On the analysis of some equations concerning the "Inflation after the initial Climbing Phase": mathematical connections with some parameters of Particle Physics and some sectors of Number Theory. II

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Abstract

In this research thesis (part II), we analyze some equations concerning the topic "Inflation after the initial Climbing Phase" and we describe the mathematical connections with some parameters of Particle Physics and some sectors of Number Theory.

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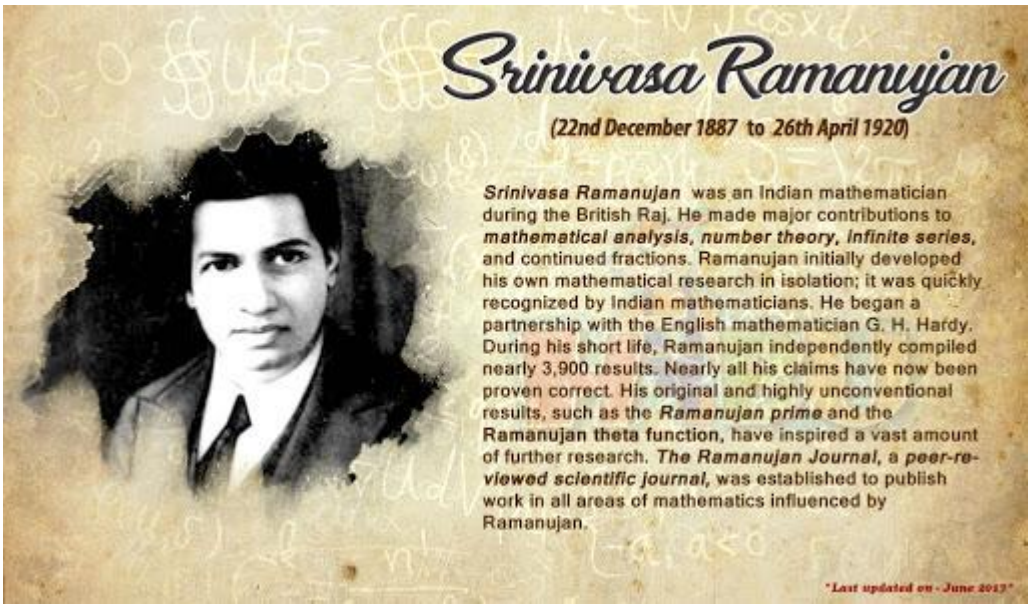


http://www.eehibu.com/whoami/Srinivasa-Ramanujan

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

From:

Pre – Inflationary Clues from String Theory ?
N. Kitazawa and A. Sagnotti - arXiv:1402.1418v2 [hep-th] 12 Mar 2014

We have that:

$$A_\ell^{(\mathrm{attr})}(\mathcal{M}) \;=\; \mathcal{M}\;\frac{\sqrt{\pi}\,\ell(\ell+1)}{4}\,\frac{\Gamma\left(\frac{3-n_s}{2}\right)\Gamma\left(\frac{2l-1+n_s}{2}\right)}{\Gamma\left(\frac{4-n_s}{2}\right)\Gamma\left(\frac{2l+5-n_s}{2}\right)}\,. \qquad (4.4)$$

We can now compare this expression, computed for the preferred value of the spectral index $n_s \simeq 0.96$, with the first 31 raw WMAP9 data, adjusting the normalization $\mathcal{M}$ in such a way as

We put $\ell \leq 32$

For $n_s \approx 0.96$ = 0.9568666373 , that is equal to the following value of Rogers-Ramanujan continued fraction

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

= 0.9568666373

l = 3 and ℓ = 32 , we obtain:

1/4 * sqrt(Pi)*32(32+1) * gamma ((3-0.9568666373)/2) * 1/ gamma((4-0.9568666373)/2) * gamma ((2*3-1+0.9568666373)/2) * 1/ gamma((2*3+5-0.9568666373)/2)

Input interpretation:

$$\left(\frac{1}{4}\sqrt{\pi}\times 32\,(32+1)\right)\Gamma\left(\frac{3-0.9568666373}{2}\right)\times\frac{1}{\Gamma\left(\frac{4-0.9568666373}{2}\right)}$$
$$\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.9568666373)\right)\times\frac{1}{\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.9568666373)\right)}$$

$\Gamma(x)$ is the gamma function

Result:

41.21383331...

41.21383331…

Alternative representations:

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} = \frac{2052.15\ \sqrt{\pi}}{\frac{0.994476\times 1.00871\times 4\times 0.947134\times 313.724}{1.06765\times 12.6534}}$$

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} = \frac{1056\ e^{0.673338}\ \sqrt{\pi}}{\frac{4\ e^{0.01207}\ e^{3.21059}}{e^{0.119779}}}$$

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} = \frac{1056\times 0.0215667!\times 1.97843!\ \sqrt{\pi}}{4\times 0.521567!\times 4.02157!}$$

Series representations:

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} = \frac{264\ \exp\left(i\,\pi\left\lfloor\frac{\arg(\pi-x)}{2\,\pi}\right\rfloor\right)\Gamma(1.02157)\,\Gamma(2.97843)\ \sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k\,(\pi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\Gamma(1.52157)\,\Gamma(5.02157)}$$

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

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} =$$
$$\left(264\,\Gamma(1.02157)\,\Gamma(2.97843)\left(\frac{1}{z_0}\right)^{1/2\,[\arg(\pi-z_0)/(2\,\pi)]}\ z_0^{1/2\,(1+[\arg(\pi-z_0)/(2\,\pi)])}\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\,(\pi-z_0)^k\,z_0^{-k}}{k!}\right)\Big/\left(\Gamma(1.52157)\,\Gamma(5.02157)\right)$$

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} =$$
$$\left(264\sqrt{-1+\pi}\ \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\right.$$
$$\left.\frac{(-1+\pi)^{-k_1}\binom{\frac{1}{2}}{k_1}(1.02157-z_0)^{k_2}\,(2.97843-z_0)^{k_3}\,\Gamma^{(k_2)}(z_0)\,\Gamma^{(k_3)}(z_0)}{k_2!\,k_3!}\right)$$
$$\Big/\left(\left(\sum_{k=0}^{\infty}\frac{(1.52157-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(5.02157-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)$$
for $(z_0 \notin \mathbb{Z}$ or $z_0 > 0)$

Integral representations:

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} =$$
$$\int_0^1\int_0^1 \log^{0.0215667}\left(\frac{1}{t_1}\right)\log^{1.97843}\left(\frac{1}{t_2}\right)dt_2\,dt_1$$

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} =$$
$$264\exp\left(\int_0^1\frac{-2.54313+2.54313\,x+x^{1.02157}-x^{1.52157}+x^{2.97843}-x^{5.02157}}{(-1+x)\log(x)}\,dx\right)\sqrt{\pi}$$

$$\frac{\Gamma\left(\frac{3-0.956867}{2}\right)\left(\sqrt{\pi}\ 32\,(32+1)\right)\Gamma\left(\frac{1}{2}\,(2\times 3-1+0.956867)\right)}{\left(\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\,(2\times 3+5-0.956867)\right)\right)4} =$$
$$264\exp\left(2.54313\,\gamma+\int_0^1 \frac{1}{(-1+x)\log(x)}\left(x^{1.02157}-x^{1.52157}+x^{2.97843}-x^{5.02157}-\right.\right.$$
$$\left.\left.\log(x^{1.02157})+\log(x^{1.52157})-\log(x^{2.97843})+\log(x^{5.02157})\right)dx\right)\sqrt{\pi}$$

For $l = \pi^2/\varphi^2$ and $\ell = 32$, multiplying by 16 and subtracting 16, we obtain:

16 * sqrt(Pi)*32(32+1) * gamma ((3-0.9568666373)/2) * 1/ gamma((4-0.9568666373)/2) * gamma ((2*(Pi^2/golden ratio^2)-1+0.9568666373)/2) * 1/ gamma((2*(Pi^2/golden ratio^2)+5-0.9568666373)/2)-16

Input interpretation:

$$16\sqrt{\pi}\times 32\left((32+1)\,\Gamma\left(\frac{3-0.9568666373}{2}\right)\times\frac{1}{\Gamma\left(\frac{4-0.9568666373}{2}\right)}\right.$$
$$\left.\Gamma\left(\frac{1}{2}\left(2\times\frac{\pi^2}{\phi^2}-1+0.9568666373\right)\right)\times\frac{1}{\Gamma\left(\frac{1}{2}\left(2\times\frac{\pi^2}{\phi^2}+5-0.9568666373\right)\right)}\right)-16$$

$\Gamma(x)$ is the gamma function

ϕ is the golden ratio

Result:

1728.235525...

1728.235525….

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. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternative representations:

$$\frac{(16\,(32+1)\sqrt{\pi}\;\;32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=$$
$$-16+\frac{16\,896\times 0.0215667!\left(-1+\frac{1}{2}\left(-0.0431334+\frac{2\pi^2}{\phi^2}\right)\right)!\,\sqrt{\pi}}{0.521567!\left(-1+\frac{1}{2}\left(4.04313+\frac{2\pi^2}{\phi^2}\right)\right)!}$$

$$\frac{(16\,(32+1)\sqrt{\pi}\;\;32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=-16+$$
$$\frac{16\,896\exp\left(-\log G\left(\frac{1}{2}\left(-0.0431334+\frac{2\pi^2}{\phi^2}\right)\right)+\log G\left(1+\frac{1}{2}\left(-0.0431334+\frac{2\pi^2}{\phi^2}\right)\right)\right)\sqrt{\pi}}{\frac{e^{0.01207\exp\left(-\log G\left(\frac{1}{2}\left(4.04313+\frac{2\pi^2}{\phi^2}\right)\right)+\log G\left(1+\frac{1}{2}\left(4.04313+\frac{2\pi^2}{\phi^2}\right)\right)\right)}}{e^{0.119779}}}$$

$$\frac{(16\,(32+1)\sqrt{\pi}\;\;32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=$$
$$-16+\frac{16\,838.7\,G\left(1+\frac{1}{2}\left(-0.0431334+\frac{2\pi^2}{\phi^2}\right)\right)\sqrt{\pi}}{\frac{1.00871\,G\left(\frac{1}{2}\left(-0.0431334+\frac{2\pi^2}{\phi^2}\right)\right)0.947134\,G\left(1+\frac{1}{2}\left(4.04313+\frac{2\pi^2}{\phi^2}\right)\right)}{1.06765\,G\left(\frac{1}{2}\left(4.04313+\frac{2\pi^2}{\phi^2}\right)\right)}}$$

Series representations:

$$\frac{(16\,(32+1)\sqrt{\pi}\;\;32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=$$
$$-16+\left(16\,896\exp\left(i\pi\left\lfloor\frac{\arg(\pi-x)}{2\pi}\right\rfloor\right)\Gamma(1.02157)\right.$$
$$\left.\Gamma\left(-0.0215667+\frac{\pi^2}{\phi^2}\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\,(\pi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$
$$\left(\Gamma(1.52157)\,\Gamma\left(2.02157+\frac{\pi^2}{\phi^2}\right)\right)\quad\text{for}\ (x\in\mathbb{R}\ \text{and}\ x<0)$$

$$\frac{(16\,(32+1)\sqrt{\pi}\;32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=-16+$$
$$\left(16\,896\,\Gamma(1.02157)\,\Gamma\left(-0.0215667+\frac{\pi^2}{\phi^2}\right)\left(\frac{1}{z_0}\right)^{1/2\,[\arg(\pi-z_0)/(2\pi)]}z_0^{1/2\,(1+[\arg(\pi-z_0)/(2\pi)])}\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k\,z_0^{-k}}{k!}\right)\Big/\left(\Gamma(1.52157)\,\Gamma\left(2.02157+\frac{\pi^2}{\phi^2}\right)\right)$$

$$\frac{(16\,(32+1)\sqrt{\pi}\;32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=$$
$$\left(16\left(-\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(1.52157-z_0)^{k_1}\left(2.02157+\frac{\pi^2}{\phi^2}-z_0\right)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}+\right.\right.$$
$$1056\,\sqrt{-1+\pi}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\sum_{k_3=0}^{\infty}\frac{1}{k_2!\,k_3!}(-1+\pi)^{-k_1}\binom{\frac{1}{2}}{k_1}(1.02157-z_0)^{k_2}$$
$$\left.\left.\left(-0.0215667+\frac{\pi^2}{\phi^2}-z_0\right)^{k_3}\Gamma^{(k_2)}(z_0)\,\Gamma^{(k_3)}(z_0)\right)\right)\Big/$$
$$\left(\left(\sum_{k=0}^{\infty}\frac{(1.52157-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{\left(2.02157+\frac{\pi^2}{\phi^2}-z_0\right)^k\,\Gamma^{(k)}(z_0)}{k!}\right)$$

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

Integral representations:

$$\frac{(16\,(32+1)\sqrt{\pi}\;32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=$$
$$-16+16\,896\exp\left(\int_0^1\left(\left(-2.54313\,x^{0.0215667}+2.54313\,x^{1.02157}+x^{1.04313}-x^{1.54313}+\right.\right.\right.$$
$$\left.\left.\left.x^{\pi^2/\phi^2}-x^{2.04313+\pi^2/\phi^2}\right)\Big/\left((-1+x)\,x^{0.0215667}\log(x)\right)\right)dx\right)\sqrt{\pi}$$

$$\frac{(16\,(32+1)\sqrt{\pi}\ 32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=-16+16\,896$$

$$\exp\left(0.5\,\gamma-\frac{1}{2}\,\gamma\left(-0.0431334+\frac{2\pi^2}{\phi^2}\right)+\frac{1}{2}\,\gamma\left(4.04313+\frac{2\pi^2}{\phi^2}\right)+\int_0^1\frac{1}{(-1+x)\log(x)}\left(x^{1.02157}-x^{1.52157}+x^{-0.0215667+\pi^2/\phi^2}-x^{2.02157+\pi^2/\phi^2}-\log\left(x^{1.02157}\right)+\log\left(x^{1.52157}\right)-\log\left(x^{-0.0215667+\pi^2/\phi^2}\right)+\log\left(x^{2.02157+\pi^2/\phi^2}\right)\right)dx\right)\sqrt{\pi}$$

$$\frac{(16\,(32+1)\sqrt{\pi}\ 32)\,\Gamma\left(\frac{3-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}-1+0.956867\right)\right)}{\Gamma\left(\frac{4-0.956867}{2}\right)\Gamma\left(\frac{1}{2}\left(\frac{2\pi^2}{\phi^2}+5-0.956867\right)\right)}-16=$$

$$\left(16\left(\int_0^1\int_0^1\log^{0.0215667}\left(\frac{1}{t_1}\right)\log^{-1.02157+\pi^2/\phi^2}\left(\frac{1}{t_2}\right)dt_2\,dt_1+\int_0^1\int_0^1\log^{0.521567}\left(\frac{1}{t_1}\right)\log^{1.02157+\pi^2/\phi^2}\left(\frac{1}{t_2}\right)dt_2\,dt_1\right)\right)\Big/\left(\left(\int_0^1\log^{0.521567}\left(\frac{1}{t}\right)dt\right)\int_0^1\log^{1.02157+\pi^2/\phi^2}\left(\frac{1}{t}\right)dt\right)$$

$\log(x)$ is the natural logarithm

γ is the Euler-Mascheroni constant

From which:

[16 * sqrt(Pi)*32(32+1) * gamma ((3-0.9568666373)/2) * 1/ gamma((4-0.9568666373)/2) * gamma ((2*(Pi^2/golden ratio^2)-1+0.9568666373)/2) * 1/ gamma((2*(Pi^2/golden ratio^2)+5-0.9568666373)/2)-16]^1/15

Input interpretation:

$$\left(16\sqrt{\pi}\times 32\left((32+1)\,\Gamma\left(\frac{3-0.9568666373}{2}\right)\times\frac{1}{\Gamma\left(\frac{4-0.9568666373}{2}\right)}\,\Gamma\left(\frac{1}{2}\left(2\times\frac{\pi^2}{\phi^2}-1+0.9568666373\right)\right)\times\frac{1}{\Gamma\left(\frac{1}{2}\left(2\times\frac{\pi^2}{\phi^2}+5-0.9568666373\right)\right)}\right)-16\right)^{(1/15)}$$

$\Gamma(x)$ is the gamma function

ϕ is the golden ratio

Result:

1.6437667647...

$1.6437667647\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

From:

Pre–Inflationary Relics in the CMB ?

A.Gruppuso, N. Kitazawa, N. Mandolesi, P. Natoli, A. Sagnotti - arXiv:1508.00411v2 [astro-ph.CO] 11 Dec 2015

A typical feature is indeed that inflation lasts $\mathcal{O}(100)$ times the time scale set by $H_{\rm Infl}$, so that taking this fact into account and retracing the subsequent evolution of the Universe, one can convert eq. (11) into primordial length or energy scales at the onset of inflation,

$$\Delta^{\rm Infl} \;=\; 3\times 10^{14}\; e^{N-60}\times\sqrt{\frac{H_{\rm Infl}}{\mu_{Pl}}}\;\;{\rm GeV}\;, \qquad (12)$$

$$e^{N-60} \gtrsim 8 \times 10^3 \sqrt{\frac{H_{\rm Infl}}{\mu_{Pl}}} \,. \tag{13}$$

For $H_{\rm Infl} \simeq 10^{14}$ GeV this implies the reasonable bound $N \gtrsim 64$. Conversely, PLANCK set the upper bound [6]

$$\frac{H_{\rm Infl}}{\mu_{Pl}} < 3.6 \times 10^{-5} \,, \tag{14}$$

and making use of this result in eq. (12) yields

$$\Delta^{\rm Infl} \lesssim 4 \times 10^{12}\, e^{N-60}\ {\rm GeV} \,, \tag{15}$$

with an upper bound again $\mathcal{O}(10^{14})$ GeV for $N \simeq 64$.

Thence, we obtain:

for

$$\frac{H_{\rm Infl}}{\mu_{Pl}} < 3.6 \times 10^{-5}$$

= 4 * 10^{-8}

From

$$\Delta^{\rm Infl} = 3 \times 10^{14}\, e^{N-60} \times \sqrt{\frac{H_{\rm Infl}}{\mu_{Pl}}}\ {\rm GeV} \,,$$

We obtain:

4*10^12 * 8*10^3 * sqrt(4*10^-8)

Input interpretation:

$4 \times 10^{12} \times 8 \times 10^3 \sqrt{4 \times 10^{-8}}$

Exact result:

6 400 000 000 000

Scientific notation:

6.4×10^{12}

$6.4*10^{12}$ practically a result that is a multiple of number 64

From which, we obtain:

2*((((4*10^12 * 8*10^3 * sqrt(4*10^-8)))))^1/7+4

Input interpretation:

$$2\sqrt[7]{4\times 10^{12}\times 8\times 10^{3}\sqrt{4\times 10^{-8}}}+4$$

Result:

$4+40\times 2^{3/7}\times 5^{4/7}$

Decimal approximation:

139.046793730031027721206922104575534405633855629434041107 8...

139.04679373…. result practically equal to the rest mass of Pion meson 139.57 MeV

Alternate forms:

$4\left(1+10\times 2^{3/7}\times 5^{4/7}\right)$

root of $x^7-28x^6+336x^5-2240x^4+8960x^3-21504x^2+28672x-819200000016384$ near $x=139.047$

2*((((4*10^12 * 8*10^3 * sqrt(4*10^-8)))))^1/7-8-2

Input interpretation:

$$2\sqrt[7]{4\times 10^{12}\times 8\times 10^{3}\sqrt{4\times 10^{-8}}}-8-2$$

Result:

$40\times 2^{3/7}\times 5^{4/7}-10$

Decimal approximation:

125.046793730031027721206922104575534405633855629434041107 8...

125.0467937…. result very near to the Higgs boson mass 125.18 GeV

Alternate forms:

$$10\left(4\times 2^{3/7}\times 5^{4/7}-1\right)$$

$$\text{root of } x^7+70x^6+2100x^5+35\,000x^4+350\,000x^3+2\,100\,000x^2+7\,000\,000x-819\,199\,990\,000\,000 \text{ near } x=125.047$$

27*1/2((2*((((4*10^12 * 8*10^3 * sqrt(4*10^-8)))))^1/7-7))

Input interpretation:

$$27\times\frac{1}{2}\left(2\sqrt[7]{4\times 10^{12}\times 8\times 10^3\sqrt{4\times 10^{-8}}}-7\right)$$

Result:

$$\frac{27}{2}\left(40\times 2^{3/7}\times 5^{4/7}-7\right)$$

Decimal approximation:

1728.631715355418874236293448411769714476057050997359554955...

1728.6317153….

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. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms:

$$540 \times 2^{3/7} \times 5^{4/7} - \frac{189}{2}$$

root of $128\,x^7 + 84\,672\,x^6 + 24\,004\,512\,x^5 + 3\,780\,710\,640\,x^4 + 357\,277\,155\,480\,x^3 + 20\,257\,614\,715\,716\,x^2 + 638\,114\,863\,545\,054\,x - 8\,569\,121\,335\,283\,049\,342\,141\,771$ near $x = 1728.63$

From

BRANE SUSY BREAKING AND INFLATION: IMPLICATIONS FOR SCALAR FIELDS AND CMB DISTORTION
A. Sagnotti - arXiv:1303.6685v3 [hep-th] 9 Jul 2013

We have that:

1. For $0 < \gamma < 1$ two distinct types of solutions exist: a *climbing scalar*, for which

$$\dot{\varphi} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\,\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) - \sqrt{\frac{1+\gamma}{1-\gamma}}\,\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right], \qquad (9)$$

and a *descending scalar*, for which

$$\dot{\varphi} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\,\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) - \sqrt{\frac{1+\gamma}{1-\gamma}}\,\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right]. \qquad (10)$$

We obtain, for $\gamma = 0.5$ and $\tau = 128$:

1/2 [sqrt((1-0.5)/(1+0.5)) coth(128/2*sqrt(1-0.5^2)) – sqrt((1+0.5)/(1-0.5)) tanh(128/2*sqrt(1-0.5^2))]

Input:

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128}{2}\sqrt{1-0.5^2}\right) - \sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128}{2}\sqrt{1-0.5^2}\right)\right)$$

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

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

Result:

$-0.577350\ldots$

-0.577350…

Result:

$-0.577350269189625764509148780501957455647601751268461882 89\ldots$

Alternative representations:

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$\frac{1}{2}\left(-\left(-1+\frac{2}{1+e^{-128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{1.5}{0.5}}-i\left(\cot\left(-64\,i\sqrt{1-0.5^2}\right)\sqrt{\frac{0.5}{1.5}}\right)\right)$$

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$\frac{1}{2}\left(-\left(-1+\frac{2}{1+e^{-128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{1.5}{0.5}}+\left(1+\frac{2}{-1+e^{128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{0.5}{1.5}}\right)$$

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$\frac{1}{2}\left(-i\left(\cot\left(\frac{\pi}{2}+64\,i\sqrt{1-0.5^2}\right)\sqrt{\frac{1.5}{0.5}}\right)+\left(1+\frac{2}{-1+e^{128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{0.5}{1.5}}\right)$$

Series representations:

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=32\sqrt{0.75}$$

$$\sqrt{x}\left(-8\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k_1=0}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1}\,(3-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(16\,384\sqrt{0.75}^{\,2}+\pi^2\,(1-2\,k_2)^2\right)}+\right.$$
$$\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=-\infty}^{\infty}\frac{(-1)^{k_1}\,(0.333333-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(4096\sqrt{0.75}^{\,2}+\pi^2\,k_2^2\right)}\right)\quad\text{for}\ (x\in\mathbb{R}\ \text{and}\ x<0)$$

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$-\frac{1}{2}\sqrt{x}\left(\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(0.333333-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}-\right.$$
$$\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(3-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+$$
$$2\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)$$
$$\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_2}\,q^{2k_1}\,(0.333333-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}-$$
$$\left.2\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,q^{2k_1}\,(3-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}\right)$$
$$\text{for}\ (x\in\mathbb{R}\ \text{and}\ x<0\ \text{and}\ q=1.17772\times10^{24})$$

1/2 [sqrt((1-0.5)/(1+0.5)) tanh(128/2*sqrt(1-0.5^2)) – sqrt((1+0.5)/(1-0.5)) coth(128/2*sqrt(1-0.5^2))]

Input:

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128}{2}\sqrt{1-0.5^2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128}{2}\sqrt{1-0.5^2}\right)\right)$$

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

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

Result:

−0.577350…

-0.577350…

Result:

−0.577350269189625764509148780501957455647601751271791869 14…

Alternative representations:

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$\frac{1}{2}\left(i\cot\left(-64\,i\sqrt{1-0.5^2}\right)\sqrt{\frac{1.5}{0.5}}+\left(-1+\frac{2}{1+e^{-128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{0.5}{1.5}}\right)$$

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$\frac{1}{2}\left(-\left(1+\frac{2}{-1+e^{128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{1.5}{0.5}}+\left(-1+\frac{2}{1+e^{-128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{0.5}{1.5}}\right)$$

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$\frac{1}{2}\left(-\left(1+\frac{2}{-1+e^{128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{1.5}{0.5}}+i\cot\left(\frac{\pi}{2}+64\,i\sqrt{1-0.5^2}\right)\sqrt{\frac{0.5}{1.5}}\right)$$

Series representations:

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$

$$-32\sqrt{0.75}\,\sqrt{x}\left(\left(-8\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)\sum_{k_1=0}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1}\,(0.333333-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(16\,384\sqrt{0.75}^{\,2}+\pi^2\,(1-2\,k_2)^2\right)}+\right.\right.$$

$$\left.\left.\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k_1=0}^{\infty}\sum_{k_2=-\infty}^{\infty}\frac{(-1)^{k_1}\,(3-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(4096\sqrt{0.75}^{\,2}+\pi^2\,k_2^2\right)}\right)\right.\quad\text{for}\ (x\in$$

$\mathbb{R}$ and $x<0$)

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$

$$-\frac{1}{2}\sqrt{x}\left(\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^{k}\,(0.333333-x)^{k}\,x^{-k}\left(-\frac{1}{2}\right)_{k}}{k!}-\right.$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^{k}\,(3-x)^{k}\,x^{-k}\left(-\frac{1}{2}\right)_{k}}{k!}+$$

$$2\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,q^{2k_1}\,(0.333333-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}-$$

$$\left.2\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_2}\,q^{2k_1}\,(3-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}\right)$$

for $(x\in\mathbb{R}$ and $x<0$ and $q=1.17772\times10^{24})$

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$-\frac{1}{2}\sqrt{x}\left(\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(0.333333-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+\right.$$
$$2\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)$$
$$\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,q^{2k_1}\,(0.333333-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}+$$
$$\left.64\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{0.75}\sum_{k_1=0}^{\infty}\sum_{k_2=-\infty}^{\infty}\frac{(-1)^{k_1}\,(3-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(4096\sqrt{0.75}^{\,2}+\pi^2\,k_2^2\right)}\right)$$
for $(x\in\mathbb{R}$ and $x<0$ and $q=1.17772\times10^{24})$

Integral representation:

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)=$$
$$\int_0^{64\sqrt{0.75}}\left(\frac{1}{2}\,\operatorname{sech}^2(t)\sqrt{0.333333}+\right.$$
$$\left.\frac{\operatorname{csch}^2\left(t+\frac{1}{128}\,i\pi\left(64-\frac{t}{\sqrt{0.75}}\right)\right)\left(-i\pi+128\sqrt{0.75}\right)\sqrt{3}}{256\sqrt{0.75}}\right)dt$$

We note that:

-0.577350269189625764509148780501957455647601751268461

is equal to

Possible closed forms:

$$-\frac{1}{\sqrt{3}}\approx-0.57735026918962576450914878050195745564760175170126$$

And that, from the two results, we obtain:

(-0.57735026918962576450914878050195745564760175127179 1-
0.577350269189625764509148780501957455647601751268461)

Input interpretation:

$$-0.577350269189625764509148780501957455647601751271791 - 0.577350269189625764509148780501957455647601751268461$$

Result:

$$-1.154700538379251529018297561003914911295203502540252$$

-1.154700538…

Input interpretation:

$$-1.154700538379251529018297561003914911295203502540252$$

that is equal to:

Possible closed forms:

$$-\frac{2}{\sqrt{3}} \approx -1.154700538379251529018297561003914911295203502540253752 0$$

Furthermore, we have also:

1/((((1/2 [sqrt((1-0.5)/(1+0.5)) coth(128/2*sqrt(1-0.5^2)) – sqrt((1+0.5)/(1-0.5)) tanh(128/2*sqrt(1-0.5^2))]))))

Input:

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128}{2}\sqrt{1-0.5^2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128}{2}\sqrt{1-0.5^2}\right)\right)}$$

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

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

Result:

$$-1.732050807568877293527446341505872366942805253815375 60743...$$

-1.7320508075… = -√3

Input interpretation:

$$-1.732050807568877293527446341505872366942805253815375$$

Possible closed forms:

$$-\sqrt{3} \approx -1.732050807568877293527446341505872366942805253803806$$

Alternative representations:

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)} = \frac{1}{\frac{1}{2}\left(-\left(-1+\frac{2}{1+e^{-128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{1.5}{0.5}}-i\left(\cot\left(-64\,i\sqrt{1-0.5^2}\right)\sqrt{\frac{0.5}{1.5}}\right)\right)}$$

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)} = \frac{1}{\frac{1}{2}\left(-\left(-1+\frac{2}{1+e^{-128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{1.5}{0.5}}+\left(1+\frac{2}{-1+e^{128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{0.5}{1.5}}\right)}$$

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)} = \frac{1}{\frac{1}{2}\left(-i\left(\cot\left(\frac{\pi}{2}+64\,i\sqrt{1-0.5^2}\right)\sqrt{\frac{1.5}{0.5}}\right)+\left(1+\frac{2}{-1+e^{128\sqrt{1-0.5^2}}}\right)\sqrt{\frac{0.5}{1.5}}\right)}$$

Series representations:

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)}=$$

$$1\Big/\left(32\sqrt{0.75}\,\sqrt{x}\left(\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)\right.\right.$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=-\infty}^{\infty}\frac{(-1)^{k_1}\,(0.333333-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(4096\sqrt{0.75}^{\,2}+\pi^2\,k_2^2\right)}-$$

$$\left.\left.8\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k_1=0}^{\infty}\sum_{k_2=1}^{\infty}\frac{(-1)^{k_1}\,(3-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(16\,384\sqrt{0.75}^{\,2}+\pi^2\,(-1+2\,k_2)^2\right)}\right)\right)$$

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

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)}=$$

$$-\left(2\Big/\left(\sqrt{x}\left(\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(0.333333-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}-\right.\right.\right.$$

$$\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(3-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+$$

$$2\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)$$

$$\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_2}\,q^{2k_1}\,(0.333333-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}-2\exp\left(\right.$$

$$\left.\left.\left.i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,q^{2k_1}\,(3-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}\right)\right)\right)$$

for $(x \in \mathbb{R}$ and $x < 0$ and $q = 1.17772\times10^{24})$

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)}=$$

$$2\Big/\left(\sqrt{x}\left(\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(3-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+\right.\right.$$

$$2\exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,q^{2k_1}\,(3-x)^{k_2}\,x^{-k_2}\left(-\frac{1}{2}\right)_{k_2}}{k_2!}+$$

$$64\exp\left(i\pi\left\lfloor\frac{\arg(0.333333-x)}{2\pi}\right\rfloor\right)\sqrt{0.75}$$

$$\left.\left.\sum_{k_1=0}^{\infty}\sum_{k_2=-\infty}^{\infty}\frac{(-1)^{k_1}\,(0.333333-x)^{k_1}\,x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}}{k_1!\left(4096\sqrt{0.75}^{\,2}+\pi^2\,k_2^2\right)}\right)\right)$$

for $(x\in\mathbb{R}$ and $x<0$ and $q=1.17772\times10^{24})$

Integral representation:

$$\frac{1}{\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128\sqrt{1-0.5^2}}{2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128\sqrt{1-0.5^2}}{2}\right)\right)}=$$

$$-\frac{2}{\int_{\frac{i\pi}{2}}^{64\sqrt{0.75}}\left(\operatorname{csch}^2(t)\sqrt{0.333333}-\frac{128\operatorname{sech}^2\left(\frac{64(i\pi-2t)\sqrt{0.75}}{i\pi-128\sqrt{0.75}}\right)\sqrt{0.75}\,\sqrt{3}}{i\pi-128\sqrt{0.75}}\right)dt}$$

From

Pre – Inflationary Clues from String Theory ?
N. Kitazawa and A. Sagnotti - arXiv:1402.1418v2 [hep-th] 12 Mar 2014

For $0<\gamma<1$ there are actually *two* classes of such solutions, which describe respectively a scalar that emerges from the initial singularity while *climbing* or *descending* the potential. To begin with, the *climbing* solutions for the τ–derivatives of φ and $\mathcal{A}$ are

$$\begin{aligned}\dot{\varphi} &= \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)-\sqrt{\frac{1+\gamma}{1-\gamma}}\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right],\\ \dot{\mathcal{A}} &= \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)+\sqrt{\frac{1+\gamma}{1-\gamma}}\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right], \qquad (2.12)\end{aligned}$$

We have that from

$$\dot{\varphi} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) - \sqrt{\frac{1+\gamma}{1-\gamma}}\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right]$$

we obtain, for $\gamma = 0.5$ and $\tau = 128$:

1/2 [sqrt((1-0.5)/(1+0.5)) coth(128/2*sqrt(1-0.5^2)) – sqrt((1+0.5)/(1-0.5)) tanh(128/2*sqrt(1-0.5^2))]

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128}{2}\sqrt{1-0.5^2}\right)-\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128}{2}\sqrt{1-0.5^2}\right)\right)$$

−0.577350...

−0.57735026918962576450914878050195745564760175126846188289...
-0.57735026…

And from

$$\dot{A} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) + \sqrt{\frac{1+\gamma}{1-\gamma}}\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right]$$

We obtain:

1/2 [sqrt((1-0.5)/(1+0.5)) coth(128/2*sqrt(1-0.5^2)) + sqrt((1+0.5)/(1-0.5)) tanh(128/2*sqrt(1-0.5^2))]

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\coth\left(\frac{128}{2}\sqrt{1-0.5^2}\right)+\sqrt{\frac{1+0.5}{1-0.5}}\tanh\left(\frac{128}{2}\sqrt{1-0.5^2}\right)\right)$$

1.15470...

1.15470…

The difference between the two results is:

1.154700538379251529018297561003914911295203502539421 2+0.577350269189625764509148780501957455647601751268461

1.154700538379251529018297561003914911295203502539421 2 +
0.577350269189625764509148780501957455647601751268461

1.732050807568877293527446341505872366942805253807882 2

1.7320508075…. ≈ √3

Instead, from the following equations:

1. For $0 < \gamma < 1$ two distinct types of solutions exist: a *climbing scalar*, for which

$$\dot{\varphi} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\,\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) - \sqrt{\frac{1+\gamma}{1-\gamma}}\,\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right], \qquad (9)$$

and a *descending scalar*, for which

$$\dot{\varphi} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\,\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) - \sqrt{\frac{1+\gamma}{1-\gamma}}\,\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right]. \qquad (10)$$

We obtain, for $\gamma = 0.5$ and $\tau = 128$:

1/2 [sqrt((1-0.5)/(1+0.5)) coth(128/2*sqrt(1-0.5^2)) – sqrt((1+0.5)/(1-0.5)) tanh(128/2*sqrt(1-0.5^2))]

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\coth\left(\frac{128}{2}\sqrt{1-0.5^2}\right) - \sqrt{\frac{1+0.5}{1-0.5}}\,\tanh\left(\frac{128}{2}\sqrt{1-0.5^2}\right)\right)$$

–0.577350…

And:

1/2 [sqrt((1-0.5)/(1+0.5)) tanh(128/2*sqrt(1-0.5^2)) – sqrt((1+0.5)/(1-0.5)) coth(128/2*sqrt(1-0.5^2))]

$$\frac{1}{2}\left(\sqrt{\frac{1-0.5}{1+0.5}}\,\tanh\left(\frac{128}{2}\sqrt{1-0.5^2}\right) - \sqrt{\frac{1+0.5}{1-0.5}}\,\coth\left(\frac{128}{2}\sqrt{1-0.5^2}\right)\right)$$

–0.577350…

We note that:

-0.577350269189625764509148780501957455647601751268461

Is equal to

$$-\frac{1}{\sqrt{3}} \approx -0.57735026918962576450914878050195745564760175127\,0126$$

And that, from the two results, we obtain:

(-0.57735026918962576450914878050195745564760175127179 1-0.57735026918962576450914878050195745564760175126846 1)

$$-0.57735026918962576450914878050195745564760175127179\,1 - 0.57735026918962576450914878050195745564760175126846\,1$$

$$-1.15470053837925152901829756100391491129520350254025\,2$$

That is equal to

$$-\frac{2}{\sqrt{3}} \approx -1.15470053837925152901829756100391491129520350254025\,37520$$

We observe that, with the results of the various equations developed, we obtain:

sqrt(3)-1/(sqrt(3))

Input:

$$\sqrt{3} - \frac{1}{\sqrt{3}}$$

Decimal approximation:

1.15470053837925152901829756100391491129520350254025 3752037...

1.15470053837925…..

Alternate forms:

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

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

That is the sum of the results of the two equations:

$$\dot{\varphi} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\,\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) - \sqrt{\frac{1+\gamma}{1-\gamma}}\,\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right]$$

$$\dot{\varphi} = \frac{1}{2}\left[\sqrt{\frac{1-\gamma}{1+\gamma}}\,\tanh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right) - \sqrt{\frac{1+\gamma}{1-\gamma}}\,\coth\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right]$$

$$-\frac{2}{\sqrt{3}} \approx -1.154700538379251529018297561003914911295203502540253752 0$$

with positive sign.

Thus, another fundamental solution is:

$\frac{2}{\sqrt{3}} = 1.15470053837925\ldots..$

We observe that:

[1/2(1.154700538379251529)]^1/1024

Input interpretation:

$$\sqrt[1024]{\frac{1}{2}\times 1.154700538379251529}$$

Result:

0.9994637120722281830647...

0.999463712072…. result very near to the value of the following Rogers-Ramanujan continued fraction

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

= 0.9991104684

Now, we have:

$$\mathcal{V}(\varphi) \sim \arctan\left(e^{-2\varphi}\right)$$

With φ = 3. We obtain:

((arctan(e^-6)))

Input:

$$\tan^{-1}\left(\frac{1}{e^6}\right)$$

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

Decimal approximation:

0.00247874710002515868263772923307850918895588340591775167 5...

(result in radians)

0.0024787471…

Conversion from radians to degrees:

0.142°

Alternate forms:

$$\cot^{-1}\left(e^6\right)$$

$$\frac{1}{2}\,i\log\left(1-\frac{i}{e^6}\right)-\frac{1}{2}\,i\log\left(1+\frac{i}{e^6}\right)$$

$\cot^{-1}(x)$ is the inverse cotangent function

$\log(x)$ is the natural logarithm

Alternative representations:

$$\tan^{-1}\left(\frac{1}{e^6}\right)=\sec^{-1}\left(\frac{1}{e^6}\,\middle|\,0\right)$$

$$\tan^{-1}\left(\frac{1}{e^6}\right) = \cot^{-1}\left(\frac{1}{\frac{1}{e^6}}\right)$$

$$\tan^{-1}\left(\frac{1}{e^6}\right) = \tan^{-1}\left(1, \frac{1}{e^6}\right)$$

Series representations:

$$\tan^{-1}\left(\frac{1}{e^6}\right) = \sum_{k=0}^{\infty} \frac{(-1)^k\, e^{-6-12k}}{1+2k}$$

$$\tan^{-1}\left(\frac{1}{e^6}\right) = 3\,i + \frac{1}{2}\,i\log(2) - \frac{1}{2}\,i\log\left(i + e^6\right) - \frac{1}{2}\,i\sum_{k=1}^{\infty} \frac{\left(\frac{1}{2} + \frac{i}{2\,e^6}\right)^k}{k}$$

$$\tan^{-1}\left(\frac{1}{e^6}\right) = -3\,i - \frac{1}{2}\,i\log(2) + \frac{1}{2}\,i\log\left(-i + e^6\right) + \frac{1}{2}\,i\sum_{k=1}^{\infty} \frac{\left(-\frac{1}{2}\,i\left(i + \frac{1}{e^6}\right)\right)^k}{k}$$

Integral representations:

$$\tan^{-1}\left(\frac{1}{e^6}\right) = \frac{1}{e^6}\int_0^1 \frac{1}{1+\frac{t^2}{e^{12}}}\,dt$$

$$\tan^{-1}\left(\frac{1}{e^6}\right) = -\frac{i}{4\,e^6\,\pi^{3/2}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\left(1+\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds \quad \text{for } 0<\gamma<\frac{1}{2}$$

$$\tan^{-1}\left(\frac{1}{e^6}\right) = -\frac{i}{4\,e^6\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{12\,s}\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds \quad \text{for } 0<\gamma<\frac{1}{2}$$

From which, performing the ln:

colog((arctan(e^-6)))

Input:

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)$$

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

$\log(x)$ is the natural logarithm

Decimal approximation:

6.000002048065331491153146050055944548801976358576292015561...

(result in radians)

≈ 6

Alternate forms:

$$-\log\left(\cot^{-1}\left(e^6\right)\right)$$

$$-\log\left(\frac{1}{2}\, i\left(\log\left(1-\frac{i}{e^6}\right)-\log\left(1+\frac{i}{e^6}\right)\right)\right)$$

$\cot^{-1}(x)$ is the inverse cotangent function

Alternative representations:

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\log\left(\tan^{-1}\left(1,\frac{1}{e^6}\right)\right)$$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\log_e\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)$$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\log(a)\log_a\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)$$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\log\left(\frac{1}{2}\, i\left(\log\left(1-\frac{i}{e^6}\right)-\log\left(1+\frac{i}{e^6}\right)\right)\right)$$

Series representations:

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\log\left(\sum_{k=0}^{\infty}\frac{(-1)^k\, e^{-6-12k}}{1+2k}\right)$$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\tan^{-1}\left(\frac{1}{e^6}\right)\right)^k}{k}$$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\log\left(\frac{1}{2}\,i\left(6+\log(2)-\log\left(i+e^6\right)-\sum_{k=1}^{\infty}\frac{\left(\frac{1}{2}+\frac{i}{2\,e^6}\right)^k}{k}\right)\right)$$

Integral representations:

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\int_1^{\tan^{-1}\left(\frac{1}{e^6}\right)}\frac{1}{t}\,dt$$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=6-\log\left(e^{12}\int_0^1\frac{1}{e^{12}+t^2}\,dt\right)$$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=-\log\left(-\frac{i}{4\,e^6\,\pi^{3/2}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\left(1+\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds\right)$$

for $0<\gamma<\frac{1}{2}$

$$-\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)=6+\log(\pi)-\log\left(-\frac{i}{4}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{12\,s}\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds\right)$$

for $0<\gamma<\frac{1}{2}$

From the previous results, concerning the eqs, (9)-(10) and the last expression, we obtain:

(-0.57735026918962-0.57735026918962) *1/ ((colog((arctan(e^-6)))))

Input interpretation:

$$(-0.57735026918962-0.57735026918962)\left(-\frac{1}{\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)}\right)$$

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

$\log(x)$ is the natural logarithm

Result:

−0.19245002403817...

(result in radians)

-0.19245002403817…

Alternative representations:

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{-1.154700538379240000}{-\log\left(\tan^{-1}\left(1,\ \frac{1}{e^{\delta}}\right)\right)}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{-1.154700538379240000}{-\log_e\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{-1.154700538379240000}{-\log(a)\log_a\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{-1.154700538379240000}{-\log\left(\frac{1}{2}\,i\left(\log\left(1-\frac{i}{e^{\delta}}\right)-\log\left(1+\frac{i}{e^{\delta}}\right)\right)\right)}$$

Series representations:

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=-\frac{1.154700538379240000}{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)^k}{k}}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{1.15470053837924000}{\log\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{5}\right)^{k}2^{1+2k}\,{}_{F}{}_{1+2k}\left(\frac{1}{e^{\delta}\left(1+\sqrt{1+\frac{4}{5e^{12}}}\right)}\right)^{1+2k}}{1+2k}\right)}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{1.15470053837924000}{2i\pi\left\lfloor\frac{\arg\left(-x+\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^{k}x^{-k}\left(-x+\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)^{k}}{k}}\quad\text{for } x<0$$

Integral representations:

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{1.15470053837924000}{\int_{1}^{\tan^{-1}\left(\frac{1}{e^{\delta}}\right)}\frac{1}{t}\,dt}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{1.15470053837924000}{\log\left(\frac{1}{e^{\delta}}\int_{0}^{1}\frac{1}{1+\frac{t^{2}}{e^{12}}}\,dt\right)}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)}=\frac{1.15470053837924000}{\log\left(-\frac{i}{4e^{\delta}\pi^{3/2}}\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(1+\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^{2}\,ds\right)}\quad\text{for } 0<\gamma<\frac{1}{2}$$

$$-\frac{-0.577350269189620000 - 0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)} = \frac{1.15470053837924000}{\log\left(\frac{1}{4\,e^{\delta}\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\left(\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds\right)} \quad \text{for } 0 < \gamma < \frac{1}{2}$$

Continued fraction representations:

$$-\frac{-0.577350269189620000 - 0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{\delta}}\right)\right)} = \frac{1.15470053837924000}{\log\left(\frac{1}{e^{\delta}\left(1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{\frac{k^2}{e^{12}}}{1+2\,k}\right)}\right)} = \frac{1.15470053837924000}{\log\left(\frac{1}{e^{\delta}\left(1+\cfrac{1}{\left(3+\cfrac{4}{\left(5+\cfrac{9}{\left(7+\cfrac{16}{(9+\ldots)\,e^{12}}\right)e^{12}}\right)e^{12}}\right)e^{12}}\right)}\right)}$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)}=$$

$$\frac{1.15470053837924000\left(1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{\left(-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)\left\lfloor\frac{1+k}{2}\right\rfloor^{2}}{1+k}\right)}{-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)}=$$

$$-1.15756986131605369\left(1+\cfrac{-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)}{2+\cfrac{-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)}{3+\cfrac{4\left(-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)}{4+\cfrac{4\left(-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)}{5+\ldots}}}}\right)$$

$$-\frac{-0.577350269189620000-0.577350269189620000}{\log\left(\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)}=$$

$$\frac{1.15470053837924000\left(1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{\left(-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)\left\lfloor\frac{1+k}{2}\right\rfloor}{\frac{1}{2}\left(3+(-1)^{k}(-1+k)+k\right)}\right)}{-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)}=$$

$$-1.15756986131605369\left(1+\cfrac{-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)}{2+\cfrac{-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)}{3+\cfrac{2\left(-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)}{2+\cfrac{2\left(-1+\tan^{-1}\left(\frac{1}{e^{6}}\right)\right)}{5+\ldots}}}}\right)$$

$\underset{k=k_1}{\overset{k_2}{\mathrm{K}}} a_k/b_k$ is a continued fraction

We obtain also from:

9*(-0.19245002403817)

Input interpretation:

$9 \times (-0.19245002403817)$

Result:

-1.73205021634353

-1.73205021634353 = -√3

Input interpretation:

-1.732050216

Possible closed forms:

$-\sqrt{3} \approx -1.732050\,80756$

$-\csc\left(\tan\left(\frac{16}{29}\right)\right) \approx -1.732050\,18245$

$-\frac{13\,029\,\pi}{23\,632} \approx -1.732050\,251160$

From the two results:

Decimal approximation:

0.00247874710002515868263772923307850918895588340591775167 5...

(result in radians)

−0.57735026918962576450914878050195745564760175127179186914...

we obtain:

-1/((arctan(e^-6))) * (-0.57735026918962576450914878050195745564760)

Input interpretation:

$-\frac{-0.57735026918962576450914878050195745564760}{\tan^{-1}\left(\frac{1}{e^6}\right)}$

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

Result:

232.92019955717378312961950988923906004 60…

(result in radians)

232.92019955… ≈ 233 that is a Fibonacci number

Alternative representations:

$$-\frac{0.57735026918962576450914878050195745564760000\,(-1)}{\frac{\tan^{-1}\left(\frac{1}{e^{\delta}}\right)}{0.57735026918962576450914878050195745564760000}} =$$

$$\frac{\mathrm{sc}^{-1}\left(\frac{1}{e^{\delta}}\,\middle|\,0\right)}{0.57735026918962576450914878050195745564760000}$$

$$-\frac{0.57735026918962576450914878050195745564760000\,(-1)}{\frac{\tan^{-1}\left(\frac{1}{e^{\delta}}\right)}{0.57735026918962576450914878050195745564760000}} =$$

$$\frac{\tan^{-1}\left(1,\,\frac{1}{e^{\delta}}\right)}{0.57735026918962576450914878050195745564760000}$$

$$-\frac{0.57735026918962576450914878050195745564760000\,(-1)}{\frac{\tan^{-1}\left(\frac{1}{e^{\delta}}\right)}{0.57735026918962576450914878050195745564760000}} =$$

$$\frac{\cot^{-1}\left(\frac{1}{\frac{1}{e^{\delta}}}\right)}{0.57735026918962576450914878050195745564760000}$$

Series representations:

$$-\frac{0.57735026918962576450914878050195745564760000\,(-1)}{\frac{\tan^{-1}\left(\frac{1}{e^{\delta}}\right)}{0.57735026918962576450914878050195745564760000}} =$$

$$\frac{\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1}{e^{\delta}}\right)^{1+2k}}{1+2k}}{0.57735026918962576450914878050195745564760000}$$

$$-\frac{0.5773502691896257645091487805019574556476000\,(-1)}{\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.5773502691896257645091487805019574556476000}{\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{5}\right)^k 2^{1+2k} {}_{F_{1+2k}}\left(\frac{1}{e^6\left(1+\sqrt{1+\frac{4}{5e^{12}}}\right)}\right)^{1+2k}}{1+2k}}$$

$$-\frac{0.5773502691896257645091487805019574556476000\,(-1)}{\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.5773502691896257645091487805019574556476000}{\tan^{-1}(x)+\pi\left\lfloor\frac{\arg\left(i\left(\frac{1}{e^6}-x\right)\right)}{2\pi}\right\rfloor+\frac{1}{2}i\sum_{k=1}^{\infty}\frac{\left(-(-i-x)^{-k}+(i-x)^{-k}\right)\left(\frac{1}{e^6}-x\right)^k}{k}}$$

for $(i\,x \in \mathbb{R}$ and $i\,x < -1)$

Integral representations:

$$-\frac{0.5773502691896257645091487805019574556476000\,(-1)}{\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.5773502691896257645091487805019574556476000\,e^6}{\int_0^1 \frac{1}{1+\frac{t^2}{e^{12}}}\,dt}$$

$$-\frac{0.5773502691896257645091487805019574556476000\,(-1)}{\tan^{-1}\left(\frac{1}{e^6}\right)} = -\frac{2.3094010767585030580365951220078298225904000\,e^6\,\pi^{3/2}}{i\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(1+\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds} \quad \text{for } 0<\gamma<\frac{1}{2}$$

$$-\frac{0.5773502691896257645091487805019574556476000\,(-1)}{\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{2.3094010767585030580365951220078298225904000\,e^6\,i\,\pi}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds} \quad \text{for } 0<\gamma<\frac{1}{2}$$

From which:

[-1/((arctan(e^-6))) * (-0.5773502691896257645091487805019574556476)]*1/144

Input interpretation:

$$-\frac{-0.5773502691896257645091487805019574556476}{\tan^{-1}\left(\frac{1}{e^6}\right)} \times \frac{1}{144}$$

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

Result:

1.617501385813706827289024374230826805875...

(result in radians)

1.6175013858…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternative representations:

$$-\frac{-0.5773502691896257645091487805019574556476 0000}{144 \tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.5773502691896257645091487805019574556476 0000}{144 \sec^{-1}\left(\frac{1}{e^6} \middle| 0\right)}$$

$$-\frac{-0.5773502691896257645091487805019574556476 0000}{144 \tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.5773502691896257645091487805019574556476 0000}{144 \tan^{-1}\left(1, \frac{1}{e^6}\right)}$$

$$-\frac{-0.5773502691896257645091487805019574556476 0000}{144 \tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.5773502691896257645091487805019574556476 0000}{144 \cot^{-1}\left(\frac{1}{\frac{1}{e^6}}\right)}$$

Series representations:

$$-\frac{-0.5773502691896257645091487805019574556476000}{144\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.00400937686937240114242464430904137121977500000}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{1}{e^6}\right)^{1+2k}}{1+2k}}$$

$$-\frac{-0.5773502691896257645091487805019574556476000}{144\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.00400937686937240114242464430904137121977500000}{\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{5}\right)^k 2^{1+2k}\,{}_F{}_{1+2k}\left(\frac{1}{e^6\left(1+\sqrt{1+\frac{4}{5e^{12}}}\right)}\right)^{1+2k}}{1+2k}}$$

$$-\frac{-0.5773502691896257645091487805019574556476000}{144\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.00400937686937240114242464430904137121977500000}{\tan^{-1}(x)+\pi\left\lfloor\frac{\arg\left(i\left(\frac{1}{e^6}-x\right)\right)}{2\pi}\right\rfloor+\frac{1}{2}i\sum_{k=1}^{\infty}\frac{\left(-(-i-x)^{-k}+(i-x)^{-k}\right)\left(\frac{1}{e^6}-x\right)^k}{k}}$$

for $(i\,x\in\mathbb{R}$ and $i\,x<-1)$

Integral representations:

$$-\frac{-0.5773502691896257645091487805019574556476000}{144\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.00400937686937240114242464430904137121977500000\,e^6}{\int_0^1\frac{1}{1+\frac{t^2}{e^{12}}}\,dt}$$

$$-\frac{-0.57735026918962576450914878050195745564760000}{144\tan^{-1}\left(\frac{1}{e^6}\right)} = -\frac{0.01603750747748960456969857723616548487910000\,e^6\,\pi^{3/2}}{i\int_{-i\infty+\gamma}^{i\infty+\gamma}\left(1+\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds} \quad \text{for } 0<\gamma<\frac{1}{2}$$

$$-\frac{-0.57735026918962576450914878050195745564760000}{144\tan^{-1}\left(\frac{1}{e^6}\right)} = \frac{0.01603750747748960456969857723616548487910000\,e^6\,i\,\pi}{\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{1}{e^{12}}\right)^{-s}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)}{\Gamma\left(\frac{3}{2}-s\right)}\,ds} \quad \text{for } 0<\gamma<\frac{1}{2}$$

Now, we have the following Ramanujan expression for $q = e^{-t}$ (see figure at the end of the paper):

1+e^(-t)/(1-e^(-t))^2+(e^(-t))^3/((1-e^(-t))^2(1-((e^(-t)))^2))^2+(e^(-t))^6/((1-e^(-t))^2(1-(e^(-t))^2)^2(1-(e^(-t))^3)^2)

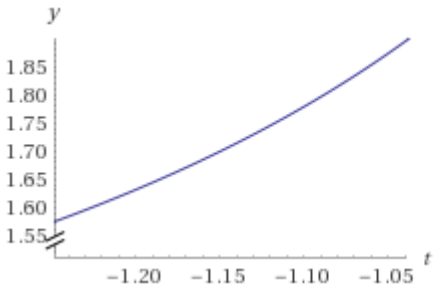
Input:

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

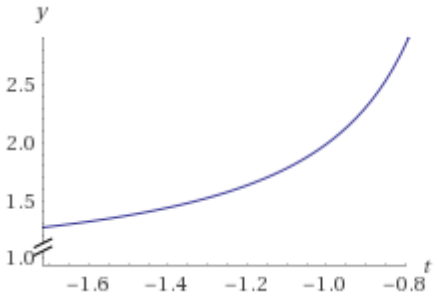
Exact result:

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

Plots:



(t from −1.2 to −1)



(t from −1.7 to −0.8)

Alternate forms:

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

$$\frac{-2e^{t}+e^{2t}-e^{3t}+2e^{4t}+e^{6t}+3e^{7t}+e^{9t}-2e^{10t}+e^{11t}+1}{\left(e^{t}-1\right)^6\left(e^{t}+1\right)\left(e^{t}+e^{2t}+1\right)^2}$$

$$\frac{e^{t}+1}{27\left(e^{t}+e^{2t}+1\right)^2}+\frac{63}{64\left(e^{t}-1\right)}-\frac{1}{27\left(e^{t}+e^{2t}+1\right)}+\frac{923}{864\left(e^{t}-1\right)^2}+\frac{341}{432\left(e^{t}-1\right)^3}+\frac{323}{216\left(e^{t}-1\right)^4}+\frac{13}{12\left(e^{t}-1\right)^5}+\frac{5}{18\left(e^{t}-1\right)^6}+\frac{1}{64\left(e^{t}+1\right)}+1$$

Series expansion at t = 0:

$$\frac{5}{18\,t^6}+\frac{1}{4\,t^5}-\frac{7}{216\,t^4}-\frac{1}{12\,t^3}+\frac{325}{324\,t^2}+O\left(\frac{1}{t}\right)$$

(Laurent series)

Derivative:

$$\frac{d}{dt}\left(1+\frac{e^{-t}}{(1-e^{-t})^2}+\frac{(e^{-t})^3}{((1-e^{-t})^2\,(1-(e^{-t})^2))^2}+\frac{(e^{-t})^6}{(1-e^{-t})^2\,(1-(e^{-t})^2)^2\,(1-(e^{-t})^3)^2}\right)=$$
$$-\left(\left(e^{t}\left(2\,e^{t}-5\,e^{3t}-2\,e^{4t}+20\,e^{5t}+42\,e^{6t}+52\,e^{7t}+41\,e^{8t}+18\,e^{9t}+5\,e^{10t}+3\,e^{11t}+2\,e^{12t}+e^{13t}+1\right)\right)\Big/\left((e^{t}-1)^7\,(e^{t}+1)^2\,(e^{t}+e^{2t}+1)^3\right)\right)$$

Indefinite integral:

$$\int\left(1+\frac{e^{-3t}}{(1-e^{-2t})^2\,(1-e^{-t})^4}+\frac{e^{-t}}{(1-e^{-t})^2}+\frac{e^{-6t}}{(1-e^{-3t})^2\,(1-e^{-2t})^2\,(1-e^{-t})^2}\right)dt=$$
$$\frac{e^{t}+2}{81\,(e^{t}+e^{2t}+1)}+t-\frac{31}{32\,(e^{t}-1)}-\frac{43}{864\,(e^{t}-1)^2}-\frac{149}{648\,(e^{t}-1)^3}-\frac{29}{144\,(e^{t}-1)^4}-$$
$$\frac{1}{18\,(e^{t}-1)^5}+\frac{1}{64}\log(1-e^{t})-\frac{1}{64}\log(e^{t}+1)+\frac{2\tan^{-1}\left(\frac{2\,e^{t}+1}{\sqrt{3}}\right)}{81\,\sqrt{3}}+\text{constant}$$

(assuming a complex-valued logarithm)

Now, we want consider t equal to -0.5773502691896257645… that is equal to

$$-\frac{1}{\sqrt{3}}\approx -0.57735026918962576450914878050195745564760175127012 6$$

We obtain:

1+(e^(-0.57735)^1)/((1-e^(-0.57735)))^2+(e^(-0.57735))^3/((1-e^(-0.57735))^2(1-((e^(-0.57735)))^2))^2+(e^(-0.57735))^6/((1-e^(-0.57735))^2(1-(e^(-0.57735))^2)^2(1-(e^(-0.57735))^3)^2)

Input:

$$1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}$$

Result:

14.621980515170888432605014107059041812627865635199478292 98...

14.6219805…

(For t = -0.5773502691 we have 14.621948791559012)

Alternative representation:

$$1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}=$$

$$1+\frac{\exp^{(-0.57735)^1}(z)}{\left(1-\frac{1}{\exp^{0.57735}(z)}\right)^2}+\frac{\left(\frac{1}{\exp^{0.57735}(z)}\right)^3}{\left(\left(1-\frac{1}{\exp^{0.57735}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.57735}(z)}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{\exp^{0.57735}(z)}\right)^6}{\left(1-\frac{1}{\exp^{0.57735}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.57735}(z)}\right)^2\right)^2\left(1-\left(\frac{1}{\exp^{0.57735}(z)}\right)^3\right)^2}\quad \text{for } z=1$$

Series representations:

$$1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}=$$
$$\left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{5.19615}-3\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{5.7735}+2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6.35085}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6.9282}-2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8.66025}+4\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{9.2376}-4\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{9.81495}-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{10.3923}+2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{11.547}+2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{12.1244}-3\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{12.7017}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{13.2791}\right)\Big/$$
$$\left(\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.57735}\right)^4\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{5.19615}\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.1547}\right)^2\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.73205}\right)^2\right)$$

$$1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}=$$
$$\left(\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{5.19615}-3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{5.7735}+2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{6.35085}+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{6.9282}-2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{8.66025}+4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{9.2376}-4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{9.81495}-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{10.3923}+2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{11.547}+2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{12.1244}-3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{12.7017}+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{13.2791}\right)\Big/$$
$$\left(\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.57735}\right)^4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{5.19615}\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.1547}\right)^2\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.73205}\right)^2\right)$$

$$1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}=$$
$$\left(\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{5.19615}-3\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{5.7735}+2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{6.35085}+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{6.9282}-2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{8.66025}+4\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{9.2376}-4\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{9.81495}-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{10.3923}+2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{11.547}+2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{12.1244}-3\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{12.7017}+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{13.2791}\right)\Big/$$
$$\left(\left(-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{0.57735}\right)^4\left(-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{1.1547}\right)^2\left(-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{1.73205}\right)^2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{5.19615}\right)$$

0.979+1/[1+(e^(-0.57735)^1)/((1-e^(-0.57735)))^2+(e^(-0.57735))^3/((1-e^(-0.57735))^2(1-((e^(-0.57735)))^2))^2+(e^(-0.57735))^6/((1-e^(-0.57735))^2(1-(e^(-0.57735))^2)^2(1-(e^(-0.57735))^3)^2)]^1/6

Input:

$$0.979+1\Big/\left(\left(1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}\right)\text{^}(1/6)\right)$$

Result:

1.6184878535033613505261688570373827461198154843297042078 53...

1.618487853…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternative representation:

$$0.979+1\Big/\left(\left(1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}\right)\text{^}(1/6)\right)=$$

$$0.979+1\Big/\left(\left(1+\frac{\exp^{(-0.57735)^1}(z)}{\left(1-\frac{1}{\exp^{0.57735}(z)}\right)^2}+\frac{\left(\frac{1}{\exp^{0.57735}(z)}\right)^3}{\left(\left(1-\frac{1}{\exp^{0.57735}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.57735}(z)}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{\exp^{0.57735}(z)}\right)^6}{\left(1-\frac{1}{\exp^{0.57735}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.57735}(z)}\right)^2\right)^2\left(1-\left(\frac{1}{\exp^{0.57735}(z)}\right)^3\right)^2}\right)\text{^}(1/6)\right)\quad\text{for } z=1$$

Series representations:

$$0.979+1\Bigg/\left(\left(1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}\right)\text{^}(1/6)\right)=$$

$$0.979+1\Bigg/\left(\left(1+1\Bigg/\left(\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.73205}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.1547}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.57735}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.4641}\right)+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.1547}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.57735}}\right)^4\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.73205}}+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.57735}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.57735}}\right)\text{^}(1/6)\right)$$

$$0.979+1\Big/\left(\left(1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}\right)\text{^}(1/6)\right)=$$

$$0.979+1\Big/\left(\left(1+11.0357\Big/\left(\left(1-\frac{3.322}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.73205}}\right)^2\left(1-\frac{2.22638}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.1547}}\right)^2\left(1-\frac{1.49211}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.57735}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{3.4641}\right)+\frac{3.322}{\left(1-\frac{2.22638}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.1547}}\right)^2\left(1-\frac{1.49211}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.57735}}\right)^4\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.73205}}+\frac{1.49211}{\left(1-\frac{1.49211}{\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.57735}}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.57735}}\right)\text{^}(1/6)\right)$$

$$0.979+1\Big/\left(\left(1+\frac{e^{(-0.57735)^1}}{\left(1-\frac{1}{e^{0.57735}}\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^3}{\left(\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.57735}}\right)^6}{\left(1-\frac{1}{e^{0.57735}}\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.57735}}\right)^3\right)^2}\right)\text{^}(1/6)\right)=$$

$$0.979+1\Big/\left(\left(1+1\Big/\left(\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.73205}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.1547}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.57735}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.4641}\right)+1\Big/\left(\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.1547}}\right)^2\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.57735}}\right)^4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.73205}\right)+\frac{1}{\left(1-\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.57735}}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.57735}}\right)\text{^}(1/6)\right)$$

We know that α' is the Regge slope (string tension). With regard the Omega mesons, the values are:

ω	6	$m_{u/d}=0-60$	$0.910-0.918$	
	ω/ω_3	$5+3$	$m_{u/d}=255-390$	$0.988-1.18$
	ω/ω_3	$5+3$	$m_{u/d}=240-345$	$0.937-1.000$
Ψ	3	$m_c=1500$	0.979	-0.09

In this above scheme we note the value 0.979 (Regge Slope of J/Psi meson), that we have utilized in the previous expression.

From the previous expression:

Input interpretation:

$$(-0.57735026918962 - 0.57735026918962)\left(-\frac{1}{\log\left(\tan^{-1}\left(\frac{1}{e^6}\right)\right)}\right)$$

−0.19245002403817...

(result in radians)

-0.19245002403817…

Now, we want consider t equal to -0.19245002403817…

We obtain:

1+(e^(-0.19245)^1)/((1-e^(-0.19245)))^2+(e^(-0.19245))^3/((1-e^(-0.19245))^2(1-((e^(-0.19245)))^2))^2+(e^(-0.19245))^6/((1-e^(-0.19245))^2(1-(e^(-0.19245))^2)^2(1-(e^(-0.19245))^3)^2)

Input:

$$1+\frac{e^{(-0.19245)^1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}$$

Result:

6407.28...

6407.28…

Alternative representation:

$$1+\frac{e^{(-0.19245)^1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}=$$
$$1+\frac{\exp^{(-0.19245)^1}(z)}{\left(1-\frac{1}{\exp^{0.19245}(z)}\right)^2}+\frac{\left(\frac{1}{\exp^{0.19245}(z)}\right)^3}{\left(\left(1-\frac{1}{\exp^{0.19245}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.19245}(z)}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{\exp^{0.19245}(z)}\right)^6}{\left(1-\frac{1}{\exp^{0.19245}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.19245}(z)}\right)^2\right)^2\left(1-\left(\frac{1}{\exp^{0.19245}(z)}\right)^3\right)^2}\quad \text{for } z=1$$

Series representations:

$$1+\frac{e^{(-0.19245)^1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}=$$
$$\left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.73205}-3\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.9245}+2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.11695}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.3094}-2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.88675}+4\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.0792}-4\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.27165}-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.4641}+2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.849}+2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.04145}-3\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.2339}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.42635}\right)\Big/$$
$$\left(\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.19245}\right)^4\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.3849}\right)^2\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.57735}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.73205}\right)$$

$$1+\frac{e^{(-0.19245)1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}=$$

$$\left(\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.73205}-3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.9245}+2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.11695}+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.3094}-2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.88675}+4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.0792}-4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.27165}-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.4641}+2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.849}+2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.04145}-3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.2339}+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.42635}\right)\Big/$$

$$\left(\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.19245}\right)^4\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.3849}\right)^2\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.57735}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.73205}\right)$$

$$1+\frac{e^{(-0.19245)^1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}=$$
$$\left(\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{1.73205}-3\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{1.9245}+2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2.11695}+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2.3094}-2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2.88675}+4\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{3.0792}-4\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{3.27165}-\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{3.4641}+2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{3.849}+2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{4.04145}-3\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{4.2339}+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{4.42635}\right)\Big/$$
$$\left(\left(-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{0.19245}\right)^4\left(-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{0.3849}\right)^2\left(-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{0.57735}\right)^2\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{1.73205}\right)$$

From which, we obtain:

1+(e^(-0.19245)^1)/((1-e^(-0.19245)))^2+(e^(-0.19245))^3/((1-e^(-0.19245))^2(1-((e^(-0.19245)))^2))^2+(e^(-0.19245))^6/((1-e^(-0.19245))^2(1-(e^(-0.19245))^2)^2(1-(e^(-0.19245))^3)^2)-128-4

Input:

$$1+\frac{e^{(-0.19245)^1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}-128-4$$

Result:

6275.28...

6275.28…. result practically equal to the rest mass of Charmed B meson 6275.6

Alternative representation:

$$1+\frac{e^{(-0.19245)^1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}-128-4=$$

$$1+\frac{\exp^{(-0.19245)^1}(z)}{\left(1-\frac{1}{\exp^{0.19245}(z)}\right)^2}+\frac{\left(\frac{1}{\exp^{0.19245}(z)}\right)^3}{\left(\left(1-\frac{1}{\exp^{0.19245}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.19245}(z)}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{\exp^{0.19245}(z)}\right)^6}{\left(1-\frac{1}{\exp^{0.19245}(z)}\right)^2\left(1-\left(\frac{1}{\exp^{0.19245}(z)}\right)^2\right)^2\left(1-\left(\frac{1}{\exp^{0.19245}(z)}\right)^3\right)^2}-128-4 \quad \text{for } z=1$$

Series representations:

$$1+\frac{e^{(-0.19245)1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}-128-4=$$

$$-\left(\left(131\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.73205}-525\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.9245}+526\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.11695}+263\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.3094}-\right.\right.$$

$$264\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.50185}-528\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.6943}-394\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2.88675}+$$

$$1580\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.0792}-392\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.27165}-527\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.4641}-$$

$$264\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.65655}+262\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{3.849}+526\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.04145}-$$

$$\left.525\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.2339}+131\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4.42635}\right)\Big/\left(\left(\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.19245}\right)^4\right.\right.$$

$$\left.\left.\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.3849}\right)^2\left(-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.57735}\right)^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.73205}\right)\right)$$

$$1+\frac{e^{(-0.19245)1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+$$
$$\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}-128-4=$$
$$-\left(\left(131\left(6.4724\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.73205}-22.6997\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.9245}+\right.\right.\right.$$
$$19.9028\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.11695}+8.70863\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.3094}-$$
$$7.65006\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.50185}-13.3894\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.6943}-$$
$$8.74361\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{2.88675}+30.6845\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{3.0792}-$$
$$6.66215\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{3.27165}-7.838\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{3.4641}-$$
$$3.4361\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{3.65655}+2.98421\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{3.849}+5.24301$$
$$\left.\left.\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4.04145}-4.57953\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4.2339}+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{4.42635}\right)\right)\Big/$$
$$\left(\left(-1.1427+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.19245}\right)^4\left(-1.30577+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.3849}\right)^2\right.$$
$$\left.\left(-1.49211+\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.57735}\right)^2\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{1.73205}\right)$$

$$1+\frac{e^{(-0.19245)1}}{\left(1-\frac{1}{e^{0.19245}}\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^3}{\left(\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)\right)^2}+\frac{\left(\frac{1}{e^{0.19245}}\right)^6}{\left(1-\frac{1}{e^{0.19245}}\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^2\right)^2\left(1-\left(\frac{1}{e^{0.19245}}\right)^3\right)^2}-128-4=$$

$$-\left(\left(131\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.73205}-525\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.9245}+526\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.11695}+\right.\right.$$

$$263\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.3094}-264\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.50185}-$$

$$528\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.6943}-394\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{2.88675}+$$

$$1580\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.0792}-392\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.27165}-$$

$$527\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.4641}-264\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.65655}+$$

$$262\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{3.849}+526\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.04145}-$$

$$\left.525\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.2339}+131\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{4.42635}\right)\Big/$$

$$\left(\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.19245}\right)^4\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.3849}\right)^2\right.$$

$$\left.\left(-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.57735}\right)^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.73205}\right)\Big)$$

From

On Classical Stability with Broken Supersymmetry
I. Basile, J. Mourad and A. Sagnotti - arXiv:1811.11448v2 [hep-th] 10 Jan 2019

We have that:

of isotropy could have ignited the transition to a four–dimensional Universe. Here we would like to explore cosmological perturbations in the richer dynamical settings that become available for $d < 10$. The picture that we have in mind is that these more general potentials could have driven the scalar field along them during its descent, and in this spirit we shall explore whether instabilities arise in this dynamical regime.

$$\phi \sim -\frac{3}{2}\log(\sqrt{\alpha_H}\,\eta)$$

$$\frac{\gamma_d}{\gamma^{(c)}} = \frac{1}{12}$$

For ϕ = 0.9991104684 , we obtain:

0.9991104684 = -3/2 ln (x)

Input interpretation:

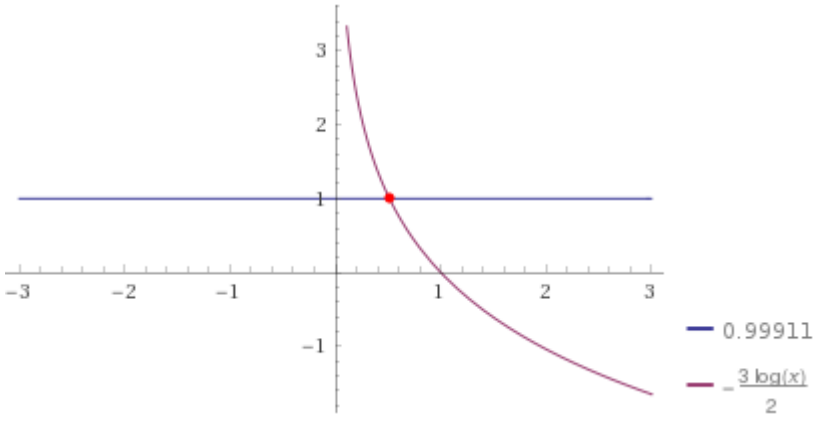
$$0.9991104684 = -\frac{3}{2}\log(x)$$

$\log(x)$ is the natural logarithm

Result:

$$0.99911 = -\frac{3\log(x)}{2}$$

Plot:



Alternate form assuming x is positive:

$$\log(x) + 0.666074 = 0$$

Solution:

$x \approx 0.513722$

0.513722

$$\tau \longrightarrow t\sqrt{\alpha_{O,H}}\sqrt{\frac{2(d-1)}{d-2}}\,, \qquad M \longrightarrow \alpha_{O,H}\sqrt{2}\,,$$

For d = 5 , t = 1 , we obtain:

0.513722*sqrt(8/3)

Input interpretation:

$0.513722\sqrt{\frac{8}{3}}$

Result:

0.838905…

0.838905…

(0.513722)^2 * sqrt(2)

Input interpretation:

$0.513722^2\sqrt{2}$

Result:

0.373226…

0.373226… = M

From

$$e^{2\Omega} = \left|\sinh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right|^{\frac{2}{(1+\gamma)(d-1)}} \left|\cosh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right|^{\frac{2}{(1-\gamma)(d-1)}}$$

We obtain for τ = 0.838905 and γ = 1/12 :

((sinh(0.838905/2*sqrt(1-1/144))))^(2/((1+1/12)*4)) ((cosh(0.838905/2*sqrt(1-1/144))))^(2/((1-1/12)*4))

Input interpretation:

$$\sinh^{2/\left(\left(1+\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right)$$

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

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

Result:

0.709703330421634433335793617984699022020648551770435306017…

0.70970333042…

Alternative representations:

$$\sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)=$$
$$\cos^{2/\left(4\left(1-\frac{1}{12}\right)\right)}\left(0.419453\,i\sqrt{1-\frac{1}{144}}\right)\left(-i\cos\left(\frac{\pi}{2}-0.419453\,i\sqrt{1-\frac{1}{144}}\right)\right)^{2/\left(4\left(1+\frac{1}{12}\right)\right)}$$

$$\sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)=$$
$$\cos^{2/\left(4\left(1-\frac{1}{12}\right)\right)}\left(0.419453\,i\sqrt{1-\frac{1}{144}}\right)$$
$$\left(\frac{1}{2}\left(-e^{-0.419453\sqrt{1-1/144}}+e^{0.419453\sqrt{1-1/144}}\right)\right)^{2/\left(4\left(1+\frac{1}{12}\right)\right)}$$

$$\sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)=$$
$$\cos^{2/\left(4\left(1-\frac{1}{12}\right)\right)}\left((-0.419453\,i)\sqrt{1-\frac{1}{144}}\right)\left(i\cos\left(\frac{\pi}{2}+0.419453\,i\sqrt{1-\frac{1}{144}}\right)\right)^{2/\left(4\left(1+\frac{1}{12}\right)\right)}$$

Series representations:

$$\sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)=$$
$$2^{6/13}\left(\sum_{k=0}^{\infty} I_{1+2k}\left(0.419453\sqrt{\frac{143}{144}}\right)\right)^{6/13}\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761k}\sqrt{\frac{143}{144}}^{2k}}{(2k)!}\right)^{6/11}$$

$$\sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)=$$
$$\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761k}\sqrt{\frac{143}{144}}^{2k}}{(2k)!}\right)^{6/11}\left(\sum_{k=0}^{\infty}\frac{0.419453^{1+2k}\sqrt{\frac{143}{144}}^{1+2k}}{(1+2k)!}\right)^{6/13}$$

$$\sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)=$$
$$\left(i\sum_{k=0}^{\infty}\frac{\left(-\frac{i\pi}{2}+0.419453\sqrt{\frac{143}{144}}\right)^{2k}}{(2k)!}\right)^{6/13}\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761k}\sqrt{\frac{143}{144}}^{2k}}{(2k)!}\right)^{6/11}$$

Or:

((sinh(0.838905/2*sqrt(1-1/4))))^(2/((1+1/2)*4)) ((cosh(0.838905/2*sqrt(1-1/4))))^(2/((1-1/2)*4))

Input interpretation:

$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{4}}\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{4}}\right)$$

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

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

Result:

0.766688971833453970578087288759583615252615495692524667798…

0.76668897183…

Alternative representations:

$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$\cos^{2/2}\left(0.419453\,i\sqrt{1-\frac{1}{4}}\right)\left(\frac{1}{2}\left(-e^{-0.419453\sqrt{1-1/4}}+e^{0.419453\sqrt{1-1/4}}\right)\right)^{2/6}$$

$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$\cos^{2/2}\left(0.419453\,i\sqrt{1-\frac{1}{4}}\right)\left(-i\cos\left(\frac{\pi}{2}-0.419453\,i\sqrt{1-\frac{1}{4}}\right)\right)^{2/6}$$

$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$\cos^{2/2}\left((-0.419453\,i)\sqrt{1-\frac{1}{4}}\right)\left(i\cos\left(\frac{\pi}{2}+0.419453\,i\sqrt{1-\frac{1}{4}}\right)\right)^{2/6}$$

Series representations:

$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$\sqrt[3]{2}\sqrt[3]{\sum_{k=0}^{\infty}I_{1+2k}\left(0.419453\sqrt{\frac{3}{4}}\right)}\sum_{k=0}^{\infty}\frac{e^{-1.73761k}\sqrt{\frac{3}{4}}^{2k}}{(2k)!}$$

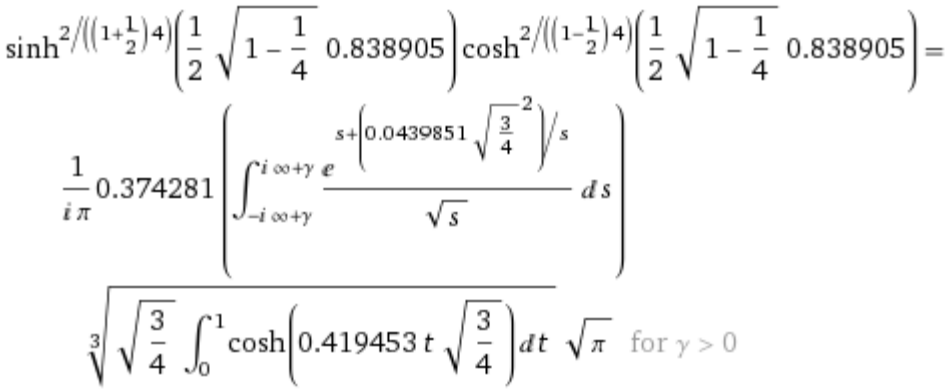
$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761\,k}\sqrt{\frac{3}{4}}^{2\,k}}{(2\,k)!}\right)\sqrt[3]{\sum_{k=0}^{\infty}\frac{0.419453^{1+2\,k}\sqrt{\frac{3}{4}}^{1+2\,k}}{(1+2\,k)!}}$$

$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$\sqrt[3]{i\sum_{k=0}^{\infty}\frac{\left(-\frac{i\,\pi}{2}+0.419453\sqrt{\frac{3}{4}}\right)^{2\,k}}{(2\,k)!}}\ \sum_{k=0}^{\infty}\frac{e^{-1.73761\,k}\sqrt{\frac{3}{4}}^{2\,k}}{(2\,k)!}$$

Integral representations:

$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$0.313986\sqrt[3]{\sqrt{\frac{3}{4}}\int_0^1\cosh\left(0.419453\,t\sqrt{\frac{3}{4}}\right)dt}$$
$$\left(2.38406+\sqrt{\frac{3}{4}}\int_0^1\sinh\left(0.419453\,t\sqrt{\frac{3}{4}}\right)dt\right)$$

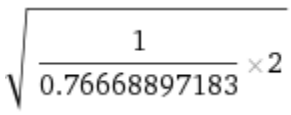
$$\sinh^{2/\left(\left(1+\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{2}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{4}}\ 0.838905\right)=$$
$$0.748562\left(\int_{\frac{i\,\pi}{2}}^{0.419453\sqrt{\frac{3}{4}}}\sinh(t)\,dt\right)\sqrt[3]{\sqrt{\frac{3}{4}}\int_0^1\cosh\left(0.419453\,t\sqrt{\frac{3}{4}}\right)dt}$$



From which:

sqrt(((1/0.76668897183)*2))

Input interpretation:



Result:

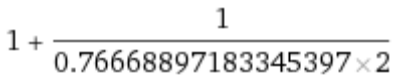
1.6151222114...

1.6151222114…. result that is a good approximation to the value of the golden ratio 1.618033988749...

and:

1+1/(0.766688971833453 97*2)

Input interpretation:



Result:

1.652154939446049337604962858866106492583801424363068273709...

1.652154939446…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

Now, from:

$$d\eta = \frac{d\tau}{M}\sqrt{\frac{d-2}{d-1}}\, e^{-2\gamma\varphi_0} \left|\sinh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right|^{-\frac{\gamma(d-1)+1}{(1+\gamma)(d-1)}} \left|\cosh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right|^{\frac{\gamma(d-1)-1}{(1-\gamma)(d-1)}}$$

for τ = 0.838905 and γ = 1/12 d = 5 0.373226… = M

$$\frac{d\tau}{M}\sqrt{\frac{d-2}{d-1}}\, e^{-2\gamma\varphi_0} \left|\sinh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right|^{-\frac{\gamma(d-1)+1}{(1+\gamma)(d-1)}} \left|\cosh\left(\frac{\tau}{2}\sqrt{1-\gamma^2}\right)\right|^{\frac{\gamma(d-1)-1}{(1-\gamma)(d-1)}}$$

[(0.838905)/(0.373226)] * sqrt(3/4) * exp(-2*1/12*0.9991104684) * ((sinh(0.838905/2*sqrt(1-1/144))))^-((1/12*4+1)/((1+1/12)*4)) * ((cosh(0.838905/2*sqrt(1-1/144))))^((1/12*4-1)/((1-1/12)*4))

Input interpretation:

$$\frac{0.838905}{0.373226}\sqrt{\frac{3}{4}}\,\exp\left(-2\times\frac{1}{12}\times 0.9991104684\right) \sinh^{-\left(\frac{1}{12}\times 4+1\right)/\left(\left(1+\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right) \cosh^{\left(\frac{1}{12}\times 4-1\right)/\left(\left(1-\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right)$$

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

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

Result:

2.10350...

2.10350…

Alternative representations:

$$\frac{1}{0.373226}\left(\sqrt{\frac{3}{4}}\,0.838905\exp\left(-\frac{2\times 0.99911}{12}\right)\right)\sinh^{-\left(\frac{4}{12}+1\right)/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)\cosh^{\left(\frac{4}{12}-1\right)/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)=\frac{1}{0.373226}$$

$$0.838905\exp\left(-\frac{1.99822}{12}\right)\cos^{\left(-1+\frac{4}{12}\right)/\left(4\left(1-\frac{1}{12}\right)\right)}\left(0.419453\,i\sqrt{1-\frac{1}{144}}\right)\left(-i\cos\left(\frac{\pi}{2}-0.419453\,i\sqrt{1-\frac{1}{144}}\right)\right)^{-\left(1+\frac{4}{12}\right)/\left(4\left(1+\frac{1}{12}\right)\right)}\sqrt{\frac{3}{4}}$$

$$\frac{1}{0.373226}\left(\sqrt{\frac{3}{4}}\,0.838905\exp\left(-\frac{2\times 0.99911}{12}\right)\right)\sinh^{-\left(\frac{4}{12}+1\right)/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)\cosh^{\left(\frac{4}{12}-1\right)/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)=\frac{1}{0.373226}$$

$$0.838905\exp\left(-\frac{1.99822}{12}\right)\cos^{\left(-1+\frac{4}{12}\right)/\left(4\left(1-\frac{1}{12}\right)\right)}\left(0.419453\,i\sqrt{1-\frac{1}{144}}\right)\left(\frac{1}{2}\left(-e^{-0.419453\sqrt{1-1/144}}+e^{0.419453\sqrt{1-1/144}}\right)\right)^{-\left(1+\frac{4}{12}\right)/\left(4\left(1+\frac{1}{12}\right)\right)}\sqrt{\frac{3}{4}}$$

$$\frac{1}{0.373226}\left(\sqrt{\frac{3}{4}}\,0.838905\exp\left(-\frac{2\times 0.99911}{12}\right)\right)\sinh^{-\left(\frac{4}{12}+1\right)/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)\cosh^{\left(\frac{4}{12}-1\right)/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)=\frac{1}{0.373226}$$

$$0.838905\exp\left(-\frac{1.99822}{12}\right)\cos^{\left(-1+\frac{4}{12}\right)/\left(4\left(1-\frac{1}{12}\right)\right)}\left((-0.419453\,i)\sqrt{1-\frac{1}{144}}\right)\left(i\cos\left(\frac{\pi}{2}+0.419453\,i\sqrt{1-\frac{1}{144}}\right)\right)^{-\left(1+\frac{4}{12}\right)/\left(4\left(1+\frac{1}{12}\right)\right)}\sqrt{\frac{3}{4}}$$

Series representations:

$$\frac{1}{0.373226}\left(\sqrt{\frac{3}{4}}\ 0.838905\exp\left(-\frac{2\times 0.99911}{12}\right)\right)\sinh^{-\left(\frac{4}{12}+1\right)/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)\cosh^{\left(\frac{4}{12}-1\right)/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)=\left(1.816\exp(-0.166518)\sum_{k=0}^{\infty}\frac{(-1)^{2k}\,4^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(\left(I_0\left(0.419453\sqrt{\frac{143}{144}}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(0.419453\sqrt{\frac{143}{144}}\right)\right)^{2/11}\left(\sum_{k=0}^{\infty}I_{1+2k}\left(0.419453\sqrt{\frac{143}{144}}\right)\right)^{4/13}\right)$$

$$\frac{1}{0.373226}\left(\sqrt{\frac{3}{4}}\ 0.838905\exp\left(-\frac{2\times 0.99911}{12}\right)\right)\sinh^{-\left(\frac{4}{12}+1\right)/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)\cosh^{\left(\frac{4}{12}-1\right)/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\sqrt{1-\frac{1}{144}}\right)=\frac{1.816\exp(-0.166518)\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{3}{4}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{3}{4}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{\left(\sum_{k=0}^{\infty}I_{1+2k}\left(0.419453\sqrt{\frac{143}{144}}\right)\right)^{4/13}\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761\,k}\sqrt{\frac{143}{144}}^{2k}}{(2k)!}\right)^{2/11}}$$

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

$$\frac{1}{0.373226}\left(\sqrt{\frac{3}{4}}\ 0.838905\ \exp\left(-\frac{2\times 0.99911}{12}\right)\right)$$
$$\sinh^{-\left(\frac{4}{12}+1\right)/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\ \sqrt{1-\frac{1}{144}}\right)$$
$$\cosh^{\left(\frac{4}{12}-1\right)/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\times 0.838905\ \sqrt{1-\frac{1}{144}}\right)=$$
$$\left(1.816\ \exp(-0.166518)\ \exp\left(i\,\pi\left\lfloor\frac{\arg\left(\frac{3}{4}-x\right)}{2\,\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{3}{4}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/$$
$$\left(\left(I_0\left(0.419453\ \sqrt{\frac{143}{144}}\right)+2\sum_{k=1}^{\infty}I_{2k}\left(0.419453\ \sqrt{\frac{143}{144}}\right)\right)^{2/11}\right.$$
$$\left.\left(\sum_{k=0}^{\infty}I_{1+2k}\left(0.419453\ \sqrt{\frac{143}{144}}\right)\right)^{4/13}\right)\quad \text{for } (x\in\mathbb{R}\text{ and } x<0)$$

The result, can be expressed also in these other two closed forms:

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13\,e-17\,e^2+72\,\pi-5\,\pi^2\right)\right)\approx 2.1034962348725383939$$

$$-5-e-4\,e^2-\frac{\sqrt{1+e^2}}{2}+3\,\pi+\pi^2-4\sqrt{1+\pi}+9\sqrt{1+\pi^2}\approx 2.1034962348725020432$$

log(1/8 (20 - 29 sqrt(2) + 13 e - 17 e^2 + 72 π - 5 π^2))

Input:

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13\,e-17\,e^2+72\,\pi-5\,\pi^2\right)\right)$$

$\log(x)$ is the natural logarithm

Decimal approximation:

2.10349623487253839390703583397469467014756232228681167729 0...

2.103496234

Alternate forms:

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+(13-17e)e+(72-5\pi)\pi\right)\right)$$

$$\log\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)-\log(8)$$

$$\log\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)-3\log(2)$$

Alternative representations:

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=\log_e\left(\frac{1}{8}\left(20+13e+72\pi-17e^2-5\pi^2-29\sqrt{2}\right)\right)$$

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=\log(a)\log_a\left(\frac{1}{8}\left(20+13e+72\pi-17e^2-5\pi^2-29\sqrt{2}\right)\right)$$

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=-\text{Li}_1\left(1-\frac{1}{8}\left(20+13e+72\pi-17e^2-5\pi^2-29\sqrt{2}\right)\right)$$

Series representations:

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=\log\left(\frac{1}{8}\left(12-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)-\sum_{k=1}^{\infty}\frac{8^k\left(\frac{1}{-12+29\sqrt{2}-13e+17e^2-72\pi+5\pi^2}\right)^k}{k}$$

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=\log\left(-1+\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)-\sum_{k=1}^{\infty}\frac{8^k\left(\frac{1}{-12+29\sqrt{2}-13e+17e^2-72\pi+5\pi^2}\right)^k}{k}$$

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=$$
$$2i\pi\left\lfloor\frac{\arg(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2-8x)}{2\pi}\right\rfloor+\log(x)-$$
$$\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{8}\right)^k(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2-8x)^k x^{-k}}{k}\quad\text{for } x<0$$

Integral representations:

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=\int_1^{\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)}\frac{1}{t}\,dt$$

$$\log\left(\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)=$$
$$-\frac{i}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(-1+\frac{1}{8}\left(20-29\sqrt{2}+13e-17e^2+72\pi-5\pi^2\right)\right)^{-s}\Gamma(-s)^2\Gamma(1+s)}{\Gamma(1-s)}\,ds$$
$$\text{for } -1<\gamma<0$$

-5 - e - 4 e^2 - sqrt(1 + e^2)/2 + 3 π + π^2 - 4 sqrt(1 + π) + 9 sqrt(1 + π^2)

Input:

$$-5-e-4e^2-\frac{\sqrt{1+e^2}}{2}+3\pi+\pi^2-4\sqrt{1+\pi}+9\sqrt{1+\pi^2}$$

Decimal approximation:

2.10349623487252043272653929613547074799211911857015201185...

2.1034962348…

Alternate forms:

$$\frac{1}{2}\left(-10-2e-8e^2-\sqrt{1+e^2}+6\pi+2\pi^2-8\sqrt{1+\pi}+18\sqrt{1+\pi^2}\right)$$

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

$$-e-4e^2+\frac{1}{2}\left(-10-\sqrt{1+e^2}+6\pi+2\pi^2-8\sqrt{1+\pi}+18\sqrt{1+\pi^2}\right)$$

Series representations:

$$-5-e-4e^2-\frac{\sqrt{1+e^2}}{2}+3\pi+\pi^2-4\sqrt{1+\pi}+9\sqrt{1+\pi^2}=$$
$$-5-e-4e^2+3\pi+\pi^2+\sum_{k=0}^{\infty}\frac{1}{2}\binom{\frac{1}{2}}{k}\left(-(e^2)^{-k}\sqrt{e^2}-8\pi^{-k}\sqrt{\pi}+18(\pi^2)^{-k}\sqrt{\pi^2}\right)$$

$$-5-e-4e^2-\frac{\sqrt{1+e^2}}{2}+3\pi+\pi^2-4\sqrt{1+\pi}+9\sqrt{1+\pi^2}=-5-e-4e^2+$$
$$3\pi+\pi^2+\sum_{k=0}^{\infty}\left(-\frac{1}{2}(e^2)^{-k}\binom{\frac{1}{2}}{k}\sqrt{e^2}-4\pi^{-k}\binom{\frac{1}{2}}{k}\sqrt{\pi}+9(\pi^2)^{-k}\binom{\frac{1}{2}}{k}\sqrt{\pi^2}\right)$$

$$-5-e-4e^2-\frac{\sqrt{1+e^2}}{2}+3\pi+\pi^2-4\sqrt{1+\pi}+9\sqrt{1+\pi^2}=-5-e-4e^2+3\pi+\pi^2+$$
$$\sum_{k=0}^{\infty}\frac{(-1)^{1+k}(e^2)^{-k}\pi^{-k}(\pi^2)^{-k}\left(-\frac{1}{2}\right)_k\left(\pi^k(\pi^2)^k\sqrt{e^2}+2(e^2)^k\left(4(\pi^2)^k\sqrt{\pi}-9\pi^k\sqrt{\pi^2}\right)\right)}{2\,k!}$$

With the two solutions, we obtain also:

(((2.1034962348725333855 - ((sinh(0.838905/2*sqrt(1-1/144))))^(2/((1+1/12)*4))
((cosh(0.838905/2*sqrt(1-1/144))))^(2/((1-1/12)*4)))))

Input interpretation:

$$2.1034962348725333855-\sinh^{2/\left(\left(1+\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right)$$

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

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

Result:

1.39379290445089895216420638201530097797935144822956469398 2…

1.39379290445…

Alternative representations:

$$2.1034962348725333855000 0 - \sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right) = 2.1034962348725333855000 0 - \cos^{2/\left(4\left(1-\frac{1}{12}\right)\right)}\left(0.419453\,i\sqrt{1-\frac{1}{144}}\right)\left(-i\cos\left(\frac{\pi}{2}-0.419453\,i\sqrt{1-\frac{1}{144}}\right)\right)^{2/\left(4\left(1+\frac{1}{12}\right)\right)}$$

$$2.1034962348725333855000 0 - \sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right) = 2.1034962348725333855000 0 - \cos^{2/\left(4\left(1-\frac{1}{12}\right)\right)}\left(0.419453\,i\sqrt{1-\frac{1}{144}}\right)\left(\frac{1}{2}\left(-e^{-0.419453\sqrt{1-1/144}}+e^{0.419453\sqrt{1-1/144}}\right)\right)^{2/\left(4\left(1+\frac{1}{12}\right)\right)}$$

$$2.1034962348725333855000 0 - \sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right) = 2.1034962348725333855000 0 - \cos^{2/\left(4\left(1-\frac{1}{12}\right)\right)}\left((-0.419453\,i)\sqrt{1-\frac{1}{144}}\right)\left(i\cos\left(\frac{\pi}{2}+0.419453\,i\sqrt{1-\frac{1}{144}}\right)\right)^{2/\left(4\left(1+\frac{1}{12}\right)\right)}$$

Series representations:

$$2.10349623487253338550000 - \sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right) = -1.37700945119426937404602\left(-1.52758300463964701676207 + 1.00000000000000000000000\left(\sum_{k=0}^{\infty} I_{1+2k}\left(0.419453\sqrt{\frac{143}{144}}\right)\right)^{6/13}\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761k}\sqrt{\frac{143}{144}}^{2k}}{(2k)!}\right)^{6/11}\right)$$

$$2.10349623487253338550000 - \sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\,0.838905\right) = -1.00000000000000000000000\left(-2.10349623487253338550000 + 1.00000000000000000000000\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761k}\sqrt{\frac{143}{144}}^{2k}}{(2k)!}\right)^{6/11}\left(\sum_{k=0}^{\infty}\frac{0.419453^{1+2k}\sqrt{\frac{143}{144}}^{1+2k}}{(1+2k)!}\right)^{6/13}\right)$$

$$2.10349623487253338550000 - \sinh^{2/\left(\left(1+\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)4\right)}\left(\frac{1}{2}\sqrt{1-\frac{1}{144}}\ 0.838905\right) =$$

$$-1.000000000000000000000 \left(-2.10349623487253338550000 + 1.000000000000000000000 \left(i\sum_{k=0}^{\infty}\frac{\left(-\frac{i\pi}{2}+0.419453\sqrt{\frac{143}{144}}\right)^{2k}}{(2k)!}\right)^{6/13}\left(\sum_{k=0}^{\infty}\frac{e^{-1.73761k}\sqrt{\frac{143}{144}}^{2k}}{(2k)!}\right)^{6/11}\right)$$

(((2[(((2.1034962348725333855 - ((sinh(0.838905/2*sqrt(1-1/144))))^(2/((1+1/12)*4)) ((cosh(0.838905/2*sqrt(1-1/144))))^(2/((1-1/12)*4)))))]))))^1/2

Input interpretation:

$$\sqrt{\left(2\left(2.1034962348725333855 - \sinh^{2/\left(\left(1+\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right)\cosh^{2/\left(\left(1-\frac{1}{12}\right)\times 4\right)}\left(\frac{0.838905}{2}\sqrt{1-\frac{1}{144}}\right)\right)\right)}$$

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

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

Result:

1.669606483247414173243599878531613219041316730964251475487...

1.669606483…. result near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

We have that:

$$h_{ij} = A_{ij} + B_{ij} \log\left[\tanh\left(\sqrt{\alpha_{O,H}}\, t \sqrt{\frac{d-1}{2(d-2)}}\sqrt{1 - \left(\frac{\widetilde{\gamma}}{\gamma^{(c)}}\right)^2}\right)\right], \qquad (8.20)$$

Consider $A_{ij} = 1$; $B_{ij} = 2$;

1+2 ln [tanh(((0.513722 * sqrt(4/6) * sqrt(1-1/144))))]

Input interpretation:

$$1 + 2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)$$

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

$\log(x)$ is the natural logarithm

Result:

−0.856531597910290992168860555453217144746723472920225071 94...

-0.85653159791…

Alternative representations:

$$1 + 2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right) =$$
$$1 + 2\log_e\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)$$

$$1 + 2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right) =$$
$$1 + 2\log(a)\log_a\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)$$

$$1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)=$$
$$1+2\log\left(i\cot\left(\frac{\pi}{2}+0.513722\,i\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)$$

Series representation:

$$1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)=$$
$$1-2\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)\right)^k}{k}$$

Integral representations:

$$1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)=1+2\int_1^{\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)}\frac{1}{t}\,dt$$

$$1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)=1+2\log\left(\int_0^{0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}}\operatorname{sech}^2(t)\,dt\right)$$

From which:

sqrt(((([-1/(((1+2 ln [tanh(((0.513722 * sqrt(4/6) * sqrt(1-1/144))))])))]^(2Pi)))))

Input interpretation:

$$\sqrt{\left(-\frac{1}{1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)}\right)^{2\pi}}$$

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

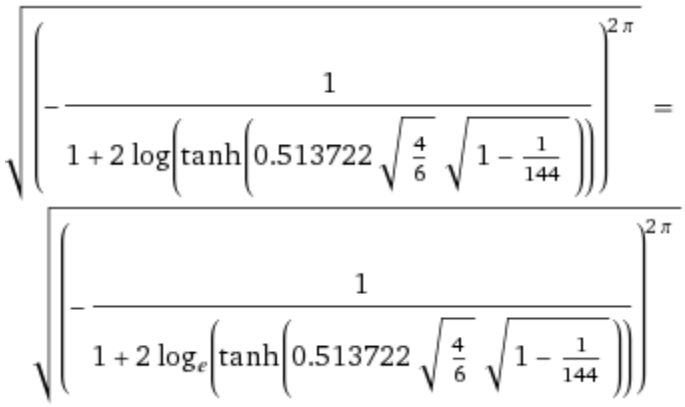
$\log(x)$ is the natural logarithm

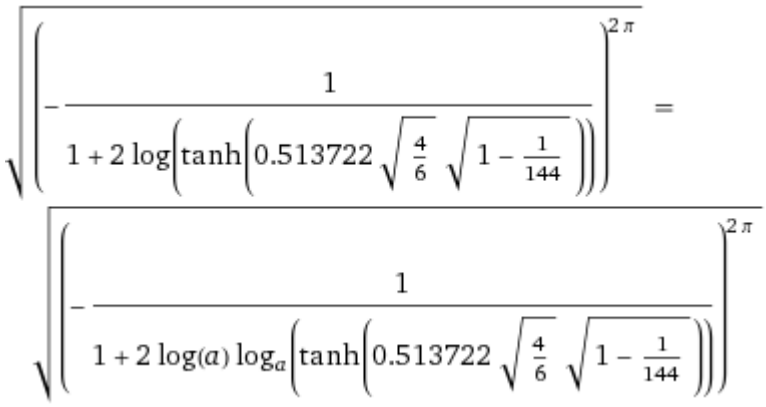
Result:

1.62665...

1.62665….. result that is near to the value of the golden ratio 1.618033988749...

Alternative representations:





$$\sqrt{\left(-\frac{1}{1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)}\right)^{2\pi}} = \sqrt{\left(-\frac{1}{1+2\log\left(-1+\frac{2}{1+e^{-1.02744\sqrt{4/6}\sqrt{1-1/144}}}\right)}\right)^{2\pi}}$$

Series representations:

$$\sqrt{\left(-\frac{1}{1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)}\right)^{2\pi}} = \exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\left(\frac{1}{-1-2\log\left(\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)\right)}\right)^{2\pi}\right)}{2\pi}\right\rfloor\right)\sqrt{x}$$

$$\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-x+\left(\frac{1}{-1-2\log\left(\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)\right)}\right)^{2\pi}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

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

$$\sqrt{\left(-\frac{1}{1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)}\right)^{2\pi}} =$$

$$\left(\frac{1}{z_0}\right)^{1/2\left\lfloor \arg\left(\left(\frac{1}{-1-2\log\left(\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)\right)}\right)^{2\pi}-z_0\right)\Big/(2\pi)\right\rfloor}$$

$$z_0^{1/2\left(1+\left\lfloor \arg\left(\left(\frac{1}{-1-2\log\left(\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)\right)}\right)^{2\pi}-z_0\right)\Big/(2\pi)\right\rfloor\right)}$$

$$\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\left(\frac{1}{-1-2\log\left(\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)\right)}\right)^{2\pi}-z_0\right)^k z_0^{-k}}{k!}$$

Integral representations:

$$\sqrt{\left(-\frac{1}{1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)}\right)^{2\pi}} =$$

$$\sqrt{\left(\frac{1}{-1-2\int_1^{\tanh\left(0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}\right)}\frac{1}{t}\,dt}\right)^{2\pi}}$$

$$\sqrt{\left(-\frac{1}{1+2\log\left(\tanh\left(0.513722\sqrt{\frac{4}{6}}\sqrt{1-\frac{1}{144}}\right)\right)}\right)^{2\pi}} = \sqrt{\left(\frac{1}{-1-2\log\left(\int_0^{0.513722\sqrt{\frac{2}{3}}\sqrt{\frac{143}{144}}}\operatorname{sech}^2(t)\,dt\right)}\right)^{2\pi}}$$

Observations

Figs.

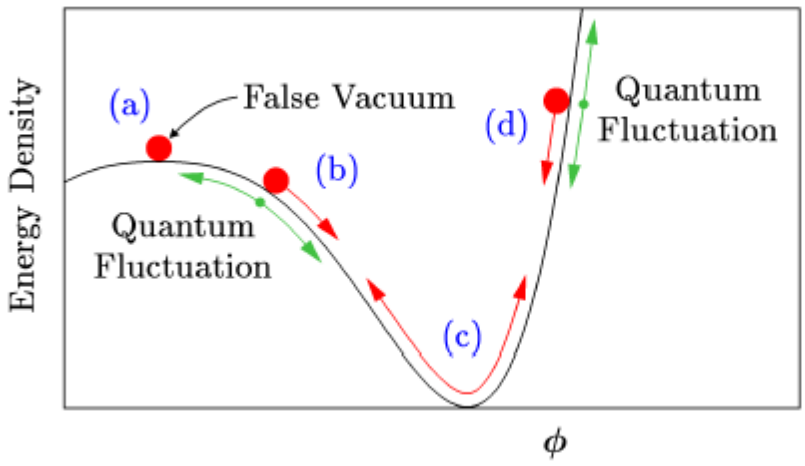


FIG. 1: In simple inflationary models, the universe at early times is dominated by the potential energy density of a scalar field, ϕ. Red arrows show the classical motion of ϕ. When ϕ is near region (a), the energy density will remain nearly constant, $\rho \cong \rho_f$, even as the universe expands. 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

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

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

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

$$\frac{\sqrt{3\,(2.17049\times10^{37})^2 - 0.001^2}}{\frac{1}{2}\left((3\sqrt{3})\,(4.2\times10^6\times1.9891\times10^{30})\right)}$$

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

(**Can massless wormholes mimic a Schwarzschild black hole in the strong field lensing?** - *Ramil N. Izmailov and Eduard R. Zhdanov, Amrita Bhattacharya, Alexander A. Potapov, K.K. Nandi* - arXiv:1909.13052v1 [gr-qc] 28 Sep 2019)

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

$i\sqrt{3}$

1.732050807568877293527446341505872366942805253810380628055... 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

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

$$= 1.732050807568877293527446341505872366942805253810380628055\ldots\, i$$

$$r \approx 1.73205 \text{ (radius)}, \quad \theta = 90° \text{ (angle)}$$

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:

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

$$= i\sqrt{3} = 1.732050807568877293527446341505872366942805253810380628055\ldots\, i$$

$$r \approx 1.73205 \text{ (radius)}, \quad \theta = 90° \text{ (angle)}$$

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

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

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

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

Thence:

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

And

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

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 observe that 1728 and 1729 are results 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).

Furthermore, we obtain as results of our computations, always values very near to the Higgs boson mass 125.18 GeV and practically equals to the rest mass of Pion meson 139.57 MeV. In conclusion we obtain also many results that are very good approximations to the value of the golden ratio 1.618033988749... and to ζ(2) = $\frac{\pi^2}{6} = 1.644934$ ...

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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Figure

From:

Letter by Ramanujan on mock theta functions

https://mss-cat.trin.cam.ac.uk/manuscripts/uv/view.php?n=Add.Ms.a.94.14

Add Ms a 94 14(1) (44) (1)

If we consider a ϑ-function in the transformed form Eulerian e.g.

$$(A)\quad 1+\frac{q}{(1-q)^2}+\frac{q^4}{(1-q)^2(1-q^2)^2}+\frac{q^9}{(1-q)^2(1-q^2)^2(1-q^3)^2}$$

$$(B)\quad 1+\frac{q}{1-q}+\frac{q^4}{(1-q)(1-q^2)}+\frac{q^9}{(1-q)(1-q^2)(1-q^3)}$$

and ~~consider~~ determine the nature of the singularities at ~~the~~ points $q=1$, $q^2=1$, $q^3=1$, $q^4=1$, $q^5=1$, ... we know how beautifully the asymptotic ~~nature~~ form of the function can be expressed in a very neat and closed ~~form~~ exponential form. For instance when $q=e^{-t}$ and $t\to 0$

$$(A)=\sqrt{\frac{t}{2\pi}}\,e^{\frac{\pi^2}{6t}-\frac{t}{24}}\ {}^{*}+\underline{o}(1)^{+}$$

$$(B)=\frac{e^{\frac{\pi^2}{15t}-\frac{t}{60}}}{\sqrt{\frac{5-\sqrt{5}}{2}}}\ {}^{*}+\underline{o}(1)^{+}$$

and similar results at other singularities. * It is not necessary that there should be only one term like this. There may be many terms but the number of terms must be finite. + Also $\underline{o}(1)$ may turn out to be $\underline{O}(1)$. That is all. For instance when $q\to 1$ the function

$$\frac{1}{\{(1-q)(1-q^2)(1-q^3)\cdots\}^{120}}$$

~~there~~ is equivalent to the sum of five terms like (*) together with $O(1)$ instead of $o(1)$.

If we take a number of functions like (A) and (B) it is only in a limited number of cases the terms close as above; but in the majority of cases they never close as above. For instance when $q=e^{-t}$ and $t\to 0$

$$(C)\quad 1+\frac{q}{(1-q)^2}+\frac{q^3}{(1-q)^2(1-q^2)^2}+\frac{q^6}{(1-q)^2(1-q^2)^2(1-q^3)^2}$$

$$=\sqrt{\left(\frac{t}{2\sqrt{5}}\right)}\,e^{\frac{\pi^2}{6t}}\ {}^{*}+a_1^{+}t+a_2t^2+\cdots+\underline{O}(a_kt^k)$$

where $a_1=\frac{1}{8\sqrt{5}}$, and so on.