On various Ramanujan's equations (Hardy-Ramanujan number, taxicab numbers, etc) linked to some parameters of Standard Model Particles and String Theory: New possible mathematical connections. V

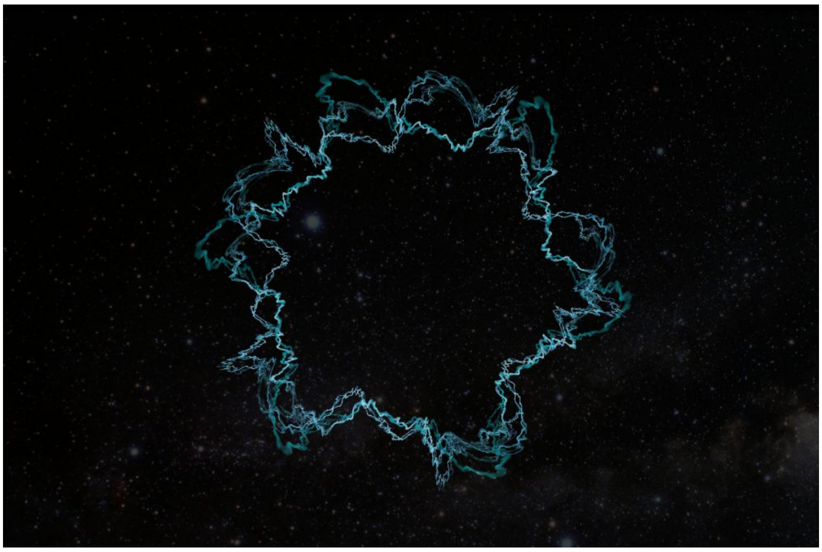
Michele Nardelli[1], Antonio Nardelli

Abstract

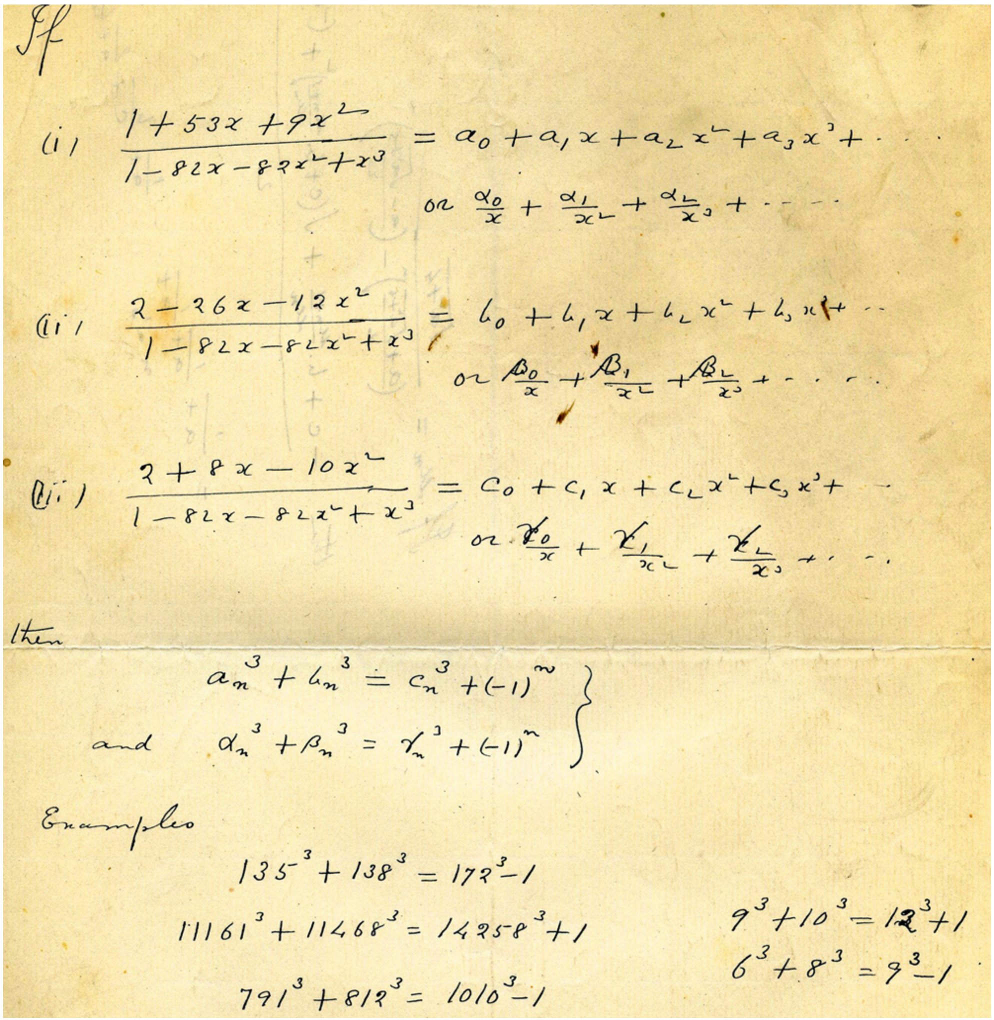
In this research thesis, we have described and deepened further Ramanujan equations (Hardy-Ramanujan number, taxicab numbers, etc) linked to some parameters of Standard Model Particles and String Theory. We have therefore obtained further possible mathematical connections.

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

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



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



If

(i) $\frac{1+53x+9x^2}{1-82x-82x^2+x^3} = a_0 + a_1x + a_2x^2 + a_3x^3 + \cdots$ or $\frac{\alpha_0}{x} + \frac{\alpha_1}{x^2} + \frac{\alpha_2}{x^3} + \cdots$

(ii) $\frac{2-26x-12x^2}{1-82x-82x^2+x^3} = b_0 + b_1x + b_2x^2 + b_3x^3 + \cdots$ or $\frac{\beta_0}{x} + \frac{\beta_1}{x^2} + \frac{\beta_2}{x^3} + \cdots$

(iii) $\frac{2+8x-10x^2}{1-82x-82x^2+x^3} = c_0 + c_1x + c_2x^2 + c_3x^3 + \cdots$ or $\frac{\gamma_0}{x} + \frac{\gamma_1}{x^2} + \frac{\gamma_2}{x^3} + \cdots$

then

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

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

Examples

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

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

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

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

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

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

Ramanujan's manuscript

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

From Wikipedia

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

From:

Two–Field Born–Infeld with Diverse Dualities
S. Ferrara, A. Sagnotti and A. Yeranyan - arXiv:1602.04566v3 [hep-th] 8 Jul 2016

From:

$\bar{\phi} = 6;\ \ \phi = 8;\ F = 9;\ \bar{F} = 10;\ V = 12;\ \bar{V} = 135;\ \nu = 138;\ \bar{\nu} = 172$

$$9^3 + 10^3 = 12^3 + 1$$
$$6^3 + 8^3 = 9^3 - 1$$

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

$F = 6;\ \bar{F} = 8;\ f = 9$ and $\gamma = 10$

$$\begin{aligned} \mathcal{L} \;=\; & f^2 \Bigg[1 - \sqrt{\left(1 + \frac{F^2 + \overline{F}^2}{2 f^2}\right)^2 - \frac{1}{f^2}\sqrt{F^2 \overline{F}^2}\left(\frac{1}{f^2}\sqrt{F^2 \overline{F}^2} - \gamma\right)} \\ & + \gamma \,\mathrm{ArcTanh}\left(\frac{1 + \frac{F^2+\overline{F}^2}{2f^2} - \sqrt{\left(1 + \frac{F^2+\overline{F}^2}{2f^2}\right)^2 - \frac{1}{f^2}\sqrt{F^2\overline{F}^2}\left(\frac{1}{f^2}\sqrt{F^2\overline{F}^2} - \gamma\right)}}{\frac{1}{f^2}\sqrt{F^2\overline{F}^2} - \gamma} \right) \Bigg] , \end{aligned} \qquad (2.38)$$

81[1-(((1+(6^2+8^2)/(2*9^2))^2-1/81*sqrt(6^2*8^2)*(1/81*sqrt(6^2*8^2)-10)))^1/2 + 10 atanh ((((1+(6^2+8^2)/(2*9^2)-(((1+(6^2+8^2)/(2*9^2))^2-1/81*sqrt(6^2*8^2)*(1/81*sqrt(6^2*8^2)-10)))^1/2))) / ((1/81*sqrt(6^2*8^2)-10))]

(((1+(6^2+8^2)/(2*9^2))^2-1/81*sqrt(6^2*8^2)*(1/81*sqrt(6^2*8^2)-10)))^1/2

Input:

$$\sqrt{\left(1+\frac{6^2+8^2}{2\times 9^2}\right)^2-\frac{1}{81}\sqrt{6^2\times 8^2}\left(\frac{1}{81}\sqrt{6^2\times 8^2}-10\right)}$$

Result:

$$\frac{\sqrt{53737}}{81}$$

Decimal approximation:

2.861881779887940244147018014647189581730989623566768581840...

2.86188177988794

81[1-(2.86188177988794) + 10 atanh (((((((1+(6^2+8^2)/(2*9^2)-(2.86188177988794))))) / ((1/81*sqrt(6^2*8^2)-10)))))]

Input interpretation:

$$81\left(1-2.86188177988794+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.86188177988794}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)$$

$\tanh^{-1}(x)$ is the inverse hyperbolic tangent function

Result:

−43.017729954751...

-43.017729954751…

Alternative representations:

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$81\left(-1.861881779887940000+10\,\mathrm{sn}^{-1}\left(\frac{-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\,\middle|\,1\right)\right)$$

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$81\left(-1.861881779887940000-10\,i\,\mathrm{sc}^{-1}\left(\frac{i\left(-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}\right)}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\,\middle|\,0\right)\right)$$

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$81\left(-1.861881779887940000+5\left(-\log\left(1-\frac{-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\right)+\log\left(1+\frac{-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\right)\right)\right)$$

Series representations:

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$-150.8124241709231400+810.000000000000000\sum_{k=0}^{\infty}\frac{100.8124241709231400^{1+2k}\left(-\frac{1.000000000000000000}{-810.000000000000000+\sqrt{2304}}\right)^{1+2k}}{1+2k}$$

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$-150.8124241709231400-405\log(2)+405\log\left(\frac{-910.812424170923140+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)+405\sum_{k=1}^{\infty}\frac{0.500000000000000000^k\left(\frac{-910.812424170923140+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)^k}{k}$$

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$-150.8124241709231400+405.0000000000000000\log(2)-405.000000000000000\log\left(\frac{-709.187575829076860+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)-405.000000000000000\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(\frac{709.187575829076860-1.000000000000000000\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)^k}{k}$$

Integral representations:

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$\frac{122\,158.063578447743}{-810.000000000000000+\sqrt{2304}}-\frac{81\,658.063578447743}{-810.000000000000000+\sqrt{2304}}\int_0^1\frac{1}{1-\frac{10\,163.1448672181282\,t^2}{\left(-810.000000000000000+\sqrt{2304}\right)^2}}\,dt-\frac{150.812424170923140\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}$$

$$81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)=$$

$$-150.8124241709231400+\frac{20\,414.5158946119359\,i}{\pi^{3/2}\left(-810.000000000000000+\sqrt{2304}\right)}\int_{-i\infty+\gamma}^{i\infty+\gamma}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\left(1-\frac{10\,163.14486721812815}{\left(-810.000000000000000+\sqrt{2304}\right)^2}\right)^{-s}ds\quad\text{for } 0<\gamma<\frac{1}{2}$$

We have that:

-3* 81[1-(2.86188177988794) + 10 atanh (((((((1+(6^2+8^2)/(2*9^2)-(2.86188177988794))))) / ((1/81*sqrt(6^2*8^2)-10)))))]+47-4

Input interpretation:

$$-3\times 81\left(1-2.86188177988794+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.86188177988794}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4$$

$\tanh^{-1}(x)$ is the inverse hyperbolic tangent function

Result:

172.05318986425...

172.05318986425… ≈ 172 (Ramanujan taxicab number)

Alternative representations:

$$-3\times 81\left(1-2.8618817798879940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.8618817798879940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=43-243\left(-1.8618817798879940000+10\,\mathrm{sn}^{-1}\left(\frac{-1.8618817798879940000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\middle|1\right)\right)$$

$$-3\times 81\left(1-2.8618817798879940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.8618817798879940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=43-243\left(-1.8618817798879940000-10\,i\,\mathrm{sc}^{-1}\left(\frac{i\left(-1.8618817798879940000+\frac{6^2+8^2}{2\times 9^2}\right)}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\middle|0\right)\right)$$

$$-3\times 81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=43-243\left(-1.861881779887940000+5\left(-\log\left(1-\frac{-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\right)+\log\left(1+\frac{-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\right)\right)\right)$$

Series representations:

$$-3\times 81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=495.437272512769420-2430.000000000000000\sum_{k=0}^{\infty}\frac{100.8124241709231400^{1+2k}\left(-\frac{1.000000000000000000}{-810.000000000000000+\sqrt{2304}}\right)^{1+2k}}{1+2k}$$

$$-3\times 81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=495.437272512769420+1215.000000000000000\log(2)-1215.000000000000000\log\left(\frac{-910.812424170923140+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)-1215.000000000000000\sum_{k=1}^{\infty}\frac{0.500000000000000000^k\left(\frac{-910.812424170923140+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)^k}{k}$$

$$-3\times 81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=$$

$$495.437272512769420-1215.000000000000000\log(2)+1215.000000000000000\log\left(\frac{-709.187575829076860+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)+1215.000000000000000\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(\frac{709.187575829076860-1.000000000000000000\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)^k}{k}$$

Integral representations:

$$-3\times 81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=$$

$$-\frac{401304.190735343}{-810.000000000000000+\sqrt{2304}}+\frac{244974.190735343}{-810.000000000000000+\sqrt{2304}}\int_0^1\frac{1}{1-\frac{10163.1448672181282\,t^2}{\left(-810.000000000000000+\sqrt{2304}\right)^2}}\,dt+\frac{495.437272512769\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}$$

$$-3\times 81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)+47-4=$$

$$-\frac{401304.19073534323}{-810.000000000000000+\sqrt{2304}}-\frac{61243.547683835808\,i}{\pi^{3/2}\left(-810.000000000000000+\sqrt{2304}\right)}\int_{-i\infty+\gamma}^{i\infty+\gamma}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\left(1-\frac{10163.14486721812815}{\left(-810.000000000000000+\sqrt{2304}\right)^2}\right)^{-s}ds+\frac{495.43727251276942\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\quad\text{for } 0<\gamma<\frac{1}{2}$$

-1/7(((((81[1-(2.86188177988794) + 10 atanh (((((((1+(6^2+8^2)/(2*9^2)-(2.86188177988794))))) / ((1/81*sqrt(6^2*8^2)-10))))]))))))^3 + 89 + 7

Input interpretation:

$$-\frac{1}{7}\left(81\left(1-2.86188177988794+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.86188177988794}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)\right)^3+89+7$$

$\tanh^{-1}(x)$ is the inverse hyperbolic tangent function

Result:

11468.19837370...

11468.1983737... ≈ 11468 (Ramanujan taxicab number)

Alternative representations:

$$\frac{1}{7}\left(81\left(1-2.8618817798879400000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.8618817798879400000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)\right)^3(-1)+89+7=96-\frac{1}{7}\left(81\left(-1.8618817798879400000+10\,\mathrm{sn}^{-1}\left(\frac{-1.8618817798879400000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\middle|1\right)\right)\right)^3$$

$$\frac{1}{7}\left(81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)^3(-1)+89+7=96-\frac{1}{7}\left(81\left(-1.861881779887940000-10\,i\,\mathrm{sc}^{-1}\left(\frac{i\left(-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}\right)}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}\,\middle|\,0\right)\right)\right)^3\right.\right.$$

$$\frac{1}{7}\left(81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)^3(-1)+89+7=96-\frac{1}{7}\left(81\left(-1.861881779887940000+10\coth^{-1}\left(\frac{1}{\frac{-1.861881779887940000+\frac{6^2+8^2}{2\times 9^2}}{-10+\frac{1}{81}\sqrt{6^2\times 8^2}}}\right)\right)\right)^3\right.\right.$$

Series representations:

$$\frac{1}{7}\left(81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)^3(-1)+89+7=96-7.59201428571428571\times 10^7\left(-0.1861881779887940000+\sum_{k=0}^{\infty}\frac{100.8124241709231400^{1+2k}\left(-\frac{1.000000000000000000}{-810.000000000000000+\sqrt{2304}}\right)^{1+2k}}{1+2k}\right)^3\right.\right.$$

$$
\frac{1}{7}\left(81\left(1-2.8618817798879400000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.8618817798879400000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)\right)^3
$$

$$
(-1)+89+7=96+9.49001785714285714\times 10^6\left(0.3723763559775880000+\log(2)-1.000000000000000000\log\left(\frac{-910.812424170923140+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)-1.000000000000000000\sum_{k=1}^{\infty}\frac{0.500000000000000000^k\left(\frac{-910.812424170923140+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)^k}{k}\right)^3
$$

$$
\frac{1}{7}\left(81\left(1-2.8618817798879400000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.8618817798879400000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)\right)^3
$$

$$
(-1)+89+7=96-9.49001785714285714\times 10^6\left(-0.3723763559775880000+\log(2)-1.000000000000000000\log\left(\frac{-709.187575829076860+\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(\frac{709.187575829076860-1.000000000000000000\sqrt{2304}}{-810.000000000000000+\sqrt{2304}}\right)^k}{k}\right)^3
$$

Integral representations:

$$\frac{1}{7}\left(81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)\right)^3(-1)+89+7=$$

$$96+\left(7.77855972817279\times 10^{13}\left(-1.495970614844329+1.000000000000000\int_0^1\frac{1}{1-\frac{10\,163.1448672181282\,t^2}{\left(-810.000000000000000+\sqrt{2304}\right)^2}}\,dt+0.001846877302276949\sqrt{2304}\right)^3\right)\Big/\left(-810.000000000000000+\sqrt{2304}\right)^3$$

$$\frac{1}{7}\left(81\left(1-2.861881779887940000+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.861881779887940000}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)\right)^3(-1)+89+7=96-\frac{531\,441}{7}\left(-1.861881779887940000+\frac{3.1114945731766401 23\,i}{\pi^{3/2}\left(-10+\frac{\sqrt{2304}}{81}\right)}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\left(1-\frac{1.549023756625229104}{\left(-10+\frac{\sqrt{2304}}{81}\right)^2}\right)^{-s}ds\right)^3 \quad \text{for } 0<\gamma<\frac{1}{2}$$

(-81[1-(2.86188177988794) + 10 atanh (((((((1+(6^2+8^2)/(2*9^2)-(2.86188177988794))))) / ((1/81*sqrt(6^2*8^2)-10)))))])^((64*2)/10^3)

Input interpretation:

$$\left(-81\left(1-2.86188177988794+10\tanh^{-1}\left(\frac{1+\frac{6^2+8^2}{2\times 9^2}-2.86188177988794}{\frac{1}{81}\sqrt{6^2\times 8^2}-10}\right)\right)\right)^{(64\times 2)/10^3}$$

$\tanh^{-1}(x)$ is the inverse hyperbolic tangent function

Result:

1.618478291345236343849011468058325401351447944122400678325...

1.6184782913... result that is a very good approximation to the value of the golden ratio 1,618033988749...

1.6184782913452363438490114680583254013514479441224006

Input interpretation:

1.6184782913452363438490114680583254013514479441224006

1.6184782913…

Rational approximation:

$$\frac{574081862166558393704516348}{354704703323142342218284581}=1+\frac{219377158843416051486231767}{354704703323142342218284581}$$

Possible closed forms:

$$\cosh\left(\sinh\left(\frac{8411398}{9100445}\right)\right)\approx 1.61847829134523634\textcolor{gray}{40579}$$

$$\left(\frac{41531845}{21856069}\right)^{3/4}\approx 1.618478291345236\textcolor{gray}{371937}$$

$$\frac{2581-8048\,e+3077\,e^2}{782\,e}\approx 1.61847829134523634\textcolor{gray}{42987}$$

$$\frac{\log\left(\frac{157732589}{2826767}\right)}{\log(12)}\approx 1.618478291345236343\textcolor{gray}{864055}$$

$$\frac{4012714503\,\pi}{7788991963} \approx 1.61847829134523634387147 0$$

$$\boxed{\text{root of } 9146\,x^3 - 57908\,x^2 + 55621\,x + 22892 \text{ near } x = 1.61848} \approx$$
1.6184782913452363438 52718

$$\pi\,\boxed{\text{root of } 2599\,x^4 + 2899\,x^3 + 2620\,x^2 - 2888\,x + 213 \text{ near } x = 0.515178} \approx$$
1.6184782913452363438 60362

$$\boxed{\text{root of } 496\,x^5 - 516\,x^4 - 346\,x^3 + 133\,x^2 + 66\,x - 956 \text{ near } x = 1.61848} \approx$$
1.6184782913452363438 69206

$$\pi\,\boxed{\text{root of } 51239\,x^3 + 136775\,x^2 + 7267\,x - 47051 \text{ near } x = 0.515178} \approx$$
1.6184782913452363438 51053

$$\frac{1}{\boxed{\text{root of } 22892\,x^3 + 55621\,x^2 - 57908\,x + 9146 \text{ near } x = 0.617864}} \approx$$
1.6184782913452363438 52718

$$\boxed{\text{root of } 3295\,x^4 - 7313\,x^3 + 2616\,x^2 - 559\,x + 2447 \text{ near } x = 1.61848} \approx$$
1.618478291345236343849 89152

$$\pi\,\boxed{\text{root of } 1824\,x^5 - 530\,x^4 - 222\,x^3 + 165\,x^2 - 909\,x + 426 \text{ near } x = 0.515178} \approx$$
1.618478291345236343843 4703

$$\frac{1}{\boxed{\text{root of } 2447\,x^4 - 559\,x^3 + 2616\,x^2 - 7313\,x + 3295 \text{ near } x = 0.617864}} \approx$$
1.618478291345236343849 89152

$$\frac{3 \times 3^{1219/1860}\, e^{(683\,\gamma)/310}}{8 \times 2^{2131/2790}} \approx 1.6184782913452363423785$$

$$\frac{645 + 686\,\pi - 285\,\pi^2}{-602 + 142\,\pi + 15\,\pi^2} \approx 1.618478291345236 25287$$

From:

With our choices one can now revert to the ordinary variables ϕ^{kl}, solving eq. (3.49) for a with h_1 as in (3.51) and substituting in the Lagrangian (3.52). The end result (with the scale f of eq. (1.1) set to one for brevity),

$$\mathcal{L} = 1 - \sqrt{(1+\text{Re}[\phi_t])^2 - |\phi_t|^2 - \text{Det}[\phi - \overline{\phi}] + 2\left(\text{Re}[\phi_d] - \sqrt{|\phi_d|^2}\right)}\,. \qquad (3.53)$$

has $U(2)$ duality and reduces to the BI theory if the two Abelian field strengths coincide.

$$\mathcal{L} = 1 - \sqrt{(1+\text{Re}[\phi_t])^2 - |\phi_t|^2 - \text{Det}[\phi - \overline{\phi}] + 2\left(\text{Re}[\phi_d] - \sqrt{|\phi_d|^2}\right)}$$

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

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

$\phi_t = 9;\ \phi_d = 10;\ \phi = 138;\ \bar{\phi} = 135$

1-sqrt[((1+Re(9)))^2-9^2-Det{{1, 138-135}, {138-135, 1}}+2(Re(10)-sqrt(10^2))]

Input interpretation:

$$1 - \sqrt{(1+\text{Re}(9))^2 - 9^2 - \begin{vmatrix} 1 & 138-135 \\ 138-135 & 1 \end{vmatrix} + 2\left(\text{Re}(10) - \sqrt{10^2}\right)}$$

Re(z) is the real part of z

|m| is the determinant

Result:

$1 - 3\sqrt{3}$

Decimal approximation:

-4.1961524227066318805823390245176171008284157614311418841 6...

-4.1961524227…

-[((((1-sqrt[((1+Re(9)))^2-9^2-Det{{1, 138-135}, {138-135, 1}}+2(Re(10)-sqrt(10^2))])))^5 + (144*2+3)]

Input interpretation:

$$-\left(\left(1-\sqrt{(1+\text{Re}(9))^2-9^2-\begin{vmatrix}1 & 138-135\\ 138-135 & 1\end{vmatrix}+2\left(\text{Re}(10)-\sqrt{10^2}\right)}\right)^5+(144\times 2+3)\right)$$

Re(z) is the real part of z

|m| is the determinant

Result:

$$-291-\left(1-3\sqrt{3}\right)^5$$

Decimal approximation:

1009.9370323974584081046683806156875692317294244768664517 04...

1009.937… ≈ 1010 (Ramanujan taxicab number)

Alternate form:

$$3012\sqrt{3}-4207$$

144+89+8+3+(((-2*-[((((1-sqrt[((1+Re(9)))^2-9^2-Det{{1, 138-135}, {138-135, 1}}+2(Re(10)-sqrt(10^2))])))^6)))

Input interpretation:

$$144+89+8+3-2\times(-1)\left(1-\sqrt{(1+\text{Re}(9))^2-9^2-\begin{vmatrix}1 & 138-135\\ 138-135 & 1\end{vmatrix}+2\left(\text{Re}(10)-\sqrt{10^2}\right)}\right)^6$$

Re(z) is the real part of z

|m| is the determinant

Result:

$$244+2\left(1-3\sqrt{3}\right)^6$$

Decimal approximation:

11161.860160566742295069783998746647727848388907517563859 79...

11161.8601605… ≈ 11161 (Ramanujan taxicab number)

Alternate forms:

$$62\,292 - 29\,520\sqrt{3}$$

$$-12\left(2460\sqrt{3} - 5191\right)$$

-34(((1-sqrt[((1+Re(9)))^2-9^2-Det{{1, 138-135}, {138-135, 1}}+2(Re(10)-sqrt(10^2))]))) - 18 +1/golden ratio

Input interpretation:

$$-34\left(1-\sqrt{(1+\mathrm{Re}(9))^2 - 9^2 - \begin{vmatrix} 1 & 138-135 \\ 138-135 & 1 \end{vmatrix} + 2\left(\mathrm{Re}(10) - \sqrt{10^2}\right)}\right) - 18 + \frac{1}{\phi}$$

Re(z) is the real part of z

|m| is the determinant

ϕ is the golden ratio

Result:

$$\frac{1}{\phi} - 18 - 34\left(1 - 3\sqrt{3}\right)$$

Decimal approximation:

125.28721636077537878800411366796461954588644506846458692 38...

125.28721636… 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:

$$\frac{1}{\phi} - 52 + 102\sqrt{3}$$

$$\frac{1}{\phi} - 18 + 34\left(3\sqrt{3} - 1\right)$$

$$\frac{2\left(51\sqrt{3} - 26\right)\phi + 1}{\phi}$$

-5+27*1/2*((((-34(((1-sqrt[((1+Re(9)))^2-9^2-Det{{1, 138-135}, {138-135, 1}}+2(Re(10)-sqrt(10^2))]))) - 18 +Pi +1/golden ratio))))

Input interpretation:

$$-5 + 27 \times \frac{1}{2}\left(-34\left(1-\sqrt{(1+\mathrm{Re}(9))^2-9^2-\begin{vmatrix} 1 & 138-135 \\ 138-135 & 1 \end{vmatrix}+2\left(\mathrm{Re}(10)-\sqrt{10^2}\right)}\right)-18+\pi+\frac{1}{\phi}\right)$$

Re(z) is the real part of z

$|m|$ is the determinant

ϕ is the golden ratio

Result:

$$\frac{27}{2}\left(\frac{1}{\phi}-18-34\left(1-3\sqrt{3}\right)+\pi\right)-5$$

Decimal approximation:

1728.788921693929822357301220191795652806128795315835852054...

1728.78892169…

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

Property:

$-5+\frac{27}{2}\left(-18-34\left(1-3\sqrt{3}\right)+\frac{1}{\phi}+\pi\right)$ is a transcendental number

Alternate forms:

$$\frac{27}{2}\left(\frac{1}{\phi}-52+102\sqrt{3}+\pi\right)-5$$

$$\frac{27}{2\phi}-707+1377\sqrt{3}+\frac{27\pi}{2}$$

$$\frac{27}{2}\left(\frac{1}{\phi}-18+34\left(3\sqrt{3}-1\right)+\pi\right)-5$$

Now, we have that:

Reverting to the field strengths, the Lagrangian takes finally the form

$$\mathcal{L} = 1 - \sqrt{(1+\text{Re}[\phi_t])^2 - |\phi_t|^2 - \text{Det}[\phi-\overline{\phi}]} \ . \qquad (3.63)$$

From

$$\mathcal{L} = 1 - \sqrt{(1+\text{Re}[\phi_t])^2 - |\phi_t|^2 - \text{Det}[\phi-\overline{\phi}]} \ .$$

For $\phi_t = 9$; $\phi_d = 10$; $\phi = 138$; $\bar{\phi} = 135$, we obtain:

1-sqrt[((1+Re(9)))^2-9^2-Det{{1, 138-135}, {138-135, 1}}]

Input interpretation:

$$1-\sqrt{(1+\text{Re}(9))^2-9^2-\begin{vmatrix}1 & 138-135\\ 138-135 & 1\end{vmatrix}}$$

Re(z) is the real part of z

|m| is the determinant

Result:

$1-3\sqrt{3}$

Decimal approximation:

-4.196152422706631880582339024517617100828415761431141884 16...

-4.1961524227..... the same previous result

We have also:

(-(((1-sqrt[((1+Re(9)))^2-9^2-Det{{1, 138-135}, {138-135, 1}}]))))^1/3+5*1/10^3

Input interpretation:

$$\sqrt[3]{-\left(1-\sqrt{(1+\mathrm{Re}(9))^2-9^2-\begin{vmatrix}1 & 138-135\\ 138-135 & 1\end{vmatrix}}\right)}+5\times\frac{1}{10^3}$$

Re(z) is the real part of z

|m| is the determinant

Result:

$$\frac{1}{200}+\sqrt[3]{3\sqrt{3}-1}$$

Decimal approximation:

1.617935813642020182463303405226893817920083356882506337493...

1.617935813642…. result that is a very good approximation to the value of the golden ratio 1,618033988749...

Alternate form:

$$\frac{1}{200}\left(1+200\sqrt[3]{3\sqrt{3}-1}\right)$$

We have that:

In terms of the field strengths, the Lagrangian becomes

$$\mathcal{L} = 1 - \sqrt{(1+\mathrm{Re}\,[\phi_t])^2 - |\phi_t|^2}\;. \qquad (3.67)$$

1-sqrt[((1+Re(9)))^2-9^2]

Input:

$$1-\sqrt{(1+\mathrm{Re}(9))^2-9^2}$$

Re(z) is the real part of z

Exact result:

$$1-\sqrt{19}$$

Decimal approximation:

$$-3.358898943540673552236981983859615659137003925232444936 89\ldots$$

-3.3588989435…

Alternative representations:

$$1-\sqrt{(1+\text{Re}(9))^2-9^2} = 1-\sqrt{-9^2+(1+\text{Im}(9\,i))^2}$$

$$1-\sqrt{(1+\text{Re}(9))^2-9^2} = 1-\sqrt{-9^2+(1-\text{Im}(-9\,i))^2}$$

$$1-\sqrt{(1+\text{Re}(9))^2-9^2} = 1-\sqrt{-9^2+(10-i\,\text{Im}(9))^2}$$

Series representations:

$$1-\sqrt{(1+\text{Re}(9))^2-9^2} = 1-\sqrt{-82+(1+\text{Re}(9))^2}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-82+(1+\text{Re}(9))^2\right)^{-k}$$

$$1-\sqrt{(1+\text{Re}(9))^2-9^2} = 1-\sqrt{-82+(1+\text{Re}(9))^2}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-82+(1+\text{Re}(9))^2\right)^{-k}}{k!}$$

$$1-\sqrt{(1+\text{Re}(9))^2-9^2} = 1-\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-81+(1+\text{Re}(9))^2-z_0\right)^k z_0^{-k}}{k!}$$

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

Multiplying the previous result by -0.481715587144498 that is equal to:

1/233*-((((76-4) π)- (322+29+7)*1/π))

we obtain:

1/233*-((((76-4) π)- (322+29+7)*1/π)) *(((1-sqrt[((1+Re(9)))^2-9^2])))

Input:

$$\frac{1}{233}\times(-1)\left((76-4)\pi-(322+29+7)\times\frac{1}{\pi}\right)\left(1-\sqrt{(1+\text{Re}(9))^2-9^2}\right)$$

Re(z) is the real part of z

Exact result:

$$-\frac{1}{233}\left(1-\sqrt{19}\right)\left(72\pi-\frac{358}{\pi}\right)$$

Decimal approximation:

1.618033976746729868559323994611158393657325290039278466390...

1.618033976746… result that is the value of the golden ratio 1,618033988749...

Property:

$$-\frac{1}{233}\left(1-\sqrt{19}\right)\left(-\frac{358}{\pi}+72\pi\right)$$ is a transcendental number

Alternate forms:

$$\frac{1}{233}\left(\sqrt{19}-1\right)\left(72\pi-\frac{358}{\pi}\right)$$

$$-\frac{2\left(\sqrt{19}-1\right)\left(179-36\pi^2\right)}{233\pi}$$

$$\frac{2\left(\sqrt{19}-1\right)\left(36\pi^2-179\right)}{233\pi}$$

Alternative representations:

$$-\frac{1}{233}\left((76-4)\pi-\frac{322+29+7}{\pi}\right)\left(1-\sqrt{(1+\mathrm{Re}(9))^2-9^2}\right)= -\frac{1}{233}\left(72\pi-\frac{358}{\pi}\right)\left(1-\sqrt{-9^2+(1+\mathrm{Im}(9\,i))^2}\right)$$

$$-\frac{1}{233}\left((76-4)\pi-\frac{322+29+7}{\pi}\right)\left(1-\sqrt{(1+\mathrm{Re}(9))^2-9^2}\right)= -\frac{1}{233}\left(72\pi-\frac{358}{\pi}\right)\left(1-\sqrt{-9^2+(1-\mathrm{Im}(-9\,i))^2}\right)$$

$$-\frac{1}{233}\left((76-4)\pi-\frac{322+29+7}{\pi}\right)\left(1-\sqrt{(1+\mathrm{Re}(9))^2-9^2}\right)= -\frac{1}{233}\left(72\pi-\frac{358}{\pi}\right)\left(1-\sqrt{-9^2+(10-i\,\mathrm{Im}(9))^2}\right)$$

Series representations:

$$-\frac{1}{233}\left((76-4)\pi-\frac{322+29+7}{\pi}\right)\left(1-\sqrt{(1+\text{Re}(9))^2-9^2}\right)=$$
$$\frac{2\left(-179+36\pi^2\right)\left(-1+\sqrt{-82+(1+\text{Re}(9))^2}\,\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-82+(1+\text{Re}(9))^2\right)^{-k}\right)}{233\pi}$$

$$-\frac{1}{233}\left((76-4)\pi-\frac{322+29+7}{\pi}\right)\left(1-\sqrt{(1+\text{Re}(9))^2-9^2}\right)=$$
$$\frac{2\left(-179+36\pi^2\right)\left(-1+\sqrt{-82+(1+\text{Re}(9))^2}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-82+(1+\text{Re}(9))^2\right)^{-k}}{k!}\right)}{233\pi}$$

$$-\frac{1}{233}\left((76-4)\pi-\frac{322+29+7}{\pi}\right)\left(1-\sqrt{(1+\text{Re}(9))^2-9^2}\right)=$$
$$\frac{2\left(-179+36\pi^2\right)\left(-1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-81+(1+\text{Re}(9))^2-z_0\right)^k z_0^{-k}}{k!}\right)}{233\pi}$$

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

Now, we have that:

$$\mathcal{L} = 1 - \sqrt{\left[1+\frac{1}{4}\left(\mathcal{F}^+\cdot\mathcal{F}^-\right)\right]^2-\frac{1}{32}C-\frac{1}{32}\sqrt{D}}\,,$$

(5.8-5.9)

$$C = \left|\left(\mathcal{F}^+\right)^2\right|^2+\left(\mathcal{F}^+\cdot\mathcal{F}^-\right)^2+\left|\mathcal{F}^+\cdot\widetilde{\mathcal{F}^-}\right|^2+\left|\mathcal{F}^+\cdot\widetilde{\mathcal{F}^+}\right|^2\,,$$

(2^2)^2+ (2*3)^2+(2*5)^2+(2*8)^2

$$\left(2^2\right)^2+(2\times3)^2+(2\times5)^2+(2\times8)^2$$

408

C = 408

$$D = \left[\left(\mathcal{F}^+\cdot\mathcal{F}^-\right)^2-\left(\mathcal{F}^+\cdot\widetilde{\mathcal{F}}^-\right)^2+\left|\mathcal{F}^+\cdot\widetilde{\mathcal{F}^+}\right|^2-\left|\mathcal{F}^{+2}\right|^2\right]^2$$
$$+\left[\left(\mathcal{F}^+\right)^2\left(\mathcal{F}^-\cdot\widetilde{\mathcal{F}}^-\right)+\left(\mathcal{F}^-\right)^2\left(\mathcal{F}^+\cdot\widetilde{\mathcal{F}}^+\right)-2\left(\mathcal{F}^+\cdot\mathcal{F}^-\right)\left(\mathcal{F}^+\cdot\widetilde{\mathcal{F}}^-\right)\right]^2$$

(5.10)

[(2*3)^2-(2*5)^2+(2*8)^2-(2^2)^2]^2

$$\left((2\times 3)^2-(2\times 5)^2+(2\times 8)^2-\left(2^2\right)^2\right)^2$$

30976

[2^2*(3*5)+(3)^2(2*8)-2(2*3)(2*5)]^2

$$\left(2^2\,(3\times 5)+3^2\,(2\times 8)-2\,(2\times 3)\,(2\times 5)\right)^2$$

7056

(((((2*3)^2-(2*5)^2+(2*8)^2-(2^2)^2))))^2 +((((2^2*(3*5)+(3)^2(2*8)-2(2*3)(2*5)))))^2

$$\left((2\times 3)^2-(2\times 5)^2+(2\times 8)^2-\left(2^2\right)^2\right)^2+\left(2^2\,(3\times 5)+3^2\,(2\times 8)-2\,(2\times 3)\,(2\times 5)\right)^2$$

38032

D = 38032

Thence:

$$\mathcal{L} = 1 - \sqrt{\left[1 + \frac{1}{4}\left(\mathcal{F}^+ \cdot \mathcal{F}^-\right)\right]^2 - \frac{1}{32}C - \frac{1}{32}\sqrt{D}}\,,$$

1- sqrt((((1+1/4(2*3))^2-1/32(408)-1/32(sqrt(38032)))))

Input:

$$1-\sqrt{\left(1+\frac{1}{4}\,(2\times 3)\right)^2-\frac{1}{32}\times 408-\frac{1}{32}\sqrt{38032}}$$

Result:

$$1-i\sqrt{\frac{13}{2}+\frac{\sqrt{2377}}{8}}$$

Decimal approximation:

1 − 3.54884641420623512949851258564743971100517368738485736186... i

Polar coordinates:

$r \approx 3.68705$ (radius), $\theta \approx -74.2631°$ (angle)

3.68705

Alternate forms:

$$\frac{1}{4}\left(4 - i\sqrt{2\left(52+\sqrt{2377}\right)}\right)$$

$$1 - \frac{1}{2}\, i\sqrt{\frac{1}{2}\left(52+\sqrt{2377}\right)}$$

$$1 + \text{root of } 64x^4 + 832x^2 + 327 \text{ near } x = -3.54885\, i$$

Minimal polynomial:

$$64x^4 - 256x^3 + 1216x^2 - 1920x + 1223$$

((((1- sqrt((((1+1/4(2*3))^2-1/32(408)-1/32(sqrt(38032))))))))^4 - 55i +(golden ratio)i

Input:

$$\left(1 - \sqrt{\left(1 + \frac{1}{4}(2\times 3)\right)^2 - \frac{1}{32}\times 408 - \frac{1}{32}\sqrt{38\,032}}\right)^4 - 55\, i + \phi\, i$$

i is the imaginary unit

ϕ is the golden ratio

Result:

$$i\phi + -55\, i + \left(1 - i\sqrt{\frac{13}{2} + \frac{\sqrt{2377}}{8}}\right)^4$$

Decimal approximation:

84.0508011013711709689604386111978578060140271317272306163... +
111.2037482365771291365271740542384120700894159793495938 44... i

Polar coordinates:

$r \approx 139.394$ (radius), $\theta \approx 52.917°$ (angle)

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

Alternate forms:

$$\frac{1}{256}\left(-256\, i\sqrt{2\left(52+\sqrt{2377}\right)}+i\,128\sqrt{5}+224\sqrt{2377}+ i\,32\sqrt{2\left(511\,420+10\,489\sqrt{2377}\right)}+10\,596-13\,952\, i\right)$$

$$i\,\phi+-55\, i+\frac{1}{256}\left(\sqrt{2\left(52+\sqrt{2377}\right)}+4\, i\right)^4$$

$$-55\, i+\frac{1}{2}\, i\left(1+\sqrt{5}\right)+\left(1-i\sqrt{\frac{13}{2}+\frac{\sqrt{2377}}{8}}\right)^4$$

Minimal polynomial:

$$79\,228\,162\,514\,264\,337\,593\,543\,950\,336\, x^{16} - 52\,468\,850\,625\,071\,557\,571\,324\,481\,110\,016\, x^{15} + 25\,603\,209\,435\,281\,972\,755\,860\,841\,943\,793\,664\, x^{14} - 7\,811\,659\,199\,744\,319\,292\,480\,648\,689\,116\,774\,400\, x^{13} + 1\,889\,513\,057\,074\,708\,850\,625\,002\,823\,926\,260\,170\,752\, x^{12} - 331\,445\,056\,901\,235\,858\,699\,716\,289\,180\,316\,137\,947\,136\, x^{11} + 47\,408\,412\,254\,625\,986\,730\,031\,814\,559\,813\,076\,286\,177\,280\, x^{10} - 5\,126\,006\,746\,536\,899\,430\,283\,499\,907\,416\,593\,546\,516\,365\,312\, x^9 + 485\,223\,526\,076\,130\,174\,516\,112\,041\,544\,827\,864\,936\,731\,377\,664\, x^8 - 35\,496\,972\,632\,655\,962\,563\,131\,854\,178\,692\,921\,904\,465\,860\,100\,096\, x^7 + 2\,542\,506\,261\,596\,162\,573\,979\,800\,117\,251\,627\,245\,182\,534\,906\,019\,840\, x^6 - 122\,685\,740\,194\,384\,795\,631\,175\,853\,162\,642\,773\,133\,485\,017\,715\,965\,952\, x^5 + 7\,309\,025\,101\,278\,312\,840\,883\,841\,728\,767\,300\,711\,022\,693\,629\,864\,968\,192\, x^4 - 208\,213\,217\,324\,652\,462\,788\,311\,546\,797\,027\,091\,890\,904\,626\,705\,224\,171\,520\, x^3 + 11\,033\,513\,561\,385\,470\,011\,447\,927\,667\,651\,262\,861\,637\,666\,903\,505\,862\,885\,376\, x^2 - 138\,643\,452\,011\,937\,923\,815\,051\,003\,108\,090\,761\,479\,435\,795\,558\,312\,273\,421\,312\, x + 6\,862\,239\,017\,182\,423\,017\,112\,684\,822\,140\,702\,761\,241\,186\,549\,848\,175\,935\,164\,801$$

Expanded form:

$$\left(\frac{2649}{64}-\frac{109\, i}{2}\right)+\frac{i\sqrt{5}}{2}+\frac{7\sqrt{2377}}{8}+ 22\, i\sqrt{\frac{13}{2}+\frac{\sqrt{2377}}{8}}+\frac{1}{2}\, i\sqrt{2377\left(\frac{13}{2}+\frac{\sqrt{2377}}{8}\right)}$$

Series representations:

$$\left(1-\sqrt{\left(1+\frac{2\times 3}{4}\right)^2-\frac{408}{32}-\frac{\sqrt{38\,032}}{32}}\right)^4-i\,55+\phi\,i= -55\,i+\phi\,i+\left(-1+\sqrt{-\frac{15}{2}-\frac{\sqrt{38\,032}}{32}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-\frac{15}{2}-\frac{\sqrt{38\,032}}{32}\right)^{-k}\right)^4$$

$$\left(1-\sqrt{\left(1+\frac{2\times 3}{4}\right)^2-\frac{408}{32}-\frac{\sqrt{38\,032}}{32}}\right)^4-i\,55+\phi\,i= -55\,i+\phi\,i+\left(-1+\sqrt{-\frac{15}{2}-\frac{\sqrt{38\,032}}{32}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{15}{2}-\frac{\sqrt{38032}}{32}\right)^{-k}}{k!}\right)^4$$

$$\left(1-\sqrt{\left(1+\frac{2\times 3}{4}\right)^2-\frac{408}{32}-\frac{\sqrt{38\,032}}{32}}\right)^4-i\,55+\phi\,i= -55\,i+\phi\,i+\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{13}{2}-\frac{\sqrt{38\,032}}{32}-z_0\right)^k z_0^{-k}}{k!}\right)^4$$

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

((((1- sqrt((((1+1/4(2*3))^2-1/32(408)-1/32(sqrt(38032))))))))^4 - 55i -13i - Pi*i

Input:

$$\left(1-\sqrt{\left(1+\frac{1}{4}(2\times 3)\right)^2-\frac{1}{32}\times 408-\frac{1}{32}\sqrt{38\,032}}\right)^4-55\,i-13\,i-\pi\,i$$

i is the imaginary unit

Result:

$$-68\,i+\left(1-i\sqrt{\frac{13}{2}+\frac{\sqrt{2377}}{8}}\right)^4-i\,\pi$$

Decimal approximation:

84.050801101371170968960438611197857806014027131727230616... +
93.4441215942374410498599438365932710681719374001687251611... i

Property:

$$-68i+\left(1-i\sqrt{\frac{13}{2}+\frac{\sqrt{2377}}{8}}\right)^4-i\pi \text{ is a transcendental number}$$

Polar coordinates:

$r \approx 125.683$ (radius), $\theta \approx 48.0294°$ (angle)

125.683 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:

$$\frac{1}{256}\left(-256i\sqrt{2\left(52+\sqrt{2377}\right)}+224\sqrt{2377}+ i\,32\sqrt{2}\sqrt{511420+10489\sqrt{2377}}-256i\pi+10596-17408i\right)$$

$$-68i+\frac{1}{256}\left(\sqrt{2\left(52+\sqrt{2377}\right)}+4i\right)^4-i\pi$$

$$\frac{1}{64}\left((2649-4352i)+56\sqrt{2377}+ 352i\sqrt{2\left(52+\sqrt{2377}\right)}+8i\sqrt{4754\left(52+\sqrt{2377}\right)}\right)-i\pi$$

Expanded form:

$$\left(\frac{2649}{64}-68i\right)+\frac{7\sqrt{2377}}{8}+22i\sqrt{\frac{13}{2}+\frac{\sqrt{2377}}{8}}+\frac{1}{2}i\sqrt{2377\left(\frac{13}{2}+\frac{\sqrt{2377}}{8}\right)}-i\pi$$

Series representations:

$$\left(1-\sqrt{\left(1+\frac{2\times 3}{4}\right)^2-\frac{408}{32}-\frac{\sqrt{38032}}{32}}\right)^4-i\,55-i\,13-i\pi=$$
$$-68i-i\pi+\left(-1+\sqrt{-\frac{15}{2}-\frac{\sqrt{38032}}{32}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-\frac{15}{2}-\frac{\sqrt{38032}}{32}\right)^{-k}\right)^4$$

$$\left(1-\sqrt{\left(1+\frac{2\times 3}{4}\right)^2-\frac{408}{32}-\frac{\sqrt{38\,032}}{32}}\right)^4 - i\,55 - i\,13 - i\,\pi =$$

$$-68\,i - i\,\pi + \left(-1+\sqrt{-\frac{15}{2}-\frac{\sqrt{38\,032}}{32}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{15}{2}-\frac{\sqrt{38032}}{32}\right)^{-k}}{k!}\right)^4$$

$$\left(1-\sqrt{\left(1+\frac{2\times 3}{4}\right)^2-\frac{408}{32}-\frac{\sqrt{38\,032}}{32}}\right)^4 - i\,55 - i\,13 - i\,\pi =$$

$$-68\,i - i\,\pi + \left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{13}{2}-\frac{\sqrt{38\,032}}{32}-z_0\right)^k z_0^{-k}}{k!}\right)^4$$

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

From:

Integrable Scalar Cosmologies I. Foundations and links with String Theory
P. Fre , A. Sagnotti and A.S. Sorin - arXiv:1307.1910v3 [hep-th] 16 Oct 2013

Depending on the choice made for the real exponent γ, these potentials can describe barriers or wells of different shapes, and the presence of the second term restricts in general the domain to the region $\varphi > 0$. For the sake of brevity and simplicity, we shall concentrate on a special but very significant case of potential wells, with $\gamma = \frac{1}{3}$, which affords relatively handy solutions in terms of elliptic functions. The potentials that we would like to discuss here in detail are thus

with $\lambda > 0$, since a relative factor between the two exponentials can clearly be absorbed into a shift of φ. One can also assume, without any loss of generality, that $0 < \gamma < 1$, so that the first

$$\mathcal{V}_{IIIa}(\varphi) = \frac{\lambda}{16}\left[\left(1-\frac{1}{3\sqrt{3}}\right)e^{-6\varphi/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-2\varphi/5} \right. \quad (5.17)$$

$$\left. +\left(7-\frac{1}{\sqrt{3}}\right)e^{2\varphi/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{6\varphi/5}\right] . \quad (5.18)$$

From the following Rogers-Ramanujan continued fraction:

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

We put for φ > 0 φ = 4 and for λ > 0 λ = 0.9991104, an obtain:

0.9991104/16[(1-1/(3sqrt3))*e^(-24/5)+(7+1/(sqrt3))*e^(-8/5)+(7-1/(sqrt3))*e^(8/5)+(1+1/(3sqrt3))*e^(24/5)]

Input interpretation:

$$\frac{0.9991104}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)$$

Result:

11.13029...

11.13029…

Series representations:

$$\frac{1}{16}\left(\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)0.99911\right) = \frac{1}{e^{24/5}}\left(0.0624444+0.437111\,e^{16/5}+0.437111\,e^{32/5}+0.0624444\,e^{48/5}+\frac{0.0208148\left(-1+e^{16/5}\right)^3}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}\right)$$

$$\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)0.99911 = \frac{1}{e^{24/5}}\left(0.0624444+0.437111\,e^{16/5}+0.437111\,e^{32/5}+0.0624444\,e^{48/5}+\frac{0.0208148\left(-1+e^{16/5}\right)^3}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

$$\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)0.99911 = \frac{1}{e^{24/5}}\left(0.0624444+0.437111\,e^{16/5}+0.437111\,e^{32/5}+0.0624444\,e^{48/5}+\frac{0.0416296\left(-1+e^{16/5}\right)^3\sqrt{\pi}}{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}\right)$$

(((((0.9991104/16[(1-1/(3sqrt3))*e^(-24/5)+(7+1/(sqrt3))*e^(-8/5)+(7-1/(sqrt3))*e^(8/5)+(1+1/(3sqrt3))*e^(24/5)]))))))^2+11+(1/(sqrt3))^3

Input interpretation:

$$\left(\frac{0.9991104}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right)^2+11+\left(\frac{1}{\sqrt{3}}\right)^3$$

Result:

135.0758...

135.0758… ≈ 135 (Ramanujan taxicab number)

Series representations:

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)0.99911\right)^2+11+\left(\frac{1}{\sqrt{3}}\right)^3=11+\frac{8\sqrt{\pi}^3}{\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^3}+\left(0.00173302\left(\left(-1+e^{16/5}\right)^3\sqrt{\pi}+\left(1.5+10.5\,e^{16/5}+10.5\,e^{32/5}+1.5\,e^{48/5}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2\right)\Big/\left(e^{48/5}\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2\right)$$

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)0.99911\right)^2+11+\left(\frac{1}{\sqrt{3}}\right)^3=$$
$$\Bigg(0.0038993\Bigg(256.456\,e^{48/5}+0.111111\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-0.666667\,e^{16/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+1.66667\,e^{32/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-2.22222\,e^{48/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+1.66667\,e^{64/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-0.666667\,e^{16}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+0.111111\,e^{96/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-0.666667\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2-2.66667\,e^{16/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+7.33333\,e^{32/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2-7.33333\,e^{64/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+2.66667\,e^{16}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+0.666667\,e^{96/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+14\,e^{16/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+63\,e^{32/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+2921.02\,e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+63\,e^{64/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+14\,e^{16}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+e^{96/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3\Bigg)\Bigg)\Big/\left(e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3\right)$$

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right.$$

$$\left.0.99911\right)^2+11+\left(\frac{1}{\sqrt{3}}\right)^3=$$

$$\Bigg(0.0038993\Bigg(256.456\,e^{48/5}+0.111111\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$0.666667\,e^{16/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+1.66667\,e^{32/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$2.22222\,e^{48/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+1.66667\,e^{64/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$0.666667\,e^{16}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+0.111111\,e^{96/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$0.666667\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-2.66667\,e^{16/5}\sqrt{2}^2$$

$$\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+7.33333\,e^{32/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-7.33333$$

$$e^{64/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+2.66667\,e^{16}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+$$

$$0.666667\,e^{96/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$14\,e^{16/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+63\,e^{32/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$2921.02\,e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+63\,e^{64/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$14\,e^{16}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+e^{96/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3\Bigg)\Bigg)\Bigg/$$

$$\left(e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3\right)$$

(((((0.9991104/16[(1-1/(3sqrt3))*e^(-24/5)+(7+1/(sqrt3))*e^(-8/5)+(7-1/(sqrt3))*e^(8/5)+(1+1/(3sqrt3))*e^(24/5)])))))^2+13+(1/(sqrt3))^3 + golden ratio^2

Input interpretation:

$$\left(\frac{0.9991104}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right)^2+13+\left(\frac{1}{\sqrt{3}}\right)^3+\phi^2$$

ϕ is the golden ratio

Result:

139.6938...

139.6938… result practically equal to the rest mass of Pion meson 139.57 MeV

Series representations:

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)0.99911\right)^2+13+\left(\frac{1}{\sqrt{3}}\right)^3+\phi^2=$$

$$13+\phi^2+\frac{8\sqrt{\pi}^3}{\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^3}+\left(0.00173302\left(\left(-1+e^{16/5}\right)^3\sqrt{\pi}+\left(1.5+10.5\,e^{16/5}+10.5\,e^{32/5}+1.5\,e^{48/5}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2\right)\Big/\left(e^{48/5}\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2\right)$$

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right.$$

$$\left.0.99911\right)^2+13+\left(\frac{1}{\sqrt{3}}\right)^3+\phi^2=$$

$$\left(0.0038993\left(256.456\,e^{48/5}+0.111111\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-\right.\right.$$

$$0.666667\,e^{16/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+1.66667\,e^{32/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-$$

$$2.22222\,e^{48/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+1.66667\,e^{64/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-$$

$$0.666667\,e^{16}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+0.111111\,e^{96/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-$$

$$0.666667\sqrt{2}^{\,2}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2-2.66667\,e^{16/5}\sqrt{2}^{\,2}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+$$

$$7.33333\,e^{32/5}\sqrt{2}^{\,2}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2-$$

$$7.33333\,e^{64/5}\sqrt{2}^{\,2}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+2.66667\,e^{16}\sqrt{2}^{\,2}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+$$

$$0.666667\,e^{96/5}\sqrt{2}^{\,2}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$

$$14\,e^{16/5}\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+63\,e^{32/5}\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$

$$3433.93\,e^{48/5}\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+63\,e^{64/5}\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$

$$14\,e^{16}\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+e^{96/5}\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$

$$\left.\left.256.456\,e^{48/5}\phi^2\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3\right)\right)\Big/\left(e^{48/5}\sqrt{2}^{\,3}\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3\right)$$

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right.$$

$$\left.0.99911\right)^2+13+\left(\frac{1}{\sqrt{3}}\right)^3+\phi^2=$$

$$\left(0.0038993\left(256.456\,e^{48/5}+0.111111\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-\right.\right.$$

$$0.666667\,e^{16/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+1.66667\,e^{32/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$2.22222\,e^{48/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+1.66667\,e^{64/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$0.666667\,e^{16}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+0.111111\,e^{96/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$0.666667\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-2.66667\,e^{16/5}\sqrt{2}^2$$

$$\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+7.33333\,e^{32/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-7.33333$$

$$e^{64/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+2.66667\,e^{16}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+$$

$$0.666667\,e^{96/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$14\,e^{16/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+63\,e^{32/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$3433.93\,e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+63\,e^{64/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$14\,e^{16}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+e^{96/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$\left.\left.256.456\,e^{48/5}\phi^2\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3\right)\right)\Big/$$

$$\left(e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3\right)$$

(((((0.9991104/16[(1-1/(3sqrt3))*e^(-24/5)+(7+1/(sqrt3))*e^(-8/5)+(7-1/(sqrt3))*e^(8/5)+(1+1/(3sqrt3))*e^(24/5)])))))^2+(1/(sqrt3))^3 + golden ratio

Input interpretation:

$$\left(\frac{0.9991104}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right)^2+\left(\frac{1}{\sqrt{3}}\right)^3+\phi$$

ϕ is the golden ratio

Result:

125.6938...

125.6938… 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

Series representations:

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)0.99911\right)^2+\left(\frac{1}{\sqrt{3}}\right)^3+\phi=\phi+\frac{8\sqrt{\pi}^3}{\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^3}+\left(0.00173302\left(\left(-1+e^{16/5}\right)^3\sqrt{\pi}+\left(1.5+10.5\,e^{16/5}+10.5\,e^{32/5}+1.5\,e^{48/5}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2\right)\Big/\left(e^{48/5}\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2\right)$$

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right) 0.99911\right)^2+\left(\frac{1}{\sqrt{3}}\right)^3+\phi=$$

$$\Bigg(0.0038993\Bigg(256.456\,e^{48/5}+0.111111\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-$$
$$0.666667\,e^{16/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+1.66667\,e^{32/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-$$
$$2.22222\,e^{48/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+1.66667\,e^{64/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-$$
$$0.666667\,e^{16}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}+0.111111\,e^{96/5}\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-$$
$$0.666667\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2-2.66667\,e^{16/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+$$
$$7.33333\,e^{32/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2-$$
$$7.33333\,e^{64/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+2.66667\,e^{16}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+$$
$$0.666667\,e^{96/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2+\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$
$$14\,e^{16/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+63\,e^{32/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$
$$100\,e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+63\,e^{64/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$
$$14\,e^{16}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+e^{96/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3+$$
$$256.456\,e^{48/5}\,\phi\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3\Bigg)\Bigg)\Bigg/\left(e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^3\right)$$

$$\left(\frac{1}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right.$$

$$\left.0.99911\right)^2+\left(\frac{1}{\sqrt{3}}\right)^3+\phi=$$

$$\left(0.0038993\left(256.456\,e^{48/5}+0.111111\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-\right.\right.$$

$$0.666667\,e^{16/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+1.66667\,e^{32/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$2.22222\,e^{48/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+1.66667\,e^{64/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$0.666667\,e^{16}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+0.111111\,e^{96/5}\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$

$$0.666667\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-2.66667\,e^{16/5}\sqrt{2}^2$$

$$\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+7.33333\,e^{32/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-$$

$$7.33333\,e^{64/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+2.66667\,e^{16}\sqrt{2}^2$$

$$\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+0.666667\,e^{96/5}\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+$$

$$\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+14\,e^{16/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$63\,e^{32/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+100\,e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$63\,e^{64/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+14\,e^{16}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$\left.\left.e^{96/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3+256.456\,e^{48/5}\,\phi\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3\right)\right)\Big/$$

$$\left(e^{48/5}\sqrt{2}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3\right)$$

sqrt729*1/2(((((((((0.9991104/16[(1-1/(3sqrt3))*e^(-24/5)+(7+1/(sqrt3))*e^(-8/5)+(7-1/(sqrt3))*e^(8/5)+(1+1/(3sqrt3))*e^(24/5)])))))^2 +4 + (1/(sqrt3))^2)))-2

where 729 = 9^3 (see Ramanujan cubes)

Input interpretation:

$$\sqrt{729}\times\frac{1}{2}\left(\left(\frac{0.9991104}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right)^2+4+\left(\frac{1}{\sqrt{3}}\right)^2\right)-2$$

Result:

1728.925...

1728.925…

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

Series representations:

$$\frac{1}{2}\sqrt{729}\left(\left(\frac{1}{16}\times 0.99911\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right)^2+4+\left(\frac{1}{\sqrt{3}}\right)^2\right)-2=$$

$$-2+\frac{1}{2}\sqrt{728}\left(4+0.0038993\left(e^{8/5}\left(7-\frac{1}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}\right)+\frac{1-\frac{1}{3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}}{e^{24/5}}+e^{24/5}\left(1+\frac{1}{3\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}\right)+\frac{7+\frac{1}{\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}}{e^{8/5}}\right)^2+\frac{1}{\sqrt{2}^2\left(\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)^2}\right)\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{1}{2}\sqrt{729}\left(\left(\frac{1}{16}\times 0.99911\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right)^2+4+\left(\frac{1}{\sqrt{3}}\right)^2\right)-2=-2+\frac{1}{2}\sqrt{728}$$

$$\left(4+0.0038993\left(e^{8/5}\left(7-\frac{1}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)+\frac{1-\frac{1}{3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}{e^{24/5}}+e^{24/5}\left(1+\frac{1}{3\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)+\frac{7+\frac{1}{\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}}{e^{8/5}}\right)^2+\frac{1}{\sqrt{2}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}\right)\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{1}{2}\sqrt{729}\left(\left(\frac{1}{16}\times 0.99911\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)\right)^2+4+\left(\frac{1}{\sqrt{3}}\right)^2\right)-2=$$

$$-2+\frac{1}{2}\sqrt{z_0}\left(4+0.0038993\left(e^{8/5}\left(7-\frac{1}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}\right)+\frac{1-\frac{1}{3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}}{e^{24/5}}+e^{24/5}\left(1+\frac{1}{3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}\right)+\frac{7+\frac{1}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}}}{e^{8/5}}\right)^2+\frac{1}{\sqrt{z_0}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)^2}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(729-z_0)^k z_0^{-k}}{k!}$$

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

(((((((0.9991104/16[(1-1/(3sqrt3))*e^(-24/5)+(7+1/(sqrt3))*e^(-8/5)+(7-1/(sqrt3))*e^(8/5)+(1+1/(3sqrt3))*e^(24/5)])))))))^1/5

Input interpretation:

$$\sqrt[5]{\frac{0.9991104}{16}\left(\left(1-\frac{1}{3\sqrt{3}}\right)e^{-24/5}+\left(7+\frac{1}{\sqrt{3}}\right)e^{-8/5}+\left(7-\frac{1}{\sqrt{3}}\right)e^{8/5}+\left(1+\frac{1}{3\sqrt{3}}\right)e^{24/5}\right)}$$

Result:

1.6192030...

1.6192030… result that is a good approximation to the value of the golden ratio 1,618033988749...

Now, we have that:

$$\mathcal{V}_{IIIb}(\varphi) = \frac{\lambda}{16}\left[\left(2-18\sqrt{3}\right)e^{-6\varphi/5}+\left(6+30\sqrt{3}\right)e^{-2\varphi/5}\right. \tag{5.23}$$

$$\left.+\left(6-30\sqrt{3}\right)e^{2\varphi/5}+\left(2+18\sqrt{3}\right)e^{6\varphi/5}\right]. \tag{5.24}$$

We put for φ > 0 φ = 4 and for λ > 0 λ = 0.9991104, an obtain:

0.9991104/16[(2-18(sqrt3))*e^(-24/5)+(6+30(sqrt3))*e^(-8/5)+(6-30(sqrt3))*e^(8/5)+(2+18(sqrt3))*e^(24/5)]

Input interpretation:

$$\frac{0.9991104}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)$$

Result:

238.2350...

238.235…

Series representations:

$$\frac{1}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)$$
$$0.99911=\frac{1}{e^{24/5}}\left(0.124889\left(1.+e^{16/5}\right)^3+\left(-1.124+1.87333\,e^{16/5}-1.87333\,e^{32/5}+1.124\,e^{48/5}\right)\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{1}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)$$
$$0.99911=\frac{1}{e^{24/5}}\left(0.124889\left(1.+e^{16/5}\right)^3+\left(-1.124+1.87333\,e^{16/5}-1.87333\,e^{32/5}+1.124\,e^{48/5}\right)\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{1}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)$$
$$0.99911=\frac{1}{e^{24/5}\sqrt{\pi}}\left(0.124889\left(1.+e^{16/5}\right)^3\sqrt{\pi}+\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)$$

1/2*(((0.9991104/16[(2-18(sqrt3))*e^(-24/5)+(6+30(sqrt3))*e^(-8/5)+(6-30(sqrt3))*e^(8/5)+(2+18(sqrt3))*e^(24/5)])))+11+8-Pi

Input interpretation:

$$\frac{1}{2}\left(\frac{0.9991104}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)\right)+11+8-\pi$$

Result:

134.9759...

134.9759... ≈ 135 (Ramanujan taxicab number) and practically equal to the rest mass of Pion meson 134.9766 MeV

Series representations:

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+11+8-\pi = 19+\frac{0.0624444}{e^{24/5}}+\frac{0.187333}{e^{8/5}}+0.187333\,e^{8/5}+0.0624444\,e^{24/5}-\pi+\frac{\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)\sqrt{2}\,\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}{e^{24/5}}$$

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+11+8-\pi = 19+\frac{0.0624444}{e^{24/5}}+\frac{0.187333}{e^{8/5}}+0.187333\,e^{8/5}+0.0624444\,e^{24/5}-\pi+\frac{\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}{e^{24/5}}$$

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+11+8-\pi = \frac{1}{e^{24/5}\sqrt{\pi}}\left(\left(0.0624444+0.187333\,e^{16/5}+0.187333\,e^{32/5}+0.0624444\,e^{48/5}+e^{24/5}(19-\pi)\right)\sqrt{\pi}+\left(-0.281+0.468333\,e^{16/5}-0.468333\,e^{32/5}+0.281\,e^{48/5}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)$$

1/2*(((0.9991104/16[(2-18(sqrt3))*e^(-24/5)+(6+30(sqrt3))*e^(-8/5)+(6-30(sqrt3))*e^(8/5)+(2+18(sqrt3))*e^(24/5)])))+8-Pi+golden ratio

Input interpretation:

$$\frac{1}{2}\left(\frac{0.9991104}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)\right)+8-\pi+\phi$$

ϕ is the golden ratio

Result:

125.5939...

125.5939… 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

Series representations:

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+8-\pi+\phi=$$
$$8+\frac{0.0624444}{e^{24/5}}+\frac{0.187333}{e^{8/5}}+0.187333\,e^{8/5}+0.0624444\,e^{24/5}+\phi-\pi+$$
$$\frac{\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)\sqrt{2}\,\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}{e^{24/5}}$$

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+8-\pi+\phi=$$
$$8+\frac{0.0624444}{e^{24/5}}+\frac{0.187333}{e^{8/5}}+0.187333\,e^{8/5}+0.0624444\,e^{24/5}+\phi-\pi+$$
$$\frac{\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}{e^{24/5}}$$

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+8-\pi+\phi=$$
$$\frac{1}{e^{24/5}\sqrt{\pi}}\left(\left(0.0624444+0.187333\,e^{16/5}+0.187333\,e^{32/5}+0.0624444\,e^{48/5}+e^{24/5}(8+\phi-\pi)\right)\sqrt{\pi}+\left(-0.281+0.468333\,e^{16/5}-0.468333\,e^{32/5}+0.281\,e^{48/5}\right)\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)$$

1/2*(((0.9991104/16[(2-18(sqrt3))*e^(-24/5)+(6+30(sqrt3))*e^(-8/5)+(6-30(sqrt3))*e^(8/5)+(2+18(sqrt3))*e^(24/5)])))+11-e+1/golden ratio

Input interpretation:

$$\frac{1}{2}\left(\frac{0.9991104}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)\right)+11-e+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

128.0173...

128.0173…

Series representations:

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+11-e+\frac{1}{\phi}=$$
$$11+\frac{0.0624444}{e^{24/5}}+\frac{0.187333}{e^{8/5}}-e+0.187333\,e^{8/5}+0.0624444\,e^{24/5}+\frac{1}{\phi}+\sum_{k=0}^{\infty}\frac{2^{-k}\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)\binom{\frac{1}{2}}{k}\sqrt{2}}{e^{24/5}}$$

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}+11-e+\frac{1}{\phi}=$$
$$11+\frac{0.0624444}{e^{24/5}}+\frac{0.187333}{e^{8/5}}-e+0.187333\,e^{8/5}+0.0624444\,e^{24/5}+\frac{1}{\phi}+\frac{\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)\sqrt{2}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}{e^{24/5}}$$

$$\frac{0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)}{16\times 2}$$

$$+11-e+\frac{1}{\phi}=$$

$$11+\frac{0.0624444}{e^{24/5}}+\frac{0.187333}{e^{8/5}}-e+0.187333\,e^{8/5}+0.0624444\,e^{24/5}+$$

$$\frac{1}{\phi}+\frac{1}{e^{24/5}}\left(-0.562+0.936666\,e^{16/5}-0.936666\,e^{32/5}+0.562\,e^{48/5}\right)$$

$$\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!} \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty< z_0\leq 0))$$

sqrt729*1/2*(((1/2*(((0.9991104/16[(2-18(sqrt3))*e^(-24/5)+(6+30(sqrt3))*e^(-8/5)+(6-30(sqrt3))*e^(8/5)+(2+18(sqrt3))*e^(24/5)])))+11-e+1/golden ratio)))+4/5

Input interpretation:

$$\sqrt{729}\times\frac{1}{2}\left(\frac{1}{2}\left(\frac{0.9991104}{16}\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)\right)+11-e+\frac{1}{\phi}\right)+\frac{4}{5}$$

ϕ is the golden ratio

Result:

1729.033...

1729.033…

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

Series representations:

$$\frac{1}{2}\sqrt{729}\left(\frac{1}{2\times 16}0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)+11-e+\frac{1}{\phi}\right)+\frac{4}{5}=$$

$$\frac{1}{e^{24/5}\phi}0.281\left(2.84698\,e^{24/5}\phi+1.77936\,e^{24/5}\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}+\right.$$
$$0.111111\,\phi\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}+0.333333\,e^{16/5}\phi\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}+$$
$$19.573\,e^{24/5}\phi\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}-1.77936\,e^{29/5}\phi\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}+$$
$$0.333333\,e^{32/5}\phi\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}+$$
$$0.111111\,e^{48/5}\phi\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}-$$
$$\phi\left(\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}2^{-k_1-3k_2}\times 91^{-k_2}\binom{\frac{1}{2}}{k_1}\binom{\frac{1}{2}}{k_2}+\right.$$
$$1.66667\,e^{16/5}\phi\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}2^{-k_1-3k_2}\times 91^{-k_2}\binom{\frac{1}{2}}{k_1}\binom{\frac{1}{2}}{k_2}-$$
$$1.66667\,e^{32/5}\phi\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}2^{-k_1-3k_2}\times 91^{-k_2}\binom{\frac{1}{2}}{k_1}\binom{\frac{1}{2}}{k_2}+$$
$$\left.\left.e^{48/5}\phi\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}2^{-k_1-3k_2}\times 91^{-k_2}\binom{\frac{1}{2}}{k_1}\binom{\frac{1}{2}}{k_2}\right)\right)$$

$$\frac{1}{2}\sqrt{729}\left(\frac{1}{2\times 16}0.99911\left(\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)+11-e+\frac{1}{\phi}\right)+\frac{4}{5}=$$

$$\frac{1}{e^{24/5}\,\phi}\,0.281\left(2.84698\,e^{24/5}\,\phi+1.77936\,e^{24/5}\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\right.$$
$$0.111111\,\phi\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+$$
$$0.333333\,e^{16/5}\,\phi\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+$$
$$19.573\,e^{24/5}\,\phi\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$
$$1.77936\,e^{29/5}\,\phi\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+$$
$$0.333333\,e^{32/5}\,\phi\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+$$
$$0.111111\,e^{48/5}\,\phi\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$
$$\phi\left(\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_1-3k_2}\times 91^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\right)+$$
$$1.66667\,e^{16/5}\,\phi\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_1-3k_2}\times 91^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}-1.66667\,e^{32/5}$$
$$\phi\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_1-3k_2}\times 91^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}+$$
$$\left.e^{48/5}\,\phi\sqrt{2}\sqrt{728}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_1-3k_2}\times 91^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\right)$$

$$\frac{1}{2}\sqrt{729}\left(\frac{1}{2\times 16}0.99911\left(\left(2-18\sqrt{3}\right)e^{-24/5}+\left(6+30\sqrt{3}\right)e^{-8/5}+\left(6-30\sqrt{3}\right)e^{8/5}+\left(2+18\sqrt{3}\right)e^{24/5}\right)+11-e+\frac{1}{\phi}\right)+\frac{4}{5}=$$

$$\frac{1}{e^{24/5}\,\phi\,\sqrt{\pi}^2}\,0.8\Bigg(e^{24/5}\,\phi\,\sqrt{\pi}^2+0.3125\,e^{24/5}\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)+$$
$$0.0195139\,\phi\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)+$$
$$0.0585416\,e^{16/5}\,\phi\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)+$$
$$3.4375\,e^{24/5}\,\phi\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)-$$
$$0.3125\,e^{29/5}\,\phi\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)+$$
$$0.0585416\,e^{32/5}\,\phi\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)+$$
$$0.0195139\,e^{48/5}\,\phi\sqrt{\pi}\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)-0.0878124\,\phi$$
$$\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\text{Res}_{s=-\frac{1}{2}+j_1}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\left(\text{Res}_{s=-\frac{1}{2}+j_2}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)+$$
$$0.146354\,e^{16/5}\,\phi$$
$$\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\text{Res}_{s=-\frac{1}{2}+j_1}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\left(\text{Res}_{s=-\frac{1}{2}+j_2}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)-$$
$$0.146354\,e^{32/5}\,\phi\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\text{Res}_{s=-\frac{1}{2}+j_1}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)$$
$$\left(\text{Res}_{s=-\frac{1}{2}+j_2}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)+0.0878124\,e^{48/5}\,\phi$$
$$\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\text{Res}_{s=-\frac{1}{2}+j_1}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\left(\text{Res}_{s=-\frac{1}{2}+j_2}\,728^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\Bigg)$$

Now, we have that:

$$\begin{aligned}\mathcal{V}_{Va}(\varphi) &= \lambda\left[a\,\cosh^{\frac{4}{3}}\left(\frac{3\varphi}{5}\right)\;+\;b\,\frac{\sinh^2\left(\frac{3\varphi}{5}\right)}{\cosh^{\frac{2}{3}}\left(\frac{3\varphi}{5}\right)}\right]\\ &= \frac{a-b+(a+b)\cosh\left(\frac{6\varphi}{5}\right)}{2\cosh^{\frac{2}{3}}\left(\frac{3\varphi}{5}\right)}\,,\end{aligned}\qquad (5.29)$$

We put for φ > 0 φ = 4 and for λ > 0 λ = 0.9991104, and a = 138, b = 135 and obtain:

((138-135+(138+135) cosh(24/5))) / ((2 cosh^(2/3)(12/5)))

Input:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

cosh(x) is the hyperbolic cosine function

Exact result:

$$\frac{3+273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

Decimal approximation:

2644.031410843619594106656897494426919135475769955533719560...

2644.03141084…

Alternate forms:

$$\frac{3\left(1+91\cosh\left(\frac{24}{5}\right)\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{3}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\frac{273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{3\left(91+2e^{24/5}+91e^{48/5}\right)}{2\sqrt[3]{2}\,e^{16/5}\left(1+e^{24/5}\right)^{2/3}}$$

Alternative representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}=\frac{3+273\cos\left(\frac{24i}{5}\right)}{2\cos^{2/3}\left(\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}=\frac{3+273\cos\left(-\frac{24i}{5}\right)}{2\cos^{2/3}\left(-\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)} = \frac{3+\frac{273}{\sec\left(\frac{24 i}{5}\right)}}{2\left(\frac{1}{\sec\left(\frac{12 i}{5}\right)}\right)^{2/3}}$$

Series representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)} = \frac{3\left(1+91\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}\right)}{2\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)} = \frac{3\left(1+91\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i z_0\right)\left(\frac{24}{5}-z_0\right)^k}{k!}\right)}{2\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)} = \frac{3\left(1+91 I_0\left(\frac{24}{5}\right)+182\sum_{k=1}^{\infty} I_{2k}\left(\frac{24}{5}\right)\right)}{2\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty} I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}}$$

Integral representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)} = \frac{3\left(1+91\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt\right)}{2\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)} = \frac{6\left(115+546\int_0^1\sinh\left(\frac{24t}{5}\right)dt\right)}{\sqrt[3]{5}\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)} = \frac{3\sqrt[3]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}\left(2i\sqrt{\pi}+91\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds\right)}{2\sqrt[3]{2}\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds} \quad \text{for } \gamma>0$$

((138-135+(138+135) cosh(24/5))) / ((2 cosh^(2/3)(12/5))) + golden ratio

Input:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi$$

cosh(x) is the hyperbolic cosine function

ϕ is the golden ratio

Exact result:

$$\phi+\frac{3+273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

Decimal approximation:

2645.649444832369488954861484328792557253196079135339482422...

2645.649444832… result practically equal to the rest mass of charmed Xi baryon 2645.9

Alternate forms:

$$\frac{1}{2}+\frac{\sqrt{5}}{2}+\frac{3}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\frac{273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{3+\cosh^{2/3}\left(\frac{12}{5}\right)+\sqrt{5}\cosh^{2/3}\left(\frac{12}{5}\right)+273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$\phi+\frac{e^{8/5}\left(\frac{3}{\sqrt[3]{2}}+\frac{273}{2\sqrt[3]{2}\,e^{24/5}}+\frac{273\,e^{24/5}}{2\sqrt[3]{2}}\right)}{\left(1+e^{24/5}\right)^{2/3}}$$

Alternative representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=\phi+\frac{3+273\cos\left(\frac{24i}{5}\right)}{2\cos^{2/3}\left(\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=\phi+\frac{3+273\cos\left(-\frac{24i}{5}\right)}{2\cos^{2/3}\left(-\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=\phi+\frac{3+\frac{273}{\sec\left(\frac{24i}{5}\right)}}{2\left(\frac{1}{\sec\left(\frac{12i}{5}\right)}\right)^{2/3}}$$

Series representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=$$
$$\frac{3+\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}+\sqrt{5}\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}+273\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}}{2\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=$$
$$\left(3+273\,I_0\left(\frac{24}{5}\right)+\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}+\sqrt{5}\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}+\right.$$
$$\left.546\sum_{k=1}^{\infty}I_{2k}\left(\frac{24}{5}\right)\right)\Big/\left(2\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}\right)$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=\left(3+\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i\,z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}+\right.$$
$$\sqrt{5}\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i\,z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}+$$
$$\left.273\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i\,z_0\right)\left(\frac{24}{5}-z_0\right)^k}{k!}\right)\Big/$$
$$\left(2\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i\,z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}\right)$$

Integral representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=\frac{3+\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}+\sqrt{5}\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}+273\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt}{2\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=\left(1380\times 5^{2/3}+5\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}+5\sqrt{5}\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}+6552\times 5^{2/3}\int_0^1\sinh\left(\frac{24t}{5}\right)dt\right)\Big/\left(10\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}\right)$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\phi=\left(6\,i\,2^{2/3}\sqrt{\pi}\sqrt[3]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}+2\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds+2\sqrt{5}\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds+273\times 2^{2/3}\sqrt[3]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds\right)\Big/\left(4\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds\right)\quad\text{for }\gamma>0$$

(((1/3((138-135+(138+135) cosh(24/5))) / ((2 cosh^(2/3)(12/5))))))-76+7-34*1/10^2

Input:

$$\frac{1}{3}\times\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-76+7-34\times\frac{1}{10^2}$$

cosh(x) is the hyperbolic cosine function

Exact result:

$$\frac{3+273\cosh\left(\frac{24}{5}\right)}{6\cosh^{2/3}\left(\frac{12}{5}\right)}-\frac{3467}{50}$$

Decimal approximation:

812.0038036145398647022189658314756397118252566518445731867...

812.0038036145… ≈ 812 (Ramanujan taxicab number)

Alternate forms:

$$-\frac{-25+3467\cosh^{2/3}\left(\frac{12}{5}\right)-2275\cosh\left(\frac{24}{5}\right)}{50\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$-\frac{3467}{50}+\frac{1}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\frac{91\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{91\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-\frac{3467\cosh^{2/3}\left(\frac{12}{5}\right)-25}{50\cosh^{2/3}\left(\frac{12}{5}\right)}$$

Alternative representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=-69-\frac{34}{10^2}+\frac{3+273\cos\left(\frac{24i}{5}\right)}{3\left(2\cos^{2/3}\left(\frac{12i}{5}\right)\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=-69-\frac{34}{10^2}+\frac{3+273\cos\left(-\frac{24i}{5}\right)}{3\left(2\cos^{2/3}\left(-\frac{12i}{5}\right)\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=-69-\frac{34}{10^2}+\frac{3+\frac{273}{\sec\left(\frac{24i}{5}\right)}}{3\left(2\left(\frac{1}{\sec\left(\frac{12i}{5}\right)}\right)^{2/3}\right)}$$

Series representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=$$
$$-\frac{-25+3467\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}-2275\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}}{50\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=$$
$$-\frac{-25-2275\,I_0\left(\frac{24}{5}\right)+3467\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}-4550\sum_{k=1}^{\infty}I_{2k}\left(\frac{24}{5}\right)}{50\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=$$
$$-\frac{-25+3467\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}-2275\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i z_0\right)\left(\frac{24}{5}-z_0\right)^k}{k!}}{50\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-i z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}}$$

Integral representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=$$
$$-\frac{-25+3467\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}-2275\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt}{50\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=$$
$$\frac{2300\times5^{2/3}-3467\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}+10\,920\times5^{2/3}\int_0^1\sinh\left(\frac{24t}{5}\right)dt}{50\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{\left(2\cosh^{2/3}\left(\frac{12}{5}\right)\right)3}-76+7-\frac{34}{10^2}=$$
$$\left(50\,i\,2^{2/3}\sqrt{\pi}\sqrt[3]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}-6934\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds+\right.$$
$$\left.2275\times2^{2/3}\sqrt[3]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds\right)\Big/$$
$$\left(100\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds\right)\text{ for }\gamma>0$$

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

(((138-135+(138+135) cosh(24/5))) / ((2 cosh^(2/3)(12/5))))-843-76+4

Input:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4$$

cosh(x) is the hyperbolic cosine function

Exact result:

$$\frac{3+273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-915$$

Decimal approximation:

1729.031410843619594106656897494426919135475769955533719560...

1729.031410843...

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

Alternate forms:

$$-915+\frac{3}{2\cosh^{2/3}\left(\frac{12}{5}\right)}+\frac{273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$-\frac{3\left(-1+610\cosh^{2/3}\left(\frac{12}{5}\right)-91\cosh\left(\frac{24}{5}\right)\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{273\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-\frac{3\left(610\cosh^{2/3}\left(\frac{12}{5}\right)-1\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}$$

Alternative representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=-915+\frac{3+273\cos\left(\frac{24i}{5}\right)}{2\cos^{2/3}\left(\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=-915+\frac{3+273\cos\left(-\frac{24i}{5}\right)}{2\cos^{2/3}\left(-\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=-915+\frac{3+\frac{273}{\sec\left(\frac{24i}{5}\right)}}{2\left(\frac{1}{\sec\left(\frac{12i}{5}\right)}\right)^{2/3}}$$

Series representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=$$
$$-\frac{3\left(-1+610\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}-91\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}\right)}{2\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=$$
$$-\frac{3\left(-1-91I_0\left(\frac{24}{5}\right)+610\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}-182\sum_{k=1}^{\infty}I_{2k}\left(\frac{24}{5}\right)\right)}{2\left(I_0\left(\frac{12}{5}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(\frac{12}{5}\right)\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=$$
$$-\frac{3\left(-1+610\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-iz_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}-91\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-iz_0\right)\left(\frac{24}{5}-z_0\right)^k}{k!}\right)}{2\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cos\left(\frac{k\pi}{2}-iz_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}}$$

Integral representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=-\frac{3\left(-1+610\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}-91\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt\right)}{2\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=\frac{3\left(230\times 5^{2/3}-1525\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}+1092\times 5^{2/3}\int_0^1\sinh\left(\frac{24t}{5}\right)dt\right)}{5\left(5+12\int_0^1\sinh\left(\frac{12t}{5}\right)dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-843-76+4=\left(3\left(2\,i\,2^{2/3}\sqrt{\pi}\sqrt[3]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}-1220\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds+91\times 2^{2/3}\sqrt[3]{-i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds\right)\right)\Big/\left(4\sqrt[6]{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds\right)\quad\text{for } \gamma>0$$

(((138-135+(138+135) cosh(24/5))) / ((2 cosh^(2/3)(12/5))))-(2452.9-1535)

where 2452.9 and 1535 are the rest mass of the charmed Sigma baryon and Xi baryon

Input interpretation:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)$$

cosh(x) is the hyperbolic cosine function

Result:

1726.13...

1726.13… result very near to the mass of candidate glueball $f_0(1710)$ meson.

Alternative representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=-917.9+\frac{3+273\cos\left(\frac{24i}{5}\right)}{2\cos^{2/3}\left(\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=-917.9+\frac{3+273\cos\left(-\frac{24i}{5}\right)}{2\cos^{2/3}\left(-\frac{12i}{5}\right)}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=-917.9+\frac{3+\frac{273}{\sec\left(\frac{24i}{5}\right)}}{2\left(\frac{1}{\sec\left(\frac{12i}{5}\right)}\right)^{2/3}}$$

Series representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=-\frac{917.9\left(-0.00163416+\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}-0.148709\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}\right)}{\left(\sum_{k=0}^{\infty}\frac{\left(\frac{144}{25}\right)^k}{(2k)!}\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=-\left(\left(917.9\left(-0.00163416+\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cosh\left(\frac{ik\pi}{2}+z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}-0.148709\sum_{k=0}^{\infty}\frac{(-i)^k\cosh\left(\frac{ik\pi}{2}+z_0\right)\left(\frac{24}{5}-z_0\right)^k}{k!}\right)\right)\Big/\left(\sum_{k=0}^{\infty}\frac{(-i)^k\cosh\left(\frac{ik\pi}{2}+z_0\right)\left(\frac{12}{5}-z_0\right)^k}{k!}\right)^{2/3}\right)$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=$$

$$\frac{1}{i\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}\,136.5\left(-6.72454\,i\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}+\right.$$
$$\left.0.010989\sqrt[3]{i\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}+i\sqrt[3]{i\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}}\sum_{k=0}^{\infty}\frac{\left(\frac{24}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}\right)$$

Integral representations:

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=$$
$$-\frac{917.9\left(-0.00163416+\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}-0.148709\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt\right)}{\left(\int_{\frac{i\pi}{2}}^{\frac{12}{5}}\sinh(t)\,dt\right)^{2/3}}$$

$$\frac{138-135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\cosh^{2/3}\left(\frac{12}{5}\right)}-(2452.9-1535)=$$
$$\left(1.5\left(-611.933\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds+1.5874\,i\pi\sqrt[3]{\frac{\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}+\right.\right.$$
$$\left.\left.72.2267\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds\right)\sqrt{\pi}\sqrt[3]{\frac{\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds}\right)\right)\Big/$$
$$\left(\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{36/(25s)+s}}{\sqrt{s}}\,ds\right)\quad\text{for }\gamma>0$$

From

$$\mathcal{V}_{Vb}(\varphi)=\lambda\left[a\sinh^{\frac{4}{3}}\left(\frac{3\varphi}{5}\right)+b\frac{\cosh^2\left(\frac{3\varphi}{5}\right)}{\sinh^{\frac{2}{3}}\left(\frac{3\varphi}{5}\right)}\right]$$
$$=\frac{-a+b+(a+b)\cosh\left(\frac{6\varphi}{5}\right)}{2\sinh^{\frac{2}{3}}\left(\frac{3\varphi}{5}\right)},\qquad(5.33)$$

We obtain:

for φ > 0 φ = 4 and for λ > 0 λ = 0.9991104, and a = 138, b = 135 and obtain:

((-138+135+(138+135) cosh(24/5))) / ((2 sinh^(2/3)(12/5)))

Input:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

cosh(x) is the hyperbolic cosine function

sinh(x) is the hyperbolic sine function

Exact result:

$$\frac{273\cosh\left(\frac{24}{5}\right)-3}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

Decimal approximation:

2672.237998872641217733820876740236691949476671178658401997...

2672.23799887…

Alternate forms:

$$\frac{3\left(91\cosh\left(\frac{24}{5}\right)-1\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{273\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}-\frac{3}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{3\left(91-2e^{24/5}+91e^{48/5}\right)}{2\sqrt[3]{2}\,e^{16/5}\left(e^{24/5}-1\right)^{2/3}}$$

Alternative representations:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}=\frac{-3+273\cos\left(\frac{24i}{5}\right)}{2\left(\frac{1}{2}\left(-e^{-12/5}+e^{12/5}\right)\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}=\frac{-3+273\cos\left(-\frac{24i}{5}\right)}{2\left(\frac{1}{2}\left(-e^{-12/5}+e^{12/5}\right)\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)} = \frac{-3+273\cos\left(-\frac{24i}{5}\right)}{2\left(i\cos\left(\frac{\pi}{2}+\frac{12i}{5}\right)\right)^{2/3}}$$

Series representations:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)} = \frac{3\left(-1+91\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}\right)}{2\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)} = \frac{3i\left(i+91\sum_{k=0}^{\infty}\frac{\left(\frac{24}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}\right)}{2\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)} = -\frac{3i\left(-1+91\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}\right)\sqrt[3]{i\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}-\frac{i\pi}{2}\right)^{2k}}{(2k)!}}}{2\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}-\frac{i\pi}{2}\right)^{2k}}{(2k)!}}$$

Integral representations:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)} = \frac{3\sqrt[3]{\frac{3}{10}}\left(75+364\int_0^1\sinh\left(\frac{24t}{5}\right)dt\right)}{2\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)} = \frac{\sqrt[3]{\frac{3}{2}}\,5^{2/3}\left(-1+91\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt\right)}{4\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)} = -\frac{\sqrt[3]{\frac{3}{2}}\,5^{2/3}\left(2\sqrt{\pi}+91i\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds\right)}{8\sqrt{\pi}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}} \quad \text{for } \gamma > 0$$

((-138+135+(138+135) cosh(24/5))) / ((2 sinh^(2/3)(12/5))) + 21 + Pi - 1/golden ratio

Input:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}$$

cosh(x) is the hyperbolic cosine function

sinh(x) is the hyperbolic sine function

ϕ is the golden ratio

Exact result:

$$-\frac{1}{\phi}+21+\pi+\frac{273\cosh\left(\frac{24}{5}\right)-3}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

Decimal approximation:

2695.761557537481116124078933289150556715953531398227744956...

2695.7615575… result practically equal to the rest mass of charmed Omega baryon 2695.2

Alternate forms:

$$-\frac{1}{\phi}+21+\pi+\frac{3\left(91\cosh\left(\frac{24}{5}\right)-1\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

$$\frac{1}{2}\left(43-\sqrt{5}\right)+\pi+\frac{273\cosh\left(\frac{24}{5}\right)-3}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

$$21-\frac{2}{1+\sqrt{5}}+\pi-\frac{3}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+\frac{273\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}$$

Alternative representations:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=21+\pi-\frac{1}{\phi}+\frac{-3+273\cos\left(\frac{24i}{5}\right)}{2\left(\frac{1}{2}\left(-e^{-12/5}+e^{12/5}\right)\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=21+\pi-\frac{1}{\phi}+\frac{-3+273\cos\left(-\frac{24i}{5}\right)}{2\left(\frac{1}{2}\left(-e^{-12/5}+e^{12/5}\right)\right)^{2/3}}$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=21+\pi-\frac{1}{\phi}+\frac{-3+273\cos\left(-\frac{24i}{5}\right)}{2\left(i\cos\left(\frac{\pi}{2}+\frac{12i}{5}\right)\right)^{2/3}}$$

Series representations:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=$$
$$\left(-3-3\sqrt{5}+273\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}+273\sqrt{5}\sum_{k=0}^{\infty}\frac{\left(\frac{576}{25}\right)^k}{(2k)!}+38\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+\right.$$
$$\left.42\sqrt{5}\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+2\pi\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+2\sqrt{5}\,\pi\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}\right)\Big/$$
$$\left(2\left(1+\sqrt{5}\right)\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}\right)$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=$$
$$\left(-3-3\sqrt{5}+38\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+42\sqrt{5}\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+\right.$$
$$2\pi\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+2\sqrt{5}\,\pi\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+273\,i\sum_{k=0}^{\infty}\frac{\left(\frac{24}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}+$$
$$\left.273\,i\sqrt{5}\sum_{k=0}^{\infty}\frac{\left(\frac{24}{5}-\frac{i\pi}{2}\right)^{1+2k}}{(1+2k)!}\right)\Big/\left(2\left(1+\sqrt{5}\right)\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}\right)$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=$$

$$\left(-3-3\sqrt{5}+38\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+42\sqrt{5}\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+2\pi\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+ 2\sqrt{5}\,\pi\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}+273\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{144}{25}\right)^{-s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}+ 273\sqrt{5\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\frac{\left(-\frac{144}{25}\right)^{-s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\right)\Bigg/\left(2\left(1+\sqrt{5}\right)\left(\sum_{k=0}^{\infty}\frac{\left(\frac{12}{5}\right)^{1+2k}}{(1+2k)!}\right)^{2/3}\right)$$

Integral representations:

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=$$

$$\left(1125\times 2^{2/3}\sqrt[3]{3}\sqrt[6]{5}+225\sqrt[3]{3}\,10^{2/3}+ 380\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+420\sqrt{5}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+ 20\pi\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+20\sqrt{5}\,\pi\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+ 5460\times 2^{2/3}\sqrt[3]{3}\sqrt[6]{5}\int_0^1\sinh\left(\frac{24t}{5}\right)dt+1092\sqrt[3]{3}\,10^{2/3}\int_0^1\sinh\left(\frac{24t}{5}\right)dt\right)\Bigg/ \left(20\left(1+\sqrt[6]{5}\right)\left(1-\sqrt[6]{5}+\sqrt[3]{5}\right)\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}\right)$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=$$

$$\left(-5\times 2^{2/3}\sqrt[3]{3}\sqrt[6]{5}-\sqrt[3]{3}\,10^{2/3}+152\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+ 168\sqrt{5}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+ 8\pi\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+8\sqrt{5}\,\pi\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}+ 455\times 2^{2/3}\sqrt[3]{3}\sqrt[6]{5}\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt+91\sqrt[3]{3}\,10^{2/3}\int_{\frac{i\pi}{2}}^{\frac{24}{5}}\sinh(t)\,dt\right)\Bigg/ \left(8\left(1+\sqrt[6]{5}\right)\left(1-\sqrt[6]{5}+\sqrt[3]{5}\right)\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}\right)$$

$$\frac{-138+135+(138+135)\cosh\left(\frac{24}{5}\right)}{2\sinh^{2/3}\left(\frac{12}{5}\right)}+21+\pi-\frac{1}{\phi}=$$

$$-\left(\left(10\times 2^{2/3}\sqrt[3]{3}\sqrt[6]{5}\sqrt{\pi}+2\sqrt[3]{3}\,10^{2/3}\sqrt{\pi}+455\,i\,2^{2/3}\sqrt[3]{3}\sqrt[6]{5}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds+91\,i\sqrt[3]{3}\,10^{2/3}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{144/(25s)+s}}{\sqrt{s}}\,ds-304\sqrt{\pi}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}-16\pi^{3/2}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}-16\sqrt{5}\,\pi^{3/2}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}-336\sqrt{5\pi}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}\right)\Big/\left(16\left(1+\sqrt[6]{5}\right)\left(1-\sqrt[6]{5}+\sqrt[3]{5}\right)\sqrt{\pi}\left(\int_0^1\cosh\left(\frac{12t}{5}\right)dt\right)^{2/3}\right)\right) \text{ for } \gamma>0$$

Now:

It is thus convenient to define the two fields

$$\Phi_t = \sqrt{\frac{d-2}{2(d-1)}}\left(\frac{3}{2}\phi - \frac{10-d}{d-2}\sigma\right), \qquad (6.7)$$

$$\Phi_s = \sqrt{\frac{10-d}{2(d-1)}}\left(\frac{1}{2}\phi + 3\sigma\right), \qquad (6.8)$$

One can add to this discussion a further degree of freedom, allowing for an off-critical bulk of dimension d. Confining our attention to the case $d > 10$, let us add some cursory remarks on the resulting potential after a compactification to four dimensions. For simplicity, let us confine our attention to the contributions arising from $D9$ branes and from the conformal anomaly originally described by Polyakov in [43]. Up to shifts of the two fields Φ_s and Φ_t, the resulting potential

contains again two terms with identical normalizations, and assuming again that Φ_s is somehow stabilized, one is finally confronted with

$$V = V_0\left(e^{\sqrt{3}\,\gamma_9\,\Phi_t} + e^{\sqrt{3}\,\gamma_\Lambda\,\Phi_t}\right), \qquad (6.18)$$

where

$$\gamma_9 = \sqrt{\frac{d^2-14d+184}{24(d-4)}}, \quad \gamma_\Lambda = -\frac{10}{3}\frac{(d-4)(d-10)}{\sqrt{2(d^2-14d+184)}} \qquad (6.19)$$

Interestingly, for d slightly larger than ten γ_Λ is *small and negative* while γ_9 is very close to one, so that one has a potential well which combines a steep wall with a rather flat one. As a result, the scalar is essentially bound to emerge from the initial singularity with the scalar descending along the mild wall and to stabilize readily at the bottom as the Universe enters a de Sitter phase.

for d = 11, $\phi = 6$, $\sigma = 8$ and $V_0 > 0$; $V_0 = 0.5$

(((sqrt(((11-2)/((2(11-1)))))))) * (3/2 * 6 – ((10-11)*8/(11-2)))

Input:

$$\sqrt{\frac{11-2}{2(11-1)}}\left(\frac{3}{2}\times 6-(10-11)\times\frac{8}{11-2}\right)$$

Result:

$$\frac{89}{6\sqrt{5}}$$

Decimal approximation:

6.6336683332493760993472152172361194984738344668475263153336...

6.6336683… = Φ_t

Alternate form:

$$\frac{89\sqrt{5}}{30}$$

sqrt((((10-11)/(2(11-1))))) (1/2 * 6 + 3*8)

Input:

$$\sqrt{\frac{10-11}{2(11-1)}}\left(\frac{1}{2}\times 6+3\times 8\right)$$

Result:

$$\frac{27\,i}{2\sqrt{5}}$$

Decimal approximation:

6.0373835392494321803047689055744458356896695709511194555531... i

Polar coordinates:

$r \approx 6.03738$ (radius), $\theta = 90°$ (angle)

6.03738 = Φ_s

$$\gamma_9 \;=\; \sqrt{\frac{d^2\,-\,14\,d\,+\,184}{24\,(d\,-\,4)}}\;, \quad \gamma_\Lambda \;=\; -\,\frac{10}{3}\,\frac{(d\,-\,4)(d\,-\,10)}{\sqrt{2(d^2\,-\,14\,d\,+\,184)}}$$

sqrt[(((11^2-14*11+184)))/((24(11-4)))]

Input:

$$\sqrt{\frac{11^2 - 14 \times 11 + 184}{24(11-4)}}$$

Result:

$$\frac{\sqrt{\frac{151}{42}}}{2}$$

Decimal approximation:

0.9480556543840260275354750080868387502967800068579564584 52...

0.948055654 = γ_9 - result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 (see Appendix) and to the value of the following Rogers-Ramanujan continued fraction:

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

From:

Astronomy & Astrophysics manuscript no. ms c ESO 2019 - September 24, 2019
Planck 2018 results. VI. Cosmological parameters

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

Alternate form:

$$\frac{\sqrt{6342}}{84}$$

-10/3*(((11-4)(11-10)))/((2(11^2-14*11+184)))^1/2

Input:

$$-\frac{10}{3} \times \frac{(11-4)(11-10)}{\sqrt{2(11^2-14\times 11+184)}}$$

Result:

$$-\frac{35\sqrt{\frac{2}{151}}}{3}$$

Decimal approximation:

-1.3426824545130173143513438094603769344422413161052494 8089...

-1.342682454… = γ_Λ

Alternate form:

$$-\frac{35\sqrt{302}}{453}$$

Thence:

$$V = V_0 \left(e^{\sqrt{3}\,\gamma_9\,\Phi_t} + e^{\sqrt{3}\,\gamma_\Lambda\,\Phi_t} \right)$$

0.5(e^(sqrt3*0.948055654*6.6336683) + e^(sqrt3*-1.342682454*6.6336683))

Input interpretation:

$$0.5\left(e^{\sqrt{3}\times 0.948055654\times 6.6336683} + e^{\sqrt{3}\times(-1.342682454)\times 6.6336683}\right)$$

Result:

26899.7...

26899.7…

Series representations:

$$0.5\left(e^{\sqrt{3}\;0.948056\times 6.63367} + e^{\left(\sqrt{3}\;6.63367\right)(-1)\,1.34268}\right) = 0.5\,e^{-8.90691\sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{1/2}{k}}\left(1 + e^{15.196\sqrt{2}\sum_{k=0}^{\infty} 2^{-k}\binom{1/2}{k}}\right)$$

$$0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)=$$

$$0.5\exp\left(-8.90691\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)$$

$$0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)=$$

$$0.5\exp\left(-\frac{4.45346\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\left(1+\exp\left(\frac{7.598\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)$$

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

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

for n = 294 and subtracting 322 that is a Lucas number and adding the conjugate of the golden ratio, we obtain:

(((sqrt(golden ratio) * exp(Pi*sqrt(294/15)) / (2*5^(1/4)*sqrt(294))))) - 322 +1/golden ratio

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{294}{15}}\right)}{2\sqrt[4]{5}\sqrt{294}}-322+\frac{1}{\phi}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{7\sqrt{2/5}\,\pi}\sqrt{\frac{\phi}{6}}}{14\sqrt[4]{5}}+\frac{1}{\phi}-322$$

Decimal approximation:

26899.316674225663359433237986562040154068644672286301802390...

26899.3166…

Property:

$$-322+\frac{e^{7\sqrt{2/5}\,\pi}\sqrt{\frac{\phi}{6}}}{14\sqrt[4]{5}}+\frac{1}{\phi} \text{ is a transcendental number}$$

Alternate forms:

$$\frac{1}{2}\left(\sqrt{5}-645\right)+\frac{1}{28}\sqrt{\frac{1}{15}\left(5+\sqrt{5}\right)}\,e^{7\sqrt{2/5}\,\pi}$$

$$-322+\frac{2}{1+\sqrt{5}}+\frac{\sqrt{1+\sqrt{5}}\,e^{7\sqrt{2/5}\,\pi}}{28\sqrt{3}\sqrt[4]{5}}$$

$$\frac{14\sqrt[4]{5}\sqrt{6}\,(1-322\,\phi)+e^{7\sqrt{2/5}\,\pi}\,\phi^{3/2}}{14\sqrt[4]{5}\sqrt{6}\,\phi}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{294}{15}}\right)}{2\sqrt[4]{5}\sqrt{294}}-322+\frac{1}{\phi}=$$
$$\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(294-z_0)^k z_0^{-k}}{k!}-3220\,\phi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(294-z_0)^k z_0^{-k}}{k!}+5^{3/4}\,\phi\right.$$
$$\left.\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{98}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/$$
$$\left(10\,\phi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(294-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{294}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{294}}-322+\frac{1}{\phi}=$$

$$\left(10\exp\left(i\pi\left\lfloor\frac{\arg(294-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(294-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}-\right.$$
$$3220\,\phi\exp\left(i\pi\left\lfloor\frac{\arg(294-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(294-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+$$
$$5^{3/4}\,\phi\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{98}{5}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{98}{5}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/$$
$$\left(10\,\phi\exp\left(i\pi\left\lfloor\frac{\arg(294-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(294-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{294}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{294}}-322+\frac{1}{\phi}=\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(294-z_0)/(2\pi)\rfloor}z_0^{-1/2\lfloor\arg(294-z_0)/(2\pi)\rfloor}\right.$$
$$\left(10\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(294-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(294-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(294-z_0)^k z_0^{-k}}{k!}-\right.$$
$$3220\,\phi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(294-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(294-z_0)/(2\pi)\rfloor}$$
$$\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(294-z_0)^k z_0^{-k}}{k!}+5^{3/4}\,\phi\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{98}{5}-z_0\right)/(2\pi)\right\rfloor}\right.$$
$$\left.z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{98}{5}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{98}{5}-z_0\right)^k z_0^{-k}}{k!}\right)$$
$$\left.\left.\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Bigg/$$
$$\left(10\,\phi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(294-z_0)^k z_0^{-k}}{k!}\right)$$

We have also that:

(((0.5(e^(sqrt3*0.948055654*6.6336683) + e^(sqrt3*-1.342682454*6.6336683)))))^1/2+8

Input interpretation:

$$\sqrt{0.5\left(e^{\sqrt{3}\times 0.948055654\times 6.6336683}+e^{\sqrt{3}\times(-1.342682454)\times 6.6336683}\right)}+8$$

Result:

172.011...

172.011…. ≈ 172 (Ramanujan taxicab number)

Series representations:

$$\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}+8=0.707107\left(11.3137+\sqrt{e^{-8.90691\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\right)}\right)$$

$$\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}+8=0.707107\left(11.3137+\sqrt{\exp\left(-8.90691\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}\right)$$

$$\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}+8=0.707107\left(11.3137+\sqrt{\left(\exp\left(-\frac{4.45346\sum_{j=0}^{\infty}\mathrm{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\left(1+\exp\left(\frac{7.598\sum_{j=0}^{\infty}\mathrm{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)\right)}\right)$$

(((0.5(e^(sqrt3*0.948055654*6.6336683) + e^(sqrt3*-1.342682454*6.6336683)))))^1/2-34-5

Input interpretation:

$$\sqrt{0.5\left(e^{\sqrt{3}\times 0.948055654\times 6.6336683}+e^{\sqrt{3}\times(-1.342682454)\times 6.6336683}\right)}-34-5$$

Result:

125.011...

125.011… 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

Series representations:

$$\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}-34-5=$$
$$0.707107\left(-55.1543+\sqrt{e^{-8.90691\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\right)}\right)$$

$$\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}-34-5=0.707107$$
$$\left(-55.1543+\sqrt{\exp\left(-8.90691\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}\right)$$

$$\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}-34-5=$$
$$0.707107\left(-55.1543+\sqrt{\left(\exp\left(-\frac{4.45346\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\left(1+\exp\left(\frac{7.598\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)\right)}\right)$$

And:

sqrt729*1/2*(((((0.5(e^(sqrt3*0.948055654*6.6336683) + e^(sqrt3*-1.342682454*6.6336683)))))^1/2-34-2))+4/5

Input interpretation:

$$\sqrt{729}\times\frac{1}{2}\left(\sqrt{0.5\left(e^{\sqrt{3}\times 0.948055654\times 6.6336683}+e^{\sqrt{3}\times(-1.342682454)\times 6.6336683}\right)}-34-2\right)+\frac{4}{5}$$

Result:

1728.95...

1728.95…

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

Series representations:

$$\frac{1}{2}\sqrt{729}\left(\sqrt{0.5\left(e^{\sqrt{3}\ 0.948056\times 6.63367}+e^{\sqrt{3}\ (-1.34268)\ 6.63367}\right)}-34-2\right)+\frac{4}{5}=$$
$$0.353553\left(2.26274-50.9117\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}+\sqrt{e^{-8.90691\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\right)}\sqrt{728}\sum_{k=0}^{\infty}728^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{1}{2}\sqrt{729}\left(\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\sqrt{3}\,(-1.34268)\,6.63367}\right)}-34-2\right)+\frac{4}{5}=$$

$$0.353553\left(2.26274-50.9117\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\sqrt{\exp\left(-8.90691\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}\sqrt{728}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{728}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{1}{2}\sqrt{729}\left(\sqrt{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\sqrt{3}\,(-1.34268)\,6.63367}\right)}-34-2\right)+\frac{4}{5}=$$

$$0.353553\left(2.26274-50.9117\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(729-z_0)^k z_0^{-k}}{k!}+\sqrt{\left(\exp\left(-8.90691\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\left(1+\exp\left(15.196\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\right)\right)}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(729-z_0)^k z_0^{-k}}{k!}\right) \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

(((((0.5(e^(sqrt3*0.948055654*6.6336683) + e^(sqrt3*-1.342682454*6.6336683)))))))^1/21- 7*1/10^3

Input interpretation:

$$\sqrt[21]{0.5\left(e^{\sqrt{3}\times 0.948055654\times 6.6336683}+e^{\sqrt{3}\times(-1.342682454)\times 6.6336683}\right)}-7\times\frac{1}{10^3}$$

Result:

1.618325531898728836063509055847500751410065335542606770967...

1.6183255318…. result that is a very good approximation to the value of the golden ratio 1,618033988749...

Series representations:

$$\sqrt[21]{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}-\frac{7}{10^3}=$$
$$0.967532\left(-0.0072349+\sqrt[21]{e^{-8.90691\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{1/2}{k}}\right)}\right)$$

$$\sqrt[21]{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}-\frac{7}{10^3}=0.967532\left(-0.0072349+\right.$$
$$\left.\sqrt[21]{\exp\left(-8.90691\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(1+e^{15.196\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)}\right)$$

$$\sqrt[21]{0.5\left(e^{\sqrt{3}\,0.948056\times 6.63367}+e^{\left(\sqrt{3}\,6.63367\right)(-1)\,1.34268}\right)}-\frac{7}{10^3}=$$
$$0.967532\left(-0.0072349+\left(\exp\left(-\frac{4.45346\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right.\right.$$
$$\left.\left.\left(1+\exp\left(\frac{7.598\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}2^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}\right)\right)\right)\wedge(1/21)\right)$$

Observations

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

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