1}{\pi^2}\sum_{p=1}^{\infty}\frac{1}{p^4}+\frac{1}{2\pi}\sum_{n=-\infty}^{\infty}\left\{2\pi\,|n|\,\mathrm{Li}_2(e^{-2\pi|n|})+\mathrm{Li}_3(e^{-2\pi|n|})\right\}\right]\\
&= \frac{1}{(2\pi a)^2}\left[\frac{1}{\pi^2}\mathrm{Li}_4(1)+\frac{1}{2\pi}\sum_{n=-\infty}^{\infty}\sum_{p=1}^{\infty}\left\{\frac{2\pi}{p^2}\,|n|\,(e^{-2\pi p})^{|n|}+\frac{1}{p^3}(e^{-2\pi p})^{|n|}\right\}\right]\\
&= \frac{1}{(2\pi a)^2}\left[\frac{\pi^2}{90}+\frac{1}{2\pi}\sum_{p=1}^{\infty}\left\{2\pi\frac{1}{2p^2\sinh^2\pi p}+\frac{\coth\pi p}{p^3}\right\}\right]\\
&= \frac{1}{(2\pi a)^2}\left[\frac{\pi^2}{90}+\frac{1}{\pi}\sum_{p=1}^{\infty}\left\{2\pi\frac{1}{p^2\left(\cosh\pi p-1\right)}\right\}+\frac{7\pi^2}{360}\right]\\
&= \frac{1}{(2\pi a)^2}\frac{\mathcal{G}}{3},
\end{aligned}
\tag{B.12}
$$

where $\mathcal{G}\simeq 0.915966$ is Catalan's constant. For the case of antiperiodic boundary conditions the Casimir energy reads:

$$
\begin{aligned}
V_{\mathcal{C}}\left[a,\frac{1}{2}\right] &= \frac{1}{(2\pi a)^2}\left[\frac{1}{\pi^2}\sum_{p=1}^{\infty}\frac{(-1)^p}{p^4}+\frac{1}{2\pi}\sum_{n=-\infty}^{\infty}\left\{\pi\,|2n+1|\,\mathrm{Li}_2(-e^{-\pi|2n+1|})+\mathrm{Li}_3(-e^{-\pi|2n+1|})\right\}\right]\\
&= \frac{1}{(2\pi a)^2}\left[\frac{1}{\pi^2}\mathrm{Li}_4(-1)+\frac{1}{2\pi}\sum_{n=1}^{\infty}\left\{\frac{(-1)^p\,\pi}{p^2}\,|2n+1|\,(e^{-\pi p})^{|2n+1|}+\frac{(-1)^p}{p^3}(e^{-\pi p})^{|2n+1|}\right\}\right]\\
&= \frac{1}{(2\pi a)^2}\left[-\frac{7}{8}\frac{\pi^2}{90}-\frac{1}{2\pi}\sum_{p=1}^{\infty}\left\{2\pi\frac{\frac{(-1)^p}{4}\mathrm{csch}^2\pi p+\frac{(-1)^p}{4}\mathrm{sech}^2\pi p}{2p^2}+\frac{(-1)^p\mathrm{csch}2\pi p}{p^3}\right\}\right]\\
&= \frac{-1}{(2\pi a)^2}\frac{\mathcal{G}}{6}=-\frac{1}{2}V_{\mathcal{C}}[a,0]\,.
\end{aligned}
\tag{B.13}
$$

where $\mathcal{G}\simeq 0.915966$ is Catalan's constant.

$$
\begin{aligned}
V_{\mathcal{C}}[a,0] &= \frac{1}{(2\pi a)^2}\left[\frac{1}{\pi^2}\sum_{p=1}^{\infty}\frac{1}{p^4}+\frac{1}{2\pi}\sum_{n=-\infty}^{\infty}\left\{2\pi\,|n|\,\mathrm{Li}_2(e^{-2\pi|n|})+\mathrm{Li}_3(e^{-2\pi|n|})\right\}\right]\\
&= \frac{1}{(2\pi a)^2}\frac{\mathcal{G}}{3},
\end{aligned}
$$

1/(2Pi*a)^2*1/3*0.915966

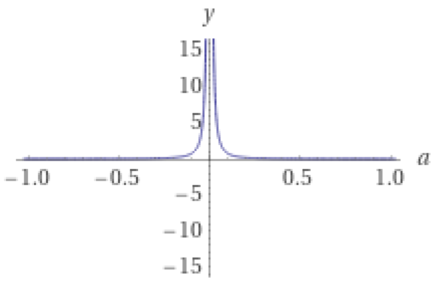
Input interpretation:

$$\frac{1}{(2\pi a)^2} \times \frac{1}{3} \times 0.915966$$

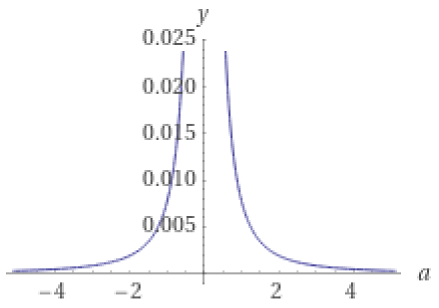
Result:

$$\frac{0.0077339}{a^2}$$

Plots:



(a from −1 to 1)



(a from −5.1 to 5.1)

Alternate form assuming a is real:

$$\frac{0.0077339}{a^2} + 0$$

Roots:

(no roots exist)

Property as a function:
Parity

even

Derivative:

$$\frac{d}{da}\left(\frac{0.0077339}{a^2}\right) = -\frac{0.0154678}{a^3}$$

Indefinite integral:

$$\int \frac{0.915966}{(2\,\pi\,a)^2\,3}\,da = -\frac{0.0077339}{a} + \text{constant}$$

Limit:

$$\lim_{a\to\pm\infty} \frac{0.0077339}{a^2} = 0 \approx 0$$

Alternative representations:

$$\frac{0.915966}{3\,(2\,\pi\,a)^2} = \frac{0.305322}{(360\,a\,{}^\circ)^2}$$

$$\frac{0.915966}{3\,(2\,\pi\,a)^2} = \frac{0.305322}{(-2\,a\,i\log(-1))^2}$$

$$\frac{0.915966}{3\,(2\,\pi\,a)^2} = \frac{0.305322}{\left(2\,a\cos^{-1}(-1)\right)^2}$$

Series representations:

$$\frac{0.915966}{3(2\pi a)^2} = \frac{0.00477066}{a^2 \left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^2}$$

$$\frac{0.915966}{3(2\pi a)^2} = \frac{0.0190826}{a^2 \left(-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)^2}$$

$$\frac{0.915966}{3(2\pi a)^2} = \frac{0.0763305}{a^2 \left(\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Integral representations:

$$\frac{0.915966}{3(2\pi a)^2} = \frac{0.0190826}{a^2 \left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^2}$$

$$\frac{0.915966}{3(2\pi a)^2} = \frac{0.00477066}{a^2 \left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2}$$

$$\frac{0.915966}{3(2\pi a)^2} = \frac{0.0190826}{a^2 \left(\int_0^{\infty} \frac{\sin(t)}{t}\, dt\right)^2}$$

For a =1:

1/(2Pi)^2*1/3*0.915966

Input interpretation:

$$\frac{1}{(2\pi)^2} \times \frac{1}{3} \times 0.915966$$

Result:

0.00773390…

0.00773390….

Alternative representations:

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.305322}{(360\,°)^2}$$

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.305322}{(-2\,i\log(-1))^2}$$

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.305322}{\left(2\cos^{-1}(-1)\right)^2}$$

Series representations:

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.00477066}{\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^2}$$

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.0190826}{\left(-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)^2}$$

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.0763305}{\left(\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Integral representations:

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.0190826}{\left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^2}$$

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.00477066}{\left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2}$$

$$\frac{0.915966}{3(2\pi)^2} = \frac{0.0190826}{\left(\int_0^{\infty} \frac{\sin(t)}{t}\, dt\right)^2}$$

For a = 5.1, after some calculations:

((0.00773390))1/(((1/(2Pi*5.1)^2*1/3*0.915966)))

Input interpretation:

$$0.00773390 \times \frac{1}{\frac{1}{(2\pi\times 5.1)^2} \times \frac{1}{3} \times 0.915966}$$

Result:

26.0100…

26.01….

Alternative representations:

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = \frac{0.0077339}{\frac{0.305322}{(1836.°)^2}}$$

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = \frac{0.0077339}{\frac{0.305322}{(-10.2 i \log(-1))^2}}$$

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = \frac{0.0077339}{\frac{0.305322}{\left(10.2 \cos^{-1}(-1)\right)^2}}$$

Series representations:

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = 42.1658 \left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^2$$

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = 10.5415 \left(-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)^2$$

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = 2.63537 \left(\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2$$

Integral representations:

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = 10.5415 \left(\int_0^\infty \frac{1}{1+t^2}\, dt \right)^2$$

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = 42.1658 \left(\int_0^1 \sqrt{1-t^2}\, dt \right)^2$$

$$\frac{0.0077339}{\frac{0.915966}{(2\pi 5.1)^2 3}} = 10.5415 \left(\int_0^\infty \frac{\sin(t)}{t}\, dt \right)^2$$

From:

$$V_{\mathcal{C}}\left[a, \frac{1}{2}\right] = \frac{1}{(2\pi a)^2}\left[\frac{1}{\pi^2}\sum_{p=1}^{\infty}\frac{(-1)^p}{p^4} + \frac{1}{2\pi}\sum_{n=-\infty}^{\infty}\left\{\pi\,|2n+1|\,\mathrm{Li}_2(-e^{-\pi|2n+1|}) + \mathrm{Li}_3(-e^{-\pi|2n+1|})\right\}\right]$$
$$= \frac{-1}{(2\pi a)^2}\frac{\mathcal{G}}{6} = -\frac{1}{2}V_{\mathcal{C}}\left[a, 0\right].$$

-1/(2Pi*a)^2*1/6*0.915966

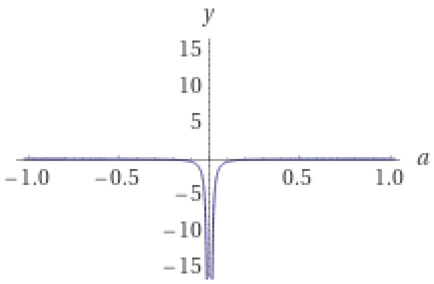
Input interpretation:

$$-\frac{\frac{1}{6}\times 0.915966}{(2\pi a)^2}$$

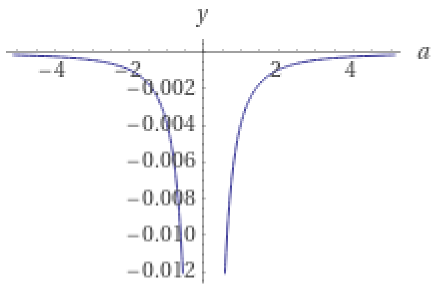
Result:

$$-\frac{0.00386695}{a^2}$$

Plots:



(a from −1 to 1)



(a from −5.1 to 5.1)

Alternate form assuming a is real:

$$0-\frac{0.00386695}{a^2}$$

Roots:

(no roots exist)

Property as a function:
Parity

even

Derivative:

$$\frac{d}{da}\left(-\frac{0.00386695}{a^2}\right)=\frac{0.0077339}{a^3}$$

Indefinite integral:

$$\int -\frac{0.915966}{(2\pi a)^2 6} \, da = \frac{0.00386695}{a} + \text{constant}$$

Limit:

$$\lim_{a \to \pm\infty} -\frac{0.00386695}{a^2} = 0 \approx 0$$

Alternative representations:

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.915966}{6(360\, a\, °)^2}$$

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.915966}{6(-2\, a\, i \log(-1))^2}$$

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.915966}{6\left(2\, a \cos^{-1}(-1)\right)^2}$$

Series representations:

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.00238533}{a^2 \left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.00954131}{a^2 \left(-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.0381653}{a^2\left(\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Integral representations:

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.00954131}{a^2\left(\int_0^{\infty} \frac{1}{1+t^2}\,dt\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.00238533}{a^2\left(\int_0^{1} \sqrt{1-t^2}\,dt\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi a)^2} = -\frac{0.00954131}{a^2\left(\int_0^{\infty} \frac{\sin(t)}{t}\,dt\right)^2}$$

-1/(2Pi)^2*1/6*0.915966

Input interpretation:

$$-\frac{\frac{1}{6}\times 0.915966}{(2\pi)^2}$$

Result:

$-0.00386695\ldots$

-0.00386695….

Alternative representations:

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.915966}{6(360°)^2}$$

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.915966}{6(-2i\log(-1))^2}$$

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.915966}{6\left(2\cos^{-1}(-1)\right)^2}$$

Series representations:

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.00238533}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.00954131}{\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.0381653}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Integral representations:

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.00954131}{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.00238533}{\left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2}$$

$$\frac{0.915966(-1)}{6(2\pi)^2} = -\frac{0.00954131}{\left(\int_0^\infty \frac{\sin(t)}{t}\, dt\right)^2}$$

From which:

(-0.00386695)1/(((-1/(2Pi*5.1)^2*1/6*0.915966)))

Input interpretation:

$$-0.00386695\left(-\frac{1}{\frac{\frac{1}{6}\times 0.915966}{(2\pi\times 5.1)^2}}\right)$$

Result:

26.0100…

26.01….

Alternative representations:

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi\, 5.1)^2\, 6}} = \frac{-0.00386695}{-\frac{0.915966}{6(1836.\,°)^2}}$$

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi\, 5.1)^2\, 6}} = \frac{-0.00386695}{-\frac{0.915966}{6(-10.2\, i \log(-1))^2}}$$

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi 5.1)^2 6}} = \frac{-0.00386695}{-\frac{0.915966}{6\left(10.2\cos^{-1}(-1)\right)^2}}$$

Series representations:

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi 5.1)^2 6}} = 42.1658\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2$$

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi 5.1)^2 6}} = 10.5415\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^2$$

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi 5.1)^2 6}} = 2.63537\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2$$

Integral representations:

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi 5.1)^2 6}} = 10.5415\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2$$

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi 5.1)^2 6}} = 42.1658\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2$$

$$\frac{-0.00386695}{-\frac{0.915966}{(2\pi 5.1)^2 6}} = 10.5415\left(\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)^2$$

From the sum between the two above expression, after some calculations:

Pi*((([((0.00773390))1/(((1/(2Pi*5.1)^2*1/3*0.915966)))]^2 + [(-0.00386695)1/(((-1/(2Pi*5.1)^2*1/6*0.915966)))]^2)))-89-55-8-e

Input interpretation:

$$\pi\left(\left(0.00773390\times\frac{1}{\frac{1}{(2\pi\times5.1)^2}\times\frac{1}{3}\times0.915966}\right)^2+\left(-0.00386695\left(-\frac{1}{\frac{\frac{1}{6}\times0.915966}{(2\pi\times5.1)^2}}\right)\right)^2\right)-89-55-8-e$$

Result:

4095.99…

4095.99…. ≈ 4096 = 64^2

Alternative representations:

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=-152-e+180\,°\left(\left(\frac{0.0077339}{\frac{0.305322}{(1836.\,°)^2}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{6\,(1836.\,°)^2}}\right)^2\right)$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=-152-e-i\left(\log(-1)\left(\left(\frac{0.0077339}{\frac{0.305322}{(-10.2\,i\log(-1))^2}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{6\,(-10.2\,i\log(-1))^2}}\right)^2\right)\right)$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-\exp(z)\quad \text{for } z=1$$

Series representations:

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=$$
$$14223.7\left(-0.0106864+\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^5-0.0000703054\sum_{k=0}^{\infty}\frac{1}{k!}\right)$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=$$
$$14223.7\left(-0.0106864+\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^5-0.0000703054\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=$$
$$-\left(152+\sum_{k=0}^{\infty}\frac{1}{k!}-13.8903\left(\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)\right)^5\right)$$

Integral representations:

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=$$
$$-152-e+444.49\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^5$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=$$
$$-152-e+14223.7\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^5$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e=$$
$$-152-e+444.49\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^5$$

Pi*((([((0.00773390))1/(((1/(2Pi*5.1)^2*1/3*0.915966)))]^2 + [(-0.00386695)1/(((-1/(2Pi*5.1)^2*1/6*0.915966)))]^2)))+123-sqrt3

Input interpretation:

$$\pi\left(\left(0.00773390\times\frac{1}{\frac{1}{(2\pi\times 5.1)^2}\times\frac{1}{3}\times 0.915966}\right)^2+\left(-0.00386695\left(-\frac{1}{\frac{\frac{1}{6}\times 0.915966}{(2\pi\times 5.1)^2}}\right)\right)^2\right)+$$
$$123-\sqrt{3}$$

Result:

4371.97…

4371.97…. ≈ 4372

Where 4372 is a value indicated in the fundamental Ramanujan paper “**Modular equations and Approximations to π**”

Hence

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

so that

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

Hence

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

Series representations:

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2 + \left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right) + 123 - \sqrt{3} = 123 + 13.8903\,\pi^5 - \sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{\frac{1}{2}}{k}$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2 + \left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right) + 123 - \sqrt{3} = 123 + 13.8903\,\pi^5 - \sqrt{2}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}$$

$$\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2 + \left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right) + 123 - \sqrt{3} = 123 + 13.8903\,\pi^5 - \frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 2^{-s}\,\Gamma\left(-\frac{1}{2} - s\right)\Gamma(s)}{2\sqrt{\pi}}$$

27*sqrt((Pi*((([((0.00773390))1/(((1/(2Pi*5.1)^2*1/3*0.915966)))]^2 + [(-0.00386695)1/(((-1/(2Pi*5.1)^2*1/6*0.915966)))]^2)))-89-55-8-e))+1

Input interpretation:

$$27\sqrt{\left(\pi\left(\left(0.00773390\times\frac{1}{\frac{1}{(2\pi\times5.1)^2}\times\frac{1}{3}\times0.915966}\right)^2+\left(-0.00386695\left(-\frac{1}{\frac{\frac{1}{6}\times0.915966}{(2\pi\times5.1)^2}}\right)\right)^2\right)-89-55-8-e\right)}+1$$

Result:

1729.00…

1729

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. ($1728 = 8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Series representations:

$$27\sqrt{\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e}+1=$$
$$1+27\sqrt{-153-e+13.8903\,\pi^5}\sum_{k=0}^{\infty}\left(-153-e+13.8903\,\pi^5\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$27\sqrt{\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e}+1=$$

$$1+27\sqrt{-153-e+13.8903\,\pi^5}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-153-e+13.8903\,\pi^5\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$27\sqrt{\pi\left(\left(\frac{0.0077339}{\frac{0.915966}{(2\pi\,5.1)^2\,3}}\right)^2+\left(\frac{-0.00386695}{-\frac{0.915966}{(2\pi\,5.1)^2\,6}}\right)^2\right)-89-55-8-e}+1=$$

$$1+27\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-152-e+13.8903\,\pi^5-z_0\right)^k z_0^{-k}}{k!}$$

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

((27*sqrt((Pi*((([((0.00773390))1/(((1/(2Pi*5.1)^2*1/3*0.915966)))]^2 + [(-0.00386695)1/(((-1/(2Pi*5.1)^2*1/6*0.915966)))]^2)))-89-55-8-e))+1))^1/15

Input interpretation:

$$\left(27\sqrt{\left(\pi\left(\left(0.00773390\times\frac{1}{\frac{1}{(2\pi\times5.1)^2}\times\frac{1}{3}\times0.915966}\right)^2+\left(-0.00386695\left(-\frac{1}{\frac{\frac{1}{6}\times0.915966}{(2\pi\times5.1)^2}}\right)\right)^2\right)-89-55-8-e\right)}+1\right)\char`^(1/15)$$

Result:

1.643815049583038604700519933168848268607751238074607630251799734 6...

$1.643815049\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

We have that:

$$V_C^{(2)}[a,m,0] = (am)^2\left\{2\pi\left(\log(2\pi ma)-\frac{1}{4}\right)-\mathrm{Li}_2(1)+\sum_{n=1}^{\infty}2\pi\log\left(1-e^{-2\pi n}\right)\right\}$$
$$=(am)^2\left\{\pi\log(2\pi ma)-\frac{\pi^2}{6}-\frac{5\pi}{2}+\log\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right\} \qquad \text{(B.14)}$$

Finally, for the antiperiodic case we find:

$$V_C^{(2)}\left[a,m,\frac{1}{2}\right]=(am)^2\left\{-\mathrm{Li}_2(-1)+\sum_{n=-\infty}^{\infty}\pi\log\left(1+e^{-\pi|2n+1|}\right)\right\}$$
$$=(am)^2\left\{-\frac{\pi^2}{12}+\frac{3\pi}{4}\log 2\right\} \qquad \text{(B.15)}$$

From:

$$(am)^2\left\{\pi\log(2\pi ma)-\frac{\pi^2}{6}-\frac{5\pi}{2}+\log\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right\}$$

x^2 [Pi*ln(2Pi*x)-(Pi^2)/6 – (5Pi)/2 + ln((gamma(1/4))/(2Pi^(3/4))]

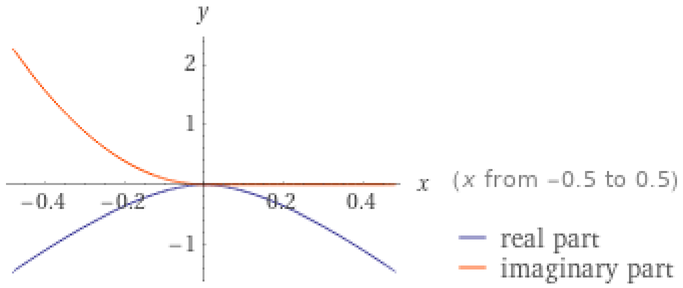
Input:

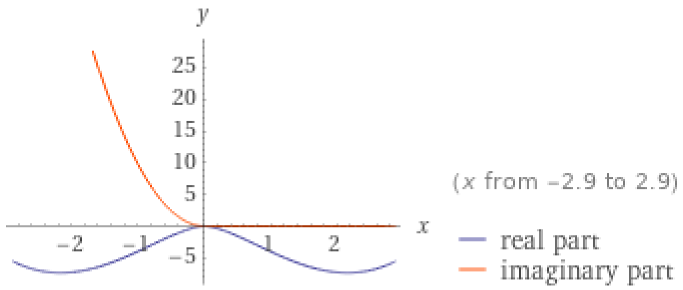
$$x^2\left(\pi\log(2\pi x)-\frac{\pi^2}{6}-\frac{5\pi}{2}+\log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right)\right)$$

$\log(x)$ is the natural logarithm

$\Gamma(x)$ is the gamma function

Plots:





Alternate forms:

$$x^2 \left(\pi \log(2\pi x) - \frac{1}{6}\pi(15+\pi) + \log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)$$

$$x^2 \log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\,\pi^{3/4}}\right) - \frac{1}{6}\pi x^2 (-6\log(2\pi x) + \pi + 15)$$

$$-\frac{1}{6}x^2 \left(-6\pi\log(2\pi x) + \pi^2 + 15\pi - 6\log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\,\pi^{3/4}}\right)\right)$$

Expanded form:

$$-\frac{\pi^2 x^2}{6} - \frac{5\pi x^2}{2} + \pi x^2 \log(2\pi x) + x^2 \log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\,\pi^{3/4}}\right)$$

Alternate form assuming x>0:

$$-\frac{1}{12}x^2\left(-12\pi\log(2\pi x)+2\pi^2+30\pi+3\left(\log(16)+3\log(\pi)-4\log\left(\Gamma\left(\frac{1}{4}\right)\right)\right)\right)$$

Root:

$x \approx 3.55961$

Series expansion at x=0:

$$x^2\left(\pi\log(x)-\frac{\pi^2}{6}+\pi\left(\log(2\pi)-\frac{5}{2}\right)+\log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right)\right)+O\left(x^4\right)$$

(Puiseux series)

Series expansion at x=∞:

$$x^2\left(\pi\log(x)-\frac{\pi^2}{6}+\pi\left(\log(2\pi)-\frac{5}{2}\right)+\log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right)\right)+O\left(\left(\frac{1}{x}\right)^4\right)$$

(Puiseux series)

Derivative:

$$\frac{d}{dx}\left(x^2\left(\pi\log(2\pi x)-\frac{\pi^2}{6}-\frac{5\pi}{2}+\log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right)\right)\right)=$$
$$-\frac{1}{3}x\left(-6\pi\log(2\pi x)+\pi^2+12\pi+\frac{9\log(\pi)}{2}+\log(64)-6\log\left(\Gamma\left(\frac{1}{4}\right)\right)\right)$$

Indefinite integral:

$$\int x^2\left(\pi\log(2\pi x)-\frac{\pi^2}{6}-\frac{5\pi}{2}+\log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right)\right)dx=$$
$$-\frac{1}{18}x^3\left(-6\pi\log(2\pi x)+\pi^2+17\pi+\frac{9\log(\pi)}{2}+\log(64)-6\log\left(\Gamma\left(\frac{1}{4}\right)\right)\right)+\text{constant}$$

(assuming a complex-valued logarithm)

Local minimum:

$$\min\left\{x^2\left(\pi\log(2\pi x)-\frac{\pi^2}{6}-\frac{5\pi}{2}+\log\left(\frac{\Gamma\left(\frac{1}{4}\right)}{2\pi^{3/4}}\right)\right)\right\}=$$
$$-2^{2/\pi-3}\,e^{4+\pi/3}\,\pi^{3/(2\pi)-1}\,\Gamma\left(\frac{1}{4}\right)^{-2/\pi}\text{ at }x=2^{1/\pi-1}\,e^{2+\pi/6}\,\pi^{3/(4\pi)-1}\,\Gamma\left(\frac{1}{4}\right)^{-1/\pi}$$

For x = 0.5:

0.5^2 (-1/6 π (15 + π) + π log(2 π * 0.5) + log((2 Γ(5/4))/π^(3/4)))

Input:

$$0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\times0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)$$

log(x) is the natural logarithm

Γ(x) is the gamma function

Result:

−1.54158…

-1.54158….

Alternative representations:

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$0.5^2\left(\pi\log(\pi)+\log\left(\frac{2\,G\left(1+\frac{5}{4}\right)}{G\left(\frac{5}{4}\right)\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)$$

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$0.5^2\left(\pi\log(\pi)+\log\left(\frac{2\,e^{-\log G(5/4)+\log G(1+5/4)}}{\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)$$

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$0.5^2\left(\pi\log(\pi)+\log\left(\frac{2\left(-1+\frac{5}{4}\right)!}{\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)$$

Series representations:

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-0.625\,\pi-0.0416667\,\pi^2+0.25\,\pi\log(\pi)+0.25\log\left(\frac{2\sum_{k=0}^{\infty}\frac{\left(\frac{5}{4}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}{\pi^{3/4}}\right)$$

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

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-0.625\,\pi-0.0416667\,\pi^2+0.5\,i\,\pi^2\left\lfloor\frac{\arg(\pi-x)}{2\pi}\right\rfloor+$$
$$0.5\,i\,\pi\left\lfloor\frac{\arg\left(-x+\frac{2\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)}{2\pi}\right\rfloor+0.25\log(x)+0.25\,\pi\log(x)+$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}\left(-0.25\,\pi(\pi-x)^k-0.25\left(-x+\frac{2\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)^k\right)}{k}\quad\text{for } x<0$$

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-0.625\pi-0.0416667\pi^2+0.5\,i\,\pi^2\left\lfloor-\frac{-\pi+\arg\left(\frac{\pi}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+$$
$$0.5\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}\,z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+0.25\log(z_0)+$$
$$0.25\pi\log(z_0)+\sum_{k=1}^{\infty}\frac{(-1)^k\left(-0.25\pi(\pi-z_0)^k-0.25\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}-z_0\right)^k\right)z_0^{-k}}{k}$$

Integral representations:

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-0.625\pi-0.0416667\pi^2+0.25\pi\log(\pi)+0.25\log\left(\frac{2}{\pi^{3/4}}\int_0^\infty e^{-t}\sqrt[4]{t}\,dt\right)$$

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-0.625\pi-0.0416667\pi^2+0.25\pi\log(\pi)+0.25\log\left(\frac{2}{\pi^{3/4}}\int_0^1\sqrt[4]{\log\left(\frac{1}{t}\right)}\,dt\right)$$

$$0.5^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-0.625\pi-0.0416667\pi^2+0.25\log\left(\frac{2\exp\left(\int_0^1\frac{\frac{1}{4}-\frac{5x}{4}+x^{5/4}}{(-1+x)\log(x)}\,dx\right)}{\pi^{3/4}}\right)+0.25\pi\log(\pi)$$

For x = 2.9:

2.9^2 (-1/6 π (15 + π) + π log(2 π * 2.9) + log((2 Γ(5/4))/π^(3/4)))

Input:

$$2.9^2 \left(-\frac{1}{6} \pi (15 + \pi) + \pi \log(2 \pi \times 2.9) + \log\left(\frac{2 \Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)$$

$\log(x)$ is the natural logarithm

$\Gamma(x)$ is the gamma function

Result:

$-5.41469\ldots$

-5.41469….

Alternative representations:

$$2.9^2 \left(\frac{1}{6} (\pi (15 + \pi)) (-1) + \pi \log(2 \pi \, 2.9) + \log\left(\frac{2 \Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right) = 2.9^2 \left(\pi \log(5.8 \pi) + \log\left(\frac{2 G\left(1 + \frac{5}{4}\right)}{G\left(\frac{5}{4}\right) \pi^{3/4}}\right) - \frac{1}{6} \pi (15 + \pi)\right)$$

$$2.9^2 \left(\frac{1}{6} (\pi (15 + \pi)) (-1) + \pi \log(2 \pi \, 2.9) + \log\left(\frac{2 \Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right) = 2.9^2 \left(\pi \log(5.8 \pi) + \log\left(\frac{2 e^{-\log G(5/4) + \log G(1 + 5/4)}}{\pi^{3/4}}\right) - \frac{1}{6} \pi (15 + \pi)\right)$$

$$2.9^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\, 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$2.9^2\left(\pi\log(5.8\pi)+\log\left(\frac{2\left(-1+\frac{5}{4}\right)!}{\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)$$

Series representations:

$$2.9^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\, 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-21.025\pi-1.40167\pi^2+8.41\pi\log(5.8\pi)+8.41\log\left(\frac{2\sum_{k=0}^{\infty}\frac{\left(\frac{5}{4}-z_0\right)^k\Gamma^{(k)}(z_0)}{k!}}{\pi^{3/4}}\right)$$
for ($z_0 \notin \mathbb{Z}$ or $z_0 > 0$)

$$2.9^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\, 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-21.025\pi-1.40167\pi^2+16.82\,i\,\pi^2\left\lfloor\frac{\arg(5.8\pi-x)}{2\pi}\right\rfloor+$$
$$16.82\,i\,\pi\left\lfloor\frac{\arg\left(-x+\frac{2\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)}{2\pi}\right\rfloor+8.41\log(x)+8.41\pi\log(x)+$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}\left(-8.41\pi(5.8\pi-x)^k-8.41\left(-x+\frac{2\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)^k\right)}{k}$$
for $x < 0$

$$2.9^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\, 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-21.025\pi-1.40167\pi^2+16.82\,i\,\pi^2\left\lfloor-\frac{-\pi+\arg\left(\frac{5.8\pi}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+$$
$$16.82\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}\,z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+8.41\log(z_0)+8.41\pi\log(z_0)+$$
$$\sum_{k=1}^{\infty}\frac{(-1)^k\left(-8.41\pi(5.8\pi-z_0)^k-8.41\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}-z_0\right)^k\right)z_0^{-k}}{k}$$

Integral representations:

$$2.9^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\, 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-21.025\pi-1.40167\pi^2+8.41\pi\log(5.8\pi)+8.41\log\left(\frac{2}{\pi^{3/4}}\int_0^\infty e^{-t}\sqrt[4]{t}\,dt\right)$$

$$2.9^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\, 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-21.025\pi-1.40167\pi^2+8.41\pi\log(5.8\pi)+8.41\log\left(\frac{2}{\pi^{3/4}}\int_0^1\sqrt[4]{\log\left(\frac{1}{t}\right)}\,dt\right)$$

$$2.9^2\left(\frac{1}{6}(\pi(15+\pi))(-1)+\pi\log(2\pi\, 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)=$$
$$-21.025\pi-1.40167\pi^2+8.41\log\left(\frac{2\exp\left(\int_0^1\frac{\frac{1}{4}-\frac{5x}{4}+x^{5/4}}{(-1+x)\log(x)}\,dx\right)}{\pi^{3/4}}\right)+8.41\pi\log(5.8\pi)$$

From which, after some calculations:

sqrt(sqrt[-(((0.5^2 (-1/6 π (15 + π) + π log(2 π * 0.5) + log((2 Γ(5/4))/π^(3/4)))))- (((2.9^2 (-1/6 π (15 + π) + π log(2 π * 2.9) + log((2 Γ(5/4))/π^(3/4))))))])

Input:

$$\sqrt{\left(\sqrt{\left(-\left(0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\times 0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\times 2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)}$$

log(x) is the natural logarithm

Γ(x) is the gamma function

Result:

1.6240300085530374986265700615390767078372322612322030846419002893
...

1.62403…. result quite near to the value of the golden ratio 1.618033988749...

All 2nd roots of 2.63747:

$1.62403\, e^{0} \approx 1.6240$ (real, principal root)

$1.62403\, e^{i\pi} \approx -1.6240$ (real root)

Alternative representations:

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)}=\sqrt{\left(\sqrt{\left(-0.5^2\left(\pi\log(\pi)+\log\left(\frac{2\,G\left(1+\frac{5}{4}\right)}{G\left(\frac{5}{4}\right)\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)-2.9^2\left(\pi\log(5.8\,\pi)+\log\left(\frac{2\,G\left(1+\frac{5}{4}\right)}{G\left(\frac{5}{4}\right)\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)\right)}\right)}$$

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)}=\sqrt{\left(\sqrt{\left(-0.5^2\left(\pi\log(\pi)+\log\left(\frac{2\,e^{-\log G(5/4)+\log G(1+5/4)}}{\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)-2.9^2\left(\pi\log(5.8\,\pi)+\log\left(\frac{2\,e^{-\log G(5/4)+\log G(1+5/4)}}{\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)\right)}\right)}$$

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)}=\sqrt{\left(\sqrt{\left(-0.5^2\left(\pi\log(\pi)+\log\left(\frac{2\,(1)_{-1+\frac{5}{4}}}{\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)-2.9^2\left(\pi\log(5.8\,\pi)+\log\left(\frac{2\,(1)_{-1+\frac{5}{4}}}{\pi^{3/4}}\right)-\frac{1}{6}\pi(15+\pi)\right)\right)}\right)}$$

Series representations:

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)}=$$
$$\exp\left(i\pi\left\lfloor\frac{1}{2\pi}\arg\left(-x+\sqrt{\left(21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)}\right)\right\rfloor\right)\sqrt{x}$$
$$\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+\sqrt{\left(21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)}\right)^k \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)}=$$
$$\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\sqrt{21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\sqrt{21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)}-z_0\right)/(2\pi)\right\rfloor\right)}$$
$$\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\left(-\frac{1}{2}\right)_k\left(\sqrt{\left(21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)}-z_0\right)^k z_0^{-k}$$

Integral representations:

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)} =$$

$$\sqrt{\left(\sqrt{\left(21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2}{\pi^{3/4}}\int_0^\infty e^{-t}\sqrt[4]{t}\,dt\right)\right)}\right)}$$

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)} =$$

$$\sqrt{\left(\sqrt{\left(21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2}{\pi^{3/4}}\int_0^1\sqrt[4]{\log\left(\frac{1}{t}\right)}\,dt\right)\right)}\right)}$$

$$\sqrt{\left(\sqrt{\left(-0.5^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,0.5)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)-2.9^2\left(-\frac{1}{6}\pi(15+\pi)+\pi\log(2\pi\,2.9)+\log\left(\frac{2\,\Gamma\left(\frac{5}{4}\right)}{\pi^{3/4}}\right)\right)\right)}\right)} =$$

$$\sqrt{\left(\sqrt{\left(21.65\pi+1.44333\pi^2-0.25\pi\log(\pi)-8.41\pi\log(5.8\pi)-8.66\log\left(\frac{2\left(\int_1^\infty e^{-t}\sqrt[4]{t}\,dt+\sum_{k=0}^{\infty}\frac{(-1)^k}{\left(\frac{5}{4}+k\right)k!}\right)}{\pi^{3/4}}\right)\right)}\right)}$$

We have that:

$$(am)^2\left\{-\frac{\pi^2}{12}+\frac{3\pi}{4}\log 2\right\}$$

0.5^2 [(-Pi^2)/12+(3Pi)/4 ln(2)]

Input:

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{3\pi}{4}\log(2)\right)$$

log(x) is the natural logarithm

Result:

0.202681…

0.202681….

Alternative representations:

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=0.5^2\left(\frac{3\pi\log_e(2)}{4}-\frac{\pi^2}{12}\right)$$

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=0.5^2\left(\frac{3}{4}\pi\log(a)\log_a(2)-\frac{\pi^2}{12}\right)$$

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=0.5^2\left(\frac{6}{4}\pi\coth^{-1}(3)-\frac{\pi^2}{12}\right)$$

Series representations:

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=-0.0208333\pi^2+0.375\,i\,\pi^2\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+ 0.1875\pi\log(x)-0.1875\pi\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\quad\text{for } x<0$$

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)= -0.0208333\pi^2+0.375\,i\,\pi^2\left\lfloor-\frac{-\pi+\arg\left(\frac{2}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor+ 0.1875\pi\log(z_0)-0.1875\pi\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}$$

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)= -0.0208333\pi^2+0.1875\pi\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+0.1875\pi\log(z_0)+ 0.1875\pi\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\log(z_0)-0.1875\pi\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=-0.0208333\,\pi^2+0.1875\,\pi\int_1^2\frac{1}{t}\,dt$$

$$0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=-0.0208333\,\pi^2+\frac{0.09375}{i}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds$$

for $-1<\gamma<0$

2.9^2 [(-Pi^2)/12+(3Pi)/4 ln(2)]

Input:

$$2.9^2\left(-\frac{\pi^2}{12}+\frac{3\pi}{4}\log(2)\right)$$

$\log(x)$ is the natural logarithm

Result:

6.81818…

6.81818….

Alternative representations:

$$2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=2.9^2\left(\frac{3\pi\log_e(2)}{4}-\frac{\pi^2}{12}\right)$$

$$2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=2.9^2\left(\frac{3}{4}\pi\log(a)\log_a(2)-\frac{\pi^2}{12}\right)$$

$$2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}\log(2)(3\pi)\right)=2.9^2\left(\frac{6}{4}\pi\coth^{-1}(3)-\frac{\pi^2}{12}\right)$$

Series representations:

$$2.9^2 \left(-\frac{\pi^2}{12} + \frac{1}{4} \log(2) (3\pi)\right) = -0.700833 \pi^2 + 12.615 i \pi^2 \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + 6.3075 \pi \log(x) - 6.3075 \pi \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$2.9^2 \left(-\frac{\pi^2}{12} + \frac{1}{4} \log(2) (3\pi)\right) = -0.700833 \pi^2 + 12.615 i \pi^2 \left\lfloor -\frac{-\pi + \arg\left(\frac{2}{z_0}\right) + \arg(z_0)}{2\pi} \right\rfloor + 6.3075 \pi \log(z_0) - 6.3075 \pi \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}$$

$$2.9^2 \left(-\frac{\pi^2}{12} + \frac{1}{4} \log(2) (3\pi)\right) = -0.700833 \pi^2 + 6.3075 \pi \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + 6.3075 \pi \log(z_0) + 6.3075 \pi \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \log(z_0) - 6.3075 \pi \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}$$

Integral representations:

$$2.9^2 \left(-\frac{\pi^2}{12} + \frac{1}{4} \log(2) (3\pi)\right) = -0.700833 \pi^2 + 6.3075 \pi \int_1^2 \frac{1}{t} \, dt$$

$$2.9^2 \left(-\frac{\pi^2}{12} + \frac{1}{4} \log(2) (3\pi)\right) = -0.700833 \pi^2 + \frac{3.15375}{i} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2 \Gamma(1+s)}{\Gamma(1-s)} \, ds \quad \text{for } -1 < \gamma < 0$$

From which:

sqrt((((1+0.9568666373)[(((2.9^2 [(-Pi^2)/12+(3Pi)/4 ln(2)]))) * (((0.5^2 [(-Pi^2)/12+(3Pi)/4 ln(2)]))))])))

where 0.9568666373 is the value of the following Rogers-Ramanujan continued fraction:

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

Input interpretation:

$$\sqrt{(1+0.9568666373)\left(\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{3\pi}{4}\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{3\pi}{4}\log(2)\right)\right)\right)}$$

$\log(x)$ is the natural logarithm

Result:

1.64445…

$1.64445.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

All 2nd roots of 2.70422:

$1.64445\, e^{0} \approx 1.6445$ (real, principal root)

$1.64445\, e^{i\pi} \approx -1.6445$ (real root)

Alternative representations:

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} =$$
$$\sqrt{1.95687\times 0.5^2\times 2.9^2\left(\frac{3\pi\log_e(2)}{4}-\frac{\pi^2}{12}\right)^2}$$

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} =$$
$$\sqrt{1.95687\times 0.5^2\times 2.9^2\left(\frac{6}{4}\pi\coth^{-1}(3)-\frac{\pi^2}{12}\right)^2}$$

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} =$$
$$\sqrt{1.95687\times 0.5^2\times 2.9^2\left(\frac{3}{4}\pi\log(a)\log_a(2)-\frac{\pi^2}{12}\right)^2}$$

Series representations:

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} =$$
$$\sqrt{-1+0.0285716\pi^2(\pi-9\log(2))^2}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+0.0285716\pi^2(\pi-9\log(2))^2\right)^{-k}$$

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} = \sqrt{-1+0.0285716\,\pi^2(\pi-9\log(2))^2} \sum_{k=0}^{\infty} \frac{(-1)^k\left(-1+0.0285716\,\pi^2(\pi-9\log(2))^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} = \sqrt{0.0285716\,\pi^2\left(\pi-9\left(2\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)\right)^2}$$

for $x < 0$

Integral representations:

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} = \sqrt{0.0285716\,\pi^2\left(\pi-9\int_1^2\frac{1}{t}\,dt\right)^2}$$

$$\sqrt{(1+0.956867)\left(2.9^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)\left(0.5^2\left(-\frac{\pi^2}{12}+\frac{1}{4}(3\pi)\log(2)\right)\right)} = \sqrt{\frac{0.0285716\left(i\,\pi^2-4.5\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2}{i^2}}$$

for $-1 < \gamma < 0$

From:

$$V = -\frac{(2+2+2\times 8)}{720\pi R^6} + \sum_P (-1)^{2s_p+1}\frac{n_P}{8\pi} \times \left\{\frac{1}{90R^6} - \frac{m_p^2}{6R^4}\right\} + \\ + \sum_{AP}(-1)^{2s_p+1} n_P \times \left\{-\frac{7}{8}\frac{1}{90R^6} + \frac{1}{2}\frac{m_p^2}{6R^4}\right\} \quad (2.19)$$

For:

non-interacting massive particle of spin s_p and mass m_p

Spin = 1/2 ,

Particle	Mass (TeV)	$(-1)^{(2s_p+1)} n_p$
$\tilde{u}_R, \tilde{d}_R, \tilde{s}_R, \tilde{c}_R$	2.76	-24

-(2+2+2*8) / (720Pi*x^6)-(24/(8Pi))*[(1/(90x^6) – ((2.76)^2)/(6x^4))]-24*[(-7/(720x^6)+((2.76)^2)/(12x^4))]

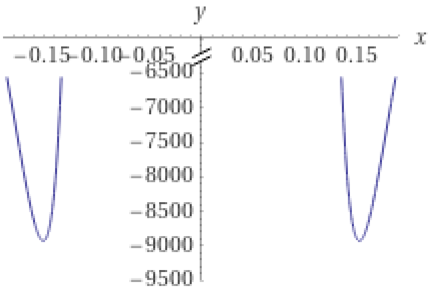
Input:

$$-\frac{2+2+2\times 8}{720\,\pi\,x^6} - \frac{24}{8\,\pi}\left(\frac{1}{90\,x^6} - \frac{2.76^2}{6\,x^4}\right) - 24\left(-\frac{7}{720\,x^6} + \frac{2.76^2}{12\,x^4}\right)$$

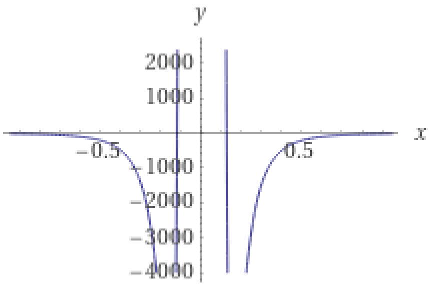
Result:

$$-\frac{1}{36\,\pi\,x^6} - \frac{3\left(\frac{1}{90\,x^6} - \frac{1.2696}{x^4}\right)}{\pi} - 24\left(\frac{0.6348}{x^4} - \frac{7}{720\,x^6}\right)$$

Plots:



(x from −0.2 to 0.2)



(x from −0.9 to 0.9)

Alternate forms:

$$\frac{0.213881 - 14.0228\,x^2}{x^6}$$

$$-\frac{4.4636\,(3.14159\,x^2 - 0.0479167)}{x^6}$$

$$-\frac{7929.72\,x^2 - 42\,\pi + 11}{180\,\pi\,x^6}$$

Partial fraction expansion:

$$\frac{42\,\pi - 11}{180\,\pi\,x^6} - \frac{14.0228}{x^4}$$

Expanded form:

$$-\frac{11}{180\pi x^6} + \frac{7}{30 x^6} - \frac{14.0228}{x^4}$$

Roots:

$x \approx -0.1235$

$x \approx 0.1235$

Properties as a real function:

Domain

$\{x \in \mathbb{R} : x \neq 0\}$

Range

$$\{y \in \mathbb{R} : y \geq (2\,590\,035\,913\,944 - 31\,080\,430\,967\,328\,\pi + 124\,321\,723\,869\,312\,\pi^2 - 165\,762\,298\,492\,416\,\pi^3) / (1\,181\,640\,625\,\pi - 9\,023\,437\,500\,\pi^2 + 17\,226\,562\,500\,\pi^3)\}$$

Parity

even

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

Derivative:

$$\frac{d}{dx}\left(-\frac{2+2+2\times 8}{720\pi x^6} - \frac{24\left(\frac{1}{90 x^6} - \frac{2.76^2}{6 x^4}\right)}{8\pi} - 24\left(-\frac{7}{720 x^6} + \frac{2.76^2}{12 x^4}\right)\right) = \frac{56.0913 x^2 - 1.28329}{x^7}$$

Indefinite integral:

$$\int\left(-\frac{3\left(\frac{1}{90x^6}-\frac{1.2696}{x^4}\right)}{\pi}-24\left(-\frac{7}{720x^6}+\frac{0.6348}{x^4}\right)-\frac{1}{36\pi x^6}\right)dx = \frac{4.67427x^2-0.0427762}{x^5} + \text{constant}$$

Global minima:

$$\min\left\{-\frac{2+2+2\times 8}{720\pi x^6}-\frac{24\left(\frac{1}{90x^6}-\frac{2.76^2}{6x^4}\right)}{8\pi}-24\left(-\frac{7}{720x^6}+\frac{2.76^2}{12x^4}\right)\right\} = -\frac{2430850583234918645426565565575839210188800(4\pi-1)^3}{9165423189346859202789669808161240667(11-42\pi)^2\pi}$$

at $x = -\frac{1}{372}\sqrt{\frac{2092750755523(42\pi-11)}{6911957230(4\pi-1)}}$

$$\min\left\{-\frac{2+2+2\times 8}{720\pi x^6}-\frac{24\left(\frac{1}{90x^6}-\frac{2.76^2}{6x^4}\right)}{8\pi}-24\left(-\frac{7}{720x^6}+\frac{2.76^2}{12x^4}\right)\right\} = -\frac{2430850583234918645426565565575839210188800(4\pi-1)^3}{9165423189346859202789669808161240667(11-42\pi)^2\pi}$$

at $x = \frac{1}{372}\sqrt{\frac{2092750755523(42\pi-11)}{6911957230(4\pi-1)}}$

Global minima:

$$\min\left\{-\frac{2+2+2\times 8}{720\pi x^6}-\frac{24\left(\frac{1}{90x^6}-\frac{2.76^2}{6x^4}\right)}{8\pi}-24\left(-\frac{7}{720x^6}+\frac{2.76^2}{12x^4}\right)\right\} \approx -8930.1$$

at $x \approx -0.15126$

$$\min\left\{-\frac{2+2+2\times 8}{720\pi x^6}-\frac{24\left(\frac{1}{90x^6}-\frac{2.76^2}{6x^4}\right)}{8\pi}-24\left(-\frac{7}{720x^6}+\frac{2.76^2}{12x^4}\right)\right\} \approx -8930.1$$

at $x \approx 0.15126$

Limit:

$$\lim_{x\to\pm\infty}\left(-\frac{3\left(\frac{1}{90 x^6}-\frac{1.2696}{x^4}\right)}{\pi}-24\left(-\frac{7}{720 x^6}+\frac{0.6348}{x^4}\right)-\frac{1}{36 \pi x^6}\right)=0\approx 0$$

Alternative representations:

$$-\frac{2+2+2\times 8}{720 \pi x^6}-\frac{\left(\frac{1}{90 x^6}-\frac{2.76^2}{6 x^4}\right)24}{8 \pi}-24\left(-\frac{7}{720 x^6}+\frac{2.76^2}{12 x^4}\right)=$$
$$-\frac{24\left(-\frac{2.76^2}{6 x^4}+\frac{1}{90 x^6}\right)}{1440\,^\circ}-24\left(\frac{2.76^2}{12 x^4}-\frac{7}{720 x^6}\right)-\frac{20}{129600\,^\circ x^6}$$

$$-\frac{2+2+2\times 8}{720 \pi x^6}-\frac{\left(\frac{1}{90 x^6}-\frac{2.76^2}{6 x^4}\right)24}{8 \pi}-24\left(-\frac{7}{720 x^6}+\frac{2.76^2}{12 x^4}\right)=$$
$$\frac{-24\left(-\frac{2.76^2}{6 x^4}+\frac{1}{90 x^6}\right)}{-8 i \log(-1)}-24\left(\frac{2.76^2}{12 x^4}-\frac{7}{720 x^6}\right)--\frac{20}{720 i \log(-1) x^6}$$

$$-\frac{2+2+2\times 8}{720 \pi x^6}-\frac{\left(\frac{1}{90 x^6}-\frac{2.76^2}{6 x^4}\right)24}{8 \pi}-24\left(-\frac{7}{720 x^6}+\frac{2.76^2}{12 x^4}\right)=$$
$$-\frac{24\left(-\frac{2.76^2}{6 x^4}+\frac{1}{90 x^6}\right)}{8 \cos^{-1}(-1)}-24\left(\frac{2.76^2}{12 x^4}-\frac{7}{720 x^6}\right)-\frac{20}{720 \cos^{-1}(-1) x^6}$$

Series representations:

$$-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)24}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)=$$
$$-\frac{15.2352\left(0.00100279-0.0625\,x^2-0.0153154\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}+x^2\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)}{x^6\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)24}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)=$$
$$\left(0.9522\left(-0.0160447+x^2+1.0502\sum_{k=0}^{\infty}\frac{1}{1+2\,k}(-1)^k\,1195^{-2\,k}\left(-0.00097629\times 25^k+0.186667\times 57\,121^k+\left(0.0637456\times 25^k-12.1882\times 57\,121^k\right)x^2\right)\right)\right)\Big/\left(x^6\sum_{k=0}^{\infty}\frac{1195^{-2\,k}\left(0.4\,(-57\,121)^k-0.00209205\,(-25)^k\right)}{0.5+k}\right)$$

$$-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)24}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)=$$
$$-\left(\left(15.2352\left(0.00401118-0.25\,x^2-0.0153154\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2\,k}+\frac{2}{1+4\,k}+\frac{1}{3+4\,k}\right)+x^2\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2\,k}+\frac{2}{1+4\,k}+\frac{1}{3+4\,k}\right)\right)\right)\Big/\left(x^6\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2\,k}+\frac{2}{1+4\,k}+\frac{1}{3+4\,k}\right)\right)\right)$$

Integral representations:

$$-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)24}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)=$$
$$-\frac{15.2352\left(0.00200559-0.125\,x^2-0.0153154\int_0^\infty \frac{1}{1+t^2}\,dt+x^2\int_0^\infty \frac{1}{1+t^2}\,dt\right)}{x^6\int_0^\infty \frac{1}{1+t^2}\,dt}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)24}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)=$$
$$-\frac{1}{x^6\int_0^1\sqrt{1-t^2}\,dt}\,15.2352$$
$$\left(0.00100279-0.0625\,x^2-0.0153154\int_0^1\sqrt{1-t^2}\,dt+x^2\int_0^1\sqrt{1-t^2}\,dt\right)$$

$$-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)24}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)=$$
$$-\frac{15.2352\left(0.00200559-0.125\,x^2-0.0153154\int_0^\infty \frac{\sin(t)}{t}\,dt+x^2\int_0^\infty \frac{\sin(t)}{t}\,dt\right)}{x^6\int_0^\infty \frac{\sin(t)}{t}\,dt}$$

From:

$$-\frac{1}{36\,\pi\,x^6}-\frac{3\left(\frac{1}{90\,x^6}-\frac{1.2696}{x^4}\right)}{\pi}-24\left(\frac{0.6348}{x^4}-\frac{7}{720\,x^6}\right)$$

For x = 0.1235:

-(3 (1/(90 0.1235^6) - 1.2696/0.1235^4))/π - 24 (-7/(720 0.1235^6) + 0.6348/0.1235^4) - 1/(36 π 0.1235^6)

Input interpretation:

$$-\frac{3\left(\frac{1}{90\times0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\times0.1235^6}$$

Result:

0.418882…

0.418882….

Alternative representations:

$$-\frac{3\left(\frac{1}{90\times0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=\left(-\frac{3\left(-\frac{1.2696}{0.1235^4}+\frac{1}{90\times0.1235^6}\right)}{180\,°}-24\left(\frac{0.6348}{0.1235^4}-\frac{7}{720\times0.1235^6}\right)-\frac{1}{6480\,°\,0.1235^6}=271.199-\frac{4.726}{°}\right)$$

$$-\frac{3\left(\frac{1}{90\times0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=\left(-\frac{3\left(-\frac{1.2696}{0.1235^4}+\frac{1}{90\times0.1235^6}\right)}{\cos^{-1}(-1)}-24\left(\frac{0.6348}{0.1235^4}-\frac{7}{720\times0.1235^6}\right)-\frac{1}{36\cos^{-1}(-1)\,0.1235^6}=271.199-\frac{850.681}{\cos^{-1}(-1)}\right)$$

$$-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=$$
$$\left(-\frac{3\left(-\frac{1.2696}{0.1235^4}+\frac{1}{90\times 0.1235^6}\right)}{2\,E(0)}-24\left(\frac{0.6348}{0.1235^4}-\frac{7}{720\times 0.1235^6}\right)-\frac{1}{72\,E(0)\,0.1235^6}=\right.$$
$$\left.271.199-\frac{425.34}{E(0)}\right)$$

Series representations:

$$-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=$$
$$271.199-\frac{212.67}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=$$
$$271.199-\frac{425.34}{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=$$
$$271.199-\frac{850.681}{\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=$$
$$271.199-\frac{425.34}{\int_0^\infty \frac{1}{1+t^2}\,dt}$$

$$-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=$$
$$271.199-\frac{212.67}{\int_0^1 \sqrt{1-t^2}\,dt}$$

$$-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}=$$
$$271.199-\frac{425.34}{\int_0^\infty \frac{\sin(t)}{t}\,dt}$$

From which:

(3+0.9568666373)((-(3 (1/(90 0.1235^6) - 1.2696/0.1235^4))/π - 24 (-7/(720 0.1235^6) + 0.6348/0.1235^4) - 1/(36 π 0.1235^6))))

where 0.9568666373 is the value of the following Rogers-Ramanujan continued fraction:

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

Input interpretation:

$$(3+0.9568666373)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\times 0.1235^6}\right)$$

Result:

1.6574587999242426068708009669496280285514866570077400318856203198
...

1.65745879….. result very near to the 14th root of the following Ramanujan's class invariant $Q=\left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Alternative representations:

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=$$
$$\left(3.95687\left(-\frac{3\left(-\frac{1.2696}{0.1235^4}+\frac{1}{90\times 0.1235^6}\right)}{180\,°}-24\left(\frac{0.6348}{0.1235^4}-\frac{7}{720\times 0.1235^6}\right)-\frac{1}{6480\,°\,0.1235^6}\right)\right)=3.95687\left(271.199-\frac{4.726}{°}\right)$$

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=$$
$$\left(3.95687\left(-\frac{3\left(-\frac{1.2696}{0.1235^4}+\frac{1}{90\times 0.1235^6}\right)}{\cos^{-1}(-1)}-24\left(\frac{0.6348}{0.1235^4}-\frac{7}{720\times 0.1235^6}\right)-\frac{1}{36\cos^{-1}(-1)\,0.1235^6}\right)\right)=3.95687\left(271.199-\frac{850.681}{\cos^{-1}(-1)}\right)$$

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=$$

$$\left(3.95687\left(-\frac{3\left(-\frac{1.2696}{0.1235^4}+\frac{1}{90\times 0.1235^6}\right)}{2\,E(0)}-24\left(\frac{0.6348}{0.1235^4}-\frac{7}{720\times 0.1235^6}\right)-\frac{1}{72\,E(0)\,0.1235^6}\right)=3.95687\left(271.199-\frac{425.34}{E(0)}\right)\right)$$

Series representations:

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=$$
$$1073.1-\frac{841.508}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=$$
$$1073.1-\frac{1683.02}{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=$$
$$1073.1-\frac{3366.03}{\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=1073.1-\frac{1683.02}{\int_0^\infty \frac{1}{1+t^2}\,dt}$$

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=1073.1-\frac{841.508}{\int_0^1 \sqrt{1-t^2}\,dt}$$

$$(3+0.956867)\left(-\frac{3\left(\frac{1}{90\times 0.1235^6}-\frac{1.2696}{0.1235^4}\right)}{\pi}-24\left(-\frac{7}{720\times 0.1235^6}+\frac{0.6348}{0.1235^4}\right)-\frac{1}{36\,\pi\,0.1235^6}\right)=1073.1-\frac{1683.02}{\int_0^\infty \frac{\sin(t)}{t}\,dt}$$

With regard the global minima:

$$\min\left\{-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{24\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)\right\}\approx -8930.1 \text{ at } x\approx -0.15126$$

We have that:

-1/372 sqrt((2092750755523 (42 π - 11))/(6911957230 (4 π - 1)))

Input:

$$-\frac{1}{372}\sqrt{\frac{2092750755523(42\pi-11)}{6911957230(4\pi-1)}}$$

Decimal approximation:

−0.151256517156642996910451527470557054387252430352248057534918833
…

x = -0.151256517156

Property:

$$-\frac{1}{372}\sqrt{\frac{2092750755523(-11+42\pi)}{6911957230(-1+4\pi)}}$$ is a transcendental number

Series representations:

$$\frac{1}{372}\sqrt{\frac{2092750755523(42\pi-11)}{6911957230(4\pi-1)}}(-1) = -\frac{1}{372}\sqrt{-1+\frac{2092750755523(-11+42\pi)}{6911957230(-1+4\pi)}}\sum_{k=0}^{\infty}\left(-1+\frac{2092750755523(-11+42\pi)}{6911957230(-1+4\pi)}\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{1}{372}\sqrt{\frac{2092750755523(42\pi-11)}{6911957230(4\pi-1)}}(-1) = -\frac{1}{372}\sqrt{-1+\frac{2092750755523(-11+42\pi)}{6911957230(-1+4\pi)}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\frac{2092750755523(-11+42\pi)}{6911957230(-1+4\pi)}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{1}{372}\sqrt{\frac{2092750755523(42\pi-11)}{6911957230(4\pi-1)}}(-1) =$$

$$-\frac{1}{372}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{2092750755523(-11+42\pi)}{6911957230(-1+4\pi)}-z_0\right)^k z_0^{-k}}{k!}$$

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

{-(2 + 2 + 2 8)/(720 π* -0.151256517156^6) - (24 (1/(90 *-0.151256517156^6) - 2.76^2/(6 *-0.151256517156^4)))/(8 π) - 24 (-7/(720 *-0.151256517156^6) + 2.76^2/(12 *-0.151256517156^4))}

Input interpretation:

$$-\frac{2+2+2\times 8}{720\pi\times(-1)\times 0.151256517156^6} - \frac{24\left(\frac{1}{90\times(-1)\times 0.151256517156^6}-\frac{2.76^2}{6\times(-1)\times 0.151256517156^4}\right)}{8\pi} - 24\left(-\frac{7}{720\times(-1)\times 0.151256517156^6}+\frac{2.76^2}{12\times(-1)\times 0.151256517156^4}\right)$$

Result:

8930.13…

8930.13…

Alternative representations:

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=-24\left(-\frac{2.76^2}{12\times 0.1512565171560000^4}--\frac{7}{720\times 0.1512565171560000^6}\right)-\frac{24\left(\frac{-2.76^2}{-6\times 0.1512565171560000^4}+-\frac{1}{90\times 0.1512565171560000^6}\right)}{1440\,^\circ}--\frac{20}{129\,600\,^\circ\,0.1512565171560000^6}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=-24\left(-\frac{2.76^2}{12\times 0.1512565171560000^4}--\frac{7}{720\times 0.1512565171560000^6}\right)--\frac{24\left(\frac{-2.76^2}{-6\times 0.1512565171560000^4}+-\frac{1}{90\times 0.1512565171560000^6}\right)}{8\,i\log(-1)}-\frac{20}{720\,i\log(-1)\,0.1512565171560000^6}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=$$
$$-24\left(-\frac{2.76^2}{12\times 0.1512565171560000^4}--\frac{7}{720\times 0.1512565171560000^6}\right)-\frac{24\left(\frac{-2.76^2}{-6\times 0.1512565171560000^4}+-\frac{1}{90\times 0.1512565171560000^6}\right)}{8\cos^{-1}(-1)}-\frac{20}{720\cos^{-1}(-1)\,0.1512565171560000^6}$$

Series representations:

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=9621.99-\frac{543.384}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=9621.99-\frac{1086.77}{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=9621.99-\frac{2173.54}{\sum_{k=0}^{\infty}\frac{2^{-k}\,(-6+50\,k)}{\binom{3k}{k}}}$$

Integral representations:

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=9621.99-\frac{1086.77}{\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=9621.99-\frac{543.384}{\int_0^{1}\sqrt{1-t^2}\,dt}$$

$$-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.1512565171560000^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.1512565171560000^6}-\frac{2.76^2}{6\,(-1)\,0.1512565171560000^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.1512565171560000^6}+\frac{2.76^2}{12\,(-1)\,0.1512565171560000^4}\right)=9621.99-\frac{1086.77}{\int_0^\infty \frac{\sin(t)}{t}\,dt}$$

From the right-hand side of the below expression

$$\min\left\{-\frac{2+2+2\times 8}{720\,\pi\,x^6}-\frac{24\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)\right\}=-\frac{2430850583234918645426565565575839210188800\,(4\,\pi-1)^3}{9165423189346859202789669808161240667\,(11-42\,\pi)^2\,\pi}$$

$$\text{at } x=-\frac{1}{372}\sqrt{\frac{2092750755523\,(42\,\pi-11)}{6911957230\,(4\,\pi-1)}}$$

we obtain:

-(2.43085058e+43 (4 π - 1)^3)/(9.16542318e+37 (11 - 42 π)^2 π)

Input interpretation:

$$-\frac{2.43085058\times 10^{43}\,(4\,\pi-1)^3}{9.16542318\times 10^{37}\,(11-42\,\pi)^2\,\pi}$$

Result:

−8930.1296…

-8930.1296….

From which:

[-(2 + 2 + 2*8)/(720 π* -0.151256517^6) - (24(1/(90 *-0.151256517^6) - 2.76^2/(6 *-0.151256517^4)))/(8π) - 24(-7/(720 *-0.151256517^6) + 2.76^2/(12 *-0.151256517^4))]-(6^3+8^3)-10

Input interpretation:

$$\left(-\frac{2+2+2\times 8}{720\,\pi\times(-1)\times 0.151256517^6}-\frac{24\left(\frac{1}{90\times(-1)\times 0.151256517^6}-\frac{2.76^2}{6\times(-1)\times 0.151256517^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\times(-1)\times 0.151256517^6}+\frac{2.76^2}{12\times(-1)\times 0.151256517^4}\right)\right)-(6^3+8^3)-10$$

Result:

8192.13…

8192.13…. ≈ 8192

The total amplitude vanishes for gauge group SO(8192), while the vacuum energy is negative and independent of the gauge group.

The vacuum energy and dilaton tadpole to lowest non-trivial order for the open bosonic string. While the vacuum energy is non-zero and independent of the gauge group, the dilaton tadpole is zero for a unique choice of gauge group, SO(2^{13}) i.e. SO(8192). (From: "Dilaton Tadpole for the Open Bosonic String " Michael R. Douglas and Benjamin Grinstein - September 2,1986)

Alternative representations:

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-\left(6^3+8^3\right)-10=-10-6^3-8^3-24\left(-\frac{2.76^2}{12\times 0.151257^4}--\frac{7}{720\times 0.151257^6}\right)-\frac{24\left(\frac{-2.76^2}{-6\times 0.151257^4}+-\frac{1}{90\times 0.151257^6}\right)}{1440\,^\circ}--\frac{20}{129600\,^\circ\,0.151257^6}$$

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-\left(6^3+8^3\right)-10=-10-6^3-8^3-24\left(-\frac{2.76^2}{12\times 0.151257^4}--\frac{7}{720\times 0.151257^6}\right)-\frac{24\left(\frac{-2.76^2}{-6\times 0.151257^4}+-\frac{1}{90\times 0.151257^6}\right)}{8\,i\log(-1)}-\frac{20}{720\,i\log(-1)\,0.151257^6}$$

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-\left(6^3+8^3\right)-10=-10-6^3-8^3-24\left(-\frac{2.76^2}{12\times 0.151257^4}--\frac{7}{720\times 0.151257^6}\right)-\frac{24\left(\frac{-2.76^2}{-6\times 0.151257^4}+-\frac{1}{90\times 0.151257^6}\right)}{8\cos^{-1}(-1)}--\frac{20}{720\cos^{-1}(-1)\,0.151257^6}$$

Series representations:

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-(6^3+8^3)-10=8883.99-\frac{543.384}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-(6^3+8^3)-10=8883.99-\frac{1086.77}{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-(6^3+8^3)-10=8883.99-\frac{2173.54}{\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-\left(6^3+8^3\right)-10=8883.99-\frac{1086.77}{\int_0^\infty \frac{1}{1+t^2}\,dt}$$

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-\left(6^3+8^3\right)-10=8883.99-\frac{543.384}{\int_0^1 \sqrt{1-t^2}\,dt}$$

$$\left(-\frac{2+2+2\times 8}{720\,\pi\,(-1)\,0.151257^6}-\frac{24\left(\frac{1}{90\,(-1)\,0.151257^6}-\frac{2.76^2}{6\,(-1)\,0.151257^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,(-1)\,0.151257^6}+\frac{2.76^2}{12\,(-1)\,0.151257^4}\right)\right)-\left(6^3+8^3\right)-10=8883.99-\frac{1086.77}{\int_0^\infty \frac{\sin(t)}{t}\,dt}$$

From the indefinite integral:

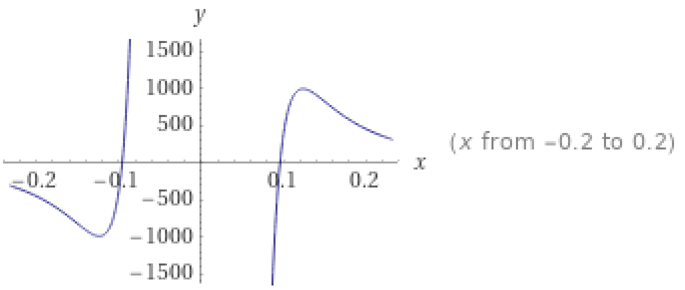
$$\int\left(-\frac{3\left(\frac{1}{90 x^6}-\frac{1.2696}{x^4}\right)}{\pi}-24\left(-\frac{7}{720 x^6}+\frac{0.6348}{x^4}\right)-\frac{1}{36 \pi x^6}\right) d x=\frac{4.67427 x^2-0.0427762}{x^5}+\text{constant}$$

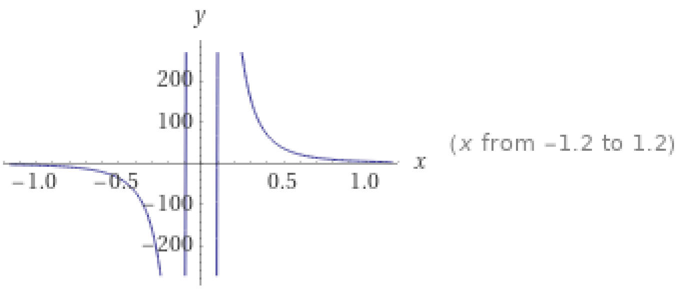
integral(-(3 (1/(90 x^6) - 1.2696/x^4))/π - 24 (-7/(720 x^6) + 0.6348/x^4) - 1/(36 π x^6)) dx

Indefinite integral:

$$\int\left(-\frac{3\left(\frac{1}{90 x^6}-\frac{1.2696}{x^4}\right)}{\pi}-24\left(-\frac{7}{720 x^6}+\frac{0.6348}{x^4}\right)-\frac{1}{36 \pi x^6}\right) d x=\frac{4.67427 x^2-0.0427762}{x^5}+\text{constant}$$

Plots of the integral:





Alternate forms of the integral:

$$\frac{4.67427(x-0.095663)(x+0.095663)}{x^5} + \text{constant}$$

$$-\frac{0.0427762-4.67427x^2}{x^5} + \text{constant}$$

Partial fraction expansion:

$$\frac{4.67427}{x^3} - \frac{0.0427762}{x^5} + \text{constant}$$

Alternate form assuming x is real:

$$-\frac{0.0427762}{x^5} + \frac{4.67427}{x^3} + 0 + \text{constant}$$

For x = 0.2:

(((4.67427 * 0.2^2 - 0.0427762)/0.2^5)) + (((4.67427 * 1.2^2 - 0.0427762)/1.2^5))

Input interpretation:

$$\frac{4.67427\times 0.2^2-0.0427762}{0.2^5} + \frac{4.67427\times 1.2^2-0.0427762}{1.2^5}$$

Result:

453.29595156571502057613168724279835390946502057613168724279835390

…

453.2959515….

From which:

1/7(((((4.67427 * 0.2^2 - 0.0427762)/0.2^5)) + (((4.67427 * 1.2^2 - 0.0427762)/1.2^5)) -5-((((√(10-2√5) -2))/((√5-1))))))

Where (((√(10-2√5) -2))/((√5-1))) = κ

Input interpretation:

$$\frac{1}{7}\left(\frac{4.67427\times 0.2^2 - 0.0427762}{0.2^5} + \frac{4.67427\times 1.2^2 - 0.0427762}{1.2^5} - 5 - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)$$

Result:

64.0017...

64.0017.... ≈ 64 = 8^2

27*1/7(((((4.67427 * 0.2^2 - 0.0427762)/0.2^5)) + (((4.67427 * 1.2^2 - 0.0427762)/1.2^5)) -5-((((√(10-2√5) -2))/((√5-1))))))+1

Input interpretation:

$$27\times\frac{1}{7}\left(\frac{4.67427\times 0.2^2 - 0.0427762}{0.2^5} + \frac{4.67427\times 1.2^2 - 0.0427762}{1.2^5} - 5 - \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+1$$

Result:

1729.05...

1729.05....

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = 8^2 * 3^3) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

[27*1/7(((((4.67427 * 0.2^2 - 0.0427762)/0.2^5)) + (((4.67427 * 1.2^2 - 0.0427762)/1.2^5)) -5-((((√(10-2√5) -2))/((√5-1))))))+1]^1/15

Input interpretation:

$$\left(27\times\frac{1}{7}\left(\frac{4.67427\times0.2^2-0.0427762}{0.2^5}+\frac{4.67427\times1.2^2-0.0427762}{1.2^5}-5-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)+1\right)\verb|^|(1/15)$$

Result:

1.64382...

$1.64382.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934...$

From the derivative:

$$\frac{d}{dx}\left(-\frac{2+2+2\times8}{720\,\pi\,x^6}-\frac{24\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)\right)=$$

$$\frac{56.0913\,x^2-1.28329}{x^7}$$

d/dx(-(2 + 2 + 2×8)/(720 π x^6) - (24 (1/(90 x^6) - 2.76^2/(6 x^4)))/(8 π) - 24 (-7/(720 x^6) + 2.76^2/(12 x^4))) = (56.0913 x^2 - 1.28329)/x^7

Input interpretation:

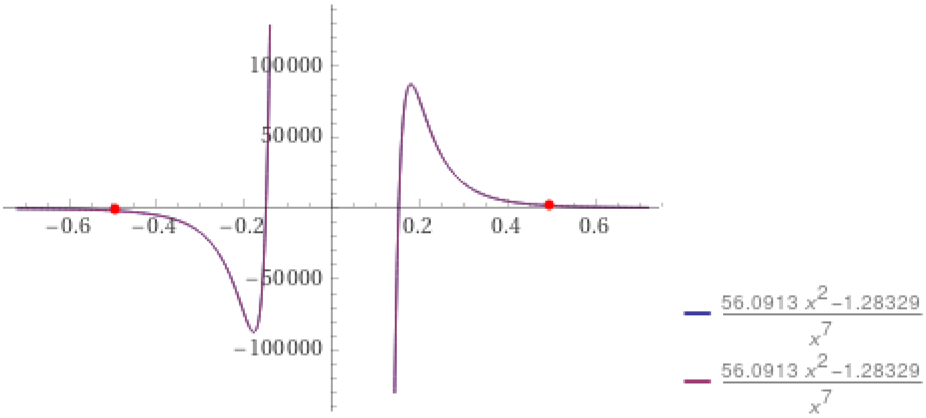
$$\frac{\partial}{\partial x}\left(-\frac{2+2+2\times8}{720\,\pi\,x^6}-\frac{24\left(\frac{1}{90\,x^6}-\frac{2.76^2}{6\,x^4}\right)}{8\,\pi}-24\left(-\frac{7}{720\,x^6}+\frac{2.76^2}{12\,x^4}\right)\right)=$$

$$\frac{56.0913\,x^2-1.28329}{x^7}$$

Result:

$$\frac{56.0913\,x^2 - 1.28329}{x^7} = \frac{56.0913\,x^2 - 1.28329}{x^7}$$

Plot:



Alternate forms assuming x is real:

$$x = \frac{0.245293}{x}$$

$$-\frac{1.28329}{x^7} + \frac{56.0913}{x^5} + 0 = -\frac{1.28329}{x^7} + \frac{56.0913}{x^5} + 0$$

Alternate form:

$$\frac{56.0913\,(x - 0.151257)\,(x + 0.151257)}{x^7} = \frac{56.0913\,(x - 0.151257)\,(x + 0.151257)}{x^7}$$

Alternate form assuming x is positive:

$$x = 0.49527$$

Expanded form:

$$\frac{56.0913}{x^5} - \frac{1.28329}{x^7} = \frac{56.0913}{x^5} - \frac{1.28329}{x^7}$$

Solutions:

$x \approx -0.49527$

$x \approx 0.49527$

0.49527

(56.0913 * 0.49527^2 - 1.28329)/0.49527^7

Input interpretation:

$$\frac{56.0913 \times 0.49527^2 - 1.28329}{0.49527^7}$$

Result:

1706.7230017390806306583878395920601480117369054483945688914018818...

1706.723001739….

From which:

(56.0913 * 0.49527^2 - 1.28329)/0.49527^7 + 21+golden ratio - ((((√(10-2√5) - 2))/((√5-1))))

Input interpretation:

$$\frac{56.0913 \times 0.49527^2 - 1.28329}{0.49527^7} + 21 + \phi - \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\sqrt{5} - 1}$$

ϕ is the golden ratio

Result:

1729.06...

1729.06….

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Series representations:

$$\frac{56.0913\times 0.49527^2-1.28329}{0.49527^7}+21+\phi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=\left(-1725.72-\phi+1727.72\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+\phi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)\Big/\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{56.0913\times 0.49527^2-1.28329}{0.49527^7}+21+\phi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=\left(-1725.72-\phi+1727.72\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\phi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)\Big/\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{56.0913\times 0.49527^2-1.28329}{0.49527^7}+21+\phi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}=$$

$$\left(-1725.72-\phi+1727.72\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}-\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)$$

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

[(56.0913 * 0.49527^2 - 1.28329)/0.49527^7 + 21+golden ratio - ((((√(10-2√5) - 2))/((√5-1))))]^1/15

Input interpretation:

$$\sqrt[15]{\frac{56.0913\times 0.49527^2-1.28329}{0.49527^7}+21+\phi-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}}$$

ϕ is the golden ratio

Result:

1.64382…

$1.64382\ldots \approx \zeta(2)=\frac{\pi^2}{6}=1.644934\ldots$

Performing the double integral:

[-(24 (-2.76^2/(6 x^4) + 1/(90 x^6)))/(8 cos^(-1)(-1)) - 24 (2.76^2/(12 x^4) - 7/(720 x^6)) - 20/(720 cos^(-1)(-1) x^6)] dxdy

Input:

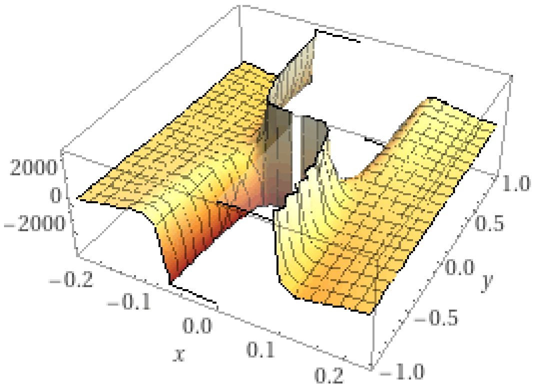
$$\int\int\left(-\frac{24\left(-\frac{2.76^2}{6x^4}+\frac{1}{90x^6}\right)}{8\cos^{-1}(-1)}-24\left(\frac{2.76^2}{12x^4}-\frac{7}{720x^6}\right)-\frac{20}{720\cos^{-1}(-1)\,x^6}\right)dx\,dy$$

$\cos^{-1}(x)$ is the inverse cosine function

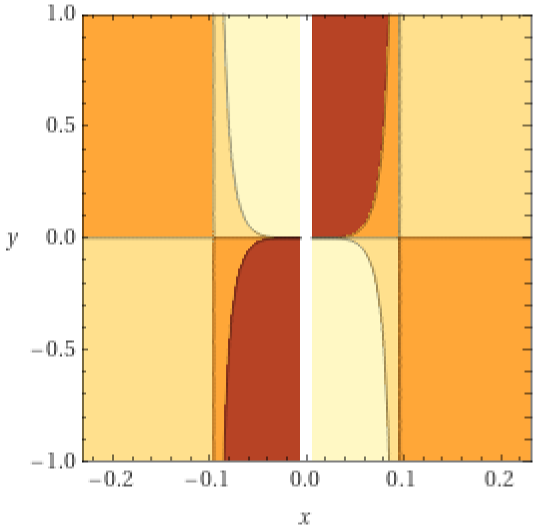
Result:

$$\frac{(4.67427x^2-0.0427762)\,y}{x^5}$$

3D plot:



Contour plot:



Indefinite integral assuming all variables are real:

$$\left(\frac{0.0106941}{x^4} - \frac{2.33714}{x^2}\right) y + \text{constant}$$

From:

$$\frac{(4.67427\, x^2 - 0.0427762)\, y}{x^5}$$

For x = 0.2 and y = 0.5 :

(((1/4[((4.67427 * 0.2^2 - 0.0427762) 0.5)/0.2^5 +34 - 3 - ((((√(10-2√5) -2))/((√5-1))))]))^2-1/golden ratio

Input interpretation:

$$\left(\frac{1}{4}\left(\frac{(4.67427\times 0.2^2 - 0.0427762)\times 0.5}{0.2^5} + 34 - 3 - \frac{\sqrt{10-2\sqrt{5}} - 2}{\sqrt{5}-1}\right)\right)^2 - \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

4096.02…

4096.02…. ≈ 4096 = 64^2

Series representations:

$$\left(\frac{1}{4}\left(\frac{(4.67427\times 0.2^2 - 0.0427762)\, 0.5}{0.2^5} + 34 - 3 - \frac{\sqrt{10-2\sqrt{5}} - 2}{\sqrt{5}-1}\right)\right)^2 - \frac{1}{\phi} =$$
$$-\frac{1}{\phi} + \frac{1}{16}\left(256.304 + \frac{2 - \sqrt{9-2\sqrt{5}}\,\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}}{-1+\sqrt{4}\,\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}}\right)^2$$

$$\left(\frac{1}{4}\left(\frac{(4.67427\times 0.2^2-0.0427762)\,0.5}{0.2^5}+34-3-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)\right)^2-\frac{1}{\phi}=$$

$$-\frac{1}{\phi}+\frac{1}{16}\left(256.304-\frac{-2+\sqrt{9-2\sqrt{5}}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(9-2\sqrt{5})^{-k}}{k!}}{-1+\sqrt{4}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)^2$$

$$\left(\frac{1}{4}\left(\frac{(4.67427\times 0.2^2-0.0427762)\,0.5}{0.2^5}+34-3-\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)\right)^2-\frac{1}{\phi}=$$

$$-\frac{1}{\phi}+\frac{1}{16}\left(256.304-\frac{-2+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(10-2\sqrt{5}-z_0)^k z_0^{-k}}{k!}}{-1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}}\right)^2$$

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

[-(24 (-2.76^2/(6 x^4) + 1/(90 x^6)))/(8 cos^(-1)(-1)) - 24 (2.76^2/(12 x^4) - 7/(720 x^6)) - 20/(720 cos^(-1)(-1) x^6)] (((√(10-2√5) -2))/((√5-1))) dxdy

Input:

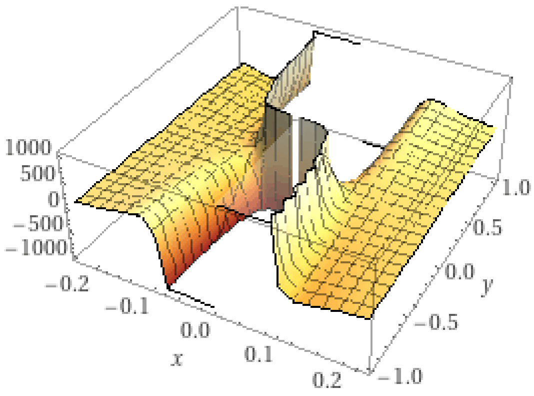
$$\int\int\left(-\frac{24\left(-\frac{2.76^2}{6x^4}+\frac{1}{90x^6}\right)}{8\cos^{-1}(-1)}-24\left(\frac{2.76^2}{12x^4}-\frac{7}{720x^6}\right)-\frac{20}{720\cos^{-1}(-1)\,x^6}\right)\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\,dx\,dy$$

$\cos^{-1}(x)$ is the inverse cosine function

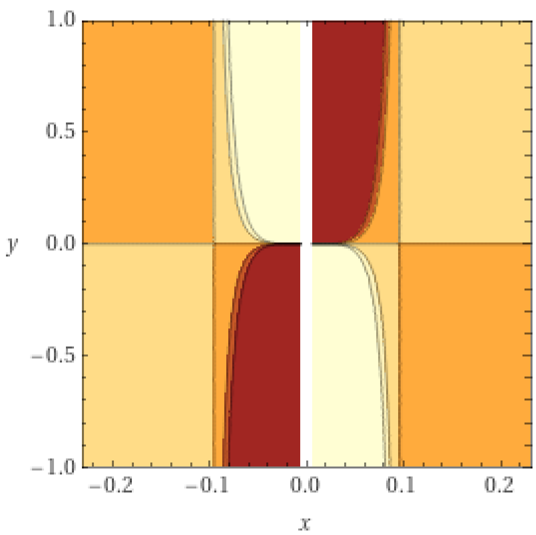
Result:

$$\frac{(1.32786\,x^2-0.0121518)\,y}{x^5}$$

3D plot:



Contour plot:



Indefinite integral assuming all variables are real:

$$\left(\frac{0.00303796}{x^4} - \frac{0.663932}{x^2}\right) y + \text{constant}$$

For x = 0.2 and y = 0.5:

((-0.0121518 + 1.32786 0.2^2) 0.5)/0.2^5

Input interpretation:

$$\frac{(-0.0121518 + 1.32786 \times 0.2^2) \times 0.5}{0.2^5}$$

Result:

64.0040625

64.0040625 ≈ 64 = 8^2

From which:

[((-0.0121518 + 1.32786 0.2^2) 0.5)/0.2^5]^2-1/2

Input interpretation:

$$\left(\frac{(-0.0121518 + 1.32786 \times 0.2^2) \times 0.5}{0.2^5}\right)^2 - \frac{1}{2}$$

Result:

4096.02001650390625

4096.02001650390625 ≈ 4096 = 64^2

27*((-0.0121518 + 1.32786 0.2^2) 0.5)/0.2^5 +1

Input interpretation:

$$27 \times \frac{(-0.0121518 + 1.32786 \times 0.2^2) \times 0.5}{0.2^5} + 1$$

Result:

1729.1096875

1729.1096875

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = 8^2 * 3^3) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

[27*((-0.0121518 + 1.32786 0.2^2) 0.5)/0.2^5 +1]^1/15

Input interpretation:

$$\sqrt[15]{27\times\frac{(-0.0121518+1.32786\times 0.2^2)\times 0.5}{0.2^5}+1}$$

Result:

1.64382…

1.64382…. $\approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Observations

We note that, from the number 8, we obtain as follows:

8^2

64

$8^2 \times 2 \times 8$

1024

$8^4 = 8^2 \times 2^6$

True

$8^4 = 4096$

$8^2 \times 2^6 = 4096$

$2^{13} = 2 \times 8^4$

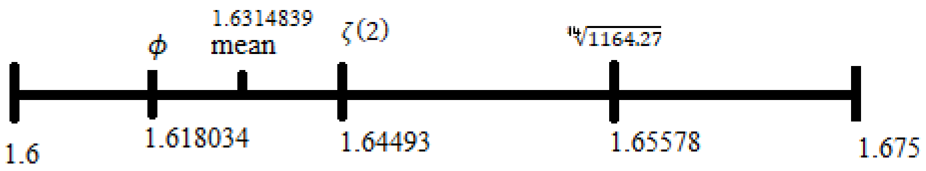
True

$2^{13} = 8192$

$2 \times 8^4 = 8192$

We notice how from the numbers 8 and 2 we get 64, 1024, 4096 and 8192, and that 8 is the fundamental number. In fact $8^2 = 64$, $8^3 = 512$, $8^4 = 4096$. We define it "fundamental number", since 8 is a Fibonacci number, which by rule, divided by the previous one, which is 5, gives 1.6 , a value that tends to the golden ratio, as for all numbers in the Fibonacci sequence

“Golden” Range



Finally we note how $8^2 = 64$, multiplied by 27, to which we add 1, is equal to 1729, the so-called "Hardy-Ramanujan number". Then taking the 15th root of 1729, we obtain a value close to ζ(2) that 1.6438 ..., which, in turn, is included in the range of what we call "golden numbers"

Furthermore for all the results very near to 1728 or 1729, adding $64 = 8^2$, one obtain values about equal to 1792 or 1793. These are values almost equal to the Planck multipole spectrum frequency 1792.35 and to the hypothetical Gluino mass

Mathematical connections with some sectors of String Theory

From:

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

We have that:

Hence

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

so that

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

Hence

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

Again

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

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

so that

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

Hence

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

Similarly, from

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

we obtain

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

Hence

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

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{-2C} \;=\; \frac{h^2\left(p\,+\,1\,-\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}}{(7\,-\,p)}$$

$$(A')^2 \;=\; k\, e^{-2A} \,+\, \frac{h^2}{16(p\,+\,1)}\left(7\,-\,p\,+\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

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

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 642, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18))   we obtain:

Input:

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

Exact result:

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

Decimal approximation:

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

1.6272016… * 10^{-6}

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

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

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

from which:

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

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

Now:

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

And:

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

Input interpretation:

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

Result:

0.0066650177536

0.006665017...

Thence:

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

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

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

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

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

Result:

0.00666501785...

0.00666501785…

Series representations:

$$\frac{\exp\left(-\pi \sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\pi \sqrt{17} \sum_{k=0}^{\infty} 17^{-k} \binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp\left(-\pi \sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\pi \sqrt{17} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{17}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp\left(-\pi \sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\frac{\pi \sum_{j=0}^{\infty} \text{Res}_{s=-\frac{1}{2}+j} 17^{-s} \Gamma\left(-\frac{1}{2} - s\right) \Gamma(s)}{2 \sqrt{\pi}}\right)$$

Now:

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

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

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

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

$\log(0.00666501784619)$

Result:

$-5.010882647757\ldots$

-5.010882647757…

Alternative representations:

$\log(0.006665017846190000) = \log_e(0.006665017846190000)$

$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$

$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$

Series representations:

$$\log(0.00666501784619000\text{0}) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.99333498215381000\text{0})^k}{k}$$

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t} \, dt$$

In conclusion:

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

and for C = 1, we obtain:

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

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

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

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

(http://www.bitman.name/math/article/102/109/)

The mean between the two results of the above Rogers-Ramanujan continued fractions is 0.97798855285, value very near to the ψ Regge slope 0.979:

Ψ	3	$m_c = 1500$	0.979	−0.09

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

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

From

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

We have:

$$e^{2C} = \frac{2\xi\, e^{\frac{\phi}{2}}}{1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}}$$

$$\frac{h^2}{32} = \frac{\xi^7 e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right) + 5\, T\, e^{2\phi}\right] . \qquad (2.7)$$

For

$T = \frac{16}{\pi^2}$

$\xi = 1$

we obtain:

(2*e^(0.989117352243/2)) / (1+sqrt(((1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))

Input interpretation:

$$\frac{2\, e^{0.989117352243/2}}{1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}}}$$

Result:

0.83941881822... −
1.4311851867... i

Polar coordinates:

$r = 1.65919106525$ (radius), $\theta = -59.607521917°$ (angle)

1.65919106525….. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.9782347044860000}}{3\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.9782347044860000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.9782347044860000}}{3\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.9782347044860000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{z_0}\ \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1-\frac{16\, e^{1.978234704486000}}{3\pi^2}-z_0\right)^k z_0^{-k}}{k!}}$$

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

From

$$\frac{h^2}{32} = \frac{\xi^7 e^{4\phi}}{\left(1 \pm \sqrt{1-\frac{\xi T}{3} e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1-\frac{\xi T}{3} e^{2\phi}}\right) + 5\, T e^{2\phi}\right]$$

we obtain:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7
[42(1+sqrt(1-
1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}}\right)^7} \left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}\right)$$

Result:

50.84107889... –
20.34506335... i

Polar coordinates:

$r = 54.76072411$ (radius), $\theta = -21.80979492°$ (angle)

54.76072411…..

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 = \left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Bigg/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 = \left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7=$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

From which:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]*1/34

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)\times\frac{1}{34}$$

Result:

1.495325850… − 0.5983842161… i

Polar coordinates:

$r = 1.610609533$ (radius), $\theta = -21.80979492°$ (angle)

1.610609533…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$

$$\left(17\,\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

Now, we have:

$$e^{2C} = \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3}\,e^{2\phi}}}\,, \tag{2.9}$$

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1 + \sqrt{1 + \frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1 + \sqrt{1 + \frac{\Lambda}{3}\,e^{2\phi}}\right) - 13\,\Lambda\,e^{2\phi}\right]. \tag{2.10}$$

For:

$\xi = 1$

$\Lambda \simeq \frac{4\pi^2}{25}$

$\phi = 0.989117352243$

From

$$e^{2C} = \frac{2\xi e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3} e^{2\phi}}},$$

we obtain:

((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))

Input interpretation:

$$\frac{2\, e^{-0.989117352243/2}}{1 + \sqrt{1 + \frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right) e^{2\times 0.989117352243}}}$$

Result:

0.382082347529...

0.382082347529….

Series representations:

$$\frac{2\, e^{-0.98911735224300000/2}}{1 + \sqrt{1 + \frac{(4\pi^2)\, e^{2\times 0.98911735224300000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.4945586761215000} \left(1 + \sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{2\, e^{-0.98911735224300000/2}}{1 + \sqrt{1 + \frac{(4\pi^2)\, e^{2\times 0.98911735224300000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.4945586761215000} \left(1 + \sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{2\, e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.98911735224300000}}{3\times 25}}} = \frac{2}{e^{0.4945586761215000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.97823470448600000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)}$$

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

From which:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))))

Input interpretation:

$$1+\frac{1}{4\times\frac{2\, e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}}}$$

Result:

1.65430921270...

1.6543092….. We note that, the result 1.6543092... is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Indeed:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4}$$
$$\times\left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}} = \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. □

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

Series representations:

$$1+\frac{1}{\frac{4\left(2e^{-0.989117352243000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times0.989117352243000}}{3\times25}}}} = 1+\frac{e^{0.494558676121500}}{8}+\frac{1}{8}e^{0.494558676121500}\sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2e^{-0.989117352243000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times0.989117352243000}}{3\times25}}}} = 1+\frac{e^{0.494558676121500}}{8}+\frac{1}{8}e^{0.494558676121500}\sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} = 1+\frac{e^{0.49455867612150000}}{8}+$$

$$\frac{1}{8}\,e^{0.49455867612150000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

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

And from

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right].$$

we obtain:

e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))-13*(4Pi^2)/25*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}\right)\right)$$

Result:

−0.034547055658…

-0.034547055658…

Series representations:

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times0.9891173522430000}}{3\times25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times0.9891173522430000}\right)\right)e^{-4\times0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times0.9891173522430000}}{3\times25}}\right)^7=$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.\left. e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.\left. e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\right.\right.\right.$$
$$\left.\left.\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\right.$$
$$e^{5.934704113458000}$$
$$\left.\left.\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

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

From which:

47 *1/(((-1/((((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))- 13*(4Pi^2)/25*e^(2*0.989117352243))]))))))))

Input interpretation:

$$47\left(-\left(1/1/\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)\right)$$

Result:

1.6237116159...

1.6237116159…. result that is an approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$-\left(47/1/\left(e^{-4\times 0.98911735224300000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.98911735224300000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.98911735224300000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.98911735224300000}}{3\times 25}}\right)^7\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$-\left(47\Big/1\Big/\left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$-\left(47\Big/1\Big/\left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

And again:

32((((e^(-4*0.989117352243) /
[1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 *
[42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-
13*(4Pi^2)/25*e^(2*0.989117352243))]))))

Input interpretation:

$$32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)$$

Result:

−1.1055057810...

-1.1055057810….

We note that the result -1.1055057810…. is very near to the value of Cosmological Constant, less 10^{-52} , thence 1.1056, with minus sign

Series representations:

$$\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right) - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\,\pi^2 - 25\, e^{1.978234704486000}\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right) \Big/ \left(25\, e^{5.934704113458000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000}\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000}\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000}\left(1+\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

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

And:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))]^5

Input interpretation:

$$-\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)^5$$

Result:

1.651220569...

1.651220569…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right.\right.\right.\right. -$$

$$\left.\left.\left.\frac{1}{25}\,(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/$$

$$\left.\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\,\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\Big/\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^5\right)\Big/\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^{35}\right)$$

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

We obtain also:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))- 13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\sqrt{\left(32\left(\frac{e^{-4\times0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times0.989117352243}\right)\right)\right)\right)}$$

Result:

-0

$1.0514303501\ldots\, i$

Polar coordinates:

$r = 1.05143035007$ (radius), $\theta = -90°$ (angle)

1.05143035007

Series representations:

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\middle/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)} = -\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\middle/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\middle/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\middle/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\middle/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=$$

$$-\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\middle/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}$$

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

1 / -[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))]^1/2

Input interpretation:

$$-\left(1\Bigg/\left(\sqrt{\left|32\left(\frac{e^{-4\times0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times0.989117352243}\right)\right)\right)\right|}\right)\right)$$

Result:

$0.95108534763\ldots\, i$

Polar coordinates:

$r = 0.95108534763$ (radius), $\theta = 90°$ (angle)

0.95108534763

We know that the primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

Thence 0.95108534763 is a result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

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

Series representations:

$$-\left(1\Big/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)}\right)\right)$$

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Bigg/\left(8\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}\right)\right)$$

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Bigg/\left(8\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}\right)\right)$$

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

From the previous expression

$$\frac{\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}}{\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)}$$

= -0.034547055658…

we have also:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))) + (-0.034547055658)

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times0.989117352243}}}}-0.034547055658$$

Result:

1.61976215705...

1.61976215705….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times0.98911735224300000}}{3\times25}}}}-0.0345470556580000=$$
$$0.9654529443420000+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.97823470448600000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times0.98911735224300000}}{3\times25}}}}-0.0345470556580000=$$
$$0.9654529443420000+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.97823470448600000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

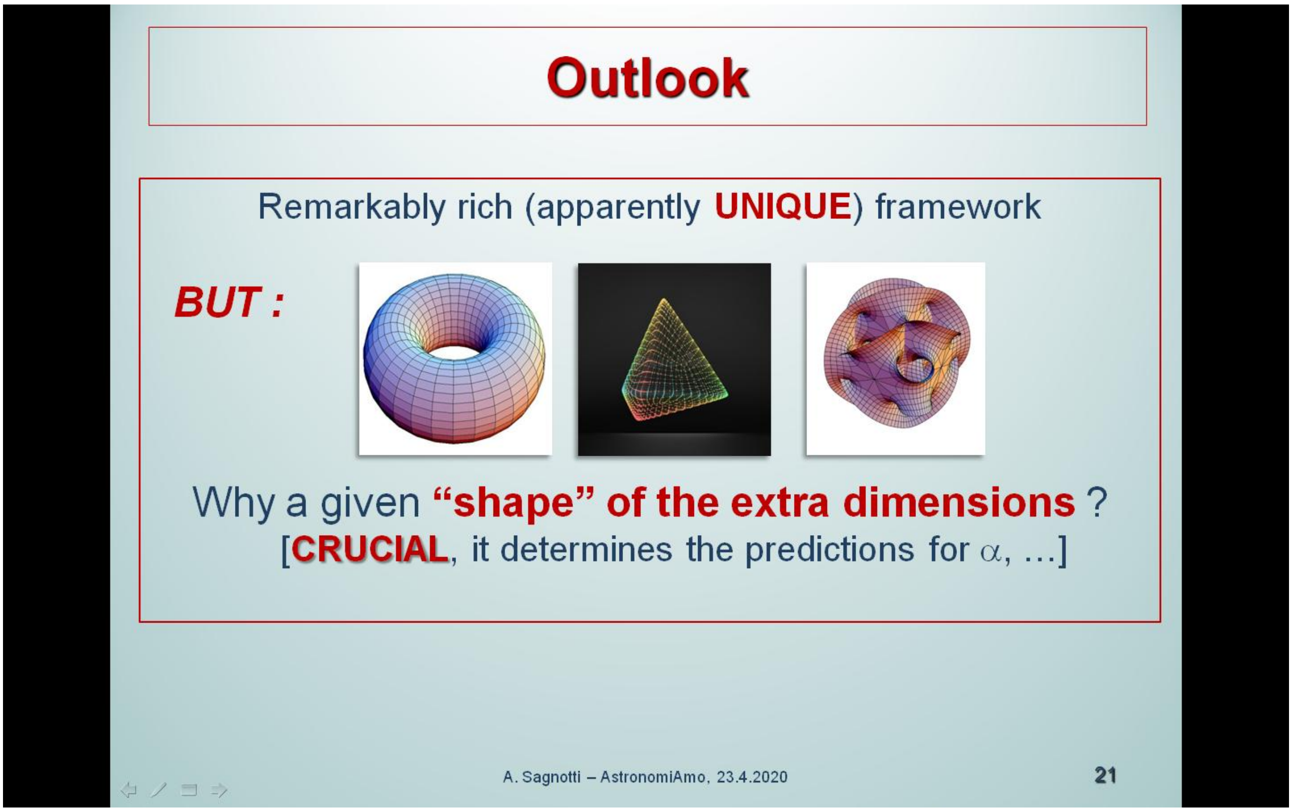
$$1+\frac{1}{\frac{4\left(2\,e^{-0.9891173522430000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.9891173522430000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

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

Appendix

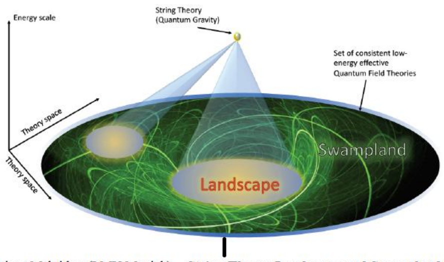


From: *A. Sagnotti – AstronomiAmo, 23.04.2020*

In the above figure, it is said that: "why a given shape of the extra dimensions? Crucial, it determines the predictions for α".

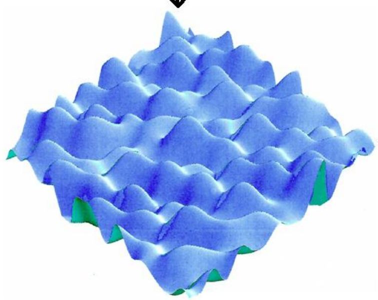
We propose that whatever shape the compactified dimensions are, their geometry must be based on the values of the golden ratio and ζ(2), (the latter connected to 1728 or 1729, whose fifteenth root provides an excellent approximation to the above mentioned value) which are recurrent as solutions of the equations that we are going to develop. It is important to specify that the initial conditions are **always** values belonging to a fundamental chapter of the work of S. Ramanujan "Modular equations and Appoximations to Pi" (see references). These values are some multiples of 8 (64 and 4096), 276, which added to 4096, is equal to 4372, and finally $e^{\pi\sqrt{22}}$

Proposal of geometric connections between Swampland, Landscape and Riemann zeta function

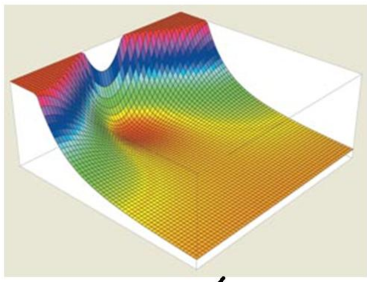


Andriana Makridou (LMU Munich) - **String Theory Landscape and Swampland** December 18, 2018

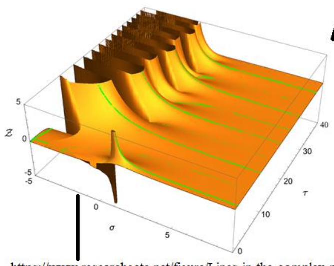
The string theory landscape: the altitude represents potential energy density and each valley is a possible vacuum solution with either positive, zero or negative cosmological constant. In this multidimensional potential energy density surface, only two out of hundreds of possible directions in parameter space are shown (figure reproduced with permission from Vilenkin, 2006).



Stringscape - a small part of the string-theory landscape showing the new de Sitter solution as a local minimum of the energy (vertical axis). The global minimum occurs at the infinite size of the extra dimensions on the extreme right of the figure.



https://physicsworld.com/a/the-string-theory-landscape/



https://www.researchgate.net/figure/Lines-in-the-complex-plane-where-the-Riemann-zeta-function-z-is-real-green-depicted-on_fig1_282438553

Riemann found a 3D image of the zeros of the zeta function where there is a critical stripe whose real values are located between 0 and 1 and that is related to prime numbers; using the program Mathematica we can obtain the behavior of the zeta function and its reciprocal. We plotted in figure 5

$$f(x,y) = |\zeta(x+iy)| \quad (17)$$

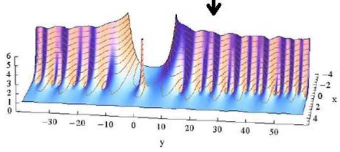
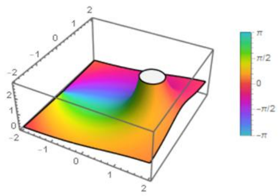


Figure 5. *Mount of Riemann*

Contributions of Euler, Gauss and Riemann to the Study of Primes Numbers - Carlos Figueroa, Raul Riera, German Campoy, Rene Betancourt - Volume 1, Issue 9, December 2014, PP 73-81

Zeta[2] = $\frac{\pi^2}{6}$



https://reference.wolfram.com/language/ref/Zeta.html

We notice a certain similarity between the figure that represents the Stringscape and that inherent in the Riemann zeta function: a case? We believe not.

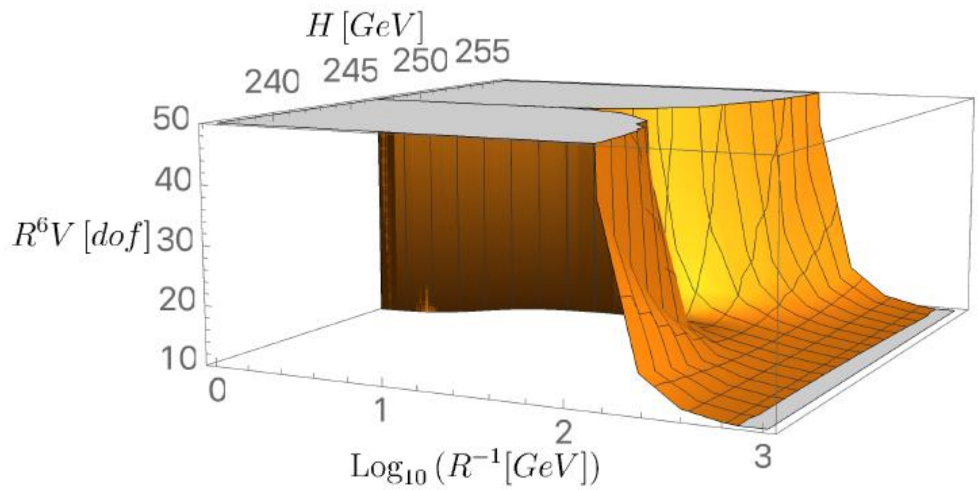


Figure 2: Effective potential with the Wilson lines fixed to zero, as a function of the Radion and the Higgs. The tree level potential dominates and the Higgs is not displaced from its tree level minimum by the one-loop corrections. This behavior is independent of the particular value of the Wilson lines. Although not very visible in the plot, the Higgs minimum remains at the same location as R^{-1} increases.

From: (**The Riemann hypothesis illuminated by the Newton flow of ζ** - *J W Neuberger , C Feiler , H Maier and W P Schleich* - Received 29 April 2015, revised 5 August 2015. Accepted for publication 19 August 2015 Published 1 October 2015 - https://doi.org/10.1088/0031-8949/90/10/108015)

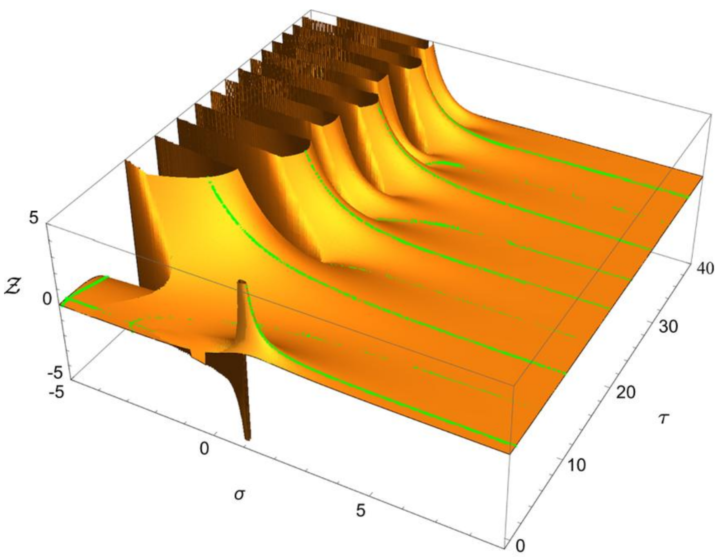


Figure 2. Lines in the complex plane where the Riemann zeta function ζ is real (green) depicted on a relief representing the positive absolute value of ζ for arguments *s* º *s* + *it* where the real part of ζ is positive, and the negative absolute value of ζ where the real part of ζ is negative. This representation brings out most clearly that the lines of constant phase corresponding to phases of integer multiples of 2*p* run down the hills on the left-hand side, turn around on the right and terminate in the non-trivial zeros. This pattern repeats itself infinitely many times. The points of arrival and departure on the right-hand side of the picture are equally spaced and given by the following equation:

$$\tau'_k \equiv k \, \frac{\pi}{\ln 2},$$

with $k = \ldots, -2, -1, 0, 1, 2, \ldots.$

2Pi/(ln(2))

Input:

$$2 \times \frac{\pi}{\log(2)}$$

Exact result:

$$\frac{2\pi}{\log(2)}$$

Decimal approximation:

9.064720283654387619255365891433333620343722935447591168372033095 8…

9.06472028365….

Alternative representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log_e(2)}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log(a)\log_a(2)}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{2\coth^{-1}(3)}$$

Series representations:

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

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

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

Integral representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\int_1^2 \frac{1}{t}\, dt}$$

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

From which:

(2Pi/(ln(2)))*(1/12 π log(2))

Input:

$$\left(2\times\frac{\pi}{\log(2)}\right)\left(\frac{1}{12}\pi\log(2)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{\pi^2}{6}$$

Decimal approximation:

1.644934066848226436472415166646025189218949901206798437735558229 3

...

1.6449340668…. = ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Property:

$\frac{\pi^2}{6}$ is a transcendental number

Alternative representations:

$$\frac{(\pi\log(2))\,2\,\pi}{12\log(2)} = \frac{2\,\pi^2\log_e(2)}{12\log_e(2)}$$

$$\frac{(\pi\log(2))\,2\,\pi}{12\log(2)} = \frac{2\,\pi^2\log(a)\log_a(2)}{12\,(\log(a)\log_a(2))}$$

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

Series representations:

$$\frac{(\pi \log(2))\, 2\,\pi}{12 \log(2)} = \sum_{k=1}^{\infty} \frac{1}{k^2}$$

$$\frac{(\pi \log(2))\, 2\,\pi}{12 \log(2)} = -2 \sum_{k=1}^{\infty} \frac{(-1)^k}{k^2}$$

$$\frac{(\pi \log(2))\, 2\,\pi}{12 \log(2)} = \frac{4}{3} \sum_{k=0}^{\infty} \frac{1}{(1+2\,k)^2}$$

Integral representations:

$$\frac{(\pi \log(2))\, 2\,\pi}{12 \log(2)} = \frac{8}{3} \left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2$$

$$\frac{(\pi \log(2))\, 2\,\pi}{12 \log(2)} = \frac{2}{3} \left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^2$$

$$\frac{(\pi \log(2))\, 2\,\pi}{12 \log(2)} = \frac{2}{3} \left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt\right)^2$$

From:

Pi/(ln(2))

Input:

$$\frac{\pi}{\log(2)}$$

$\log(x)$ is the natural logarithm

Decimal approximation:

4.532360141827193809627682945716666810171861467723795584186016547 9
…

4.53236014…..

Alternative representations:

$$\frac{\pi}{\log(2)} = \frac{\pi}{\log_e(2)}$$

$$\frac{\pi}{\log(2)} = \frac{\pi}{\log(a)\log_a(2)}$$

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

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

From which:

(Pi/(ln(2)))*(1/6 π log(2))

Input:

$$\frac{\pi}{\log(2)} \left(\frac{1}{6} \pi \log(2)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{\pi^2}{6}$$

Decimal approximation:

1.6449340668482264364724151666460251892189499012067984377355582293

…

1.6449340668…. = ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

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$$\frac{(\pi \log(2))\,\pi}{6\log(2)} = \frac{\pi^2 \log(a)\log_a(2)}{6\,(\log(a)\log_a(2))}$$

$$\frac{(\pi \log(2))\,\pi}{6\log(2)} = \frac{2\,\pi^2 \coth^{-1}(3)}{6\left(2\coth^{-1}(3)\right)}$$

Series representations:

$$\frac{(\pi \log(2))\,\pi}{6\log(2)} = \sum_{k=1}^{\infty} \frac{1}{k^2}$$

$$\frac{(\pi \log(2))\,\pi}{6\log(2)} = -2\sum_{k=1}^{\infty} \frac{(-1)^k}{k^2}$$

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$$\frac{(\pi \log(2))\,\pi}{6\log(2)} = \frac{8}{3}\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^2$$

$$\frac{(\pi \log(2))\,\pi}{6\log(2)} = \frac{2}{3}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^2$$

$$\frac{(\pi \log(2))\,\pi}{6\log(2)} = \frac{2}{3}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^2$$

Acknowledgments

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March 27, 2018
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