On the Ramanujan's mathematics applied to some parameters of Extended Gauged Supergravity, Inflaton Potentials and some sectors of String Theory: New possible mathematical connections.

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Abstract

In this research thesis, we have described some Ramanujan expressions applied to several parameters of Extended Gauged Supergravity, Inflaton Potentials and some sectors of String Theory, obtaining new possible mathematical connections.

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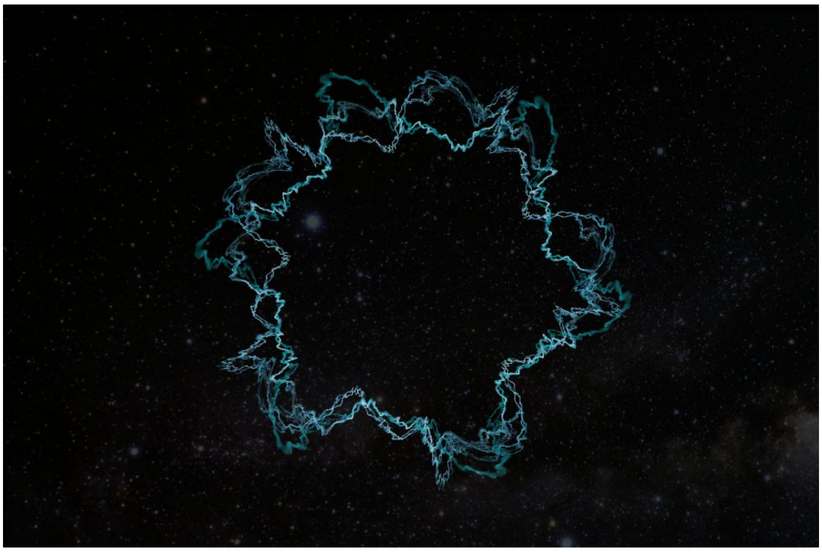
https://www.britannica.com/biography/Srinivasa-Ramanujan



https://futurism.com/brane-science-complex-notions-of-superstring-theory

From:

Axial Symmetric Kahler manifolds, the D-map of Inflaton Potentials and the Picard-Fuchs Equation - *Pietro Fre, Alexander S. Sorin* – arXiv:1310.5278v2 [hep-th] 26 Oct 2013

We remember that U(ϕ) is the potential of the inflaton field, ϕ

We have that:

As an illustration of reconstruction of the Kähler potential in the series (5.1), we utilize the best fit model $\gamma = -\frac{7}{6}$ proposed by Sagnotti. Inserting the value $\gamma = -\frac{7}{6}$ in eq.(8.1) and furthermore redefining the parameters as in equations (8.9), (8.10), (8.11), we obtain:

$$R_{-\frac{7}{6}}(\phi) = -\frac{2744 + 5996 e^{\frac{13\phi}{2\sqrt{3}}} + 9844 e^{\frac{13\phi}{\sqrt{3}}} + e^{\frac{13\sqrt{3}\phi}{2}}}{12\left(1 + e^{\frac{13\phi}{2\sqrt{3}}}\right)^2 \left(14 + e^{\frac{13\phi}{2\sqrt{3}}}\right)} \quad (8.24)$$

where the overall scale a and the parameter λ cancel. The function $R_{-\frac{7}{6}}(\phi)$ has the property:

$$R_{-\frac{7}{6}}(-\infty) = \frac{49}{12} \quad ; \quad R_{-\frac{7}{6}}(\infty) = \frac{1}{48} \quad (8.25)$$

$$R_{-\frac{7}{6}}(\phi) = -\frac{2744 + 5996 e^{\frac{13\phi}{2\sqrt{3}}} + 9844 e^{\frac{13\phi}{\sqrt{3}}} + e^{\frac{13\sqrt{3}\phi}{2}}}{12\left(1 + e^{\frac{13\phi}{2\sqrt{3}}}\right)^2 \left(14 + e^{\frac{13\phi}{2\sqrt{3}}}\right)}$$

(8.24)

e^(13*x/(2sqrt3)) = 42.63931648 = 40.915 for x = 1 or x = 0.989 (i.e. ϕ)

e^(13*x/(sqrt3)) = 1818.1113 = 1674.04 as above

e^(x(13sqrt3)/2) = 77523.023543 = 68493.1 as above

-(2744+5996*(e^(13*x/(2sqrt3))+9844*(e^(13*x/(sqrt3)))+e^(x(13sqrt3)/2)) / 12((((1+(e^(13*x/(2sqrt3)))^2 (14+e^(13*x/(2sqrt3))))) = 49/12

-(2744+5996*42.63931648+9844*1818.1113+77523.023543) / (((12(1+42.63931648)^2 (14+42.63931648))))

Input interpretation:

$$-\frac{2744+5996\times 42.63931648+9844\times 1818.1113+77523.023543}{12\,(1+42.63931648)^2\,(14+42.63931648)}$$

Result:

−14.0868213521128690592315012838303183739419265007086254459...

-14.086821352…

From which:

-3(((-(2744+5996*42.63931648+9844*1818.1113+77523.023543) / (((12(1+42.63931648)^2 (14+42.63931648)))))))

Input interpretation:

$$-3\left(-\frac{2744+5996\times 42.63931648+9844\times 1818.1113+77523.023543}{12\,(1+42.63931648)^2\,(14+42.63931648)}\right)$$

Result:

42.26046405633860717769450385149095512182577950212587633787...

42.260464…

-(2744+5996*40.915+9844*1674.04+68493.1) / (((12(1+40.915)^2 (14+40.915))))

Input interpretation:

$$-\frac{2744+5996\times 40.915+9844\times 1674.04+68\,493.1}{12\,(1+40.915)^2\,(14+40.915)}$$

Result:

−14.50740919404297882714745447752804452293260382026709398 33...

-14.507409194…

With regard the eqs. (8.25)

$$R_{-\frac{7}{6}}(-\infty) = \frac{49}{12} \quad ; \quad R_{-\frac{7}{6}}(\infty) = \frac{1}{48}$$

where 49/12 = 4.08333… and 1/48 = 0.0208333… we have the following calculations:

(((-2744+5996*(e^(13*x/(2sqrt3))+9844*(e^(13*x/(sqrt3)))+e^(x(13sqrt3)/2))))) / (((12((1+(e^(13*x/(2sqrt3)))^2 (14+e^(13*x/(2sqrt3)))))))) = 49/12

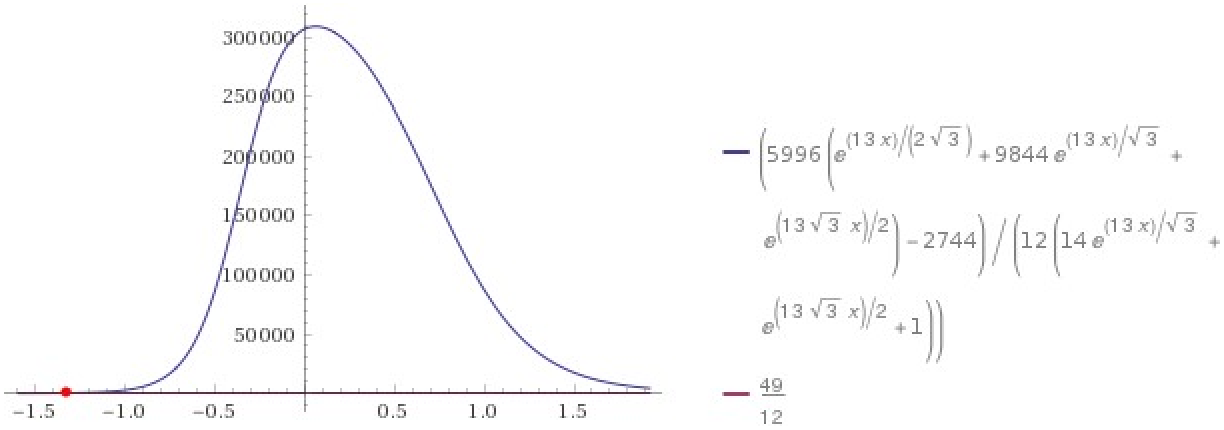
Input:

$$\frac{-2744+5996\left(e^{13\times x/\left(2\sqrt{3}\right)}+9844\,e^{13\times x/\sqrt{3}}+e^{x\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1+\left(e^{13\times x/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{13\times x/\left(2\sqrt{3}\right)}\right)\right)}=\frac{49}{12}$$

Exact result:

$$\frac{5996\left(e^{(13x)/\left(2\sqrt{3}\right)}+9844\,e^{(13x)/\sqrt{3}}+e^{\left(13\sqrt{3}\,x\right)/2}\right)-2744}{12\left(e^{(13x)/\sqrt{3}}\left(e^{(13x)/\left(2\sqrt{3}\right)}+14\right)+1\right)}=\frac{49}{12}$$

Plot:



Solutions:

$$x = \frac{2}{13}\sqrt{3}\left(2 i \pi c_1 + \log\left(\frac{1}{5947}\left(-19\,674\,646 + \frac{1}{3^{2/3}}\left(\left(\frac{1}{2}\left(-137\,086\,051\,000\,810\,387\,372\,047 + 5947 i \sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\hat{}\,(1/3)\right) + 1\,161\,275\,050\,017\,736 \Big/ \left(\left(\frac{3}{2}\left(-137\,086\,051\,000\,810\,387\,372\,047 + 5947 i \sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\hat{}\,(1/3)\right)\right)\right)\right) \approx 0.266469$$

$((6.28319 i) c_1 - (4.98668 + 2.2017\times 10^{-9} i))$ for $c_1 \in \mathbb{Z}$

$$x = \frac{2}{13}\sqrt{3}\left(2 i \pi c_1 + \log\left(-\frac{19\,674\,646}{5947} - \frac{1}{11\,894\times 3^{2/3}}\left(1 + i\sqrt{3}\right)\left(\frac{1}{2}\left(-137\,086\,051\,000\,810\,387\,372\,047 + 5947 i \sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\hat{}\,(1/3) - \left(580\,637\,525\,008\,868\left(1 - i\sqrt{3}\right)\right) \Big/ \left(5947\left(\frac{3}{2}\left(-137\,086\,051\,000\,810\,387\,372\,047 + 5947 i \sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\hat{}\,(1/3)\right)\right)\right) \approx 0.266469$$

$((6.28319 i) c_1 - (4.97191 - 3.14159 i))$ for $c_1 \in \mathbb{Z}$

$$x = \frac{2}{13}\sqrt{3}\left(2 i \pi c_1 + \log\left(-\frac{19\,674\,646}{5947} - \frac{1}{11\,894\times 3^{2/3}}\left(1 - i\sqrt{3}\right)\left(\frac{1}{2}\left(-137\,086\,051\,000\,810\,387\,372\,047 + 5947 i \sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\hat{}\,(1/3) - \left(580\,637\,525\,008\,868\left(1 + i\sqrt{3}\right)\right) \Big/ \left(5947\left(\frac{3}{2}\left(-137\,086\,051\,000\,810\,387\,372\,047 + 5947 i \sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\hat{}\,(1/3)\right)\right)\right) \approx 0.266469$$

$((9.20281 - 3.14159 i) + (6.28319 i) c_1)$ for $c_1 \in \mathbb{Z}$

$\log(x)$ is the natural logarithm

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

Real solution:

$x \approx -1.3288$

-1.3288 = ϕ

Solutions:

$x \approx 0.266469\,((6.28319\,i)\,n + (9.20281 + 3.14159\,i)), \quad n \in \mathbb{Z}$

$x \approx 0.266469\,(-(4.97191 - 3.14159\,i) + (6.28319\,i)\,n), \quad n \in \mathbb{Z}$

$x \approx 0.266469\,((6.28319\,i)\,n - 4.98668), \quad n \in \mathbb{Z}$

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

Note that:

(((-2744+5996*(e^(13*-2x/(2sqrt3))+9844*(e^(13*-2x/(sqrt3))+e^(-2x(13sqrt3)/2))))) / (((12((1+(e^(13*-2x/(2sqrt3)))^2 (14+e^(13*-2x/(2sqrt3)))))))) = 49/12

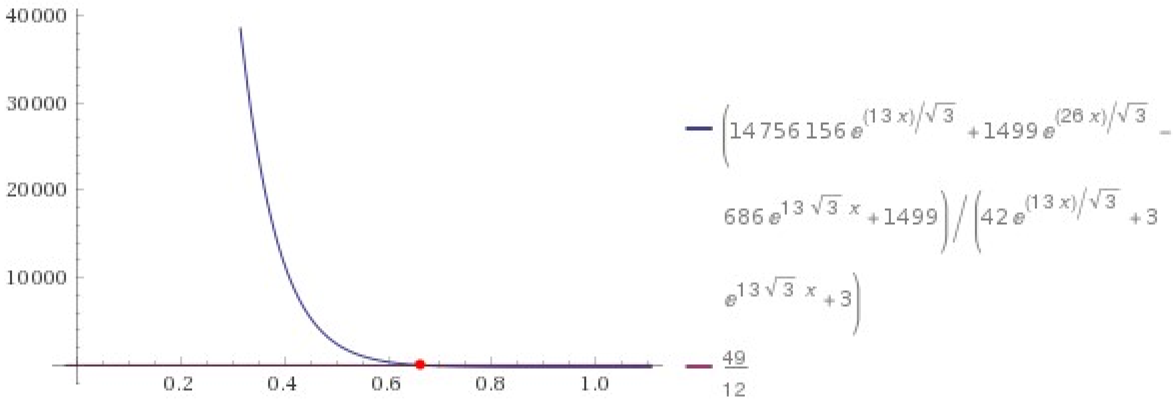
Input:

$$\frac{-2744 + 5996\left(e^{13\times(-2)\times x/\left(2\sqrt{3}\right)} + 9844\,e^{13\times(-2)\times x/\sqrt{3}} + e^{-2x\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1 + \left(e^{13\times(-2)\times x/\left(2\sqrt{3}\right)}\right)^2\left(14 + e^{13\times(-2)\times x/\left(2\sqrt{3}\right)}\right)\right)} = \frac{49}{12}$$

Exact result:

$$\frac{5996\left(9844\,e^{-(26x)/\sqrt{3}} + e^{-(13x)/\sqrt{3}} + e^{-13\sqrt{3}\,x}\right) - 2744}{12\left(e^{-(26x)/\sqrt{3}}\left(e^{-(13x)/\sqrt{3}} + 14\right) + 1\right)} = \frac{49}{12}$$

Plot:



Solutions:

$$x = \frac{1}{13}\sqrt{3}\left(2\,i\,\pi\,c_1 + \log\left(\frac{1}{8379}\left(5996 + 494\,597\,528\,518 \Big/ \left(\left(\frac{1}{2}\left(8\,897\,857\,349\,216\,929 + 8379\,i\,\sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\text{^}(1/3)\right) + \left(\frac{1}{2}\left(8\,897\,857\,349\,216\,929 + 8379\,i\,\sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\text{^}(1/3)\right)\right)\right) \approx$$

$0.133235\,(4.98668 + (6.28319\,i)\,c_1)$ for $c_1 \in \mathbb{Z}$

$$x = \frac{1}{13}\sqrt{3}\left(2\,i\,\pi\,c_1 + \log\left(\frac{5996}{8379} - \left(247\,298\,764\,259\left(1 + i\sqrt{3}\right)\right) \Big/ \left(8379\left(\frac{1}{2}\left(8\,897\,857\,349\,216\,929 + 8379\,i\,\sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\text{^}(1/3)\right) - \frac{1}{16\,758}\left(1 - i\sqrt{3}\right)\left(\frac{1}{2}\left(8\,897\,857\,349\,216\,929 + 8379\,i\,\sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\text{^}(1/3)\right)\right) \approx$$

$0.133235\,((4.97191 + 3.14159\,i) + (6.28319\,i)\,c_1)$ for $c_1 \in \mathbb{Z}$

$$x = \frac{1}{13}\sqrt{3}\left(2\,i\,\pi\,c_1 + \log\left(\frac{5996}{8379} - \left(247\,298\,764\,259\left(1 - i\sqrt{3}\right)\right) \Big/ \left(8379\left(\frac{1}{2}\left(8\,897\,857\,349\,216\,929 + 8379\,i\,\sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\text{^}(1/3)\right) - \frac{1}{16\,758}\left(1 + i\sqrt{3}\right)\left(\frac{1}{2}\left(8\,897\,857\,349\,216\,929 + 8379\,i\,\sqrt{6\,892\,239\,879\,645\,850\,388\,988\,114\,807}\right)\right)\text{^}(1/3)\right)\right) \approx$$

$0.133235\,((6.28319\,i)\,c_1 - (9.20281 - 3.14159\,i))$ for $c_1 \in \mathbb{Z}$

$\log(x)$ is the natural logarithm

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

Real solution:

$x \approx 0.66440$

0.66440 = $-\phi/2$

Solutions:

$x \approx 0.133235\,((6.28319\,i)\,n + (4.97191 + 3.14159\,i))\,, \quad n \in \mathbb{Z}$

$x \approx 0.133235\,(-(9.20281 - 3.14159\,i) + (6.28319\,i)\,n)\,, \quad n \in \mathbb{Z}$

$x \approx 0.133235\,((6.28319\,i)\,n + 4.98668)\,, \quad n \in \mathbb{Z}$

(((-2744+5996*(e^(13*(-1.3288)/(2sqrt3))+9844*(e^(13*(-1.3288)/(sqrt3)))+e^((-1.3288)(13sqrt3)/2))))) / (((12((1+(e^(13*(-1.3288)/(2sqrt3)))^2 (14+e^(13*(-1.3288)/(2sqrt3))))))))

Input interpretation:

$$\frac{-2744 + 5996\left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)} + 9844\, e^{13\left(-1.3288/\sqrt{3}\right)} + e^{-1.3288\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1 + \left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)^2 \left(14 + e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)\right)}$$

Result:

4.07659...

4.07659…≈ 49/12

Series representations:

$$\frac{-2744+5996\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)^{2}\left(14+e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)\right)}=$$

$$-\left(\left(e^{-8.6372\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\left(-1499\,e^{25.9116/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}-\right.\right.\right.$$

$$14\,756\,156\exp\left(\frac{8.6372}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}+8.6372\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)-$$

$$1499\exp\left(\frac{17.2744}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}+8.6372\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)+$$

$$\left.\left.\left.686\exp\left(\frac{25.9116}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}+8.6372\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)\right)\right)\right/$$

$$\left(3\left(1+14\,e^{8.6372/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}+e^{25.9116/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}\right)\right)$$

$$\frac{-2744+5996\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)\right)}=$$

$$-\left(\left(\exp\left(-8.6372\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(-1499\,e^{\frac{25.9116}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}-\right.\right.\right.$$

$$14\,756\,156\exp\left(\frac{8.6372}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}+8.6372\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)-$$

$$1499\exp\left(\frac{17.2744}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}+8.6372\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+$$

$$\left.\left.686\exp\left(\frac{25.9116}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}+8.6372\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)\Big/$$

$$\left(3\left(1+14\,e^{\frac{8.6372}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}+e^{\frac{25.9116}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}\right)\right)\right)$$

$$\frac{-2744+5996\left(e^{(13(-1.3288))/(2\sqrt{3})}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/(2\sqrt{3})}\right)^2\left(14+e^{(13(-1.3288))/(2\sqrt{3})}\right)\right)}=$$

$$-\left(\left(\exp\left(-\frac{4.3186\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right.\right.$$
$$\left(-1499\exp\left(\frac{51.8232\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)-\right.$$
$$14\,756\,156\exp\left(\frac{17.2744\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}+\frac{4.3186\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)-$$
$$1499\exp\left(\frac{34.5488\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}+\frac{4.3186\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)+$$
$$\left.\left.\left.686\exp\left(\frac{51.8232\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}+\frac{4.3186\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)\right)\right)\Big/$$
$$\left(3\left(1+14\exp\left(\frac{17.2744\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)+\exp\left(\frac{51.8232\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\right)\right)$$

We have also:

(((((((-2744+5996*(e^(13*(-1.3288)/(2sqrt3))+9844*(e^(13*(-1.3288)/(sqrt3))+e^((-1.3288)(13sqrt3)/2))))) / (((12((1+(e^(13*(-1.3288)/(2sqrt3)))^2 (14+e^(13*(-1.3288)/(2sqrt3)))))))))))^1/e

Input interpretation:

$$\sqrt[e]{\frac{-2744+5996\left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}+9844\,e^{13\left(-1.3288/\sqrt{3}\right)}+e^{-1.3288\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1+\left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)^2\left(14+e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)\right)}}$$

Result:

1.676933774582334581657001861376930679192936661895708451250...

1.67693377458233458….

Series representations:

$$\sqrt[e]{\frac{-2744+5996\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)\right)}}=$$
$$12^{-1/e}\left(\left(-2744+5996\left(9844\,e^{-17.2744/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}+e^{-8.6372/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}+e^{-8.6372\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\right)\right)\Big/\left(1+e^{-17.2744/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}\right)\left(14+e^{-8.6372/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}\right)\right)\wedge(1/e)$$

$$\sqrt[e]{\frac{-2744+5996\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)\right)}}=$$
$$12^{-1/e}\left(\left(-2744+5996\left(9844\exp\left(-\frac{17.2744}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)+\exp\left(-\frac{8.6372}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)+\exp\left(-8.6372\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)\Big/\left(1+\exp\left(-\frac{17.2744}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\right)\left(14+\exp\left(-\frac{8.6372}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\right)\right)\wedge(1/e)$$

$$\sqrt[e]{\frac{-2744+5996\left(e^{(13(-1.3288))/(2\sqrt{3})}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/(2\sqrt{3})}\right)^2\left(14+e^{(13(-1.3288))/(2\sqrt{3})}\right)\right)}} =$$

$$12^{-1/e}\left(\left(-2744+5996\left(9844\exp\left(-\frac{34.5488\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)+\exp\left(-\frac{17.2744\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)+\exp\left(-\frac{4.3186\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)\right)\middle/\left(1+\exp\left(-\frac{34.5488\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\right)\left(14+\exp\left(-\frac{17.2744\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\right)\right)\text{^}(1/e)$$

Integral representation:

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

$\operatorname{Re}(z)$ is the real part of z

$\arg(z)$ is the complex argument

$|z|$ is the absolute value of z

i is the imaginary unit

and:

- (55+4)*1/10^3+[(((-2744+5996*(e^(13*(-1.3288)/(2sqrt3))+9844*(e^(13*(-1.3288)/(sqrt3)))+e^((-1.3288)(13sqrt3/2))))) / (((12((1+(e^(13*(-1.3288)/(2sqrt3)))^2 (14+e^(13*(-1.3288)/(2sqrt3))))))))]^1/e

Input interpretation:

$$-(55+4)\times\frac{1}{10^3}+\sqrt[e]{\frac{-2744+5996\left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}+9844\,e^{13\left(-1.3288/\sqrt{3}\right)}+e^{-1.3288\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1+\left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)^2\left(14+e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)\right)}}$$

Result:

1.617933774582334581657001861376930679192936661895708451250...

1.61793377458233…. result that is a very good approximation to the value of the golden ratio 1,618033988749...

Series representations:

$$-\frac{55+4}{10^3}+\sqrt[e]{\frac{-2744+5996\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{(13(-1.3288))/\left(2\sqrt{3}\right)}\right)\right)}}$$

$$=-\frac{1}{125}\times 2^{-3-2/e}\times 3^{-1/e}\left(59\sqrt[e]{12}-1000\left(\left(-2744+5996\left(9844\,e^{-17.2744/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}+e^{-8.6372/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}+e^{-8.6372\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\right)\right)\Big/\left(\left(1+e^{-17.2744/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}\right)\left(14+e^{-8.6372/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}\right)\right)\right)\hat{\ }(1/e)\right)$$

$$-\frac{55+4}{10^3}+\sqrt[e]{\frac{-2744+5996\left(e^{(13(-1.3288))/(2\sqrt{3})}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/(2\sqrt{3})}\right)^2\left(14+e^{(13(-1.3288))/(2\sqrt{3})}\right)\right)}}$$

$$= -\frac{1}{125}\times 2^{-3-2/e}\times 3^{-1/e}$$

$$\left(59\sqrt[e]{12}-1000\left(\left(-2744+5996\left(9844\exp\left(-\frac{17.2744}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)+\right.\right.\right.\right.$$

$$\exp\left(-\frac{8.6372}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)+\exp\left(-8.6372\sqrt{2}\right.$$

$$\left.\left.\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)\Big/\left(1+\exp\left(-\frac{17.2744}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\right.$$

$$\left.\left.\left.\left(14+\exp\left(-\frac{8.6372}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\right)\right)\right)\hat{}\,(1/e)\right)$$

$$-\frac{55+4}{10^3}+\sqrt[e]{\frac{-2744+5996\left(e^{(13(-1.3288))/(2\sqrt{3})}+9844\,e^{(13(-1.3288))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.3288}\right)}{12\left(1+\left(e^{(13(-1.3288))/(2\sqrt{3})}\right)^2\left(14+e^{(13(-1.3288))/(2\sqrt{3})}\right)\right)}}$$

$$=-\frac{1}{125}\times 2^{-3-2/e}\times 3^{-1/e}$$

$$\left(59\sqrt[e]{12}-1000\left(\left(-2744+5996\left(9844\exp\left(-\frac{34.5488\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)+\right.\right.\right.\right.$$

$$\exp\left(-\frac{17.2744\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)+$$

$$\left.\left.\left.\exp\left(-\frac{4.3186\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)\right)\right)\Big/$$

$$\left(1+\exp\left(-\frac{34.5488\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\right.$$

$$\left.\left.\left.\left(14+\exp\left(-\frac{17.2744\sqrt{\pi}}{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\right)\right)\right)\right)\hat{}\,(1/e)\right)$$

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

$n!$ is the factorial function

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

$\Gamma(x)$ is the gamma function

$\operatorname{Res}_{z=z_0} f$ is a complex residue

(((-2744+5996*(e^(13*x/(2sqrt3))+9844*(e^(13*x/(sqrt3)))+e^(x(13sqrt3)/2))))) / (((12((1+(e^(13*x/(2sqrt3)))^2 (14+e^(13*x/(2sqrt3)))))))) = 1/48

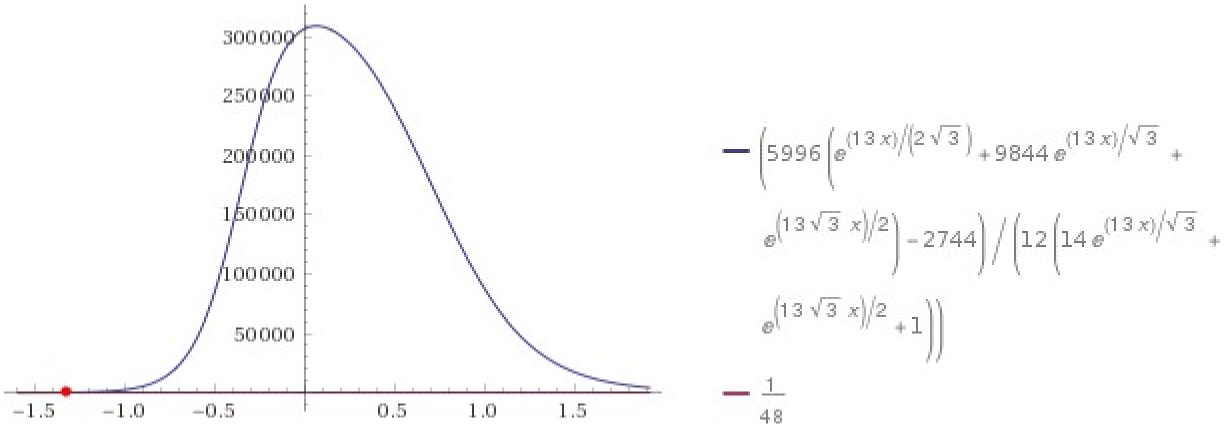
Input:

$$\frac{-2744+5996\left(e^{13\times x/\left(2\sqrt{3}\right)}+9844\,e^{13\times x/\sqrt{3}}+e^{x\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1+\left(e^{13\times x/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{13\times x/\left(2\sqrt{3}\right)}\right)\right)}=\frac{1}{48}$$

Exact result:

$$\frac{5996\left(e^{(13x)/\left(2\sqrt{3}\right)}+9844\,e^{(13x)/\sqrt{3}}+e^{\left(13\sqrt{3}\,x\right)/2}\right)-2744}{12\left(e^{(13x)/\sqrt{3}}\left(e^{(13x)/\left(2\sqrt{3}\right)}+14\right)+1\right)}=\frac{1}{48}$$

Plot:



Solutions:

$$x=\frac{2}{13}\sqrt{3}\left(2i\pi c_1+\log\left(\frac{1}{23983}\left(-78699494+\frac{1}{3^{2/3}}\left(\left(\frac{1}{2}\left(-8773811611228315720231623+23983\,i\sqrt{1733678535658161449854094472687}\right)\right)^{\wedge}(1/3)\right)+18580830492359836\Big/\left(\left(\frac{3}{2}\left(-8773811611228315720231623+23983\,i\sqrt{1733678535658161449854094472687}\right)\right)^{\wedge}(1/3)\right)\right)\right)\right)\approx 0.266469\,(-4.99555+(6.28319\,i)\,c_1)\ \text{for } c_1\in\mathbb{Z}$$

$$x = \frac{2}{13}\sqrt{3}\left(2 i \pi c_1 + \log\left(-\frac{78\,699\,494}{23\,983} - \frac{1}{47\,966 \times 3^{2/3}} \left(1 + i\sqrt{3}\right)\left(\frac{1}{2}\left(-8\,773\,811\,611\,228\,315\,720\,231\,623 + 23\,983\, i\sqrt{1\,733\,678\,535\,658\,161\,449\,854\,094\,472\,687}\right)\right)\hat{}\,(1/3) - \left(9\,290\,415\,246\,179\,918\left(1 - i\sqrt{3}\right)\right) / \left(23\,983\left(\frac{3}{2}\left(-8\,773\,811\,611\,228\,315\,720\,231\,623 + 23\,983\, i \sqrt{1\,733\,678\,535\,658\,161\,449\,854\,094\,472\,687}\right)\right)\hat{}\,(1/3)\right)\right)\right) \approx 0.266469$$

$((6.28319\, i)\, c_1 - (4.98065 + 3.14159\, i))$ for $c_1 \in \mathbb{Z}$

$$x = \frac{2}{13}\sqrt{3}\left(2 i \pi c_1 + \log\left(-\frac{78\,699\,494}{23\,983} - \frac{1}{47\,966 \times 3^{2/3}} \left(1 - i\sqrt{3}\right)\left(\frac{1}{2}\left(-8\,773\,811\,611\,228\,315\,720\,231\,623 + 23\,983\, i\sqrt{1\,733\,678\,535\,658\,161\,449\,854\,094\,472\,687}\right)\right)\hat{}\,(1/3) - \left(9\,290\,415\,246\,179\,918\left(1 + i\sqrt{3}\right)\right) / \left(23\,983\left(\frac{3}{2}\left(-8\,773\,811\,611\,228\,315\,720\,231\,623 + 23\,983\, i \sqrt{1\,733\,678\,535\,658\,161\,449\,854\,094\,472\,687}\right)\right)\hat{}\,(1/3)\right)\right)\right) \approx 0.266469$$

$((9.19466 + 3.14159\, i) + (6.28319\, i)\, c_1)$ for $c_1 \in \mathbb{Z}$

$\log(x)$ is the natural logarithm

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

Real solution:

$x \approx -1.3312$

-1.3312 = ϕ

Solutions:

$x \approx 0.266469\, ((6.28319\, i)\, n + (9.19466 + 3.14159\, i)), \quad n \in \mathbb{Z}$

$x \approx 0.266469\, (-(4.98065 - 3.14159\, i) + (6.28319\, i)\, n), \quad n \in \mathbb{Z}$

$x \approx 0.266469\, ((6.28319\, i)\, n - 4.99555), \quad n \in \mathbb{Z}$

Note that:

(((-2744+5996*(e^(13*-2x/(2sqrt3))+9844*(e^(13*-2x/(sqrt3)))+e^(-2x(13sqrt3)/2))))) / (((12((1+(e^(13*-2x/(2sqrt3)))^2 (14+e^(13*-2x/(2sqrt3)))))))) = 1/48

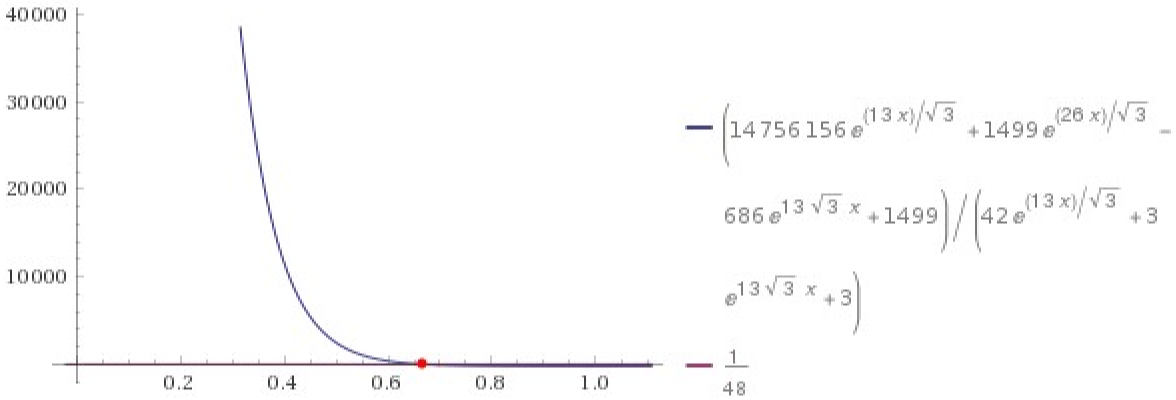
Input:

$$\frac{-2744+5996\left(e^{13\times(-2)\times x/\left(2\sqrt{3}\right)}+9844\,e^{13\times(-2)\times x/\sqrt{3}}+e^{-2x\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1+\left(e^{13\times(-2)\times x/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{13\times(-2)\times x/\left(2\sqrt{3}\right)}\right)\right)}=\frac{1}{48}$$

Exact result:

$$\frac{5996\left(9844\,e^{-(26x)/\sqrt{3}}+e^{-(13x)/\sqrt{3}}+e^{-13\sqrt{3}\,x}\right)-2744}{12\left(e^{-(26x)/\sqrt{3}}\left(e^{-(13x)/\sqrt{3}}+14\right)+1\right)}=\frac{1}{48}$$

Plot:



Solutions:

$$x=\frac{1}{13}\sqrt{3}\left(2\,i\,\pi\,c_1+\log\left(\frac{1}{32\,931}\left(23\,984+7\,775\,534\,342\,998\Big/\left(\left(\frac{1}{2}\left(559\,529\,475\,824\,767\,381+32\,931\,i\sqrt{1\,733\,678\,535\,658\,161\,449\,854\,094\,472\,687}\right)\right)^{\wedge}(1/3)\right)+\left(\frac{1}{2}\left(559\,529\,475\,824\,767\,381+32\,931\,i\sqrt{1\,733\,678\,535\,658\,161\,449\,854\,094\,472\,687}\right)\right)^{\wedge}(1/3)\right)\right)\right)\approx 0.133235\,(4.99555+(6.28319\,i)\,c_1)\text{ for }c_1\in\mathbb{Z}$$

$$x = \frac{1}{13}\sqrt{3}\left(2 i \pi c_1 + \log\left(\frac{23984}{32931} - \left(3887767171499\left(1 + i\sqrt{3}\right)\right)/\left(32931\left(\frac{1}{2}\left(559529475824767381 + 32931 i\sqrt{1733678535658161449854094472687}\right)\right)^{\wedge}(1/3)\right) - \frac{1}{65862}\left(1 - i\sqrt{3}\right)\left(\frac{1}{2}\left(559529475824767381 + 32931 i\sqrt{1733678535658161449854094472687}\right)\right)^{\wedge}(1/3)\right)\right) \approx$$

$$0.133235\,((4.98065 - 3.14159\, i) + (6.28319\, i)\, c_1)$$

for $c_1 \in \mathbb{Z}$

$$x = \frac{1}{13}\sqrt{3}\left(2 i \pi c_1 + \log\left(\frac{23984}{32931} - \left(3887767171499\left(1 - i\sqrt{3}\right)\right)/\left(32931\left(\frac{1}{2}\left(559529475824767381 + 32931 i\sqrt{1733678535658161449854094472687}\right)\right)^{\wedge}(1/3)\right) - \frac{1}{65862}\left(1 + i\sqrt{3}\right)\left(\frac{1}{2}\left(559529475824767381 + 32931 i\sqrt{1733678535658161449854094472687}\right)\right)^{\wedge}(1/3)\right)\right) \approx$$

$$0.133235\,((6.28319\, i)\, c_1 - (9.19466 - 3.14159\, i))$$

for $c_1 \in \mathbb{Z}$

$\log(x)$ is the natural logarithm

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

Real solution:

$x \approx 0.66558$

$0.66558 = -\phi/2$

Solutions:

$x \approx 0.133235\,((6.28319\, i)\, n + (4.98065 + 3.14159\, i)), \quad n \in \mathbb{Z}$

$x \approx 0.133235\,(-(9.19466 - 3.14159\, i) + (6.28319\, i)\, n), \quad n \in \mathbb{Z}$

$x \approx 0.133235\,((6.28319\, i)\, n + 4.99555), \quad n \in \mathbb{Z}$

(((-2744+5996*(e^(13*(-1.33116109)/(2sqrt3))+9844*(e^(13*(-1.33116109)/(sqrt3))+e^((-1.33116109)(13sqrt3)/2))))) / (((12((1+(e^(13*(-1.33116109)/(2sqrt3)))^2 (14+e^(13*(-1.33116109)/(2sqrt3)))))))

Input interpretation:

$$\left(-2744+5996\left(e^{13\left(-1.33116109/\left(2\sqrt{3}\right)\right)}+9844\,e^{13\left(-1.33116109/\sqrt{3}\right)}+e^{-1.33116109\left(1/2\left(13\sqrt{3}\right)\right)}\right)\right)/\left(12\left(1+\left(e^{13\left(-1.33116109/\left(2\sqrt{3}\right)\right)}\right)^2\left(14+e^{13\left(-1.33116109/\left(2\sqrt{3}\right)\right)}\right)\right)\right)$$

Result:

0.0208481...

0.0208481…. ≈ 1/48

Series representations:

$$\frac{-2744+5996\left(e^{(13(-1.33116))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.33116))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.33116}\right)}{12\left(1+\left(e^{(13(-1.33116))/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{(13(-1.33116))/\left(2\sqrt{3}\right)}\right)\right)}=$$

$$-\left(\left(e^{-8.65255\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\left(-1499\,e^{25.9576/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}-14\,756\,156\exp\left(\frac{8.65255}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}+8.65255\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)-1499\exp\left(\frac{17.3051}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}+8.65255\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)+686\exp\left(\frac{25.9576}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}+8.65255\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)\right)\right)/\left(3\left(1+14\,e^{8.65255/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}+e^{25.9576/\left(\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)}\right)\right)\right)$$

$$\frac{-2744+5996\left(e^{(13(-1.33116))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.33116))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.33116}\right)}{12\left(1+\left(e^{(13(-1.33116))/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{(13(-1.33116))/\left(2\sqrt{3}\right)}\right)\right)}=$$

$$-\left(\left(\exp\left(-8.65255\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(-1499\,e^{\frac{25.9576}{\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}-\right.\right.\right.$$

$$14\,756\,156\exp\left(\frac{8.65255}{\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}+8.65255\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)-$$

$$1499\exp\left(\frac{17.3051}{\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}+8.65255\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+$$

$$\left.\left.686\exp\left(\frac{25.9576}{\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}+8.65255\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)\Bigg/$$

$$\left.\left(3\left(1+14\,e^{\frac{8.65255}{\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}+e^{\frac{25.9576}{\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}\right)\right)\right)$$

$$\frac{-2744+5996\left(e^{(13(-1.33116))/\left(2\sqrt{3}\right)}+9844\,e^{(13(-1.33116))/\sqrt{3}}+e^{1/2\left(13\sqrt{3}\right)(-1)\,1.33116}\right)}{12\left(1+\left(e^{(13(-1.33116))/\left(2\sqrt{3}\right)}\right)^2\left(14+e^{(13(-1.33116))/\left(2\sqrt{3}\right)}\right)\right)}=$$

$$-\left(\left(\exp\left(-\frac{4.32627\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right.\right.$$
$$\left(-1499\exp\left(\frac{51.9153\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)-\right.$$
$$14\,756\,156\exp\left(\frac{17.3051\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}+\frac{4.32627\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)-$$
$$1499\exp\left(\frac{34.6102\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}+\frac{4.32627\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)+$$
$$\left.\left.\left.686\exp\left(\frac{51.9153\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}+\frac{4.32627\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)\right)\right)\Big/$$
$$\left(3\left(1+14\exp\left(\frac{17.3051\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)+\exp\left(\frac{51.9153\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)\right)\right)$$

We have also that:

[(((-2744+5996*(e^(13*(-1.33116)/(2sqrt3))+9844*(e^(13*(-1.33116)/(sqrt3)))+e^((-1.33116)(13sqrt3/2))))) / (((12((1+(e^(13*(-1.33116)/(2sqrt3)))^2 (14+e^(13*(-1.33116)/(2sqrt3))))))))]^1/4096

Input interpretation:

$$\sqrt[4096]{\frac{-2744+5996\left(e^{13\left(-1.33116/\left(2\sqrt{3}\right)\right)}+9844\,e^{13\left(-1.33116/\sqrt{3}\right)}+e^{-1.33116\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1+\left(e^{13\left(-1.33116/\left(2\sqrt{3}\right)\right)}\right)^2\left(14+e^{13\left(-1.33116/\left(2\sqrt{3}\right)\right)}\right)\right)}}$$

Result:

0.9990555 result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

2*sqrt(((log base 0.9990555 (0.0208480781677724380))))-Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.9990555}(0.0208480781677724380)}-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.476...

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

Alternative representation:

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{\phi}+2\sqrt{\frac{\log(0.0208480781677724380000)}{\log(0.999056)}}$$

Series representations:

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\sqrt{-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.9791519218322275620000)^k}{k}}{\log(0.999056)}}$$

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\sqrt{-1+\log_{0.999056}(0.0208480781677724380000)}$$
$$\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}(-1+\log_{0.999056}(0.0208480781677724380000))^{-k}$$

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+2\sqrt{-1+\log_{0.999056}(0.0208480781677724380000)}$$
$$\sum_{k=0}^{\infty}\frac{(-1)^k(-1+\log_{0.999056}(0.0208480781677724380000))^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

2*sqrt(((log base 0.9990555 (0.020848078167772438))))+11+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.9990555}(0.020848078167772438)}+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.618...

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

Alternative representation:

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+2\sqrt{\frac{\log(0.0208480781677724380000)}{\log(0.999056)}}$$

Series representations:

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+2\sqrt{-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.97915192183222756200000)^k}{k}}{\log(0.999056)}}$$

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+2\sqrt{-1+\log_{0.999056}(0.0208480781677724380000)}$$
$$\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}(-1+\log_{0.999056}(0.0208480781677724380000))^{-k}$$

$$2\sqrt{\log_{0.999056}(0.0208480781677724380000)}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+2\sqrt{-1+\log_{0.999056}(0.0208480781677724380000)}$$
$$\sum_{k=0}^{\infty}\frac{(-1)^k(-1+\log_{0.999056}(0.0208480781677724380000))^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

Note that the two values of the field -1.3312 = ϕ and -1.3288 = ϕ are very near to the value of the following 5[th] order Ramanujan mock theta function:

$$f(q)=1+\frac{q}{1+q}+\frac{q^4}{(1+q)(1+q^2)}+\frac{q^9}{(1+q)(1+q^2)(1+q^3)}+\cdots$$

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

Input interpretation:

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

Result:

1.333425959911272680899883774926957939703837145947480074487...

f(q) = 1.333425959...

We have also:

(4.076594584857+0.020848078167)*10

Input interpretation:

$(4.076594584857+0.020848078167)\times 10$

Result:

40.97442663024

40.97442663024

And:

(4.076594584857)*10 = 40.76594584857

Furthermore:

(4.076594584857+0.020848078167)

Input interpretation:

$4.076594584857+0.020848078167$

Result:

4.097442663024

4.097442663024

And:

(4.076594584857-0.020848078167)

Input interpretation:

4.076594584857 – 0.020848078167

Result:

4.05574650669

4.05574650669

From the sum of the two results, considering 49/12 and 1/48, we obtain: 4.104166666

We note that 10 * 4.10416666 = 41.04166666

From:

On a Polya functional for rhombi, isosceles triangles, and thinning convex sets.
M. van den Berg, V. Ferone, C. Nitsch, C. Trombetti - arXiv:1811.04503v2 [math.AP] 21 May 2019

Let Ω be an open convex set in $\mathbb{R}^m$ with finite width, and with boundary $\partial\Omega$. Let v_Ω be the torsion function for Ω, i.e. the solution of $-\Delta v = 1, v|_{\partial\Omega} = 0$. An upper bound is obtained for the product of $\|v_\Omega\|_{L^\infty(\Omega)}\lambda(\Omega)$, where $\lambda(\Omega)$ is the bottom of the spectrum of the Dirichlet Laplacian acting in $L^2(\Omega)$. The upper bound is sharp in the limit of a thinning sequence of convex sets. For planar rhombi and isosceles triangles with area 1, it is shown that $\|v_\Omega\|_{L^1(\Omega)}\lambda(\Omega) \geq \frac{\pi^2}{24}$, and that this bound is sharp.

Theorem 1.2 *If $\triangle_\beta$ is an isosceles triangle with angles $\beta, \beta, \pi - 2\beta$, and if $0 < \beta \leq \frac{\pi}{3}$ then*

$$\frac{T(\triangle_\beta)\lambda(\triangle_\beta)}{|\triangle_\beta|} \leq \frac{\pi^2}{24}(1 + 81(\tan\beta)^{2/3}). \tag{1.14}$$

Theorem 1.3 *If $\lozenge_\beta$ is a rhombus with angles $\beta, \pi - \beta, \beta, \pi - \beta$, and if $\beta \leq \frac{\pi}{3}$ then*

$$\frac{T(\lozenge_\beta)\lambda(\lozenge_\beta)}{|\lozenge_\beta|} \leq \frac{\pi^2}{24}(1 + 15(\tan\beta)^{2/3}). \tag{1.15}$$

Theorem 1.4 *If $\lozenge_\beta$ is as in Theorem 1.3, then*

$$\frac{T(\lozenge_\beta)\lambda(\lozenge_\beta)}{|\lozenge_\beta|} \geq \frac{\pi^2}{24}. \tag{1.16}$$

Theorem 1.5 *If $\triangle_\beta$ is an isosceles triangle with angles $\beta, \beta, 2\pi - \beta$, then*

$$\frac{T(\triangle_\beta)\lambda(\triangle_\beta)}{|\triangle_\beta|} \geq \frac{\pi^2}{24}. \tag{1.17}$$

$$\begin{aligned}\frac{T(\triangle_\beta)\lambda(\triangle_\beta)}{|\triangle_\beta|} &\leq \frac{\pi^2}{24}(1+d^2)^2\left(1+7\left(\frac{d}{2}\right)^{2/3}\right)\\ &\leq \frac{\pi^2}{24}(1+81d^{2/3})\\ &= \frac{\pi^2}{24}(1+81(\tan\beta)^{2/3}),\ 0<\beta\leq\frac{\pi}{3}.\end{aligned}$$

For β = π/4

(Pi^2)/(24)*((1+81(tan(Pi/4)^(2/3))))

Input:

$$\frac{\pi^2}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)$$

Exact result:

$$\frac{41\pi^2}{12}$$

Decimal approximation:

33.721148370388641947684510916243516378988472974739367973577...

33.72114837…

Property:

$\frac{41\pi^2}{12}$ is a transcendental number

Alternative representations:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+81\left(\frac{1}{\cot\left(\frac{\pi}{4}\right)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+81\cot^{2/3}\left(\frac{\pi}{2}-\frac{\pi}{4}\right)\right)$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+81\left(-\cot\left(\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)$$

Series representations:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{41}{2}\sum_{k=1}^{\infty}\frac{1}{k^2}$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = -41\sum_{k=1}^{\infty}\frac{(-1)^k}{k^2}$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{82}{3}\sum_{k=0}^{\infty}\frac{1}{(1+2k)^2}$$

Integral representations:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{41}{3}\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{164}{3}\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{41}{3}\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^2$$

Multiple-argument formulas:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+81\times 2^{2/3}\left(-\frac{\tan\left(\frac{\pi}{8}\right)}{-1+\tan^2\left(\frac{\pi}{8}\right)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+81\left(\frac{\tan\left(\frac{\pi}{12}\right)\left(-3+\tan^2\left(\frac{\pi}{12}\right)\right)}{-1+3\tan^2\left(\frac{\pi}{12}\right)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+81\left(\frac{\tan\left(-\frac{3\pi}{4}\right)+\tan(\pi)}{1-\tan\left(-\frac{3\pi}{4}\right)\tan(\pi)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+81\left(\frac{U_{-\frac{3}{4}}(\cos(\pi))\sin(\pi)}{T_{\frac{1}{4}}(\cos(\pi))}\right)^{2/3}\right)$$

$$\frac{T(\triangle_\beta)\lambda(\triangle_\beta))}{|\triangle_\beta|} \geq \frac{\pi^2}{24},\ 0<\beta\leq\frac{\pi}{3}.$$

$$\begin{aligned}\frac{T(\Diamond_\beta)\lambda(\Diamond_\beta)}{|\Diamond_\beta|} &\leq \frac{\pi^2}{24}\left(1+\frac{d^2}{4}\right)^2\left(1+\frac{9d^2}{32}\right)\left(1+7\left(\frac{d}{2}\right)^{2/3}\right)\\ &\leq \frac{\pi^2}{24}\left(1+15\left(\frac{d}{2}\right)^{2/3}\right)\\ &= \frac{\pi^2}{24}\left(1+15(\tan\beta)^{2/3}\right),\ 0<\beta\leq\frac{\pi}{3}.\end{aligned}$$

(Pi^2)/(24)*((1+15(tan(Pi/4)^(2/3))))

Input:

$$\frac{\pi^2}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)$$

Exact result:

$$\frac{2\pi^2}{3}$$

Decimal approximation:

6.579736267392905745889660665841007568757996048271937509 42...

6.579736267…

Property:

$\frac{2\pi^2}{3}$ is a transcendental number

Alternative representations:

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+15\left(\frac{1}{\cot\left(\frac{\pi}{4}\right)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+15\cot^{2/3}\left(\frac{\pi}{2}-\frac{\pi}{4}\right)\right)$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+15\left(-\cot\left(\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)$$

Series representations:

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = 4\sum_{k=1}^{\infty}\frac{1}{k^2}$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = -8\sum_{k=1}^{\infty}\frac{(-1)^k}{k^2}$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{16}{3}\sum_{k=0}^{\infty}\frac{1}{(1+2k)^2}$$

Integral representations:

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{32}{3}\left(\int_0^1\sqrt{1-t^2}\,dt\right)^2$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{8}{3}\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{8}{3}\left(\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)^2$$

Multiple-argument formulas:

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+15\times 2^{2/3}\left(-\frac{\tan\left(\frac{\pi}{8}\right)}{-1+\tan^2\left(\frac{\pi}{8}\right)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+15\left(\frac{\tan\left(\frac{\pi}{12}\right)\left(-3+\tan^2\left(\frac{\pi}{12}\right)\right)}{-1+3\tan^2\left(\frac{\pi}{12}\right)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+15\left(\frac{\tan\left(-\frac{3\pi}{4}\right)+\tan(\pi)}{1-\tan\left(-\frac{3\pi}{4}\right)\tan(\pi)}\right)^{2/3}\right)$$

$$\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{1}{24}\pi^2\left(1+15\left(\frac{U_{-\frac{3}{4}}(\cos(\pi))\sin(\pi)}{T_{\frac{1}{4}}(\cos(\pi))}\right)^{2/3}\right)$$

$$\frac{\lambda(\Diamond_\beta)T(\Diamond_\beta)}{|\Diamond_\beta|} \geq \frac{\pi^2}{24}\frac{16+24d^2+d^4}{(1+\frac{3}{4}d^2)(16+4d^2)} \geq \frac{\pi^2}{24}, \qquad 0 \leq d \leq 2.$$

From the sum of the four results, we obtain:

(((33.72114837038864 + 6.5797362673929057 + (Pi^2)/24 + (Pi^2)/24)))

Input interpretation:

$$33.72114837038864 + 6.5797362673929057 + \frac{\pi^2}{24} + \frac{\pi^2}{24}$$

Result:

41.12335167120566...

41.1233516… result very near to the previous results: 1/48 = 4.104166666, from which we obtain 10 * 4.10416666 = 41.04166666 and 40.97442663024

$(4.076594584857 + 0.020848078167) \times 10$

Alternative representations:

$$33.721148370388640000 + 6.57973626739290570000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + \frac{2}{24} (180\,°)^2$$

$$33.721148370388640000 + 6.57973626739290570000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + \frac{2}{24} (-i \log(-1))^2$$

$$33.721148370388640000 + 6.57973626739290570000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + \frac{12\,\zeta(2)}{24}$$

Series representations:

$$33.721148370388640000 + 6.57973626739290570000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + 1.3333333333333333333 \left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^2$$

$$33.721148370388640000 + 6.57973626739290570000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + \frac{1}{3} \left(-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)^2$$

$$33.721148370388640000 + 6.57973626739290570000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + 0.08333333333333333333 \left(\sum_{k=0}^{\infty} \frac{2^{-k} (-6 + 50 k)}{\binom{3k}{k}}\right)^2$$

Integral representations:

$$33.721148370388640000 + 6.57973626739290570000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + 0.3333333333333333333 \left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^2$$

$$33.721148370388640000 + 6.5797362673929057000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + 1.3333333333333333333 \left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2$$

$$33.721148370388640000 + 6.5797362673929057000 + \frac{\pi^2}{24} + \frac{\pi^2}{24} = 40.300884637781545700 + 0.33333333333333333333 \left(\int_0^\infty \frac{\sin(t)}{t}\, dt\right)^2$$

From the sum of the four results, performing the following calculations, we obtain:

1+sqrt729/(((33.72114837038864 + 6.5797362673929057 + (Pi^2)/24 + (Pi^2)/24)))

Where 729 = 9^3 (see Ramanujan cubes)

Input interpretation:

$$1 + \frac{\sqrt{729}}{33.72114837038864 + 6.5797362673929057 + \frac{\pi^2}{24} + \frac{\pi^2}{24}}$$

Result:

1.656561270002349...

1.65656127…. result very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164,2696$ i.e. 1,65578...

Series representations:

$$1 + \frac{\sqrt{729}}{33.721148370388640000 + 6.5797362673929057000 + \frac{\pi^2}{24} + \frac{\pi^2}{24}} = 1 + \frac{12.000000000000000000 \sqrt{728} \sum_{k=0}^{\infty} 728^{-k} \binom{\frac{1}{2}}{k}}{483.61061565337854840 + \pi^2}$$

$$1 + \frac{\sqrt{729}}{33.721148370388640000 + 6.5797362673929057000 + \frac{\pi^2}{24} + \frac{\pi^2}{24}} = 1 + \frac{12.000000000000000000 \sqrt{728} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{728}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}{483.61061565337854840 + \pi^2}$$

$$1+\frac{\sqrt{729}}{33.7211483703886400000+6.57973626739290570000+\frac{\pi^2}{24}+\frac{\pi^2}{24}} =$$

$$1+\frac{6.000000000000000000\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\left(483.61061565337854840+\pi^2\right)\sqrt{\pi}}$$

Note that, we obtain:

41.12335167120566+(((1/60 (Fibonacci factorial constant + 67))))

Where:

Fibonacci factorial constant

$$\left(-\frac{1}{\phi^2};-\frac{1}{\phi^2}\right)_\infty$$

$(a;q)_n$ gives the q-Pochhammer symbol

ϕ is the golden ratio

1.226742010720353244417630230455361655871409690440250419643...

1.2267420107...

Input interpretation:

$$41.12335167120566+\frac{1}{60}\left(\mathcal{F}_{FF}+67\right)$$

$\mathcal{F}_{FF}$ is the Fibonacci factorial constant

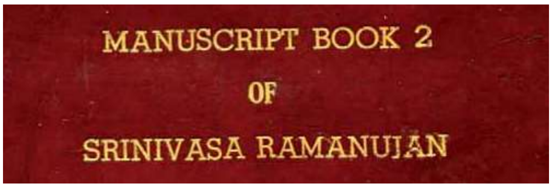
Result:

42.26046403805100...

42.260464… result equal to above first result 42.260464… obtained from the formula

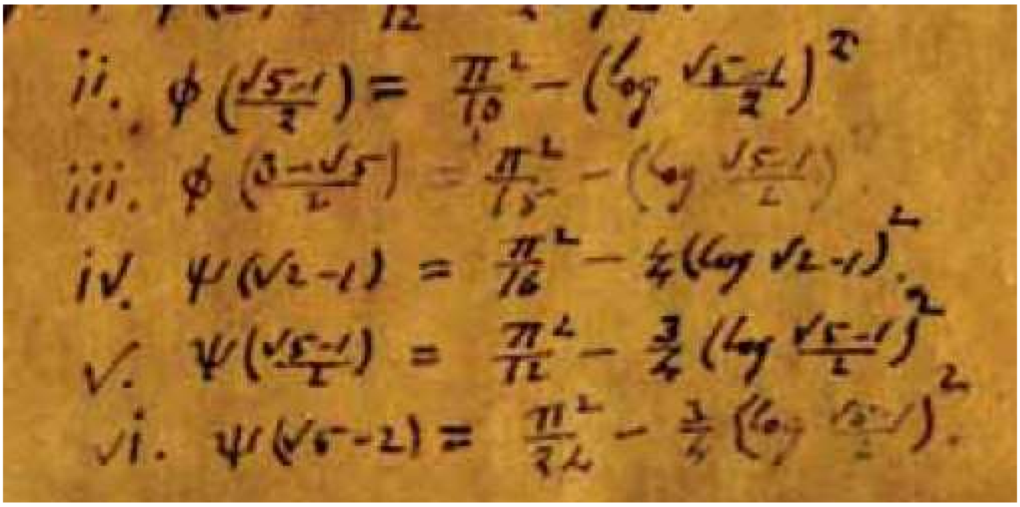
$$-3\left(-\frac{2744+5996\times 42.63931648+9844\times 1818.1113+77523.023543}{12\,(1+42.63931648)^2\,(14+42.63931648)}\right)$$

From:



we have that:

Page 109



ii. $\phi\left(\frac{\sqrt{5}-1}{2}\right) = \frac{\pi^2}{10} - \left(\log \frac{\sqrt{5}-1}{2}\right)^2$

iii. $\phi\left(\frac{3-\sqrt{5}}{2}\right) = \frac{\pi^2}{15} - \left(\log \frac{\sqrt{5}-1}{2}\right)^2$

iv. $\psi(\sqrt{2}-1) = \frac{\pi^2}{16} - \frac{1}{4}\left(\log (\sqrt{2}-1)\right)^2$

v. $\psi\left(\frac{\sqrt{5}-1}{2}\right) = \frac{\pi^2}{12} - \frac{3}{4}\left(\log \frac{\sqrt{5}-1}{2}\right)^2$

vi. $\psi(\sqrt{5}-2) = \frac{\pi^2}{24} - \frac{3}{4}\left(\log \frac{\sqrt{5}-1}{2}\right)^2$

Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2

Input:

$$\frac{\pi^2}{24} - \frac{3}{4} \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)$$

log(x) is the natural logarithm

Decimal approximation:

0.237559901279160814745406988237856727292432712764725456322...

0.23755990127916….

Alternate forms:

$$\frac{1}{24}\left(\pi^2 - 18 \operatorname{csch}^{-1}(2)^2\right)$$

$$\frac{1}{24}\left(\pi^2 - 18 \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right)$$

$$\frac{1}{24}\left(\pi^2 - 18\left(\log\left(\sqrt{5}-1\right) - \log(2)\right)^2\right)$$

$\text{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)$$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2$$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(-\text{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{1}{24}\left(\pi^2 - 18\left(2 i \pi\left\lfloor\frac{\arg\left(-1+\sqrt{5}-2x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2\right) \quad \text{for } x < 0$$

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(2 i \pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2 \quad \text{for } x < 0$$

Integral representation:

$$\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3 = \frac{\pi^2}{24} - \frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

((((Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2))))^1/128

Input:

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4} \log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)}$$

log(x) is the natural logarithm

Decimal approximation:

0.988833628580485387235048704408866760465401974342081212010...

0.988833628580…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate forms:

$$\frac{\sqrt[128]{\frac{\pi^2}{3} - 6\,\text{csch}^{-1}(2)^2}}{2^{3/128}}$$

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(\log\left(\sqrt{5} - 1\right) - \log(2)\right)^2}$$

$$\frac{\sqrt[128]{\frac{1}{3}\left(\pi^2 - 18\log^2\left(\frac{1}{2}\left(\sqrt{5} - 1\right)\right)\right)}}{2^{3/128}}$$

$\text{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

All 128th roots of π^2/24 - 3/4 log^2(1/2 (sqrt(5) - 1)):

$$e^0 \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)} \approx 0.98883 \text{ (real, principal root)}$$

$$e^{(i\pi)/64} \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)} \approx 0.98764 + 0.04852\, i$$

$$e^{(i\pi)/32} \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)} \approx 0.98407 + 0.09692\, i$$

$$e^{(3i\pi)/64} \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)} \approx 0.97813 + 0.14509\, i$$

$$e^{(i\pi)/16} \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)} \approx 0.96983 + 0.19291\, i$$

Alternative representations:

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)}$$

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2}$$

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(-\text{Li}_1\left(1+\frac{1}{2}\left(1-\sqrt{5}\right)\right)\right)^2}$$

Integral representation:

$$\sqrt[128]{\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3} = \sqrt[128]{\frac{\pi^2}{24} - \frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2}$$

log base 0.988833628580485 ((((Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2))))-Pi+1/golden ratio

Input interpretation:

$$\log_{0.988833628580485}\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)-\pi+\frac{1}{\phi}$$

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

125.4764413352...

125.4764413352… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representations:

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\log_{0.9888336285804850000}\left(\frac{\pi^2}{24}-\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)+\frac{1}{\phi}$$

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)}{\log(0.9888336285804850000)}$$

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)-\pi+\frac{1}{\phi}=$$
$$-\pi+\log_{0.9888336285804850000}\left(\frac{\pi^2}{24}-\frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2\right)+\frac{1}{\phi}$$

Series representations:

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + \log_{0.9888336285804850000}\left(\frac{1}{24}\left(\pi^2 - 18\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2\right)\right)$$

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{24}\right)^k\left(-24+\pi^2-18\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^k}{k}}{\log(0.9888336285804850000)}$$

Integral representation:

$$\log_{0.9888336285804850000}\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + \log_{0.9888336285804850000}\left(\frac{1}{24}\left(\pi^2 - 18\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2\right)\right)$$

Adding the previous analyzed expression:

$$\frac{\pi^2}{24}\left(1 + 81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)$$

with

$$\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

we obtain:

(((Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2))) + ((((Pi^2)/(24)*((1+81(tan(Pi/4)^(2/3)))))))

Input:

$$\left(\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right) + \frac{\pi^2}{24}\left(1 + 81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{83\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

Decimal approximation:

33.958708271667802762429917904481373106280905687504093429 90...

33.95870827… ≈ 34 (Fibonacci number)

Alternate forms:

$$\frac{83\pi^2}{24} - \frac{3}{4}\operatorname{csch}^{-1}(2)^2$$

$$\frac{1}{24}\left(83\pi^2 - 18\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$$\frac{83\pi^2}{24} - \frac{3}{4}\left(\log\left(\sqrt{5}-1\right) - \log(2)\right)^2$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) + \frac{1}{24}\left(1 + 81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{\pi^2}{24} + \frac{1}{24}\pi^2\left(1 + 81\left(-\cot\left(-\frac{\pi}{2} + \frac{\pi}{4}\right)\right)^{2/3}\right) - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)$$

$$\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) + \frac{1}{24}\left(1 + 81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right) + \frac{1}{24}\pi^2\left(1 + 81\left(-i + \frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)$$

$$\left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right) + \frac{1}{24}\left(1 + 81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{\pi^2}{24} + \frac{1}{24}\pi^2\left(1 + 81\left(-\cot\left(-\frac{\pi}{2} + \frac{\pi}{4}\right)\right)^{2/3}\right) - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2$$

Series representations:

$$\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)+\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{83\pi^2}{24}-\frac{3}{4}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)+\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{83\pi^2}{24}+\frac{3}{4}\left(2\pi\left\lfloor\frac{\arg(-1+\sqrt{5}-2x)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)\right)^2$$

for $x < 0$

$$\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)+\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{83\pi^2}{24}-\frac{3}{4}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2$$

for $x < 0$

Integral representation:

$$\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)+\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{83\pi^2}{24}-\frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

Multiple-argument formula:

$$\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)+\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 = \frac{83\pi^2}{24}-\frac{3}{4}\left(-\log(2)+\log\left(-1+\sqrt{5}\right)\right)^2$$

In conclusion:

1/21*[(((Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2))) + ((((Pi^2)/(24)*((1+81(tan(Pi/4)^(2/3)))))))]

Input:

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{\pi^2}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{1}{21}\left(\frac{83\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

Decimal approximation:

1.617081346269895369639519900213398719346709794643052068090...

1.61708134626… result that is a nearly approximation to the value of the golden ratio 1,618033988749...

Alternate forms:

$$\frac{1}{504}\left(83\pi^2-18\operatorname{csch}^{-1}(2)^2\right)$$

$$\frac{83\pi^2}{504}-\frac{1}{28}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

$$\frac{1}{504}\left(83\pi^2-18\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{1}{21}\left(\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)$$

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{1}{21}\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)+\frac{1}{24}\pi^2\left(1+81\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)\right)$$

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{1}{21}\left(\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2\right)$$

Series representations:

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{83\pi^2}{504}-\frac{1}{28}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{1}{21}\left(\frac{83\pi^2}{24}+\frac{3}{4}\left(2\pi\left\lfloor\frac{\arg\left(-1+\sqrt{5}-2x\right)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)\right)^2\right)\quad\text{for } x<0$$

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{1}{21}\left(\frac{83\pi^2}{24}-\frac{3}{4}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2\right)\quad\text{for } x<0$$

Integral representation:

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{83\pi^2}{504}-\frac{1}{28}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

Multiple-argument formula:

$$\frac{1}{21}\left(\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)+\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\right)=$$
$$\frac{1}{21}\left(\frac{83\pi^2}{24}-\frac{3}{4}\left(-\log(2)+\log\left(-1+\sqrt{5}\right)\right)^2\right)$$

Now, to the Ramanujan expression, adding to the two precedent expressions, we obtain:

[(Pi^2)/(24)*((1+81(tan(Pi/4)^(2/3))))] + [(Pi^2)/(24)*((1+15(tan(Pi/4)^(2/3))))] + [Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2]

Input:

$$\frac{\pi^2}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{\pi^2}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{33\pi^2}{8}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

Decimal approximation:

40.538444539060708508319578571065473863156705292331287180 84...

40.538444539….. result very near to the value of the following expression:

(4.076594584857)*10 = 40.76594584857

Alternate forms:

$$\frac{1}{8}\left(33\pi^2-6\,\mathrm{csch}^{-1}(2)^2\right)$$

$$\frac{3}{8}\left(11\pi^2-2\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$$\frac{33\pi^2}{8}-\frac{3}{4}\left(\log\left(\sqrt{5}-1\right)-\log(2)\right)^2$$

$\text{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)+$$
$$\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)+$$
$$\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)+\frac{1}{24}\pi^2\left(1+15\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)+$$
$$\frac{1}{24}\pi^2\left(1+81\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)$$

Series representations:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{33\pi^2}{8}-\frac{3}{4}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{33\pi^2}{8}+\frac{3}{4}\left(2\pi\left\lfloor\frac{\arg\left(-1+\sqrt{5}-2x\right)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)\right)^2$$

for $x<0$

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{33\pi^2}{8}-\frac{3}{4}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2$$
for $x < 0$

Integral representation:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{33\pi^2}{8}-\frac{3}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

Multiple-argument formula:

$$\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)=$$
$$\frac{33\pi^2}{8}-\frac{3}{4}\left(-\log(2)+\log\left(-1+\sqrt{5}\right)\right)^2$$

From which, dividing by 10, we obtain:

1/10((([(Pi^2)/(24)*((1+81(tan(Pi/4)^(2/3))))] + [(Pi^2)/(24)*((1+15(tan(Pi/4)^(2/3))))] + [Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2])))

Input:

$$\frac{1}{10}\left(\frac{\pi^2}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{\pi^2}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{1}{10}\left(\frac{33\pi^2}{8}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

Decimal approximation:

4.053844453906070850831957857106547386315670529233128718084...

4.0538444539….. result very near to the previous value of the following expression:

$$\frac{-2744+5996\left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}+9844\,e^{13\left(-1.3288/\sqrt{3}\right)}+e^{-1.3288\left(1/2\left(13\sqrt{3}\right)\right)}\right)}{12\left(1+\left(e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)^2\left(14+e^{13\left(-1.3288/\left(2\sqrt{3}\right)\right)}\right)\right)}$$

4.07659...

4.07659…≈ 49/12

Alternate forms:

$$\frac{1}{80}\left(33\pi^2-6\operatorname{csch}^{-1}(2)^2\right)$$

$$\frac{33\pi^2}{80}-\frac{3}{40}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

$$\frac{3}{80}\left(11\pi^2-2\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{1}{10}\left(\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)+\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)$$

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{1}{10}\left(\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)+\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2\right)$$

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{1}{10}\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)+\frac{1}{24}\pi^2\left(1+15\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)+\frac{1}{24}\pi^2\left(1+81\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)\right)$$

Series representations:

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{33\pi^2}{80}-\frac{3}{40}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{1}{10}\left(\frac{33\pi^2}{8}+\frac{3}{4}\left(2\pi\left\lfloor\frac{\arg\left(-1+\sqrt{5}-2x\right)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)\right)^2\right)$$

for $x < 0$

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{1}{10}\left(\frac{33\pi^2}{8}-\frac{3}{4}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2\right)$$ for $x < 0$

Integral representation:

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{33\pi^2}{80}-\frac{3}{40}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

Multiple-argument formula:

$$\frac{1}{10}\left(\frac{1}{24}\pi^2\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{1}{24}\pi^2\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)=\frac{1}{10}\left(\frac{33\pi^2}{8}-\frac{3}{4}\left(-\log(2)+\log\left(-1+\sqrt{5}\right)\right)^2\right)$$

We have also:

Pi*(((([(Pi^2)/(24)*((1+81(tan(Pi/4)^(2/3))))] + [(Pi^2)/(24)*((1+15(tan(Pi/4)^(2/3))))]+[Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2])))-2

Input:

$$\pi\left(\frac{\pi^2}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{\pi^2}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)-2$$

$\log(x)$ is the natural logarithm

Exact result:

$$\pi\left(\frac{33\pi^2}{8}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)-2$$

Decimal approximation:

125.35527955187039385764225329905101925088106458960808655529...

125.3552795… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

Alternate forms:

$$-2+\frac{33\pi^3}{8}-\frac{3}{4}\pi\,\text{csch}^{-1}(2)^2$$

$$-2+\frac{33\pi^3}{8}-\frac{3}{4}\pi\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)$$

$$\frac{1}{8}\left(-16+33\pi^3-6\pi\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$\text{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\pi\left(\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)+\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)$$

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\pi\left(\frac{\pi^2}{24}+\frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)+\frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right)-\frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2\right)$$

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\pi\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)+\frac{1}{24}\pi^2\left(1+15\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)+\frac{1}{24}\pi^2\left(1+81\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)\right)$$

Series representations:

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\frac{33\pi^3}{8}-\frac{3}{4}\pi\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\pi\left(\frac{33\pi^2}{8}+\frac{3}{4}\left(2\pi\left\lfloor\frac{\arg\left(-1+\sqrt{5}-2x\right)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)\right)^2\right)\quad \text{for } x<0$$

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\pi\left(\frac{33\pi^2}{8}-\frac{3}{4}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2\right) \text{ for } x<0$$

Integral representation:

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\frac{33\pi^3}{8}-\frac{3}{4}\pi\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

Multiple-argument formula:

$$\pi\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)-2=-2+\pi\left(\frac{33\pi^2}{8}-\frac{3}{4}\left(-\log(2)+\log\left(-1+\sqrt{5}\right)\right)^2\right)$$

3*((([(Pi^2)/(24)*((1+81(tan(Pi/4)^(2/3))))]+[(Pi^2)/(24)*((1+15(tan(Pi/4)^(2/3))))] + [Pi^2/(24) –3/4(((ln ((sqrt5-1)/2))))^2])))+13+3+golden ratio

Input:

$$3\left(\frac{\pi^2}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\frac{\pi^2}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)+\left(\frac{\pi^2}{24}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)\right)+13+3+\phi$$

log(x) is the natural logarithm

ϕ is the golden ratio

Exact result:

$$\phi+16+3\left(\frac{33\pi^2}{8}-\frac{3}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

Decimal approximation:

139.23336760593202037316332254756205970719042505679962440 46...

139.233367… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternate forms:

$$\phi + 16 + \frac{99\pi^2}{8} - \frac{9}{4}\operatorname{csch}^{-1}(2)^2$$

$$\phi + 16 + \frac{9}{8}\left(11\pi^2 - 2\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$$\frac{1}{8}\left(132 + 4\sqrt{5} + 99\pi^2 - 18\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)\right)$$

$\operatorname{csch}^{-1}(x)$ is the inverse hyperbolic cosecant function

Alternative representations:

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 + \frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 + \left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right) + 13 + 3 + \phi = 16 + \phi + 3\left(\frac{\pi^2}{24} + \frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right) + \frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right) - \frac{3}{4}\log_e^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)$$

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 + \frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 + \left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right) + 13 + 3 + \phi = 16 + \phi + 3\left(\frac{\pi^2}{24} + \frac{1}{24}\pi^2\left(1+15\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right) + \frac{1}{24}\pi^2\left(1+81\left(-\cot\left(-\frac{\pi}{2}+\frac{\pi}{4}\right)\right)^{2/3}\right) - \frac{3}{4}\left(\log(a)\log_a\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right)\right)^2\right)$$

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 + \frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2 + \left(\frac{\pi^2}{24} - \frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right) + 13 + 3 + \phi = 16 + \phi + 3\left(\frac{\pi^2}{24} - \frac{3}{4}\log^2\left(\frac{1}{2}\left(-1+\sqrt{5}\right)\right) + \frac{1}{24}\pi^2\left(1+15\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right) + \frac{1}{24}\pi^2\left(1+81\left(-i+\frac{2i}{1+e^{(2i\pi)/4}}\right)^{2/3}\right)\right)$$

Series representations:

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)+13+3+\phi=16+\phi+\frac{99\pi^2}{8}-\frac{9}{4}\left(\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-3+\sqrt{5}\right)^k}{k}\right)^2$$

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)+13+3+\phi=16+\phi+3\left(\frac{33\pi^2}{8}+\frac{3}{4}\left(2\pi\left\lfloor\frac{\arg(-1+\sqrt{5}-2x)}{2\pi}\right\rfloor-i\left(\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)\right)^2\right)\quad\text{for } x<0$$

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)+13+3+\phi=16+\phi+3\left(\frac{33\pi^2}{8}-\frac{3}{4}\left(2i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-1+\sqrt{5}\right)-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-1+\sqrt{5}-2x\right)^k x^{-k}}{k}\right)^2\right)\quad\text{for } x<0$$

Integral representation:

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)+13+3+\phi=16+\phi+\frac{99\pi^2}{8}-\frac{9}{4}\left(\int_1^{\frac{1}{2}\left(-1+\sqrt{5}\right)}\frac{1}{t}\,dt\right)^2$$

Multiple-argument formula:

$$3\left(\frac{1}{24}\left(1+81\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\frac{1}{24}\left(1+15\tan^{2/3}\left(\frac{\pi}{4}\right)\right)\pi^2+\left(\frac{\pi^2}{24}-\frac{1}{4}\log^2\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)3\right)\right)+13+3+\phi=$$

$$16+\phi+3\left(\frac{33\pi^2}{8}-\frac{3}{4}\left(-\log(2)+\log\left(-1+\sqrt{5}\right)\right)^2\right)$$

From:

Integrable Scalar Cosmologies II. Can they fit into Gauged Extended Supergavity or be encoded in N=1 superpotentials? - P. Fre, A.S. Sorin and M. Trigiante - arXiv:1310.5340v1 [hep-th] 20 Oct 2013

We have that:

$$T_c \overset{t\to\infty}{\simeq} \frac{125e^{\frac{12t\nu}{5}}}{12\nu^5} \qquad (5.65)$$

$$T_c \overset{t\to\infty}{\simeq} \frac{125e^{\frac{12t\nu}{5}}}{12\nu^5}$$

125*e^((12*0.25*x)/5) / ((12*0.25^5)) = y

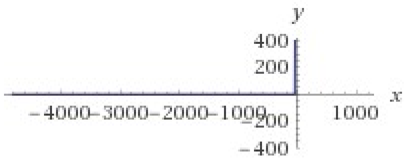
Input:

$$125\times\frac{e^{1/5\,(12\times 0.25\,x)}}{12\times 0.25^5}=y$$

Result:

$$10\,666.7\,e^{0.6x}=y$$

Implicit plot:



Alternate form assuming x and y are real:

$$10666.7\, e^{0.6x} + 0 = y$$

Real solution:

$$y \approx 10666.7 \times 2.71828^{0.6x}$$

Solution:

$$y = \frac{32000}{3}\, e^{(3x)/5}$$

Partial derivatives:

$$\frac{\partial}{\partial x}\left(10666.7\, e^{0.6x}\right) = 6400.\, e^{0.6x}$$

$$\frac{\partial}{\partial y}\left(10666.7\, e^{0.6x}\right) = 0$$

Implicit derivatives:

$$\frac{\partial x(y)}{\partial y} = \frac{26388279066624\, e^{-(1351079888211149\, x)/2251799813685248}}{168884986026393625}$$

$$\frac{\partial y(x)}{\partial x} = \frac{1351079888211149\, y}{2251799813685248}$$

Limit:

$$\lim_{x \to -\infty} 10666.7\, e^{0.6x} = 0 \approx 0$$

For

$$y \approx 10666.7 \times 2.71828^{0.6x}$$

we obtain:

125*e^((12*0.25*x)/5) / ((12*0.25^5)) = 10666.7*2.71828^(0.6x)

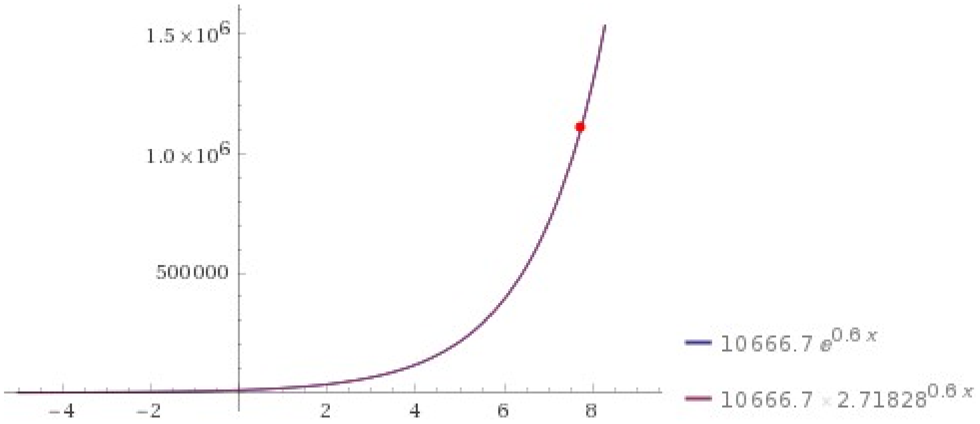
Input interpretation:

$$125 \times \frac{e^{1/5\,(12 \times 0.25\, x)}}{12 \times 0.25^5} = 10666.7 \times 2.71828^{0.6x}$$

Result:

$$10666.7\, e^{0.6x} = 10666.7 \times 2.71828^{0.6x}$$

Plot:



Alternate forms:

$e^{0.6x} = 1. \times 2.71828^{0.6x}$

$10\,666.7\, e^{0.6x} = 10\,666.7\, e^{0.6x}$

Alternate form assuming x is positive:

$e^{0.6x} = 0.999997\, e^{0.6x}$

Alternate form assuming x is real:

$10\,666.7\, e^{0.6x} + 0 = 10\,666.7 \times 2.71828^{0.6x} + 0$

Real solution:

$x \approx 7.74296$

7.74296

Solution:

$x \approx (2.47775 \times 10^6\, i)(6.28319\, n + (-3.125 \times 10^{-6}\, i)), \quad n \in \mathbb{Z}$

125*e^((12*0.25*7.74296)/5) / ((12*0.25^5))

Input interpretation:

$125 \times \frac{e^{1/5\,(12 \times 0.25 \times 7.74296)}}{12 \times 0.25^5}$

Result:

$1.11087... \times 10^6$

$1.11087...*10^6$

Alternative representation:

$$\frac{125\, e^{(12\times 0.25\times 7.74296)/5}}{12\times 0.25^5} = \frac{125\, \exp^{\frac{12\times 0.25\times 7.74296}{5}}(z)}{12\times 0.25^5} \quad \text{for } z = 1$$

Series representations:

$$\frac{125\, e^{(12\times 0.25\times 7.74296)/5}}{12\times 0.25^5} = 10\,666.7\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{4.64578}$$

$$\frac{125\, e^{(12\times 0.25\times 7.74296)/5}}{12\times 0.25^5} = 426.099\left(\sum_{k=0}^{\infty} \frac{1+k}{k!}\right)^{4.64578}$$

$$\frac{125\, e^{(12\times 0.25\times 7.74296)/5}}{12\times 0.25^5} = 10\,666.7\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{4.64578}$$

$$T_c(t) \equiv \int_0^t dx\, \exp\left[\mathrm{B}(x,\nu)\right] = \frac{25t}{\nu^4} - \frac{125e^{\frac{6t\nu}{5}}}{3\nu^5} + \frac{125e^{\frac{12t\nu}{5}}}{12\nu^5} + \frac{125}{4\nu^5}$$

For t = 7.74296 and ν = 1/4 = 0.25, we obtain:

(25*7.74296)/0.25^4 – ((125*e^((6*7.74296*0.25)/5)))/(3*0.25^5) + ((125*e^((12*7.74296*0.25)/5)))/(12*0.25^5) + 125/(4*0.25^5)

Input interpretation:

$$\frac{25\times 7.74296}{0.25^4} - \frac{125\, e^{1/5\,(6\times 7.74296\times 0.25)}}{3\times 0.25^5} + \frac{125\, e^{1/5\,(12\times 7.74296\times 0.25)}}{12\times 0.25^5} + \frac{125}{4\times 0.25^5}$$

Result:

$7.57008... \times 10^5$

$7.57008...*10^5$

Alternative representation:

$$\frac{25\times 7.74296}{0.25^4}-\frac{125\,e^{(6\times 7.74296\times 0.25)/5}}{3\times 0.25^5}+\frac{125\,e^{(12\times 7.74296\times 0.25)/5}}{12\times 0.25^5}+\frac{125}{4\times 0.25^5}=$$
$$\frac{25\times 7.74296}{0.25^4}-\frac{125\exp^{\frac{6\times 7.74296\times 0.25}{5}}(z)}{3\times 0.25^5}+\frac{125\exp^{\frac{12\times 7.74296\times 0.25}{5}}(z)}{12\times 0.25^5}+\frac{125}{4\times 0.25^5}\quad \text{for } z=1$$

Series representations:

$$\frac{25\times 7.74296}{0.25^4}-\frac{125\,e^{(6\times 7.74296\times 0.25)/5}}{3\times 0.25^5}+\frac{125\,e^{(12\times 7.74296\times 0.25)/5}}{12\times 0.25^5}+\frac{125}{4\times 0.25^5}=$$
$$-42\,666.7\left(-1.91144+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.32289}-0.25\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.64578}\right)$$

$$\frac{25\times 7.74296}{0.25^4}-\frac{125\,e^{(6\times 7.74296\times 0.25)/5}}{3\times 0.25^5}+\frac{125\,e^{(12\times 7.74296\times 0.25)/5}}{12\times 0.25^5}+\frac{125}{4\times 0.25^5}=$$
$$-8527.66\left(-9.56358+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.32289}-0.0499667\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4.64578}\right)$$

$$\frac{25\times 7.74296}{0.25^4}-\frac{125\,e^{(6\times 7.74296\times 0.25)/5}}{3\times 0.25^5}+\frac{125\,e^{(12\times 7.74296\times 0.25)/5}}{12\times 0.25^5}+\frac{125}{4\times 0.25^5}=$$
$$-42\,666.7\left(-1.91144+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.32289}-0.25\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.64578}\right)$$

To work out the behavior at very early times it is more complicated, yet we can predict it by inspecting the behavior of the energy density and of the pressure. Inserting the form of the solution and of the potential in eq.(1.5) we obtain the parametric time behavior of the energy density and of the pressure [8]:

$$\rho = \frac{3\nu^8\left(-4\nu^2+2e^{\frac{6t\nu}{5}}\left(2\nu^2+5\right)+e^{\frac{12t\nu}{5}}\left(3\nu^2-5\right)-5\right)}{15625\left(-1+e^{\frac{6t\nu}{5}}\right)^6} \tag{5.68}$$

$$p = \frac{3\nu^8\left(4\nu^2-2e^{\frac{6t\nu}{5}}\left(2\nu^2+5\right)+e^{\frac{12t\nu}{5}}\left(3\nu^2+5\right)+5\right)}{15625\left(-1+e^{\frac{6t\nu}{5}}\right)^6} \tag{5.69}$$

We have that:

$$\rho = \frac{3\nu^8\left(-4\nu^2+2e^{\frac{6t\nu}{5}}\left(2\nu^2+5\right)+e^{\frac{12t\nu}{5}}\left(3\nu^2-5\right)-5\right)}{15625\left(-1+e^{\frac{6t\nu}{5}}\right)^6} \tag{5.68}$$

$$p = \frac{3\nu^8\left(4\nu^2-2e^{\frac{6t\nu}{5}}\left(2\nu^2+5\right)+e^{\frac{12t\nu}{5}}\left(3\nu^2+5\right)+5\right)}{15625\left(-1+e^{\frac{6t\nu}{5}}\right)^6} \tag{5.69}$$

For t = 7.74296 and ν = 1/4 = 0.25, we obtain:

3*0.25^8((((-4*0.25^2+2e^((6*7.74296*0.25)/5)*(2*0.25^2+5)+e^((12*7.74296*0.25)/5)*(3*0.25^2-5)-5)))) * ((1/((((15625((-1+e^((6*7.74296*0.25)/5)))^6))))))

Input interpretation:

$$3\times 0.25^8\left(\left(-4\times 0.25^2+2\,e^{1/5(6\times 7.74296\times 0.25)}(2\times 0.25^2+5)+e^{1/5(12\times 7.74296\times 0.25)}(3\times 0.25^2-5)-5\right)\times\frac{1}{15\,625\left(-1+e^{1/5(6\times 7.74296\times 0.25)}\right)^6}\right)$$

Result:

$-1.93510\ldots\times 10^{-12}$

$-1.93510\ldots * 10^{-12} = \rho$

Alternative representation:

$$\left((3\times 0.25^8)\left(-4\times 0.25^2+2\,e^{(6\times 7.74296\times 0.25)/5}(2\times 0.25^2+5)+e^{(12\times 7.74296\times 0.25)/5}(3\times 0.25^2-5)-5\right)\right)/\left(15\,625\left(-1+e^{(6\times 7.74296\times 0.25)/5}\right)^6\right) = \left((3\times 0.25^8)\left(-4\times 0.25^2+2\exp^{\frac{6\times 7.74296\times 0.25}{5}}(z)(2\times 0.25^2+5)+\exp^{\frac{12\times 7.74296\times 0.25}{5}}(z)(3\times 0.25^2-5)-5\right)\right)/\left(15\,625\left(-1+\exp^{\frac{6\times 7.74296\times 0.25}{5}}(z)\right)^6\right) \text{ for } z=1$$

Series representations:

$$\left(\left(3\times 0.25^8\right)\left(-4\times 0.25^2+2\,e^{(6\times 7.74296\times 0.25)/5}\left(2\times 0.25^2+5\right)+e^{(12\times 7.74296\times 0.25)/5}\left(3\times 0.25^2-5\right)-5\right)\right)/\left(15625\left(-1+e^{(6\times 7.74296\times 0.25)/5}\right)^6\right)=\frac{3.00293\times 10^{-8}\left(-0.512195+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.32289}-0.469512\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.64578}\right)}{\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.32289}\right)^6}$$

$$\left(\left(3\times 0.25^8\right)\left(-4\times 0.25^2+2\,e^{(6\times 7.74296\times 0.25)/5}\left(2\times 0.25^2+5\right)+e^{(12\times 7.74296\times 0.25)/5}\left(3\times 0.25^2-5\right)-5\right)\right)/\left(15625\left(-1+e^{(6\times 7.74296\times 0.25)/5}\right)^6\right)=\frac{0.0000941543\left(-2.56268+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.32289}-0.09384\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4.64578}\right)}{\left(-5.00333+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.32289}\right)^6}$$

$$\left(\left(3\times 0.25^8\right)\left(-4\times 0.25^2+2\,e^{(6\times 7.74296\times 0.25)/5}\left(2\times 0.25^2+5\right)+e^{(12\times 7.74296\times 0.25)/5}\left(3\times 0.25^2-5\right)-5\right)\right)/\left(15625\left(-1+e^{(6\times 7.74296\times 0.25)/5}\right)^6\right)=\frac{3.00293\times 10^{-8}\left(-0.512195+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.32289}-0.469512\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.64578}\right)}{\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.32289}\right)^6}$$

$$p = \frac{3\nu^8\left(4\nu^2-2e^{\frac{6t\nu}{5}}\left(2\nu^2+5\right)+e^{\frac{12t\nu}{5}}\left(3\nu^2+5\right)+5\right)}{15625\left(-1+e^{\frac{6t\nu}{5}}\right)^6}$$

3*0.25^8((((4*0.25^2-2e^((6*7.74296*0.25)/5)*(2*0.25^2+5)+e^((12*7.74296*0.25)/5)*(3*0.25^2+5)+5)))) * ((1/((((15625((-1+e^((6*7.74296*0.25)/5)))^6))))))

Input interpretation:

$$3\times 0.25^8 \left(\left(4\times 0.25^2 - 2\,e^{1/5\,(6\times 7.74296\times 0.25)}\,(2\times 0.25^2+5) + e^{1/5\,(12\times 7.74296\times 0.25)}\,(3\times 0.25^2+5) + 5\right)\times \frac{1}{15\,625\,\left(-1+e^{1/5\,(6\times 7.74296\times 0.25)}\right)^6}\right)$$

Result:

$2.12317\ldots \times 10^{-12}$

$2.12317\ldots*10^{-12} = p$

Alternative representation:

$$\left((3\times 0.25^8)\left(4\times 0.25^2 - 2\,e^{(6\times 7.74296\times 0.25)/5}\,(2\times 0.25^2+5) + e^{(12\times 7.74296\times 0.25)/5}\,(3\times 0.25^2+5)+5\right)\right)\Big/\left(15\,625\left(-1+e^{(6\times 7.74296\times 0.25)/5}\right)^6\right) = \left((3\times 0.25^8)\left(4\times 0.25^2 - 2\exp^{\frac{6\times 7.74296\times 0.25}{5}}(z)\,(2\times 0.25^2+5) + \exp^{\frac{12\times 7.74296\times 0.25}{5}}(z)\,(3\times 0.25^2+5)+5\right)\right)\Big/\left(15\,625\left(-1+\exp^{\frac{6\times 7.74296\times 0.25}{5}}(z)\right)^6\right) \text{ for } z=1$$

Series representations:

$$\left((3\times 0.25^8)\left(4\times 0.25^2 - 2\,e^{(6\times 7.74296\times 0.25)/5}\,(2\times 0.25^2+5) + e^{(12\times 7.74296\times 0.25)/5}\,(3\times 0.25^2+5)+5\right)\right)\Big/\left(15\,625\left(-1+e^{(6\times 7.74296\times 0.25)/5}\right)^6\right) = -\frac{3.00293\times 10^{-8}\left(-0.512195+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.32289} - 0.506098\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.64578}\right)}{\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.32289}\right)^6}$$

$$\left((3\times 0.25^8)\left(4\times 0.25^2 - 2\,e^{(6\times 7.74296\times 0.25)/5}\,(2\times 0.25^2+5) + e^{(12\times 7.74296\times 0.25)/5}\,(3\times 0.25^2+5)+5\right)\right)\Big/\left(15\,625\left(-1+e^{(6\times 7.74296\times 0.25)/5}\right)^6\right) = -\frac{0.0000941543\left(-2.56268+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.32289} - 0.101152\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4.64578}\right)}{\left(-5.00333+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.32289}\right)^6}$$

$$((3\times 0.25^8)(4\times 0.25^2 - 2e^{(6\times 7.74296\times 0.25)/5}(2\times 0.25^2+5) + e^{(12\times 7.74296\times 0.25)/5}(3\times 0.25^2+5)+5))/(15625(-1+e^{(6\times 7.74296\times 0.25)/5})^6) = -\frac{3.00293\times 10^{-8}\left(-0.512195+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.32289}-0.506098\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.64578}\right)}{\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.32289}\right)^6}$$

From the ratio between p and ρ, after some calculations, we obtain:

1/(2.123169628766854516 × 10^-12 / 1.935101496001104582 × 10^-12)

Input interpretation:

$$\frac{1}{\frac{2.123169628766854516\times 10^{-12}}{1.935101496001104582\times 10^{-12}}}$$

Result:

0.911421051706084989513479994595973573934537306508437006585...

0.9114210517...

We know that α’ is the Regge slope (string tension). With regard the Omega mesons, a value is also:

ω	6	$m_{u/d} = 0 - 60$	0.910 – 0.918

(see ref. **Rotating strings confronting PDG mesons** - *Jacob Sonnenschein and Dorin Weissman* - arXiv:1402.5603v1 [hep-ph] 23 Feb 2014)

(((1/(2.123169628766854516 × 10^-12 / 1.935101496001104582 × 10^-12))))^1/128

Input interpretation:

$$\sqrt[128]{\frac{1}{\frac{2.123169628766854516\times 10^{-12}}{1.935101496001104582\times 10^{-12}}}}$$

Result:

0.9992756507316542338224...

0.9992756507... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

log base 0.99927565(((1/(2.1231696287668545 16 × 10^-12 / 1.9351014960011045 82 × 10^-12))))-Pi+1/golden ratio

Input interpretation:

$$\log_{0.99927565}\left(\frac{1}{\frac{2.123169628766854516\times 10^{-12}}{1.935101496001104582\times 10^{-12}}}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.476...

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

log base 0.99927565(((1/(2.123169628766854516 × 10^-12 / 1.935101496001104582 × 10^-12))))+11+1/golden ratio

Input interpretation:

$$\log_{0.99927565}\left(\frac{1}{\frac{2.123169628766854516\times 10^{-12}}{1.935101496001104582\times 10^{-12}}}\right)+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.618...

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

Appendix

DILATON VALUE CALCULATIONS 0.989117352243

from:

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

We have that:

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

$$1 = a g_n^{-24} - b g_n^{-48} + \cdots,$$

or

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

But we know that

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

that is

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

Similarly, if

$$1 = a G_n^{-24} - b G_n^{-48} + \cdots,$$

then

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

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

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

Hence

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

so that

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

Hence

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

Again

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

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

so that

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

Hence

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

Similarly, from

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

we obtain

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

Hence

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

From:

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

Now, we have that:

From the following vacuum equations:

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

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

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

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

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

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

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

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

Therefore with respect to the exponential of the vacuum equation, the Ramanujan's exponential has a coefficient of 4096 which is equal to 64^2, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

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

exp((-Pi*sqrt(18))

Input:

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

Exact result:

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

Decimal approximation:

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

$1.6272016... * 10^{-6}$

Now:

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

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

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

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

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

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

Input interpretation:

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

Result:

0.0066650177536

0.006665017...

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

Dividing both sides by 0.000244140625, we obtain:

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

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

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

Input interpretation:

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

Result:

0.00666501785…

0.00666501785…

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

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

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

= 0.00666501785…

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

-5.010882647757…

-5.010882647757…

Now:

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

For C = 1, we obtain:

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

Conclusions

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

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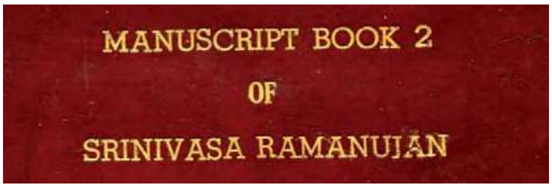

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