On some Ramanujan equations: mathematical connections with ϕ and various expressions concerning Modified Gravity Theory. II

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Abstract

In this paper we have described some Ramanujan formulas and obtained some mathematical connections with ϕ and various equations concerning Modified Gravity Theory

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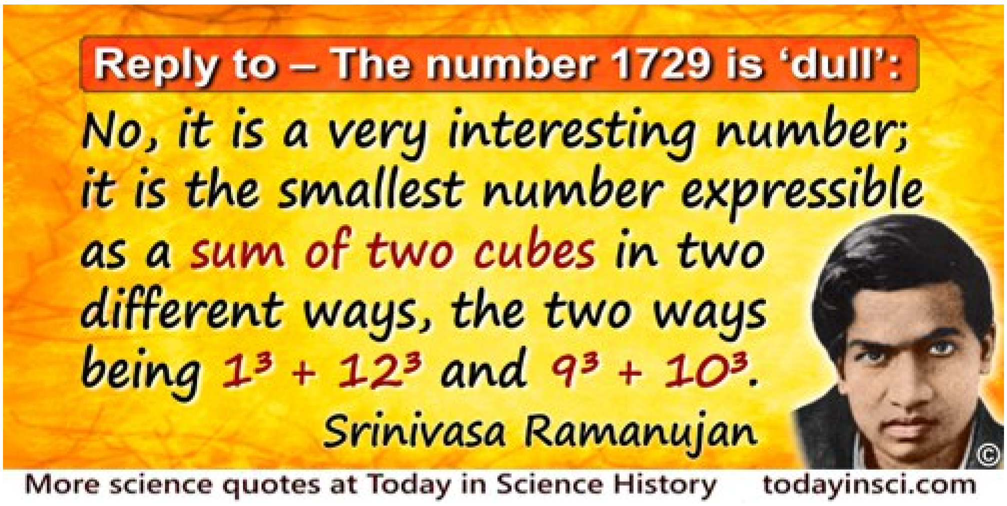
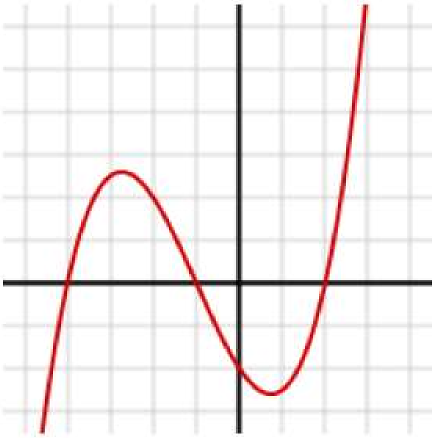
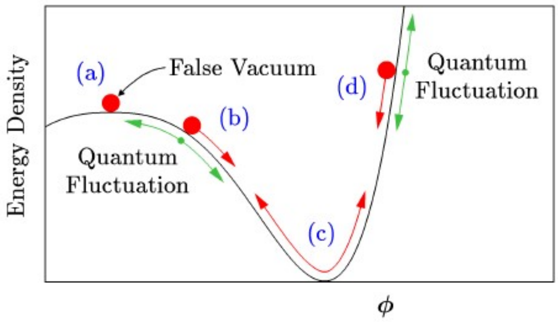


https://todayinsci.com/R/Ramanujan_Srinivasa/RamanujanSrinivasa-Quotations.htm





From:

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

We have that:

$$\left\{1-\frac{3}{\pi\sqrt{n}}-24\sum_{r=1}^{r=\infty}\frac{r}{e^{2\pi r\sqrt{n}}-1}\right\}\left\{1+240\sum_{r=1}^{r=\infty}\frac{r^3}{e^{2\pi r\sqrt{n}}-1}\right\}$$
$$=R'\left\{1-504\sum_{r=1}^{r=\infty}\frac{r^5}{e^{2\pi r\sqrt{n}}-1}\right\},$$

0.796408*1 = x*1

1+240 sum (r^3/((e^((((2Pi*r)sqrt22)))-1))), r = 1..infinity

Input interpretation:

$$1+240\sum_{r=1}^{\infty}\frac{r^3}{e^{(2\pi r)\sqrt{22}}-1}$$

Result:

1.

1

1-3/(Pi*sqrt22)-24 sum (r/((e^((((2Pi*r)sqrt22)))-1))), r = 1..infinity

Input interpretation:

$$1-\frac{3}{\pi\sqrt{22}}-24\sum_{r=1}^{\infty}\frac{r}{e^{(2\pi r)\sqrt{22}}-1}$$

Result:

0.796408

0.796408

1-504 sum (r^5/((e^((((2Pi*r)sqrt22)))-1))), r = 1..infinity

Input interpretation:

$$1-504\sum_{r=1}^{\infty}\frac{r^5}{e^{(2\pi r)\sqrt{22}}-1}$$

Result:

1.

1

1-3/(Pi*sqrt22)-24 sum (r/((e^((((2Pi*r)sqrt22)))-1))), r = 1..1729

Input interpretation:

$$1-\frac{3}{\pi\sqrt{22}}-24\sum_{r=1}^{1729}\frac{r}{e^{(2\pi r)\sqrt{22}}-1}$$

Result:

0.796408

0.796408

1+240 sum (r^3/((e^((((2Pi*r)sqrt22)))-1))), r = 1..1729

Input interpretation:

$$1+240\sum_{r=1}^{1729}\frac{r^3}{e^{(2\pi r)\sqrt{22}}-1}$$

Result:

1.

1

1-504 sum (r^5/((e^((((2Pi*r)sqrt22)))-1))), r = 1..1729

Input interpretation:

$$1-504\sum_{r=1}^{1729}\frac{r^5}{e^{(2\pi r)\sqrt{22}}-1}$$

Result:

1.

1

0.796408*1 = R*1

Input interpretation:

$0.796408\times 1 = R\times 1$

Result:

0.796408

0.796408

From

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

Hence

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

so that

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

Hence

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

we perform the following calculations adding the value of the golden ratio:

64*(22/0.796408)-24-sqrt276+golden ratio

Input interpretation:

$$64\times\frac{22}{0.796408} - 24 - \sqrt{276} + \phi$$

ϕ is the golden ratio

Result:

1728.942828070630392891426333667279707547246337834509693741...

1728.94282807… ≈ 1729

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. 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:

$$\frac{64\times 22}{0.796408}-24-\sqrt{276}+\phi=1743.94+\phi-\sqrt{275}\sum_{k=0}^{\infty}275^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{64\times 22}{0.796408}-24-\sqrt{276}+\phi=1743.94+\phi-\sqrt{275}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{275}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{64\times 22}{0.796408}-24-\sqrt{276}+\phi=1743.94+\phi-\frac{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}275^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}$$

From:

Towards a Resolution of the Cosmological Singularity in Non-local Higher Derivative Theories of Gravity

Tirthabir Biswas, Tomi Koivisto, and Anupam Mazumdar - arXiv:1005.0590v2 [hep-th] 9 Nov 2010

We have that:

$$h_3 = -\frac{1}{36M_*^4}\left(\mu + 6h_1M_*^2(\lambda + 4h_1M_*^2)\right) , \quad (3.34)$$

$$h_5 = \frac{1}{720M_*^6}\left(\lambda\mu + 2h_1(3\lambda^2 + 11\mu)M_*^2 + 132\lambda h_1^2M_*^4 + 384h_1^3M_*^6\right) , \quad (3.35)$$

$$h_7 = -\frac{1}{90720M_*^8}\Big[\mu(3\lambda^2 + 26\mu) + 6h_1\lambda(3\lambda^2 + 73\mu)M_*^2 + 12h_1^2(141\lambda^2 + 242\mu)M_*^4 + 17424\lambda h_1^3M_*^6 + 39168h_1^4M_*^8\Big] . \quad (3.36)$$

(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))

Input interpretation:

$$-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}} - 0.796408\right) + \left(\sqrt[6]{\frac{1}{\frac{720}{24}}} - 0.796408\right) - \left(\sqrt[8]{\frac{1}{\frac{90720}{24}}} - 0.796408\right)$$

Result:

0.102987...

0.102987…

1+(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))^1/(4724/10^3)

where 4724 = (4372 + 276 + 64 + 24 / 2)

Input interpretation:

$$1 + \sqrt[\frac{4724}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}} - 0.796408\right) + \left(\sqrt[6]{\frac{1}{\frac{720}{24}}} - 0.796408\right) - \left(\sqrt[8]{\frac{1}{\frac{90720}{24}}} - 0.796408\right)}$$

Result:

1.6180460117609774352564362214771789527970992733227811164766...

1.61804601176.... result that is a very good approximation to the value of the golden ratio 1.618033988749...

or:

1/6*1/(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))

Input interpretation:

$$\frac{1}{6}\times\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}$$

Result:

1.618327638710124772893694156537356414411009352673597756007...

1.61832763871...

We have also:

((1*1/(((2Pi)*1/(((2sqrt[1/(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))])))))))^1/10

Input interpretation:

$$\sqrt[10]{1\times\frac{1}{(2\pi)\times\frac{1}{2\sqrt{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}}$$

Result:

0.999184981896751798424413697236988266513720233235585215721...

0.99918498189... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and:

((1*1/(((2Pi)*1/(((2sqrt[1/(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))])))))))^1/8

Input interpretation:

$$\sqrt[8]{1\times\frac{1}{(2\pi)\times\frac{1}{2\sqrt{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}}$$

Result:

0.998981...

0.998981...

from which:

16log base 0.998981((((1*1/(((2Pi)*1/(((2sqrt[1/(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))]))))))))))-Pi+1/golden ratio

Input interpretation:

$$16\log_{0.998981}\left(1\times\frac{1}{(2\pi)\times\frac{1}{2\sqrt{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4348192664589559191802288056266217880058435454556937362...

125.434819266458… result very near to the Higgs boson mass 125.18 GeV

Alternative representation:

$$16 \log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{16 \log\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{0.796408-\sqrt[4]{\frac{1}{\frac{36}{24}}}+\sqrt[6]{\frac{1}{\frac{720}{24}}}-\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}}}}}\right)}{\log(0.998981)}$$

Series representations:

$$16 \log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{16 \sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sqrt{9.70997}}{\pi}\right)^k}{k}}{\log(0.998981)}$$

$$16\log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)}}}}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+16\log_{0.998981}\left(\frac{\sqrt{8.70997}\sum_{k=0}^{\infty}e^{-2.16447k}\binom{\frac{1}{2}}{k}}{\pi}\right)$$

$$16\log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)}}}}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+16\log_{0.998981}\left(\frac{\sqrt{8.70997}\sum_{k=0}^{\infty}\frac{(-0.114811)^k\left(-\frac{1}{2}\right)_k}{k!}}{\pi}\right)$$

16log base 0.998981((((1*1/(((2Pi)*1/(((2sqrt[1/(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))]))))))))))+11+1/golden ratio

Input interpretation:

$$16\log_{0.998981}\left(1\times\frac{1}{(2\pi)\times\frac{1}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)}}}}\right)+$$

$$11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.57641192004874915764287218890612467220301294483079955 72...

139.57641192… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternative representation:

$$16 \log_{0.998981}\left(\frac{1}{\frac{2\pi}{2\sqrt{\frac{1}{-\left(\sqrt[4]{\frac{\frac{1}{36}}{24}}-0.796408\right)+\left(\sqrt[6]{\frac{\frac{1}{720}}{24}}-0.796408\right)-\left(\sqrt[8]{\frac{\frac{1}{90\,720}}{24}}-0.796408\right)}}}}\right)+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}+\frac{16 \log\left(\frac{1}{\frac{2\pi}{2\sqrt{\frac{1}{0.796408-\sqrt[4]{\frac{\frac{1}{36}}{24}}+\sqrt[6]{\frac{\frac{1}{720}}{24}}-\sqrt[8]{\frac{\frac{1}{90\,720}}{24}}}}}}\right)}{\log(0.998981)}$$

Series representations:

$$16 \log_{0.998981}\left(\frac{1}{\frac{2\pi}{2\sqrt{\frac{1}{-\left(\sqrt[4]{\frac{\frac{1}{36}}{24}}-0.796408\right)+\left(\sqrt[6]{\frac{\frac{1}{720}}{24}}-0.796408\right)-\left(\sqrt[8]{\frac{\frac{1}{90\,720}}{24}}-0.796408\right)}}}}\right)+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}-\frac{16\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sqrt{9.70997}}{\pi}\right)^k}{k}}{\log(0.998981)}$$

$$16\log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}\right)+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}+16\log_{0.998981}\left(\frac{\sqrt{8.70997}\,\sum_{k=0}^{\infty} e^{-2.16447k}\binom{\frac{1}{2}}{k}}{\pi}\right)$$

$$16\log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}\right)+11+\frac{1}{\phi}=$$

$$11+\frac{1}{\phi}+16\log_{0.998981}\left(\frac{\sqrt{8.70997}\,\sum_{k=0}^{\infty}\frac{(-0.114811)^k\left(-\frac{1}{2}\right)_k}{k!}}{\pi}\right)$$

27*1/2*16log base 0.998981((((1*1/(((2Pi)*1/(((2sqrt[1/(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))]))))))))+golden ratio

Input interpretation:

$$27\times\frac{1}{2}\times16$$

$$\log_{0.998981}\left(1\times\frac{1}{(2\pi)\times\frac{1}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}\right)+\phi$$

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

ϕ is the golden ratio

Result:

1729.06…

1729.06…

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. 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)

With regard 27 (From Wikipedia):

*"The fundamental group of the complex form, compact real form, or any algebraic version of E_6 is the cyclic group **Z**/3**Z**, and its outer automorphism group is the cyclic group **Z**/2**Z**. Its fundamental representation is 27-dimensional (complex), and a basis is given by the 27 lines on a cubic surface. The dual representation, which is inequivalent, is also 27-dimensional. In particle physics, E_6 plays a role in some grand unified theories".*

Alternative representation:

$$\frac{27}{2} \times 16 \log_{0.998981}\left(\frac{1}{\frac{2\pi}{2\sqrt{\frac{1}{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}-0.796408\right)}}}}\right)+\phi =$$

$$\phi + \frac{216 \log\left(\frac{1}{\frac{2\pi}{2\sqrt{\frac{1}{0.796408-\sqrt[4]{\frac{1}{\frac{36}{24}}}+\sqrt[6]{\frac{1}{\frac{720}{24}}}-\sqrt[8]{\frac{1}{\frac{90\,720}{24}}}}}}}\right)}{\log(0.998981)}$$

Series representations:

$$\frac{27}{2}\times 16\log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{\frac{1}{36}}{24}}-0.796408\right)+\left(\sqrt[6]{\frac{\frac{1}{720}}{24}}-0.796408\right)-\left(\sqrt[8]{\frac{\frac{1}{90\,720}}{24}}-0.796408\right)}}}}\right)+\phi = \phi-\frac{216\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\sqrt{9.70997}}{\pi}\right)^k}{k}}{\log(0.998981)}$$

$$\frac{27}{2}\times 16\log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{\frac{1}{36}}{24}}-0.796408\right)+\left(\sqrt[6]{\frac{\frac{1}{720}}{24}}-0.796408\right)-\left(\sqrt[8]{\frac{\frac{1}{90\,720}}{24}}-0.796408\right)}}}}\right)+\phi = \phi+216\log_{0.998981}\left(\frac{\sqrt{8.70997}\sum_{k=0}^{\infty}e^{-2.16447k}\binom{\frac{1}{2}}{k}}{\pi}\right)$$

$$\frac{27}{2}\times 16\log_{0.998981}\left(\frac{1}{\frac{2\pi}{\sqrt[2]{\frac{1}{-\left(\sqrt[4]{\frac{\frac{1}{36}}{24}}-0.796408\right)+\left(\sqrt[6]{\frac{\frac{1}{720}}{24}}-0.796408\right)-\left(\sqrt[8]{\frac{\frac{1}{90\,720}}{24}}-0.796408\right)}}}}\right)+\phi = \phi+216\log_{0.998981}\left(\frac{\sqrt{8.70997}\sum_{k=0}^{\infty}\frac{(-0.114811)^k\left(-\frac{1}{2}\right)_k}{k!}}{\pi}\right)$$

1+(((-((((1/(36/504))^(1/4)-0.796408))) + ((((1/(720/504))^(1/6)-0.796408))) - ((((1/(90720/504))^(1/8)-0.796408))))))^1/(2880/10^3)

Input interpretation:

$$1+\sqrt[\frac{2880}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{504}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{504}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{504}}}-0.796408\right)}$$

Result:

1.41160... +
0.790684... i

Polar coordinates:

$r = 1.61796$ (radius), $\theta = 29.2546°$ (angle)

1.61796 result that is a very good approximation to the value of the golden ratio 1.618033988749...

Or:

1+(((-((((1/(36/504))^(1/4)-0.796408))) + ((((1/(720/504))^(1/6)-0.796408))) - ((((1/(90720/504))^(1/8)-0.796408))))))^1/((64*48-24*8)/10^3)

nput interpretation:

$$1+\sqrt[\frac{64\times48-24\times8}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{504}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{504}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{504}}}-0.796408\right)}$$

Result:

1.41160... +
0.790684... i

Polar coordinates:

$r = 1.61796$ (radius), $\theta = 29.2546°$ (angle)

1.61796

1+(((-((((1/(36/240))^(1/4)-0.796408))) + ((((1/(720/240))^(1/6)-0.796408))) - ((((1/(90720/240))^(1/8)-0.796408))))))^1/(3472/10^3)

Input interpretation:

$$1+\sqrt[\frac{3472}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{240}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{240}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{240}}}-0.796408\right)}$$

Result:

1.49213... +
0.626362... i

Polar coordinates:

$r = 1.61827$ (radius), $\theta = 22.7715°$ (angle)

1.61827 result that is a very good approximation to the value of the golden ratio 1.618033988749...

Or:

1+(((-((((1/(36/240))^(1/4)-0.796408))) + ((((1/(720/240))^(1/6)-0.796408))) - ((((1/(90720/240))^(1/8)-0.796408))))))^1/((64*48+18^2+76)/10^3)

Input interpretation:

$$1+\sqrt[\frac{64\times 48+18^2+76}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{240}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{240}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{240}}}-0.796408\right)}$$

Result:

1.49213... +
0.626362... i

Polar coordinates:

$r = 1.61827$ (radius), $\theta = 22.7715°$ (angle)

1.61827

1+(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))^1/(4728/10^3)

Input interpretation:

$$1+\sqrt[\frac{4728}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)}$$

Result:

1.61830...

1.61830... result that is a very good approximation to the value of the golden ratio 1.618033988749...

Or:

1+(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))^1/((64^2+24^2+64-8)/10^3)

Input interpretation:

$$1+\sqrt[\frac{64^2+24^2+64-8}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)}$$

Result:

1.6182976696035926339671809651349739963337299405671368132\u0035\u0033...

1.6182976696…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

(((1+(((-((((1/(36/24))^(1/4)-0.796408))) + ((((1/(720/24))^(1/6)-0.796408))) - ((((1/(90720/24))^(1/8)-0.796408))))))^1/(4728/10^3))))^15+(4372-24)/12-1/golden ratio

Input interpretation:

$$\left(1+\sqrt[\frac{4728}{10^3}]{-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)}\right)^{15}+\frac{4372-24}{12}-\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

1729.05...

1729.05…

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

Alternative representations:

$$\left(1+\left(-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)\right)^{\wedge}\left(1/\frac{4728}{10^3}\right)\right)^{15}+\frac{4372-24}{12}-\frac{1}{\phi}=$$
$$\frac{4348}{12}+\left(1+\sqrt[\frac{4728}{10^3}]{0.796408-\sqrt[4]{\frac{1}{\frac{36}{24}}}+\sqrt[6]{\frac{1}{\frac{720}{24}}}-\sqrt[8]{\frac{1}{\frac{90720}{24}}}}\right)^{15}-\frac{1}{2\sin(54°)}$$

$$\left(1+\left(-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)\right)^{\wedge}\left(1/\frac{4728}{10^3}\right)\right)^{15}+\frac{4372-24}{12}-\frac{1}{\phi}=$$
$$\frac{4348}{12}--\frac{1}{2\cos(216°)}+\left(1+\sqrt[\frac{4728}{10^3}]{0.796408-\sqrt[4]{\frac{1}{\frac{36}{24}}}+\sqrt[6]{\frac{1}{\frac{720}{24}}}-\sqrt[8]{\frac{1}{\frac{90720}{24}}}}\right)^{15}$$

$$\left(1+\left(-\left(\sqrt[4]{\frac{1}{\frac{36}{24}}}-0.796408\right)+\left(\sqrt[6]{\frac{1}{\frac{720}{24}}}-0.796408\right)-\left(\sqrt[8]{\frac{1}{\frac{90720}{24}}}-0.796408\right)\right)\hat{}\left(1\Big/\frac{4728}{10^3}\right)\right)^{15}+\frac{4372-24}{12}-\frac{1}{\phi}=$$

$$\frac{4348}{12}+\left(1+\sqrt[\frac{4728}{10^3}]{0.796408-\sqrt[4]{\frac{1}{\frac{36}{24}}}+\sqrt[6]{\frac{1}{\frac{720}{24}}}-\sqrt[8]{\frac{1}{\frac{90720}{24}}}}\right)^{15}--\frac{1}{2\sin(666°)}$$

Or:

4348/12 + (1 + (0.796408 - (1/(36/24))^(1/4) + (1/(720/24))^(1/6) - (1/(90720/24))^(1/8))^(1/(4728/10^3)))^15 - 1/(2 (1/4 + sqrt(5)/4))

Input interpretation:

$$\frac{4348}{12}+\left(1+\sqrt[\frac{4728}{10^3}]{0.796408-\sqrt[4]{\frac{1}{\frac{36}{24}}}+\sqrt[6]{\frac{1}{\frac{720}{24}}}-\sqrt[8]{\frac{1}{\frac{90720}{24}}}}\right)^{15}-\frac{1}{2\left(\frac{1}{4}+\frac{\sqrt{5}}{4}\right)}$$

Result:

1729.05...

1729.05…

where we have used/chosen

$$\mu = -6\lambda^2 = -6M_*^2\,. \tag{3.58}$$

Thus we have a late time super-inflationary attractor solution given by

$$h_1 \to -\frac{\lambda}{6}\,. \tag{4.64}$$

In the expanding branch, since $h_1 > 0$, this means that the attractor solution only exists if $\lambda < 0$. Our numerical studies confirm this behavior, see figure 3, and we will also provide a "Dynamical System Analysis" further corroborating it.

From the previous equations (3.34-3.36), we obtain:

$$h_3 = -\frac{1}{36M_*^4}\left(\mu + 6h_1M_*^2(\lambda + 4h_1M_*^2)\right) ,$$

-1/36(-6+6*(1/6)(-1+4*1/6)

Input:

$$-\frac{1}{36}\left(-6+6\times\frac{1}{6}\left(-1+4\times\frac{1}{6}\right)\right)$$

Exact result:

$$\frac{19}{108}$$

Decimal approximation:

0.17592592592592592592592592592592592592592592592592592592592592592592...

0.17592592592.....

$$h_5 = \frac{1}{720M_*^6}\left(\lambda\mu + 2h_1(3\lambda^2 + 11\mu)M_*^2 + 132\lambda h_1^2M_*^4 + 384h_1^3M_*^6\right)$$

1/720*(((-1*-6+2*1/6(3+11*(-6))+132*(-1*1/36)+384(1/216)))

Input:

$$\frac{1}{720}\left(-(-6)+2\times\frac{1}{6}(3+11\times(-6))+132\left(-\frac{1}{36}\right)+384\times\frac{1}{216}\right)$$

Exact result:

$$-\frac{19}{810}$$

Decimal approximation:

-0.023456790123456790123456790123456790123456790123456790123456790123456790123456790123456790123456790123456790123...

-0.023456790123….

$$h_7 = -\frac{1}{90720 M_*^8}\Big[\mu(3\lambda^2+26\mu) + 6h_1\lambda(3\lambda^2+73\mu)M_*^2 + 12h_1^2(141\lambda^2+242\mu)M_*^4 + 17424\lambda h_1^3 M_*^6 + 39168 h_1^4 M_*^8\Big] .$$

-1/90720*(((((-6(3+26(-6))+6*1/6*(-1)(3+73(-6))+12*1/36(141+242(-6))+17424((-1)(1/216))+39168*(1/6)^4))))

Input:

$$-\frac{1}{90720}\left(-6\,(3+26\times(-6))+6\times\frac{1}{6}\times(-1)\,(3+73\times(-6))+12\times\frac{1}{36}\,(141+242\times(-6))+17424\left(-\frac{1}{216}\right)+39168\left(\frac{1}{6}\right)^4\right)$$

Exact result:

$$-\frac{779}{81648}$$

Decimal approximation:

−0.0095409563002155594748187340779933372525965118557711150 3...

-0.00954095630021….

From the algebraic sum, we obtain:

(0.17592592592592-0.02345679012345679-0.00954095630021555)

Input interpretation:

0.17592592592592 − 0.02345679012345679 − 0.00954095630021555

Result:

0.14292817950224766

0.14292817950224766

From which:

1+(0.175925925-0.023456790-0.009540956)^1/(4048/10^3)

Input interpretation:

$$1+\sqrt[\frac{4048}{10^3}]{0.175925925-0.023456790-0.009540956}$$

Result:

1.61842075...

1.61842075…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Or:

1+(0.175925925-0.023456790-0.009540956)^1/((64^2-48)/10^3)

Input interpretation:

$$1+\sqrt[\frac{64^2-48}{10^3}]{0.175925925-0.023456790-0.009540956}$$

Result:

1.61842075...

1.61842075….

(64^2+126*2)/12+(((1+(0.175925925-0.023456790-0.009540956)^1/((64^2-48)/10^3))))^15 -1/(2(1/4+sqrt(5)/4))-8/5

Input interpretation:

$$\frac{1}{12}(64^2+126\times 2)+\left(1+\sqrt[\frac{64^2-48}{10^3}]{0.175925925-0.023456790-0.009540956}\right)^{15}-\frac{1}{2\left(\frac{1}{4}+\frac{\sqrt{5}}{4}\right)}-\frac{8}{5}$$

Result:

1729.0149...

1729.0149…

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. 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)

And:

(((((64^2+126*2)/12+(((1+(0.175925925-0.023456790-0.009540956)^1/((64^2-48)/10^3))))^15 -1/(2(1/4+sqrt(5)/4))-8/5))))^1/15

Input interpretation:

$$\left(\frac{1}{12}\left(64^2+126\times 2\right)+\left(1+\sqrt[\frac{64^2-48}{10^3}]{0.175925925-0.023456790-0.009540956}\right)^{15}-\frac{1}{2\left(\frac{1}{4}+\frac{\sqrt{5}}{4}\right)}-\frac{8}{5}\right)\text{^}(1/15)$$

Result:

1.64381617...

1.64381617…. ≈ $\zeta(2)=\frac{\pi^2}{6}=1.644934\ldots$

(((((64^2+126*2)/12+(((1+(0.175925925-0.023456790-0.009540956)^1/((64^2-48)/10^3))))^15 -1/(2(1/4+sqrt(5)/4))-8/5))))^1/14+29/10^3

Input interpretation:

$$\left(\frac{1}{12}\left(64^2+126\times 2\right)+\left(1+\sqrt[\frac{64^2-48}{10^3}]{0.175925925-0.023456790-0.009540956}\right)^{15}-\frac{1}{2\left(\frac{1}{4}+\frac{\sqrt{5}}{4}\right)}-\frac{8}{5}\right)\text{^}(1/14)+\frac{29}{10^3}$$

Result:

1.73222231...

1.73222231…. ≈ $\sqrt{3}$ that is the ratio between the gravitating mass M_0 and the Wheelerian mass q

$$M_0 = \sqrt{3q^2 - \Sigma^2},$$
$$q = \frac{(3\sqrt{3})\, M_s}{2}.$$

(see: Can massless wormholes mimic a Schwarzschild black hole in the strong field lensing? - arXiv:1909.13052v1 [gr-qc] 28 Sep 2019)

Now, we have that:

$$\delta_2 = \delta_0 \left(-h_1 + \frac{\mu}{12 h_1 M_*^4} \right), \tag{5.89}$$

$$\delta_4 = \delta_0 \frac{(\lambda + 8 h_1 M_*^2)(-\mu + 12 h_1^2 M_*^4)}{144 h_1 M_*^6}, \tag{5.90}$$

$$\delta_5 = \frac{7\delta_1 \mu + 18(\delta_1 h_1 - 2\delta_3)\lambda M_*^2 + 12 h_1 (2\delta_1 h_1 - 45\delta_3) M_*^4}{720 M_*^4}, \tag{5.91}$$

$$\delta_6 = \delta_0 \frac{(\mu - 12 h_1^2 M_*^4)(3\lambda^2 + 11\mu + 132 h_1 \lambda M_*^2 + 576 h_1^2 M_*^4)}{12960 h_1 M_*^8}, \tag{5.92}$$

$$\delta_7 = \frac{1}{30240 M_*^6} \Big[-10\delta_1 \lambda \mu + 3 \left[12(\delta_3 - \delta_1 h_1)\lambda^2 + (104\delta_3 - 87\delta_1 h_1)\mu \right] M_*^2 + 42 h_1 (72\delta_3 - 19\delta_1 h_1)\lambda M_*^4 + 36 h_1^2 (499\delta_3 - 30\delta_1 h_1) M_*^6 \Big]. \tag{5.93}$$

For $\mu = -6$; $\lambda = -1$; $h_1 = 1/6$; $M = 1$; $\delta_0 = 0.00001$; $\delta_1 = 0.00002$; $\delta_3 = 0.00003$ we obtain:

0.00001(-1/6+(-6/(12*1/6)))

Input:

$$0.00001\left(-\frac{1}{6} - \frac{6}{12 \times \frac{1}{6}}\right)$$

Result:

−0.0000316666666666666666666666666666666666666666666666666...

Repeating decimal:

$-0.0000316\overline{6}$ (period 1)

-0.0000316

0.00001*(((-1+8*1/6)(6+12*1/36)))/(-144)

Input:

$$0.00001\left(-\frac{1}{144}\left(\left(-1+8\times\frac{1}{6}\right)\left(6+12\times\frac{1}{36}\right)\right)\right)$$

Result:

$-1.46604938271604938271604938271604938271604938271604 9\ldots \times 10^{-7}$

Repeating decimal:

$-0.000000146\overline{604938271}$ (period 9)

-0.000000146604938271

((((7*0.00002*(-6)+18(0.00002*1/6-2*0.00003)*(-1)+12*1/6(2*0.00002*1/6-45*0.00003)))))/(720)

Input:

$$\frac{1}{720}\left(7\times0.00002\times(-6)+18\left(0.00002\times\frac{1}{6}-2\times0.00003\right)\times(-1)+12\times\frac{1}{6}\left(2\times0.00002\times\frac{1}{6}-45\times0.00003\right)\right)$$

Result:

$-3.481481481481481481481481481481481481481481481481481\ldots \times 10^{-6}$

Repeating decimal:

$-0.000003\overline{481}$ (period 3)

-0.000003481

(((0.00001*((-6-12*1/36))((3+11(-6)+132*1/6(-1)+576*1/36)))))/((12960*1/6))

Input:

$$\frac{0.00001\left(-6-12\times\frac{1}{36}\right)\left(3+11\times(-6)+132\times\frac{1}{6}\times(-1)+576\times\frac{1}{36}\right)}{12\,960\times\frac{1}{6}}$$

Result:

$2.023148148148148148148148148148148148148148148148148 1\ldots \times 10^{-6}$

Repeating decimal:

$0.000002023\overline{148}$ (period 3)

0.000002023148

1/30240*[(-10*0.00002*6+3((((12(0.00003-0.00002*1/6)+(104*0.00003-87*0.00002*1/6)*(-6))))+42*1/6(72*0.00003-19*0.00002*1/6)(-1)+36*1/36(499*0.00003-30*0.00002*1/6)]

Input:

$$\frac{1}{30\,240}\left(-10\times 0.00002\times 6+3\left(\left(12\left(0.00003-0.00002\times\frac{1}{6}\right)+\left(104\times 0.00003-87\times 0.00002\times\frac{1}{6}\right)\times(-6)\right)+42\times\frac{1}{6}\left(72\times 0.00003-19\times 0.00002\times\frac{1}{6}\right)\times(-1)+36\times\frac{1}{36}\left(499\times 0.00003-30\times 0.00002\times\frac{1}{6}\right)\right)\right)$$

Result:

$-1.673280423280423280423280423280423280423280423280423\ldots\times 10^{-6}$

Repeating decimal:

$-0.00000167\overline{328042}$ (period 6)

-0.00000167328042

From the algebraic sum of the five results, we obtain:

(-0.0000316 -0.000000146604938271 -0.000003481 + 0.000002023148 - 0.00000167328042)

Input interpretation:

$$-0.0000316-1.46604938271\times 10^{-7}-3.481\times 10^{-6}+2.023148\times 10^{-6}-1.67328042\times 10^{-6}$$

Result:

-0.000034877737358271

-0.000034877737358271

And:

Input interpretation:

$$-(1/(-0.0000316 - 1.46604938271\times10^{-7} - 3.481\times10^{-6} + 2.023148\times10^{-6} - 1.67328042\times10^{-6}))$$

Result:

28671.58467671806477259525799674228641179169121439785491032...

28671.58467....

From which:

[-1/(-0.0000316 -0.000000146604938271 -0.000003481 + 0.000002023148 - 0.00000167328042)]^1/2 -29 -1/golden ratio

Input interpretation:

$$\sqrt{-(1/(-0.0000316 - 1.46604938271\times10^{-7} - 3.481\times10^{-6} + 2.023148\times10^{-6} - 1.67328042\times10^{-6}))} - 29 - \frac{1}{\phi}$$

Result:

139.709...

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

[-1/(-0.0000316 -0.000000146604938271 -0.000003481 + 0.000002023148 - 0.00000167328042)]^1/2 -29-11-4

Input interpretation:

$$\sqrt{-(1/(-0.0000316 - 1.46604938271\times10^{-7} - 3.481\times10^{-6} + 2.023148\times10^{-6} - 1.67328042\times10^{-6}))} - 29 - 11 - 4$$

Result:

125.327...

125.327... result very near to the Higgs boson mass 125.18 GeV

27*1/2*((([-1/(-0.0000316 -0.000000146604938271 -0.000003481 + 0.000002023148 -0.00000167328042)]^1/2 -29-11-2/golden ratio)))

Input interpretation:

$$27 \times \frac{1}{2} \left(\sqrt{-\left(1/\left(-0.0000316 - 1.46604938271 \times 10^{-7} - 3.481 \times 10^{-6} + 2.023148 \times 10^{-6} - 1.67328042 \times 10^{-6}\right)\right)} - 29 - 11 - \frac{2}{\phi}\right)$$

ϕ is the golden ratio

Result:

1729.23...

1729.23...

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. 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)

(((((Pi+((((27*1/2*(((([-1/(-0.0000316 -0.000000146604938271 -0.000003481 + 0.000002023148 -0.00000167328042)]^1/2 -29-13+1/2)))))))))))))^1/15-(29-3)/10^3

Input interpretation:

$$\left(\pi + 27 \times \frac{1}{2} \left(\sqrt{-\left(1/\left(-0.0000316 - 1.46604938271 \times 10^{-7} - 3.481 \times 10^{-6} + 2.023148 \times 10^{-6} - 1.67328042 \times 10^{-6}\right)\right)} - 29 - 13 + \frac{1}{2}\right)\right)^{\wedge}(1/15) - \frac{29 - 3}{10^3}$$

Result:

1.617803...

1.617803…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\pi + \frac{27}{2}\left(\sqrt{\left(-\left(1/\left(-0.0000316 - 1.466049382710000\times10^{-7} - 3.481\times10^{-6} + 2.02315\times 10^{-6} - 1.67328\times10^{-6}\right)\right)\right)} - 29 - 13 + \frac{1}{2}\right)\right)^{\wedge}(1/15) - \frac{29-3}{10^3} = -\frac{13}{500} + \sqrt[15]{1725.66 + 4\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$\left(\pi + \frac{27}{2}\left(\sqrt{\left(-\left(1/\left(-0.0000316 - 1.466049382710000\times10^{-7} - 3.481\times10^{-6} + 2.02315\times 10^{-6} - 1.67328\times10^{-6}\right)\right)\right)} - 29 - 13 + \frac{1}{2}\right)\right)^{\wedge}(1/15) - \frac{29-3}{10^3} = -\frac{13}{500} + \sqrt[15]{1723.66 + 2\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$\left(\pi + \frac{27}{2}\left(\sqrt{\left(-\left(1/\left(-0.0000316 - 1.466049382710000\times10^{-7} - 3.481\times10^{-6} + 2.02315\times 10^{-6} - 1.67328\times10^{-6}\right)\right)\right)} - 29 - 13 + \frac{1}{2}\right)\right)^{\wedge}(1/15) - \frac{29-3}{10^3} = -\frac{13}{500} + \sqrt[15]{1725.66 + x + 2\sum_{k=1}^{\infty}\frac{\sin(k\,x)}{k}} \quad \text{for } (x \in \mathbb{R} \text{ and } x > 0)$$

Integral representations:

$$\left(\pi + \frac{27}{2}\left(\sqrt{\left(-\left(1/\left(-0.0000316 - 1.466049382710000\times10^{-7} - 3.481\times10^{-6} + 2.02315\times 10^{-6} - 1.67328\times10^{-6}\right)\right)\right)} - 29 - 13 + \frac{1}{2}\right)\right)^{\wedge}(1/15) - \frac{29-3}{10^3} = -\frac{13}{500} + \sqrt[15]{1725.66 + 2\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

$$\left(\pi + \frac{27}{2}\left(\sqrt{\left(-\left(1/\left(-0.0000316 - 1.466049382710000\times10^{-7} - 3.481\times10^{-6} + 2.02315\times 10^{-6} - 1.67328\times10^{-6}\right)\right)\right)} - 29 - 13 + \frac{1}{2}\right)\right)^{\wedge}(1/15) - \frac{29-3}{10^3} = -0.026 + 1.06757\sqrt[15]{647.123 + \int_0^{\infty}\frac{\sin^3(t)}{t^3}\,dt}$$

$$\left(\pi + \frac{27}{2}\left(\sqrt{\left(-\left(1/\left(-0.0000316 - 1.466049382710000\times10^{-7} - 3.481\times10^{-6} + 2.02315\times 10^{-6} - 1.67328\times10^{-6}\right)\right)\right)} - 29 - 13 + \frac{1}{2}\right)\right)^{\wedge}$$

$$(1/15) - \frac{29-3}{10^3} = -0.026 + 1.0837\sqrt[15]{516.8 + \int_0^{\infty}\frac{\sin^5(t)}{t^5}\,dt}$$

We have also:

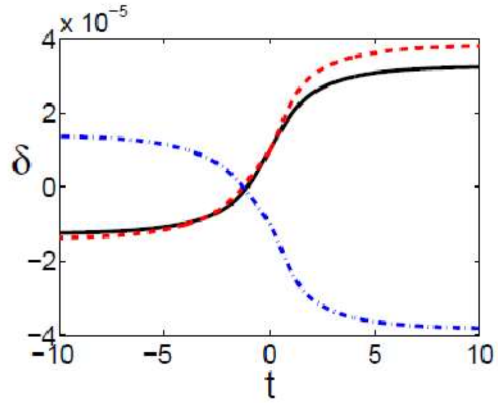


Figure 6: Numerical solutions of the perturbation evolution in the cosh-bounce for different initial conditions at $t_i = 0$. Units are such that $M_* = 1$. Solid (black) line: $\delta_i = \dot{\delta}_i = 1.0e^{-5}$. Dashed (red) lines: $\delta_i = \dot{\delta}_i = \ddot{\delta}_i = \delta_i^{(3)} = 1.0e^{-5}$. We also plot a decaying mode with dash-dotted (blue) line: $\delta_i = \dot{\delta}_i = -1.0e^{-5}$. Note that the linear perturbation δ can always be rescaled as the normalization does not affect the evolution. The results confirm that the superhorizon perturbations freeze in the expanding phase.

$$\begin{aligned}
\delta^{(4)} &+ 7\sqrt{\frac{\lambda}{2}}\tanh\left(\sqrt{\frac{\lambda}{2}}t\right)\delta^{(3)} + \left[4\lambda\mathrm{sech}^2\left(\sqrt{\frac{\lambda}{2}}t\right) + 6\lambda\tanh^2\left(\sqrt{\frac{\lambda}{2}}t\right) + \lambda\right]\ddot{\delta} \\
&+ \left[\frac{7\lambda^{3/2}}{\sqrt{2}}\tanh\left(\sqrt{\frac{\lambda}{2}}t\right)\mathrm{sech}^2\left(\sqrt{\frac{\lambda}{2}}t\right)\right. \\
&+ \left. 4\sqrt{\frac{\lambda}{2}}\tanh\left(\sqrt{\frac{\lambda}{2}}t\right)\left(3\lambda\mathrm{sech}^2\left(\sqrt{\frac{\lambda}{2}}t\right) + \lambda\right)\right]\dot{\delta} = 0\,. \qquad (5.96)
\end{aligned}$$

For t = -10 δ = 1.0e-5 λ = -1, we obtain:

1.0e-5 + 7sqrt(-1/2) tanh (sqrt(-1/2)10) (1.0e-5) + [-4sech^2(sqrt(-1/2)10)-6tanh^2(sqrt(-1/2)10)-1]*(1.0e-5) + [(-7^1.5) / (sqrt2) tanh(sqrt(-1/2)10) sech^2(sqrt(-1/2)10)+4*sqrt(-1/2) tanh(sqrt(-1/2)10) (-3sech^2(sqrt(-/2)10)-1)](1.0e-5)

1.0e-5 + 7sqrt(-1/2) tanh (sqrt(-1/2)10) (1.0e-5)

Input interpretation:

$$1\times 10^{-5}+\left(7\sqrt{-\frac{1}{2}}\right)\tanh\left(\sqrt{-\frac{1}{2}}\times 10\right)\times 1\times 10^{-5}$$

tanh(x) is the hyperbolic tangent function

Result:

−0.0000397440...

-0.0000397440….

[-4sech^2(sqrt(-1/2)10)-6tanh^2(sqrt(-1/2)10)-1]*(1.0e-5) + [(-7^1.5) / (sqrt2) tanh(sqrt(-1/2)10) sech^2(sqrt(-1/2)10)+4*sqrt(-1/2) tanh(sqrt(-1/2)10) (-3sech^2(sqrt(-1/2)10)-1)](1.0e-5)

Input interpretation:

$$\left(-4\,\text{sech}^2\left(\sqrt{-\frac{1}{2}}\times 10\right)-6\tanh^2\left(\sqrt{-\frac{1}{2}}\times 10\right)-1\right)\times 1\times 10^{-5}+\left(-\frac{7^{1.5}}{\sqrt{2}}\tanh\left(\sqrt{-\frac{1}{2}}\times 10\right)\text{sech}^2\left(\sqrt{-\frac{1}{2}}\times 10\right)+\left(4\sqrt{-\frac{1}{2}}\right)\tanh\left(\sqrt{-\frac{1}{2}}\times 10\right)\left(-3\,\text{sech}^2\left(\sqrt{-\frac{1}{2}}\times 10\right)-1\right)\right)\times 1\times 10^{-5}$$

sech(x) is the hyperbolic secant function

tanh(x) is the hyperbolic tangent function

Result:

0.000170027... −
0.000264535... i

Polar coordinates:

r = 0.000314465 (radius), θ = −57.2695° (angle)

0.000314465

Thence:

(-0.0000397440+0.000314465)

Input interpretation:

$-0.0000397440 + 0.000314465$

Result:

0.000274721

0.000274721

From which:

1/(-0.0000397440+0.000314465) - 18 -1/golden ratio

Input interpretation:

$$\frac{1}{-0.0000397440 + 0.000314465} - 18 - \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

3621.44...

3621.44…. result practically equal to the rest mass of double charmed Xi baryon 3621.40

Alternative representations:

$$\frac{1}{-0.000039744 + 0.000314465} - 18 - \frac{1}{\phi} = -18 + \frac{1}{0.000274721} - \frac{1}{2 \sin(54°)}$$

$$\frac{1}{-0.000039744 + 0.000314465} - 18 - \frac{1}{\phi} = -18 + \frac{1}{0.000274721} - -\frac{1}{2 \cos(216°)}$$

$$\frac{1}{-0.000039744 + 0.000314465} - 18 - \frac{1}{\phi} = -18 + \frac{1}{0.000274721} - -\frac{1}{2 \sin(666°)}$$

(((1/(-0.0000397440+0.000314465))))^1/17-18/10^4

Input interpretation:

$$\sqrt[17]{\frac{1}{-0.0000397440 + 0.000314465}} - \frac{18}{10^4}$$

Result:

1.618058016424155314521582279967252238430189381885487529031...

1.6180580164..... result that is a very good approximation to the value of the golden ratio 1.618033988749...

(((1/(-0.0000397440+0.000314465))))/2-89-2

Input interpretation:

$$\frac{1}{2} \times \frac{1}{-0.0000397440 + 0.000314465} - 89 - 2$$

Result:

1729.028319640653608570149351523909712035119266455786052030...

1729.02831964......

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. 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)

(((1/(-0.0000397440+0.000314465))))/29

Input interpretation:

$$\frac{1}{29} \times \frac{1}{-0.0000397440 + 0.000314465}$$

Result:

125.5191944579761109358723690706144628989737425141921415193...

125.5191944579..... result very near to the Higgs boson mass 125.18 GeV

(((1/(-0.0000397440+0.000314465))))/29+11+3

Input interpretation:

$$\frac{1}{29} \times \frac{1}{-0.0000397440 + 0.000314465} + 11 + 3$$

Result:

139.51919445797611093587236907061446289897374251419214l5193...

139.5191944579..... result practically equal to the rest mass of Pion meson 139.57 MeV

From:

Black holes in Modified Gravity

G.G.L. Nashed - nashed@bue.edu.eg - Centre for Theoretical Physics, the British University in Egypt, 11837 - P.O. Box 43, Egypt

January 11th-14th , 2020

For

M = 1.312806e+40; r = 1.949322e+13; β = 8

We have that:

$$T(r) = \frac{12\sqrt[3]{r^4} + 2\beta[3]^5}{36\,|\beta|\,\sqrt[3]{r^4}},$$

and obtain:

(((12(((1.949322e+13)^4))^(1/3)+16(3)^5))) / (((36(8) (((1.949322e+13)^4))^(1/3))))

Input interpretation:

$$\frac{12\sqrt[3]{(1.949322 \times 10^{13})^4} + 16 \times 3^5}{36 \times 8\sqrt[3]{(1.949322 \times 10^{13})^4}}$$

Result:

0.0416667...

0.0416667…

Rational approximation:

$\frac{1}{24}$

1/ (((((12(((1.949322e+13)^4))^(1/3)+16(3)^5))) / (((36(8)(((1.949322e+13)^4))^(1/3))))))

Input interpretation:

$$\frac{1}{\frac{12\sqrt[3]{(1.949322\times10^{13})^4}+16\times3^5}{36\times8\sqrt[3]{(1.949322\times10^{13})^4}}}$$

Result:

24.0000...

24

This value is linked to the "Ramanujan function" (an elliptic modular function that satisfies the need for "conformal symmetry") that has 24 "modes" corresponding to the physical vibrations of a bosonic string.

72* 1/ (((((12(((1.949322e+13)^4))^(1/3)+16(3)^5))) 1/ (((36(8)(((1.949322e+13)^4))^(1/3))))))+1

Input interpretation:

$$72\times\frac{1}{\left(12\sqrt[3]{(1.949322\times10^{13})^4}+16\times3^5\right)\times\frac{1}{36\times8\sqrt[3]{(1.949322\times10^{13})^4}}}+1$$

Result:

1729.00...

1729

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. 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)

(((((72* 1/ (((((12(((1.949322e+13)^4))^(1/3)+16(3)^5))) 1/ (((36(8) (((1.949322e+13)^4))^(1/3))))))+1)))))^1/15-(21+5)/10^3

Input interpretation:

$$\sqrt[15]{72\times\frac{1}{\left(12\sqrt[3]{(1.949322\times10^{13})^4}+16\times3^5\right)\times\frac{1}{36\times8\sqrt[3]{(1.949322\times10^{13})^4}}}+1}-\frac{21+5}{10^3}$$

Result:

1.617815228748728062938979472305726240427970019338383222774...

1.617815228748…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

5((((1/ (((((12(((1.949322e+13)^4))^(1/3)+16(3)^5))) 1/ (((36(8) (((1.949322e+13)^4))^(1/3))))))+1))))+11+Pi

Input interpretation:

$$5\left(\frac{1}{\left(12\sqrt[3]{(1.949322\times10^{13})^4}+16\times3^5\right)\times\frac{1}{36\times8\sqrt[3]{(1.949322\times10^{13})^4}}}+1\right)+11+\pi$$

Result:

139.142...

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

5((((1/ (((((12(((1.949322e+13)^4))^(1/3)+16(3)^5))) 1/ (((36(8)(((1.949322e+13)^4))^(1/3))))))+1))))+1/golden ratio

Input interpretation:

$$5\left(\frac{1}{\left(12\sqrt[3]{(1.949322\times10^{13})^4}+16\times3^5\right)\times\frac{1}{36\times8\sqrt[3]{(1.949322\times10^{13})^4}}}+1\right)+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.618...

125.618… result very near to the Higgs boson mass 125.18 GeV

Now, we have that:

$$\mathbb{B}=\frac{1}{6}T_0\gamma=const., \tag{2.8}$$

in the case where we set the explicit cosmological constant Λ to zero (in which case $T_0=\frac{-3\beta\pm\sqrt{9\beta^2-20\gamma}}{10\gamma}$). In the above expressions the constant Λ_{eff} is given by

$$\Lambda_{eff}=\frac{1}{\gamma}, \tag{2.9}$$

$$\Lambda=\frac{1}{18\beta} \quad \text{and} \quad \gamma=\frac{3\beta^2}{5}, \quad \Lambda_{eff}=-\frac{1}{18\beta}.$$

Similarly to the previous case we obtain an effective cosmological constant which now depends on the parameter β. In the case where $\beta>0$ we obtain an AdS solution. The horizon of the solution (2.12) is again at $m=\Lambda_{eff}r^{N-1}$.

For $\beta = 4$, we obtain: $\Lambda = 1/72$ $\gamma = 48/5$ $\Lambda_{eff} = -1/72$

From

$$T_0 = \frac{-3\beta \pm \sqrt{9\beta^2 - 20\gamma}}{10\gamma}$$

(((-3*4+sqrt(9*16-20*48/5)))) / ((10*(48/5)))

Input:

$$\frac{-3\times 4 + \sqrt{9\times 16 - 20\times \frac{48}{5}}}{10\times \frac{48}{5}}$$

Result:

$$\frac{1}{96}\left(-12 + 4 i \sqrt{3}\right)$$

Decimal approximation:

$-0.125 +$
$0.072168783648703220563643597562744681955950218908765 8595\ldots i$

Polar coordinates:

$r \approx 0.144338$ (radius), $\theta = 150°$ (angle)

0.144338

Alternate forms:

$$-\frac{1}{8} + \frac{i}{8\sqrt{3}}$$

$$\frac{1}{24} i\left(\sqrt{3} + 3 i\right)$$

$$\frac{1}{24}\left(-3 + i\sqrt{3}\right)$$

Minimal polynomial:

$48 x^2 + 12 x + 1$

Thence:

$$\mathbb{B} = \frac{1}{6} T_0 \gamma = const.,$$

(1/6*0.144338*48/5)

Input interpretation:

$$\frac{1}{6}\times 0.144338\times \frac{48}{5}$$

Result:

0.2309408

0.2309408

and:

7*(1/6*0.144338*48/5)

Input interpretation:

$$7\left(\frac{1}{6}\times 0.144338\times \frac{48}{5}\right)$$

Result:

1.6165856

1.6165856 result that is a good approximation to the value of the golden ratio 1.618033988749...

34*1/(1/6*0.144338*48/5)-8

Input interpretation:

$$34\times \frac{1}{\frac{1}{6}\times 0.144338\times \frac{48}{5}}-8$$

Result:

139.22387728803225761753661544430434119912982028294697169 14...

139.223877288... result practically equal to the rest mass of Pion meson 139.57 MeV

34*1/(1/6*0.144338*48/5)-21-1/golden ratio

Input interpretation:

$$34\times \frac{1}{\frac{1}{6}\times 0.144338\times \frac{48}{5}}-21-\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.606...

125.606… result very near to the Higgs boson mass 125.18 GeV

Alternative representations:

$$\frac{34}{\frac{0.144338\times 48}{6\times 5}}-21-\frac{1}{\phi}=-21+\frac{34}{\frac{6.92822}{5\times 6}}-\frac{1}{2\sin(54°)}$$

$$\frac{34}{\frac{0.144338\times 48}{6\times 5}}-21-\frac{1}{\phi}=-21--\frac{1}{2\cos(216°)}+\frac{34}{\frac{6.92822}{5\times 6}}$$

$$\frac{34}{\frac{0.144338\times 48}{6\times 5}}-21-\frac{1}{\phi}=-21+\frac{34}{\frac{6.92822}{5\times 6}}--\frac{1}{2\sin(666°)}$$

We note also that:

1/4*1/((((((-3*4+sqrt(9*16-20*48/5)))) / ((10*(48/5))))))

Input:

$$\frac{1}{4}\times\frac{1}{\frac{-3\times 4+\sqrt{9\times 16-20\times\frac{48}{5}}}{10\times\frac{48}{5}}}$$

Result:

$$\frac{24}{-12+4\,i\sqrt{3}}$$

Decimal approximation:

$-1.5 - 0.866025403784438646763723170752936183471402626905190314 0\ldots\,i$

Polar coordinates:

$r\approx 1.73205$ (radius), $\theta=-150°$ (angle)

$1.73205=\sqrt{3}$ that is the ratio between the gravitating mass M_0 and the Wheelerian mass q

$$M_0 = \sqrt{3q^2 - \Sigma^2},$$
$$q = \frac{(3\sqrt{3})\, M_s}{2}.$$

(see: Can massless wormholes mimic a Schwarzschild black hole in the strong field lensing? - arXiv:1909.13052v1 [gr-qc] 28 Sep 2019)

Possible closed forms:

$\sqrt{3} \approx 1.7320508075$

Alternate forms:

$\frac{1}{2}\left(-3 - i\sqrt{3}\right)$

$-\sqrt[6]{-1}\,\sqrt{3}$

$-\frac{3}{2} - \frac{i\sqrt{3}}{2}$

Minimal polynomial:

$x^2 + 3x + 3$

From

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

Now, we have that:

$$\frac{32}{\pi} = (5\sqrt{5} - 1) + \frac{47\sqrt{5} + 29}{64}\left(\frac{1}{2}\right)^3\left(\frac{\sqrt{5} - 1}{2}\right)^8 + \frac{89\sqrt{5} + 59}{64^2}\left(\frac{1 \cdot 3}{2 \cdot 4}\right)^3\left(\frac{\sqrt{5} - 1}{2}\right)^{16} + \cdots,$$

32/Pi

Input:

$$\frac{32}{\pi}$$

Decimal approximation:

10.185916357881301489208560855840919170205417327389212719 85...

10.1859163578813…..

Property:

$\frac{32}{\pi}$ is a transcendental number

Alternative representations:

$$\frac{32}{\pi} = \frac{32}{180\,°}$$

$$\frac{32}{\pi} = -\frac{32}{i \log(-1)}$$

$$\frac{32}{\pi} = \frac{32}{\cos^{-1}(-1)}$$

Series representations:

$$\frac{32}{\pi} = \frac{8}{\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}}$$

$$\frac{32}{\pi} = \frac{8}{\sum_{k=0}^{\infty} \frac{(-1)^{1+k}\, 1195^{-1-2k} \left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}}$$

$$\frac{32}{\pi} = \frac{32}{\sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)}$$

Integral representations:

$$\frac{32}{\pi} = \frac{8}{\int_0^1 \sqrt{1-t^2}\, dt}$$

$$\frac{32}{\pi} = \frac{16}{\int_0^\infty \frac{1}{1+t^2}\, dt}$$

$$\frac{32}{\pi} = \frac{16}{\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt}$$

(5sqrt5 – 1)+1/64(47sqrt5 + 29)*1/8*((sqrt5-1)/2)^8+1/64^2(89sqrt5 + 59)*(3/8)^3*((sqrt5-1)/2)^16

Input:

$$\left(5\sqrt{5}-1\right)+\frac{1}{64}\left(47\sqrt{5}+29\right)\times\frac{1}{8}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8+\frac{1}{64^2}\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}$$

Result:

$$-1+5\sqrt{5}+\frac{(\sqrt{5}-1)^8\,(29+47\sqrt{5})}{131\,072}+\frac{27\,(\sqrt{5}-1)^{16}\,(59+89\sqrt{5})}{137\,438\,953\,472}$$

Decimal approximation:

10.185916357452345299336727734394539078233439350749910096 94...

10.18591635745234…..

Alternate forms:

$$\frac{15\,(1\,041\,875\sqrt{5}-905\,609)}{2\,097\,152}$$

$$\frac{15\,628\,125\sqrt{5}}{2\,097\,152}-\frac{13\,584\,135}{2\,097\,152}$$

$$\frac{15\,628\,125\sqrt{5}-13\,584\,135}{2\,097\,152}$$

Minimal polynomial:

$$1\,099\,511\,627\,776\,x^2+14\,243\,997\,941\,760\,x-259\,165\,682\,844\,975$$

From which:

((((5sqrt5 -1)+1/64(47sqrt5 + 29)*1/8*((sqrt5-1)/2)^8+1/64^2(89sqrt5 + 59)*(3/8)^3*((sqrt5-1)/2)^16)))^1/(5/3+Pi)-2/10^3

Input:

$$\left(\left(5\sqrt{5}-1\right)+\frac{1}{64}\left(47\sqrt{5}+29\right)\times\frac{1}{8}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8+\frac{1}{64^2}\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}\right)\hat{}\left(\frac{1}{\frac{5}{3}+\pi}\right)-\frac{2}{10^3}$$

Exact result:

$$\sqrt[\frac{5}{3}+\pi]{-1+5\sqrt{5}+\frac{\left(\sqrt{5}-1\right)^8\left(29+47\sqrt{5}\right)}{131072}+\frac{27\left(\sqrt{5}-1\right)^{16}\left(59+89\sqrt{5}\right)}{137438953472}}-\frac{1}{500}$$

Decimal approximation:

1.618463664739065429983262440416526342190570120055624581263...

1.618463664739.....

Alternate forms:

$$\sqrt[\frac{5}{3}+\pi]{\frac{15628125\sqrt{5}}{2097152}-\frac{13584135}{2097152}}-\frac{1}{500}$$

$$\sqrt[\frac{5}{3}+\pi]{\frac{15\left(1041875\sqrt{5}-905609\right)}{2097152}}-\frac{1}{500}$$

$$\sqrt[\frac{5}{3}+\pi]{\frac{15628125\sqrt{5}-13584135}{2097152}}-\frac{1}{500}$$

Series representations:

$$\sqrt[\frac{5}{3}+\pi]{\left(5\sqrt{5}-1\right)+\frac{\left(47\sqrt{5}+29\right)\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8}{64\times 8}+\frac{\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}}{64^2}}-\frac{2}{10^3}=\frac{1}{500}\left(-1+500\left(-1+5\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+\frac{\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^8\left(29+47\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}{131072}+\frac{27\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^{16}\left(59+89\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}{137438953472}\right)\hat{}\left(\frac{1}{\frac{5}{3}+\pi}\right)\right)$$

$$\sqrt[\frac{5}{3}+\pi]{\left(5\sqrt{5}-1\right)+\frac{\left(47\sqrt{5}+29\right)\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8}{64\times 8}+\frac{\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}}{64^2}}-\frac{2}{10^3}=\frac{1}{500}\left(-1+500\left(-1+5\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\frac{\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^8\left(29+47\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{131072}+\frac{27\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^{16}\left(59+89\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{137438953472}\right)\hat{}\left(\frac{1}{\frac{5}{3}+\pi}\right)\right)$$

$$\sqrt[\frac{5}{3}+\pi]{\left(5\sqrt{5}-1\right)+\frac{\left(47\sqrt{5}+29\right)\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8}{64\times 8}+\frac{\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}}{64^2}-\frac{2}{10^3}} = \left(\frac{1}{500}\left(-1+500\left(-1+5\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}+\frac{1}{131072}\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^8\left(29+47\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)+\left(27\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^{16}\left(59+89\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/137438953472\right)\right)\right)\wedge\left(\frac{1}{\frac{5}{3}+\pi}\right)\right)$$

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

and:

((((5sqrt5 -1)+1/64(47sqrt5 + 29)*1/8*(1/x)^8+1/64^2(89sqrt5 + 59)*(3/8)^3*(1/x)^16))) = 10.1859163574523

Input interpretation:

$$\left(5\sqrt{5}-1\right)+\frac{1}{64}\left(47\sqrt{5}+29\right)\times\frac{1}{8}\left(\frac{1}{x}\right)^8+\frac{1}{64^2}\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{x}\right)^{16} = 10.1859163574523$$

Result:

$$\frac{27\left(59+89\sqrt{5}\right)}{2097152\,x^{16}}+\frac{29+47\sqrt{5}}{512\,x^8}+5\sqrt{5}-1 = 10.18591635745230$$

Alternate form assuming x is real:

$$1.00000000\,x+0.\times10^{-9} = \frac{2.61803399}{x}$$

Alternate forms:

$$\frac{1593+2403\sqrt{5}}{2097152\,x^{16}}+\frac{29+47\sqrt{5}}{512\,x^8}+5\sqrt{5}-1 = 10.18591635745230$$

$$\frac{10485760\sqrt{5}\ x^{16} - 2097152\,x^{16} + 192512\sqrt{5}\ x^8 + 118784\,x^8 + 2403\sqrt{5} + 1593}{2097152\,x^{16}} =$$

10.18591635745230

Alternate form assuming x is positive:

$1.00000000\,x = 1.61803399$

Expanded form:

$$\frac{2403\sqrt{5}}{2097152\,x^{16}} + \frac{1593}{2097152\,x^{16}} + \frac{47\sqrt{5}}{512\,x^8} + \frac{29}{512\,x^8} + 5\sqrt{5} - 1 = 10.18591635745230$$

Real solutions:

$x \approx -1.61803398875$

$x \approx 1.61803398875$

1.61803398875

Complex solutions:

$x = -1.14412280564 - 1.14412280564\,i$

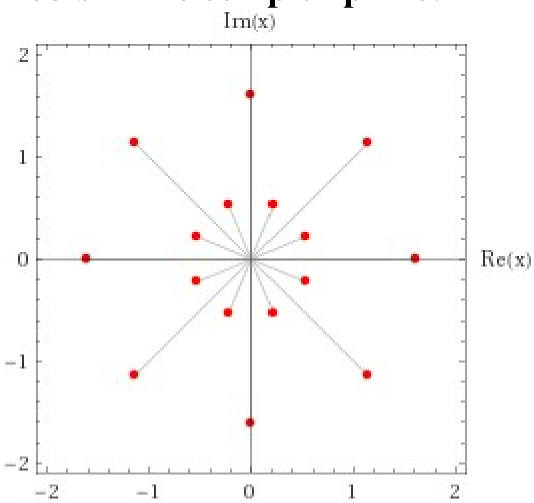
$x = -1.14412280564 + 1.14412280564\,i$

$x = -0.535185199589 + 0.221680968051\,i$

$x = -0.535185199589 - 0.221680968051\,i$

$x = -0.221680968051 + 0.535185199589\,i$

Roots in the complex plane:



We have also:

(((((5sqrt5 – 1)+1/64(47sqrt5 + 29)*1/8*((sqrt5-1)/2)^8+1/64^2(89sqrt5 + 59)*(3/8)^3*((sqrt5-1)/2)^16))))^1/4 -(47+7)/10^3

Input:

$$\left(\left(5\sqrt{5}-1\right)+\frac{1}{64}\left(47\sqrt{5}+29\right)\times\frac{1}{8}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8+\frac{1}{64^2}\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}\right)\hat{\ }(1/4)-\frac{47+7}{10^3}$$

Result:

$$\sqrt[4]{-1+5\sqrt{5}+\frac{(\sqrt{5}-1)^8\,(29+47\sqrt{5})}{131072}+\frac{27(\sqrt{5}-1)^{16}\,(59+89\sqrt{5})}{137438953472}}-\frac{27}{500}$$

Decimal approximation:

1.732487683457196218793609372174001381067603294034223745120...

1.732487683….. ≈ $\sqrt{3}$ that is the ratio between the gravitating mass M_0 and the Wheelerian mass q

$$M_0 = \sqrt{3q^2 - \Sigma^2},$$

$$q = \frac{(3\sqrt{3})\,M_s}{2}.$$

(see: Can massless wormholes mimic a Schwarzschild black hole in the strong field lensing? - arXiv:1909.13052v1 [gr-qc] 28 Sep 2019)

Alternate forms:

$$\frac{125\times 2^{3/4}\sqrt[4]{15\left(1041875\sqrt{5}-905609\right)}-432}{8000}$$

$$\sqrt[4]{\frac{15628125\sqrt{5}}{2097152}-\frac{13584135}{2097152}}-\frac{27}{500}$$

$$\frac{1}{32}\sqrt[4]{\frac{15}{2}\left(1041875\sqrt{5}-905609\right)}-\frac{27}{500}$$

Minimal polynomial:

$$65536000000000000000000000000 x^8 + 28311552000000000000000000000 x^7 + 5350883328000000000000000000 x^6 + 577895399424000000000000000 x^5 + 849047445439461120000000000000 x^4 + 183387507642984720384000000000 x^3 + 14854297121360587450368000000 x^2 + 534753760392420492091392000 x - 15447471244775255947278621742479$$

And:

13(((((5sqrt5 – 1)+1/64(47sqrt5 + 29)*1/8*((sqrt5-1)/2)^8+1/64^2(89sqrt5 + 59)*(3/8)^3*((sqrt5-1)/2)^16))))+7

Input:

$$13\left(\left(5\sqrt{5}-1\right)+\frac{1}{64}\left(47\sqrt{5}+29\right)\times\frac{1}{8}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8+\frac{1}{64^2}\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}\right)+7$$

Result:

$$7+13\left(-1+5\sqrt{5}+\frac{\left(\sqrt{5}-1\right)^8\left(29+47\sqrt{5}\right)}{131072}+\frac{27\left(\sqrt{5}-1\right)^{16}\left(59+89\sqrt{5}\right)}{137438953472}\right)$$

Decimal approximation:

139.41691264688048889137746054712900801703471155974883126O2...

139.41691264…

Alternate forms:

$$\frac{203165625\sqrt{5}-161913691}{2097152}$$

$$\frac{203165625\sqrt{5}}{2097152}-\frac{161913691}{2097152}$$

Minimal polynomial:

$$1099511627776 x^2 + 169778810454016 x - 45041328143739911$$

13(((((5sqrt5 – 1)+1/64(47sqrt5 + 29)*1/8*((sqrt5-1)/2)^8+1/64^2(89sqrt5 + 59)*(3/8)^3*((sqrt5-1)/2)^16))))-7

Input:

$$13\left(\left(5\sqrt{5}-1\right)+\frac{1}{64}\left(47\sqrt{5}+29\right)\times\frac{1}{8}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8+\frac{1}{64^2}\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}\right)-7$$

Result:

$$13\left(-1+5\sqrt{5}+\frac{(\sqrt{5}-1)^8(29+47\sqrt{5})}{131072}+\frac{27(\sqrt{5}-1)^{16}(59+89\sqrt{5})}{137438953472}\right)-7$$

Decimal approximation:

125.41691264688048889137746054712900801703471155974883126O2...

125.41691264…..

Alternate forms:

$$\frac{203165625\sqrt{5}-191273819}{2097152}$$

$$\frac{203165625\sqrt{5}}{2097152}-\frac{191273819}{2097152}$$

Minimal polynomial:

$$1099511627776x^2+200565136031744x-42448920518339591$$

27*1/2(((13(((((5sqrt5 – 1)+1/64(47sqrt5 + 29)*1/8*((sqrt5-1)/2)^8+1/64^2(89sqrt5 + 59)*(3/8)^3*((sqrt5-1)/2)^16))))-4-2/5)))+4/5

Input:

$$27\times\frac{1}{2}\left(13\left(\left(5\sqrt{5}-1\right)+\frac{1}{64}\left(47\sqrt{5}+29\right)\times\frac{1}{8}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^8+\frac{1}{64^2}\left(89\sqrt{5}+59\right)\left(\frac{3}{8}\right)^3\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^{16}\right)-4-\frac{2}{5}\right)+\frac{4}{5}$$

Result:

$$\frac{4}{5}+\frac{27}{2}\left(13\left(-1+5\sqrt{5}+\frac{(\sqrt{5}-1)^8(29+47\sqrt{5})}{131072}+\frac{27(\sqrt{5}-1)^{16}(59+89\sqrt{5})}{137438953472}\right)-\frac{22}{5}\right)$$

Decimal approximation:

1729.0283207328866000335957173862416082299686060566O9222013...

1729.0283207….

Alternate forms:

$$\frac{27\,427\,359\,375\sqrt{5}-25\,069\,087\,997}{20\,971\,520}$$

$$\frac{5\,485\,471\,875\sqrt{5}}{4\,194\,304}-\frac{25\,069\,087\,997}{20\,971\,520}$$

Minimal polynomial:

$$109\,951\,162\,777\,600\,x^2+262\,868\,440\,155\,422\,720\,x-783\,210\,259\,606\,418\,120\,279$$

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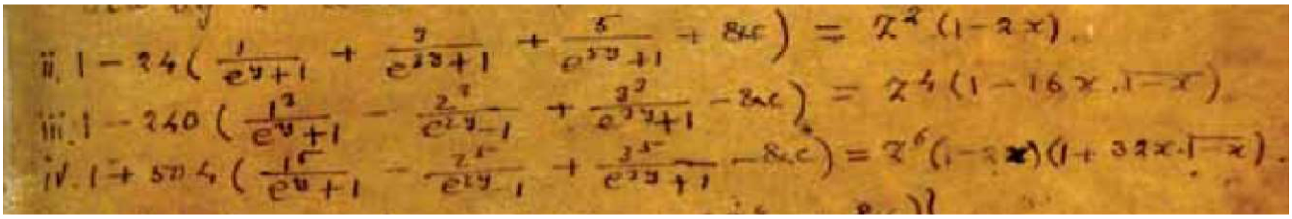


ii. $1-24\left(\frac{1}{e^{y}+1}+\frac{3}{e^{3y}+1}+\frac{5}{e^{5y}+1}+\&c\right)=z^2(1-2x)$.

iii. $1-240\left(\frac{1^3}{e^{y}+1}-\frac{2^3}{e^{2y}-1}+\frac{3^3}{e^{3y}+1}-\&c\right)=z^4(1-16x\cdot\overline{1-x})$.

iv. $1+504\left(\frac{1^5}{e^{y}+1}-\frac{2^5}{e^{2y}-1}+\frac{3^5}{e^{3y}+1}-\&c\right)=z^6(1-2x)(1+32x\cdot\overline{1-x})$.

For y =2

1-240((((1/(e^2+1))-8/(e^4-1)+27/(e^6+1)))

Input:

$$1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)$$

Decimal approximation:

-7.809167441855379067675831682534226637655260620905520871 83...

-7.8091674418…

Property:

$1-240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)$ is a transcendental number

Alternate forms:

$$\frac{8639-8879\,e^2+2400\,e^4-241\,e^6+e^8}{(e-1)(1+e)(1+e^2)(1-e^2+e^4)}$$

$$1-\frac{240}{1+e^2}+\frac{1920}{e^4-1}-\frac{6480}{1+e^6}$$

$$1+\frac{480}{e-1}-\frac{480}{1+e}-\frac{3360}{1+e^2}+\frac{2160\,(e^2-2)}{1-e^2+e^4}$$

Alternative representation:

$$1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)=$$
$$1-240\left(\frac{1}{\exp^2(z)+1}-\frac{8}{\exp^4(z)-1}+\frac{27}{\exp^6(z)+1}\right) \text{ for } z=1$$

Series representations:

$$1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)=1-\frac{240}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}+\frac{1920}{-1+\sum_{k=0}^{\infty}\frac{4^k}{k!}}-\frac{6480}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}$$

$$1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)=$$
$$\frac{8639-8879\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2+2400\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4-241\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^8}{\left(-1+\sum_{k=0}^{\infty}\frac{1}{k!}\right)\left(1+\sum_{k=0}^{\infty}\frac{1}{k!}\right)\left(1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4\right)}$$

$$1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)=$$
$$\frac{2\,211\,584-568\,256\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^2+38\,400\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^4-964\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^6+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^8}{\left(-2+\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)\left(2+\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)\left(4+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^2\right)\left(16-4\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^2+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^4\right)}$$

From which:

a)

1/10^27(([-(((1-240((((1/(e^2+1))-8/(e^4-1)+27/(e^6+1)))))))]^1/4))

Input:

$$\frac{1}{10^{27}}\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}$$

Exact result:

$$\frac{\sqrt[4]{240\left(\frac{1}{1+e^2}-\frac{8}{e^4-1}+\frac{27}{1+e^6}\right)-1}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Decimal approximation:

$1.6716724446383073841768972151437478653569123133032946\ldots \times 10^{-27}$

1.671672444…*10^{-27} result very near to the value of the formula:

$m_{p\prime} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-27}$ kg

that is the holographic proton mass (N. Haramein)

Property:

$$\frac{\sqrt[4]{-1 + 240\left(\frac{1}{1+e^2} - \frac{8}{-1+e^4} + \frac{27}{1+e^6}\right)}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$ is a transcendental number

Alternate form:

$$\frac{\sqrt[4]{\frac{-8639+8879\,e^2-2400\,e^4+241\,e^6-e^8}{(e^2-1)(1+e^2)(1-e^2+e^4)}}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Alternative representation:

$$\frac{\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1} - \frac{8}{e^4-1} + \frac{27}{e^6+1}\right)\right)}}{10^{27}} = \frac{\sqrt[4]{-\left(1-240\left(\frac{1}{\exp^2(z)+1} - \frac{8}{\exp^4(z)-1} + \frac{27}{\exp^6(z)+1}\right)\right)}}{10^{27}} \text{ for } z = 1$$

Series representations:

$$\frac{\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1} - \frac{8}{e^4-1} + \frac{27}{e^6+1}\right)\right)}}{10^{27}} = \frac{\sqrt[4]{-1+240\left(\frac{1}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}} - \frac{8}{-1+\sum_{k=0}^{\infty}\frac{4^k}{k!}} + \frac{27}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}\right)}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

$$\frac{\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}}{10^{27}} = \frac{\sqrt[4]{-1+240\left(\frac{1}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2}-\frac{8}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4}+\frac{27}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6}\right)}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

$$\frac{\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}}{10^{27}} = \frac{\sqrt[4]{-1+240\left(\frac{27}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^6}}-\frac{8}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^4}}+\frac{1}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^2}}\right)}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

b)

(([-(((1-240((((1/(e^2+1))-8/(e^4-1)+27/(e^6+1)))))))]^1/4))-(47+2Pi)/10^3

Input:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}$$

Exact result:

$$\sqrt[4]{240\left(\frac{1}{1+e^2}-\frac{8}{e^4-1}+\frac{27}{1+e^6}\right)-1}+\frac{-47-2\pi}{1000}$$

Decimal approximation:

1.618389259331127797699971928377188859588517974504544476959...

1.61838925933…

Alternate forms:

$$\frac{-47+1000\sqrt[4]{\frac{-8639+8879\,e^2-2400\,e^4+241\,e^6-e^8}{-1+e^2-e^6+e^8}}-2\pi}{1000}$$

$$-\frac{47}{1000}+\sqrt[4]{\frac{-8639+8879 e^2-2400 e^4+241 e^6-e^8}{(e^2-1)(1+e^2)(1-e^2+e^4)}}-\frac{\pi}{500}$$

$$\frac{-47+1000 \sqrt[4]{\frac{-8639+8879 e^2-2400 e^4+241 e^6-e^8}{(e^2-1)(1+e^2)(1-e^2+e^4)}}-2\pi}{1000}$$

Alternative representations:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}= -\frac{47+360^\circ}{10^3}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}= -\frac{47-2 i \log(-1)}{10^3}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}= -\frac{47+4 i \log\left(\frac{1-i}{1+i}\right)}{10^3}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}$$

Series representations:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}= -\frac{47}{1000}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}-\frac{1}{125}\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}= \frac{-47-2\pi+1000\sqrt[4]{-1+240\left(\frac{1}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2}-\frac{8}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4}+\frac{27}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6}\right)}}{1000}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}=$$

$$\frac{-47-8\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}+1000\sqrt[4]{-1+240\left(\frac{1}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}-\frac{8}{-1+\sum_{k=0}^{\infty}\frac{4^k}{k!}}+\frac{27}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}\right)}}{1000}$$

Integral representations:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}=$$

$$-\frac{47}{1000}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}-\frac{1}{125}\int_0^1\sqrt{1-t^2}\,dt$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}=$$

$$-\frac{47}{1000}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}-\frac{1}{250}\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{47+2\pi}{10^3}=$$

$$-\frac{47}{1000}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}-\frac{1}{250}\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

c)

(([-(((1-240((((1/(e^2+1))-8/(e^4-1)+27/(e^6+1))))))]^1/4))+(47+7+2Pi)1/10^3

Input:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+(47+7+2\pi)\times\frac{1}{10^3}$$

Exact result:

$$\sqrt[4]{240\left(\frac{1}{1+e^2}-\frac{8}{e^4-1}+\frac{27}{1+e^6}\right)-1}+\frac{54+2\pi}{1000}$$

Decimal approximation:

1.7319556299454869706538225019103068711253066521020449002420...

$1.731955629945... \approx \sqrt{3}$ that is the ratio between the gravitating mass M_0 and the Wheelerian mass q

$$M_0 = \sqrt{3q^2 - \Sigma^2},$$
$$q = \frac{(3\sqrt{3})\, M_s}{2}.$$

(see: Can massless wormholes mimic a Schwarzschild black hole in the strong field lensing? - arXiv:1909.13052v1 [gr-qc] 28 Sep 2019)

Alternate forms:

$$\frac{27}{500} + \sqrt[4]{240\left(\frac{1}{1+e^2} - \frac{8}{e^4-1} + \frac{27}{1+e^6}\right) - 1} + \frac{\pi}{500}$$

$$\frac{1}{500}\left(27 + 500\sqrt[4]{\frac{-8639 + 8879\, e^2 - 2400\, e^4 + 241\, e^6 - e^8}{-1 + e^2 - e^6 + e^8}} + \pi\right)$$

$$\frac{1}{500}\left(27 + 500\sqrt[4]{\frac{-8639 + 8879\, e^2 - 2400\, e^4 + 241\, e^6 - e^8}{-1 + e^2 - e^6 + e^8}}\right) + \frac{\pi}{500}$$

Alternative representations:

$$\sqrt[4]{-\left(1 - 240\left(\frac{1}{e^2+1} - \frac{8}{e^4-1} + \frac{27}{e^6+1}\right)\right)} + \frac{47 + 7 + 2\pi}{10^3} = \frac{54 + 360\,°}{10^3} + \sqrt[4]{-1 + 240\left(\frac{1}{1+e^2} - \frac{8}{-1+e^4} + \frac{27}{1+e^6}\right)}$$

$$\sqrt[4]{-\left(1 - 240\left(\frac{1}{e^2+1} - \frac{8}{e^4-1} + \frac{27}{e^6+1}\right)\right)} + \frac{47 + 7 + 2\pi}{10^3} = \frac{54 - 2\, i \log(-1)}{10^3} + \sqrt[4]{-1 + 240\left(\frac{1}{1+e^2} - \frac{8}{-1+e^4} + \frac{27}{1+e^6}\right)}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+\frac{47+7+2\pi}{10^3}=$$
$$\frac{54+4i\log\left(\frac{1-i}{1+i}\right)}{10^3}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}$$

Series representations:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+\frac{47+7+2\pi}{10^3}=$$
$$\frac{27}{500}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}+\frac{1}{125}\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+\frac{47+7+2\pi}{10^3}=$$
$$\frac{1}{500}\left(27+\pi+500\sqrt[4]{-1+240\left(\frac{1}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2}-\frac{8}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4}+\frac{27}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6}\right)}\right)$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+\frac{47+7+2\pi}{10^3}=\frac{1}{500}\left(27+4\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}+\right.$$
$$\left.500\sqrt[4]{-1+240\left(\frac{1}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}-\frac{8}{-1+\sum_{k=0}^{\infty}\frac{4^k}{k!}}+\frac{27}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}\right)}\right)$$

Integral representations:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+\frac{47+7+2\pi}{10^3}=$$
$$\frac{27}{500}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}+\frac{1}{125}\int_0^1\sqrt{1-t^2}\,dt$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+\frac{47+7+2\pi}{10^3}=$$
$$\frac{27}{500}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}+\frac{1}{250}\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}+\frac{47+7+2\pi}{10^3}=$$

$$\frac{27}{500}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}+\frac{1}{250}\int_0^\infty \frac{1}{1+t^2}\,dt$$

d)

(([-(((1-240((((1/(e^2+1))-8/(e^4-1)+27/(e^6+1)))))))]^1/4))-(29-2)1/10^3

Input:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-(29-2)\times\frac{1}{10^3}$$

Exact result:

$$\sqrt[4]{240\left(\frac{1}{1+e^2}-\frac{8}{e^4-1}+\frac{27}{1+e^6}\right)-1}-\frac{27}{1000}$$

Decimal approximation:

1.644672444638307384176897215143747865356912313303294688600...

1.64467244463…. ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Property:

$-\frac{27}{1000}+\sqrt[4]{-1+240\left(\frac{1}{1+e^2}-\frac{8}{-1+e^4}+\frac{27}{1+e^6}\right)}$ is a transcendental number

Alternate forms:

$$\frac{1000\sqrt[4]{\frac{-8639+8879e^2-2400e^4+241e^6-e^8}{-1+e^2-e^6+e^8}}-27}{1000}$$

$$\sqrt[4]{\frac{-8639+8879e^2-2400e^4+241e^6-e^8}{(e^2-1)(1+e^2)(1-e^2+e^4)}}-\frac{27}{1000}$$

$$\frac{1000\sqrt[4]{\frac{-8639+8879e^2-2400e^4+241e^6-e^8}{(e^2-1)(1+e^2)(1-e^2+e^4)}}-27}{1000}$$

Alternative representation:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{29-2}{10^3}=\sqrt[4]{-\left(1-240\left(\frac{1}{\exp^2(z)+1}-\frac{8}{\exp^4(z)-1}+\frac{27}{\exp^6(z)+1}\right)\right)}-\frac{29-2}{10^3} \text{ for } z=1$$

Series representations:

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{29-2}{10^3}=\frac{-27+1000\sqrt[4]{-1+240\left(\frac{1}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}-\frac{8}{-1+\sum_{k=0}^{\infty}\frac{4^k}{k!}}+\frac{27}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}\right)}}{1000}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{29-2}{10^3}=\frac{-27+1000\sqrt[4]{-1+240\left(\frac{1}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2}-\frac{8}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4}+\frac{27}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6}\right)}}{1000}$$

$$\sqrt[4]{-\left(1-240\left(\frac{1}{e^2+1}-\frac{8}{e^4-1}+\frac{27}{e^6+1}\right)\right)}-\frac{29-2}{10^3}=\frac{-27+1000\sqrt[4]{-1+240\left(\frac{27}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^6}}-\frac{8}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^4}}+\frac{1}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^2}}\right)}}{1000}$$

(((1-24((((1/(e^2+1))+3/(e^6+1)+5/(e^10+1)))))))

Input:

$$1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)$$

Decimal approximation:

-2.0443467400528172219593870874765105461367211042617199 1099...

-2.04434674…

Property:

$1-24\left(\frac{1}{1+e^2}+\frac{3}{1+e^6}+\frac{5}{1+e^{10}}\right)$ is a transcendental number

Alternate forms:

$$1-\frac{24}{1+e^2}-\frac{72}{1+e^6}-\frac{120}{1+e^{10}}$$

$$1-\frac{72}{1+e^2}+\frac{24\left(e^2-2\right)}{1-e^2+e^4}+\frac{24\left(-4+3e^2-2e^4+e^6\right)}{1-e^2+e^4-e^6+e^8}$$

$$1-\frac{24\left(9-10e^2+11e^4-6e^6+6e^8-2e^{10}+e^{12}\right)}{\left(1+e^2\right)\left(1-e^2+e^4\right)\left(1-e^2+e^4-e^6+e^8\right)}$$

Alternative representation:

$$1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)=1-24\left(\frac{1}{\exp^2(z)+1}+\frac{3}{\exp^6(z)+1}+\frac{5}{\exp^{10}(z)+1}\right)\text{ for } z=1$$

Series representations:

$$1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)=1-\frac{24}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}-\frac{72}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}-\frac{120}{1+\sum_{k=0}^{\infty}\frac{10^k}{k!}}$$

$$1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)=1-\frac{24}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2}-\frac{72}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6}-\frac{120}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{10}}$$

$$1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)=1-\frac{120}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{10}}}-\frac{72}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{6}}}-\frac{24}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{2}}}$$

From which:

((([-(((1-24((((1/(e^2+1))+3/(e^6+1)+5/(e^10+1)))))))]^2)))^1/3+7/10^3

Input:

$$\sqrt[3]{\left(-\left(1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)\right)\right)^2}+\frac{7}{10^3}$$

Exact result:

$$\frac{7}{1000}+\left(24\left(\frac{1}{1+e^2}+\frac{3}{1+e^6}+\frac{5}{1+e^{10}}\right)-1\right)^{2/3}$$

Decimal approximation:

1.617780531937765532982553597561811166615457653165039341632...

1.617780531937…

Property:

$$\frac{7}{1000}+\left(-1+24\left(\frac{1}{1+e^2}+\frac{3}{1+e^6}+\frac{5}{1+e^{10}}\right)\right)^{2/3}$$ is a transcendental number

Alternate forms:

$$\frac{7}{1000}+\frac{1}{\left(\frac{(1+e^2)(1-e^2+e^4)(1-e^2+e^4-e^6+e^8)}{215-239e^2+263e^4-144e^6+144e^8-49e^{10}+25e^{12}-e^{14}}\right)^{2/3}}$$

$$\frac{7+\frac{1000}{\left(\frac{(1+e^2)(1-e^2+e^4)(1-e^2+e^4-e^6+e^8)}{215-239e^2+263e^4-144e^6+144e^8-49e^{10}+25e^{12}-e^{14}}\right)^{2/3}}}{1000}$$

$$\frac{1000+7\left(\frac{-1+e^2-e^4-e^{10}+e^{12}-e^{14}}{-215+239e^2-263e^4+144e^6-144e^8+49e^{10}-25e^{12}+e^{14}}\right)^{2/3}}{1000\left(\frac{-1+e^2-e^4-e^{10}+e^{12}-e^{14}}{-215+239e^2-263e^4+144e^6-144e^8+49e^{10}-25e^{12}+e^{14}}\right)^{2/3}}$$

Alternative representation:

$$\sqrt[3]{\left(-\left(1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)\right)\right)^2}+\frac{7}{10^3}=$$
$$\sqrt[3]{\left(-\left(1-24\left(\frac{1}{\exp^2(z)+1}+\frac{3}{\exp^6(z)+1}+\frac{5}{\exp^{10}(z)+1}\right)\right)\right)^2}+\frac{7}{10^3} \text{ for } z=1$$

Series representations:

$$\sqrt[3]{\left(-\left(1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)\right)\right)^2+\frac{7}{10^3}} = \frac{7+1000\left(-1+24\left(\frac{1}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}+\frac{3}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}+\frac{5}{1+\sum_{k=0}^{\infty}\frac{10^k}{k!}}\right)\right)^{2/3}}{1000}$$

$$\sqrt[3]{\left(-\left(1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)\right)\right)^2+\frac{7}{10^3}} = \frac{7+1000\left(-1+24\left(\frac{1}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2}+\frac{3}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6}+\frac{5}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{10}}\right)\right)^{2/3}}{1000}$$

$$\sqrt[3]{\left(-\left(1-24\left(\frac{1}{e^2+1}+\frac{3}{e^6+1}+\frac{5}{e^{10}+1}\right)\right)\right)^2+\frac{7}{10^3}} = \frac{7+1000\left(-1+24\left(\frac{5}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{10}}}+\frac{3}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^6}}+\frac{1}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^2}}\right)\right)^{2/3}}{1000}$$

((1+504((((1/(e^2+1))-32/(e^4-1)+3^5/(e^6+1))))))

Input:

$$1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)$$

Decimal approximation:

62.99946799157348527622354539079353528072991183899603648222...

62.99946799157…

Property:

$$1+504\left(\frac{1}{1+e^2}-\frac{32}{-1+e^4}+\frac{243}{1+e^6}\right)$$ is a transcendental number

Alternate forms:

$$\frac{-139\,105+139\,609\,e^2-17\,136\,e^4+503\,e^6+e^8}{(e-1)(1+e)\left(1+e^2\right)\left(1-e^2+e^4\right)}$$

$$1+\frac{504}{1+e^2}-\frac{16\,128}{e^4-1}+\frac{122\,472}{1+e^6}$$

$$1-\frac{4032}{e-1}+\frac{4032}{1+e}+\frac{49\,392}{1+e^2}-\frac{40\,824\left(e^2-2\right)}{1-e^2+e^4}$$

Alternative representation:

$$1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)=$$
$$1+504\left(\frac{1}{\exp^2(z)+1}-\frac{32}{\exp^4(z)-1}+\frac{3^5}{\exp^6(z)+1}\right) \text{ for } z=1$$

Series representations:

$$1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)=1+\frac{504}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}-\frac{16\,128}{-1+\sum_{k=0}^{\infty}\frac{4^k}{k!}}+\frac{122\,472}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}$$

$$1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)=$$
$$\frac{-139\,105+139\,609\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2-17\,136\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4+503\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^8}{\left(-1+\sum_{k=0}^{\infty}\frac{1}{k!}\right)\left(1+\sum_{k=0}^{\infty}\frac{1}{k!}\right)\left(1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2\right)\left(1-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4\right)}$$

$$1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)=\left(-1-503\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^2+\right.$$
$$\left.17\,136\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^4-139\,609\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^6+139\,105\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^8\right)\Big/$$
$$\left(\left(-1+\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)\left(1+\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)\left(1+\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^2\right)\left(1-\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^2+\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^4\right)\right)$$

From which:

(((27[((1+504((((1/(e^2+1))-32/(e^4-1)+3^5/(e^6+1))))))]))^1/15-(21+3)1/10^3

Input:

$$\sqrt[15]{27\left(1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)\right)}-(21+3)\times\frac{1}{10^3}$$

Exact result:

$$\sqrt[5]{3}\ \sqrt[15]{1+504\left(\frac{1}{1+e^2}-\frac{32}{e^4-1}+\frac{243}{1+e^6}\right)}-\frac{3}{125}$$

Decimal approximation:

1.618026051338880181711644151664564972335022772493359898954...

1.61802605133…

Property:

$$-\frac{3}{125}+\sqrt[5]{3}\ \sqrt[15]{1+504\left(\frac{1}{1+e^2}-\frac{32}{-1+e^4}+\frac{243}{1+e^6}\right)}$$ is a transcendental number

Alternate forms:

$$\frac{1}{125}\left(125\sqrt[5]{3}\ \sqrt[15]{\frac{-139\,105+139\,609\,e^2-17\,136\,e^4+503\,e^6+e^8}{-1+e^2-e^6+e^8}}-3\right)$$

$$\sqrt[5]{3}\ \sqrt[15]{\frac{-139\,105+139\,609\,e^2-17\,136\,e^4+503\,e^6+e^8}{(e^2-1)(1+e^2)(1-e^2+e^4)}}-\frac{3}{125}$$

$$\frac{1}{125}\left(125\sqrt[5]{3}\ \sqrt[15]{\frac{-139\,105+139\,609\,e^2-17\,136\,e^4+503\,e^6+e^8}{(e^2-1)(1+e^2)(1-e^2+e^4)}}-3\right)$$

Alternative representation:

$$\sqrt[15]{27\left(1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)\right)}-\frac{21+3}{10^3}=$$

$$\sqrt[15]{27\left(1+504\left(\frac{1}{\exp^2(z)+1}-\frac{32}{\exp^4(z)-1}+\frac{3^5}{\exp^6(z)+1}\right)\right)}-\frac{21+3}{10^3}\ \text{for } z=1$$

Series representations:

$$\sqrt[15]{27\left(1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)\right)}-\frac{21+3}{10^3}=$$
$$\frac{1}{125}\left(-3+125\sqrt[5]{3}\sqrt[15]{1+504\left(\frac{1}{1+\sum_{k=0}^{\infty}\frac{2^k}{k!}}-\frac{32}{-1+\sum_{k=0}^{\infty}\frac{4^k}{k!}}+\frac{243}{1+\sum_{k=0}^{\infty}\frac{6^k}{k!}}\right)}\right)$$

$$\sqrt[15]{27\left(1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)\right)}-\frac{21+3}{10^3}=$$
$$\frac{1}{125}\left(-3+125\sqrt[5]{3}\sqrt[15]{1+504\left(\frac{1}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^2}-\frac{32}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^4}+\frac{243}{1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^6}\right)}\right)$$

$$\sqrt[15]{27\left(1+504\left(\frac{1}{e^2+1}-\frac{32}{e^4-1}+\frac{3^5}{e^6+1}\right)\right)}-\frac{21+3}{10^3}=\frac{1}{125}\left(-3+\right.$$
$$\left.125\sqrt[5]{3}\sqrt[15]{1+504\left(\frac{243}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^6}}-\frac{32}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^4}}+\frac{1}{1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^2}}\right)}\right)$$

Observations

Figs.

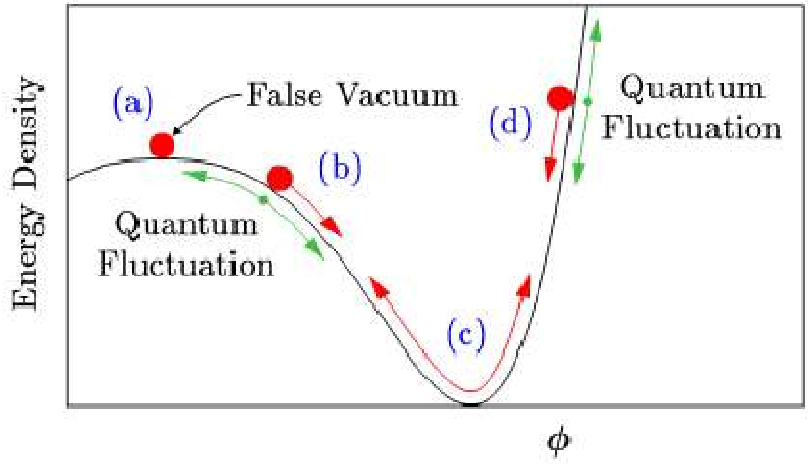
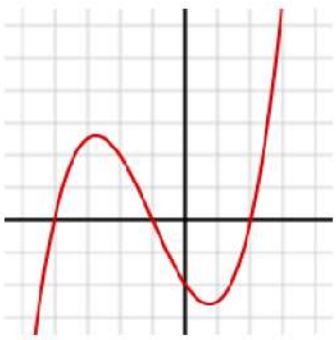


FIG. 1: In simple inflationary models, the universe at early times is dominated by the potential energy density of a scalar field, ϕ. Red arrows show the classical motion of ϕ. When ϕ is near region (a), the energy density will remain nearly constant, $\rho \cong \rho_f$, even as the universe expands. Moreover, cosmic expansion acts like a frictional drag, slowing the motion of ϕ: Even near regions (b) and (d), ϕ behaves more like a marble moving in a bowl of molasses, slowly creeping down the side of its potential, rather than like a marble sliding down the inside of a polished bowl. During this period of "slow roll," ρ remains nearly constant. Only after ϕ has slid most of the way down its potential will it begin to oscillate around its minimum, as in region (c), ending inflation.



Graph of a cubic function with 3 real roots (where the curve crosses the horizontal axis at $y = 0$). The case shown has two critical points. Here the function is $f(x) = (x^3 + 3x^2 - 6x - 8)/4$.

The ratio between M_0 and q

$$M_0 = \sqrt{3q^2 - \Sigma^2},$$

$$q = \frac{(3\sqrt{3})\, M_s}{2}.$$

i.e. the gravitating mass M_0 and the Wheelerian mass q of the wormhole, is equal to:

$$\frac{\sqrt{3\,(2.17049\times 10^{37})^2 - 0.001^2}}{\frac{1}{2}\left((3\sqrt{3})\,(4.2\times 10^6\times 1.9891\times 10^{30})\right)}$$

1.732050787905194420703947625671018160083566548802082460520...

1.7320507879

$1.7320507879 \approx \sqrt{3}$ that is the ratio between the gravitating mass M_0 and the Wheelerian mass q of the wormhole

We note that:

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

i is the imaginary unit

$i\sqrt{3}$

1.7320508075688772935274463415058723669428052538103806280558... i

$r \approx 1.73205$ (radius), $\theta = 90°$ (angle)

1.73205

This result is very near to the ratio between M_0 and q, that is equal to 1.7320507879 $\approx \sqrt{3}$

With regard $\sqrt{3}$, we note that is a fundamental value of the formula structure that we need to calculate a Cubic Equation

We have that the previous result

$$\left(-\frac{1}{2}+\frac{i}{2}\sqrt{3}\right)-\left(-\frac{1}{2}-\frac{i}{2}\sqrt{3}\right) = i\sqrt{3} =$$

$$= 1.7320508075688772935274463415058723669428052538103806280558...\, i$$

$r \approx 1.73205$ (radius), $\theta = 90°$ (angle)

can be related with:

$$u^2(-u)\left(\frac{1}{2}\pm\frac{i\sqrt{3}}{2}\right)+v^2(-v)\left(\frac{1}{2}\pm\frac{i\sqrt{3}}{2}\right)=q$$

Considering:

$$(-1)\left(\frac{1}{2}-\frac{i\sqrt{3}}{2}\right)-(-1)\left(\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)=q$$

$$= i\sqrt{3} = 1.7320508075688772935274463415058723669428052538103806280558...\, i$$

$r \approx 1.73205$ (radius), $\theta = 90°$ (angle)

Thence:

$$\left(-\frac{1}{2}+\frac{i}{2}\sqrt{3}\right)-\left(-\frac{1}{2}-\frac{i}{2}\sqrt{3}\right) \Rightarrow$$

$$\Rightarrow (-1)\left(\frac{1}{2}-\frac{i\sqrt{3}}{2}\right)-(-1)\left(\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)=q=1.73205\approx\sqrt{3}$$

We observe how the graph above, concerning the cubic function, is very similar to the graph that represent the scalar field (in red). It is possible to hypothesize that cubic functions and cubic equations, with their roots, are connected to the scalar field.

From:
https://www.scientificamerican.com/article/mathematics-ramanujan/?fbclid=IwAR2caRXrn_RpOSvJ1QxWsVLBcJ6KVgd_Af_hrmDYBNyU8mpSjRs1BDeremA

Ramanujan's statement concerned the deceptively simple concept of partitions—the different ways in which a whole number can be subdivided into smaller numbers. Ramanujan's original statement, in fact, stemmed from the observation of patterns, such as the fact that p(9) = 30, p(9 + 5) = 135, p(9 + 10) = 490, p(9 + 15) = 1,575 and so on are all divisible by 5. Note that here the n's come at intervals of five units.

Ramanujan posited that this pattern should go on forever, and that similar patterns exist when 5 is replaced by 7 or 11—there are infinite sequences of p(n) that are all divisible by 7 or 11, or, as mathematicians say, in which the "moduli" are 7 or 11.

Then, in nearly oracular tone Ramanujan went on: "There appear to be corresponding properties," he wrote in his 1919 paper, "in which the moduli are powers of 5, 7 or 11...and no simple properties for any moduli involving primes other than these three." (Primes are whole numbers that are only divisible by themselves or by 1.) Thus, for instance, there should be formulas for an infinity of n's separated by 5^3 = 125 units, saying that the corresponding p(n)'s should all be divisible by 125.
In the past methods developed to understand partitions have later been applied to physics problems such as the theory of the strong nuclear force or the entropy of black holes.

From Wikipedia

In particle physics, Yukawa's interaction or Yukawa coupling, named after Hideki Yukawa, is an interaction between a scalar field ϕ and a Dirac field ψ. The Yukawa interaction can be used to describe the nuclear force between nucleons (which are fermions), mediated by pions (which are pseudoscalar mesons). The Yukawa interaction is also used in the Standard Model to describe the coupling between the Higgs field and massless quark and lepton fields (i.e., the fundamental fermion particles). Through spontaneous symmetry breaking, these fermions acquire a mass proportional to the vacuum expectation value of the Higgs field.

Can be this the motivation that from the development of the Ramanujan's equations we obtain results 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 and practically equal to the rest mass of Pion meson 139.57 MeV

Note that:

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

Hence

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

so that

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

Hence

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

Thence:

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

And

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

That are connected with 64, 128, 256, 512, 1024 and 4096 = 64^2

(Modular equations and approximations to π - S. Ramanujan - Quarterly Journal of Mathematics, XLV, 1914, 350 – 372)

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

In mathematics, the Fibonacci numbers, commonly denoted F_n, form a sequence, called the Fibonacci sequence, such that each number is the sum of the two preceding ones, starting from 0 and 1. Fibonacci numbers are strongly related to the golden ratio: Binet's formula expresses the nth Fibonacci number in terms of n and the golden ratio, and implies that the ratio of two consecutive Fibonacci numbers tends to the golden ratio as n increases.
Fibonacci numbers are also closely related to Lucas numbers ,in that the Fibonacci and Lucas numbers form a complementary pair of Lucas sequences

The beginning of the sequence is thus:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418, 317811, 514229, 832040, 1346269, 2178309, 3524578, 5702887, 9227465, 14930352, 24157817, 39088169, 63245986, 102334155...

The Lucas numbers or Lucas series are an integer sequence named after the mathematician François Édouard Anatole Lucas (1842–91), who studied both that sequence and the closely related Fibonacci numbers. Lucas numbers and Fibonacci numbers form complementary instances of Lucas sequences.

The Lucas sequence has the same recursive relationship as the Fibonacci sequence, where each term is the sum of the two previous terms, but with different starting values. This produces a sequence where the ratios of successive terms approach the golden ratio, and in fact the terms themselves are roundings of integer powers of the golden ratio.[1] The sequence also has a variety of relationships with the Fibonacci numbers, like the fact that adding any two Fibonacci numbers two terms apart in the Fibonacci sequence results in the Lucas number in between.

The sequence of Lucas numbers is:

2, 1, 3, 4, 7, 11, 18, 29, 47, 76, 123, 199, 322, 521, 843, 1364, 2207, 3571, 5778, 9349, 15127, 24476, 39603, 64079, 103682, 167761, 271443, 439204, 710647, 1149851, 1860498, 3010349, 4870847, 7881196, 12752043, 20633239, 33385282, 54018521, 87403803……

All Fibonacci-like integer sequences appear in shifted form as a row of the Wythoff array; the Fibonacci sequence itself is the first row and the Lucas sequence is the second row. Also like all Fibonacci-like integer sequences, the ratio between two consecutive Lucas numbers converges to the golden ratio.

A Lucas prime is a Lucas number that is prime. The first few Lucas primes are:

2, 3, 7, 11, 29, 47, 199, 521, 2207, 3571, 9349, 3010349, 54018521, 370248451, 6643838879, ... (sequence A005479 in the OEIS).

In geometry, a golden spiral is a logarithmic spiral whose growth factor is φ, the golden ratio.[1] That is, a golden spiral gets wider (or further from its origin) by a factor of φ for every quarter turn it makes. Approximate logarithmic spirals can occur in nature, for example the arms of spiral galaxies[3] - golden spirals are one special case of these logarithmic spirals

We note how the following three values: 137.508 (golden angle), 139.57 (mass of the Pion - meson Pi) and 125.18 (mass of the Higgs boson), are connected to each other. In fact, just add 2 to 137.508 to obtain a result very close to the mass of the Pion and subtract 12 to 137.508 to obtain a result that is also very close to the mass of the Higgs boson. We can therefore hypothesize that it is the golden angle (and the related golden ratio inherent in it) to be a fundamental ingredient both in the structures of the microcosm and in those of the macrocosm.

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Black holes in Modified Gravity
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January 11th-14th , 2020

Manuscript Book 2 of Srinivasa Ramanujan