Mathematical connections between the formula concerning the coefficients of the '5th order' Ramanujan's mock theta function, the mass of mesons in string model, various parameters of Particle Physics and Cosmology.

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Abstract

In this research thesis, we have described new possible mathematical connections between the formula concerning the coefficients of the '5th order' Ramanujan's mock theta function, the mass of mesons in string model, various parameters of Particle Physics and Cosmology.

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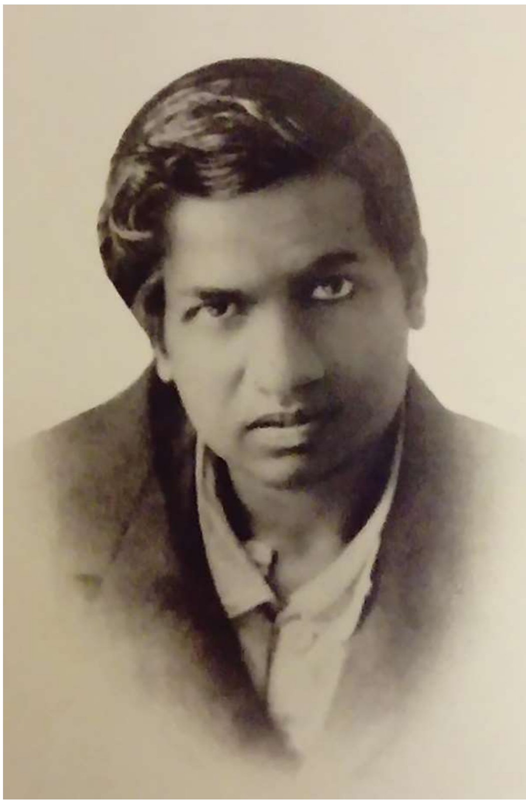

https://blog.wolfram.com/2013/05/01/after-100-years-ramanujan-gap-filled/

From:

Masses and internal structure of mesons in the string quark model

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The strange mesons $K_0^*(1430), 0^+$ and $K^*(1680), 1^-$ are not described by the same wave function Ψ_+ (with different j). It seems probable that a new strange 1^- meson exists with mass 1900 MeV which is a partner of $K_0^*(1430)$, see Table VI in Appendix C. On the other hand, the $K^*(1680)$-mass, 1717 ± 17 MeV, is only half of its width, 322 ± 110 Mev, lower than the SQM value 1910 Mev.

We have the following Table:

TABLE I.Energy distribution inside mesons at rest. $v_i(E_i)$ is velocity in c (energy in MeV) of the i-th quark, E_0 is energy of the gluon string in MeV and $m_E = m - m_1 - m_2$.

Particle, quark content	v_1	v_2	E_1	E_2	E_0	$E_0/m, \%$	$E_0/m_E, \%$
$\rho^+, d\bar{u}$	0,98	0,99	53	39	679	88	90
$\pi^+, d\bar{u}$	0,88	0,93	23	16	99	72	82
$B^+, b\bar{u}$	0,07	0,99	4727	46	507	9.6	91
$J/\psi(1S), c\bar{c}$	0,22	0,22	1476	1476	146	4.7	67
$\Upsilon(1S), bb$	0,05	0,05	4720	4720	22	0.2	67
$\chi_{b2}(1P), b\bar{b}$	0,18	0,18	4795	4795	324	3.3	67

We see that the light quarks are relativistic and give noticeable contributions to the meson masses. The main contribution to the mass "excess" of mesons $m_E = m - m_1 - m_2$ is given by the gluon string.

We have that:

53+39+679 = 771
23+16+99 = 138
4727+46+507 = 5280
1476+1476+146 = 3098
4720+4720+22 = 9462
4795+4795+324 = 9914

We take the value of E_1 , E_2 and E_0 and we make some calculations. From the formula of the coefficients of the "5th order" mock theta function $\psi_1(q)$

a(n) ~ sqrt(phi) * exp(Pi*sqrt(n/15)) / (2*5^(1/4)*sqrt(n))

we obtain, for n = 248:

sqrt(golden ratio) * exp(Pi*sqrt(248/15)) / (2*5^(1/4)*sqrt(248))-76+4+2 where 76, 4 and 2 are a Lucas numbers

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{248}{15}}\right)}{2 \sqrt[4]{5} \sqrt{248}} - 76 + 4 + 2$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{2 \sqrt{62/15}\, \pi} \sqrt{\frac{\phi}{62}}}{4 \sqrt[4]{5}} - 70$$

Decimal approximation:

9462.651386770605179169703337982742267241147864888158522697...

9462.6513867….. result very near to the rest mass of Upsilon meson 9460.30 MeV

Property:

$$-70 + \frac{e^{2 \sqrt{62/15}\, \pi} \sqrt{\frac{\phi}{62}}}{4 \sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{8} \sqrt{\frac{1}{155} \left(5 + \sqrt{5}\right)}\, e^{2 \sqrt{62/15}\, \pi} - 70$$

$$\frac{\sqrt{\frac{1}{31} \left(1 + \sqrt{5}\right)}\, e^{2 \sqrt{62/15}\, \pi}}{8 \sqrt[4]{5}} - 70$$

$$\frac{5^{3/4} \sqrt{31 \left(1 + \sqrt{5}\right)}\, e^{2 \sqrt{62/15}\, \pi} - 86800}{1240}$$

Series representations:

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{248}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{248}} - 76 + 4 + 2 = \left(-700\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (248-z_0)^k z_0^{-k}}{k!} + 5^{3/4} \exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{248}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right) \Big/ \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(248-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{248}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{248}} - 76 + 4 + 2 = \left(-700\exp\left(i\pi\left\lfloor\frac{\arg(248-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(248-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} + 5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{248}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{248}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \Big/ \left(10\exp\left(i\pi\left\lfloor\frac{\arg(248-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(248-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{248}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{248}} - 76 + 4 + 2 =$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(248-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(248-z_0)/(2\pi)\rfloor}\left(-700\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(248-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(248-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (248-z_0)^k z_0^{-k}}{k!} + 5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{248}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{248}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{248}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right) \Bigg/ \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(248-z_0)^k z_0^{-k}}{k!}\right)$$

For n = 224, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(224/15)) / (2*5^(1/4)*sqrt(224))-29-7-4-2

where 29, 7, 4 and 2 are Lucas numbers

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{224}} - 29 - 7 - 4 - 2$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{4\sqrt{14/15}\,\pi}\sqrt{\frac{\phi}{14}}}{8\sqrt[4]{5}} - 42$$

Decimal approximation:

5279.676272893316178518269411552302582626123629475691238192...

5279.67627…. result practically equal to the rest mass of B meson 5279.53 MeV

Property:

$$-42+\frac{e^{4\sqrt{14/15}\,\pi}\sqrt{\frac{\phi}{14}}}{8\sqrt[4]{5}} \text{ is a transcendental number}$$

Alternate forms:

$$\frac{1}{16}\sqrt{\frac{1}{35}\left(5+\sqrt{5}\right)}\,e^{4\sqrt{14/15}\,\pi}-42$$

$$\frac{\sqrt{\frac{1}{7}\left(1+\sqrt{5}\right)}\,e^{4\sqrt{14/15}\,\pi}}{16\sqrt[4]{5}}-42$$

$$\frac{1}{560}\left(5^{3/4}\sqrt{7\left(1+\sqrt{5}\right)}\,e^{4\sqrt{14/15}\,\pi}-23520\right)$$

Series representations:

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\sqrt{224}}-29-7-4-2=\left(-420\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(224-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{224}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(224-z_0)^k z_0^{-k}}{k!}\right) \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{224}}-29-7-4-2=$$

$$\left(-420\exp\left(i\pi\left\lfloor\frac{\arg(224-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(224-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{224}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{224}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(\phi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(224-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(224-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{224}}-29-7-4-2=$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(224-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(224-z_0)/(2\pi)\rfloor}\left(-420\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(224-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(224-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(224-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{224}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{224}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{224}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(224-z_0)^k z_0^{-k}}{k!}\right)$$

For n = 203, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(203/15)) / (2*5^(1/4)*sqrt(203))-29+7

where 29 and 7 are Lucas numbers

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{203}{15}}\right)}{2 \sqrt[4]{5} \sqrt{203}} - 29 + 7$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{203/15}\,\pi} \sqrt{\frac{\phi}{203}}}{2 \sqrt[4]{5}} - 22$$

Decimal approximation:

3098.306470397246116418734540645508975568045288431783102611...

3098.30647…… result very near to the rest mass of J/Psi meson 3096.916

Property:

$$-22 + \frac{e^{\sqrt{203/15}\,\pi} \sqrt{\frac{\phi}{203}}}{2 \sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{2} \sqrt{\frac{5 + \sqrt{5}}{2030}}\, e^{\sqrt{203/15}\,\pi} - 22$$

$$\frac{\sqrt{\frac{1}{406} \left(1 + \sqrt{5}\right)}\, e^{\sqrt{203/15}\,\pi}}{2 \sqrt[4]{5}} - 22$$

$$\frac{5^{3/4}\sqrt{406\left(1+\sqrt{5}\right)}\,e^{\sqrt{203/15}\,\pi}-89\,320}{4060}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{203}}-29+7=\left(-220\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(203-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{203}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(203-z_0)^k z_0^{-k}}{k!}\right)\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{203}}-29+7=\left(-220\exp\left(i\pi\left\lfloor\frac{\arg(203-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(203-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{203}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{203}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(203-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(203-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{203}} - 29 + 7 =$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor}\left(-220\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (203-z_0)^k z_0^{-k}}{k!} + 5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{203}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{203}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{203}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(203-z_0)^k z_0^{-k}}{k!}\right)$$

For n = 152, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(152/15)) / (2*5^(1/4)*sqrt(152))+11

where 11 is a Lucas number

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{152}} + 11$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{2\sqrt{38/15}\,\pi}\sqrt{\frac{\phi}{38}}}{4\sqrt[4]{5}} + 11$$

Decimal approximation:

771.334553720861861108772857501665458829585801593432867662 9...

771.33455372… result very near to the rest mass of Charged rho meson 775.4 MeV

Property:

$$11+\frac{e^{2\sqrt{38/15}\,\pi}\sqrt{\frac{\phi}{38}}}{4\sqrt[4]{5}} \text{ is a transcendental number}$$

Alternate forms:

$$11+\frac{1}{8}\sqrt{\frac{1}{95}\left(5+\sqrt{5}\right)}\,e^{2\sqrt{38/15}\,\pi}$$

$$11+\frac{\sqrt{\frac{1}{19}\left(1+\sqrt{5}\right)}\,e^{2\sqrt{38/15}\,\pi}}{8\sqrt[4]{5}}$$

$$\frac{1}{760}\left(8360+5^{3/4}\sqrt{19\left(1+\sqrt{5}\right)}\,e^{2\sqrt{38/15}\,\pi}\right)$$

Series representations:

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\sqrt{152}}+11=\left(110\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{152}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k z_0^{-k}}{k!}\right)\quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\sqrt{152}}+11=\left(110\exp\left(i\pi\left\lfloor\frac{\arg(152-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(152-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{152}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{152}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(152-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(152-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\sqrt{152}}+11=\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor}z_0^{-1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor}\left(110\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{152}{15}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{152}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{152}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k z_0^{-k}}{k!}\right)$$

For n = 99, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(99/15)) / (2*5^(1/4)*sqrt(99))+sqrt7

where 7 is a Lucas number

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{99}{15}}\right)}{2\sqrt[4]{5}\sqrt{99}} + \sqrt{7}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{33/5}\,\pi}\sqrt{\frac{\phi}{11}}}{6\sqrt[4]{5}} + \sqrt{7}$$

Decimal approximation:

139.43439521592579879479324485426852581945231191453743686 47...

139.4343952… result practically equal to the rest mass of Pion meson 139.57 MeV

Property:

$\sqrt{7} + \frac{e^{\sqrt{33/5}\,\pi}\sqrt{\frac{\phi}{11}}}{6\sqrt[4]{5}}$ is a transcendental number

Alternate forms:

$$\sqrt{7} + \frac{1}{6}\sqrt{\frac{1}{110}\left(5+\sqrt{5}\right)}\, e^{\sqrt{33/5}\,\pi}$$

$$\sqrt{7} + \frac{\sqrt{\frac{1}{22}\left(1+\sqrt{5}\right)}\, e^{\sqrt{33/5}\,\pi}}{6\sqrt[4]{5}}$$

$$\frac{1}{660}\left(660\sqrt{7} + 5^{3/4}\sqrt{22\left(1+\sqrt{5}\right)}\, e^{\sqrt{33/5}\,\pi}\right)$$

Series representations:

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{99}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{99}} + \sqrt{7} =$$

$$\left(5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{33}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!} + 10\sqrt{z_0}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(7-z_0)^{k_1}(99-z_0)^{k_2} z_0^{-k_1-k_2}}{k_1!\,k_2!}\right) \Big/ \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(99-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{99}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{99}} + \sqrt{7} = \left(5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{33}{5}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{33}{5}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} + 10\exp\left(i\pi\left\lfloor\frac{\arg(7-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(99-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(7-x)^{k_1}(99-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(99-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(99-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{99}{15}}\right)}{2\sqrt[4]{5}\sqrt{99}}+\sqrt{7}=$$

$$\left(\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(99-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(99-z_0)/(2\pi)\rfloor}\left(5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{33}{5}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{33}{5}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{33}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\right.\right.\right.$$

$$\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}+$$

$$10\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(7-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(99-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(7-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(99-z_0)/(2\pi)\rfloor}$$

$$\left.\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(7-z_0)^{k_1}(99-z_0)^{k_2} z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)\right)\Bigg/$$

$$\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(99-z_0)^k z_0^{-k}}{k!}\right)$$

For n = 250, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(250/15)) / (2*5^(1/4)*sqrt(250))-76-3-2

where 76, 3 and 2 are Lucas numbers

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\sqrt{250}}-76-3-2$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{5\sqrt{2/3}\,\pi}\sqrt{\frac{\phi}{2}}}{10\times5^{3/4}}-81$$

Decimal approximation:

9914.268365498153413336980122900378848161885661704798611997...

9914.2683654….

Property:

$$-81+\frac{e^{5\sqrt{2/3}\,\pi}\sqrt{\frac{\phi}{2}}}{10\times 5^{3/4}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{100}\sqrt{5+\sqrt{5}}\;e^{5\sqrt{2/3}\,\pi}-81$$

$$\frac{\sqrt{1+\sqrt{5}}\;e^{5\sqrt{2/3}\,\pi}}{20\times 5^{3/4}}-81$$

$$\frac{1}{100}\left(\sqrt[4]{5}\sqrt{1+\sqrt{5}}\;e^{5\sqrt{2/3}\,\pi}-8100\right)$$

Series representations:

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\sqrt{250}}-76-3-2=\left(-810\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(250-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{50}{3}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(250-z_0)^k z_0^{-k}}{k!}\right)\quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{250}} - 76 - 3 - 2 = \left(-810\exp\left(i\pi\left\lfloor\frac{\arg(250-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (250-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} + 5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{50}{3}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{50}{3}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \Big/ \left(10\exp\left(i\pi\left\lfloor\frac{\arg(250-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(250-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \text{ for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{250}} - 76 - 3 - 2 = \left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(250-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(250-z_0)/(2\pi)\rfloor}\left(-810\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(250-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(250-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(250-z_0)^k z_0^{-k}}{k!} + 5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{50}{3}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{50}{3}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{50}{3}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(250-z_0)^k z_0^{-k}}{k!}\right)$$

For n = 181, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(181/15)) / (2*5^(1/4)*sqrt(181))-18

where 18 is a Lucas number

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{181}{15}}\right)}{2 \sqrt[4]{5} \sqrt{181}} - 18$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{181/15}\,\pi} \sqrt{\frac{\phi}{181}}}{2 \sqrt[4]{5}} - 18$$

Decimal approximation:

1717.125533153011008619695955154105542578248297442381526157...

1717.12553… result in the range of the mass of candidate "glueball" $f_0(1710)$ ("glueball" =1760 ± 15 MeV).

Property:

$$-18 + \frac{e^{\sqrt{181/15}\,\pi} \sqrt{\frac{\phi}{181}}}{2 \sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{2} \sqrt{\frac{5+\sqrt{5}}{1810}}\, e^{\sqrt{181/15}\,\pi} - 18$$

$$\frac{\sqrt{\frac{1}{362}\left(1+\sqrt{5}\right)}\, e^{\sqrt{181/15}\,\pi}}{2 \sqrt[4]{5}} - 18$$

$$\frac{5^{3/4} \sqrt{362\left(1+\sqrt{5}\right)}\, e^{\sqrt{181/15}\,\pi} - 65160}{3620}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{181}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{181}} - 18 = \left(-180\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (181-z_0)^k z_0^{-k}}{k!} + 5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{181}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right) \Big/ \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(181-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{181}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{181}} - 18 = \left(-180\exp\left(i\pi\left\lfloor\frac{\arg(181-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(181-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} + 5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{181}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{181}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \Big/ \left(10\exp\left(i\pi\left\lfloor\frac{\arg(181-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(181-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{181}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{181}} - 18 =$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(181-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(181-z_0)/(2\pi)\rfloor}\left(-180\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(181-z_0)/(2\pi)\rfloor}\right.\right.$$

$$z_0^{1/2\lfloor\arg(181-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(181-z_0)^k z_0^{-k}}{k!} +$$

$$5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{181}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{181}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{181}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}$$

$$\left.\left.z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)/$$

$$\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(181-z_0)^k z_0^{-k}}{k!}\right)$$

We note that all seven results are transcendental numbers. We ask ourselves: is there a reason for this?

In mathematics, a **transcendental number** is a real number or complex number that is not an algebraic number—that is, not a root (i.e., solution) of a nonzero polynomial equation with integer coefficients.

The best-known transcendental numbers are π and e

It is conjectured that all infinite continued fractions with bounded terms that are not eventually periodic are transcendental. The number π is transcendental. The set of transcendent numbers is uncountable, meaning that there are infinitely more transcendental numbers than algebraic ones. This result was demonstrated by Georg Cantor at the end of the nineteenth century. In mathematics, an uncountable set (or uncountable infinite set) is an infinite set that contains too many elements to be countable.

If the number is irrational, the representation in continuous fraction is infinite and unique; vice versa, each continuous infinite fraction represents an irrational number. Irrational numbers are exactly those numbers whose expansion in any base (decimal, binary, etc.) never ends and does not form a periodic sequence. Some irrational numbers are algebraic numbers like the square root of 2 and the cube root of 5); others are transcendental numbers like π and e.

So if the values of the masses of the analyzed mesons are all transcendental numbers, which are part of an uncountable infinite set, this could mean that there is the infinite in between. It could therefore mean that the set of mesons in a bubble of an inflationary universe like ours, is an uncountable infinity.

If we take, for example the mass of J/ψ = 3098, we note that:

sqrt(golden ratio) * exp(Pi*sqrt(203/15)) / (2*5^(1/4)*sqrt(203))-29+7

$$\sqrt{\phi} \times \frac{\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\sqrt{203}} - 29 + 7$$

$$\frac{e^{\sqrt{203/15}\,\pi}\sqrt{\frac{\phi}{203}}}{2\sqrt[4]{5}} - 22$$

3098.306470397246116418734540645508975568045288431783102611...

3098.30647…

$$-22 + \frac{e^{\sqrt{203/15}\,\pi}\sqrt{\frac{\phi}{203}}}{2\sqrt[4]{5}}$$ is a transcendental number

Thence, 3098.30647.... is a transcendental number and must be expressed from an infinite continued fraction. Indeed:

Continued fraction

$$3098+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{7+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{31+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{84+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

We observe that, from the above expression, we obtain:

Input interpretation:

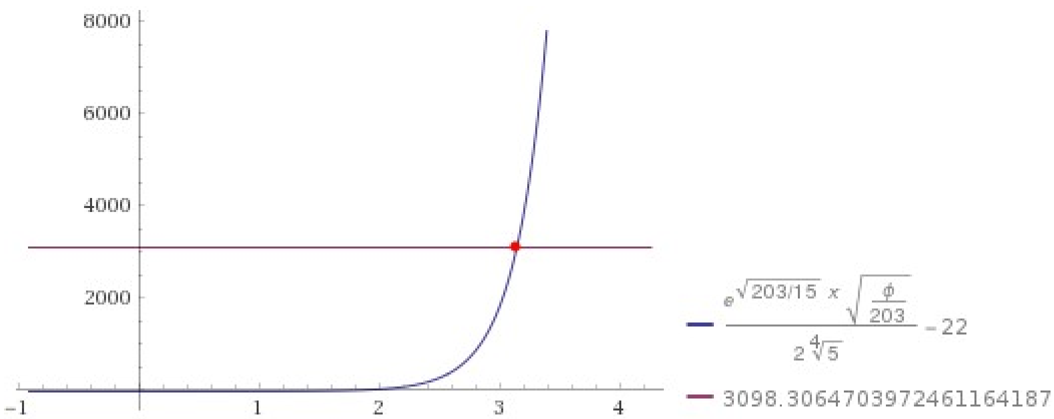
$$\sqrt{\phi}\times\frac{\exp\left(x\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{203}}-29+7=3098.3064703972461164187$$

ϕ is the golden ratio

Result:

$$\frac{e^{\sqrt{203/15}\,x}\sqrt{\frac{\phi}{203}}}{2\sqrt[4]{5}}-22=3098.3064703972461164187$$

Plot:



Alternate forms:

$$e^{\sqrt{203/15}\,x}=104525.9076055664092641 5$$

$$\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2030}}\, e^{\sqrt{203/15}\, x} - 22 = 3098.3064703972461164187$$

$$\frac{\sqrt{\frac{1}{406}\left(1+\sqrt{5}\right)}\, e^{\sqrt{203/15}\, x}}{2\sqrt[4]{5}} - 22 = 3098.3064703972461164187$$

$$1.0000000000000000000000\, e^{\sqrt{203/15}\, x} = 104525.90760556640926415$$

Real solution:

$x \approx 3.1415926535897932384626$

3.14159...

Thence, we obtain π that is a transcendental number. If instead of π, insert in the principal formula the number 3, we obtain:

sqrt(golden ratio) * exp(3*sqrt(203/15)) / (2*5^(1/4)*sqrt(203))+11

Input:

$$\sqrt{\phi} \times \frac{\exp\left(3\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{203}} + 11$$

$$\frac{e^{\sqrt{609/5}}\sqrt{\frac{\phi}{203}}}{2\sqrt[4]{5}} + 11$$

1864.4424882826174033188762288101946786432984313004287826 19...

1864.4424882826….. result practically to the rest mass of D meson 1864.84, that is a transcendental number and can be expressed from an infinite continued fraction. Indeed:

Property:

$$11 + \frac{e^{\sqrt{609/5}}\sqrt{\frac{\phi}{203}}}{2\sqrt[4]{5}} \text{ is a transcendental number}$$

Alternate forms:

$$11+\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2030}}\; e^{\sqrt{609/5}}$$

$$11+\frac{\sqrt{\frac{1}{406}\left(1+\sqrt{5}\right)}\; e^{\sqrt{609/5}}}{2\sqrt[4]{5}}$$

$$\frac{44\,660+5^{3/4}\sqrt{406\left(1+\sqrt{5}\right)}\; e^{\sqrt{609/5}}}{4060}$$

- Fraction form

[1864; 2, 3, 1, 5, 1, 1, 6, 1, 69, 26, 2, 23, 1, 2, 1, 5, 18, 4, 1, 1, 1, 1, 1, 1, 2, 3, 42, ...]

$$1864+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{69+\cfrac{1}{26+\cfrac{1}{2+\cfrac{1}{23+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{18+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}$$

$$\frac{\sqrt{\phi}\,\exp\left(3\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{203}}+11=\left(110\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(203-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{203}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(203-z_0)^k z_0^{-k}}{k!}\right)\quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

$$\frac{\sqrt{\phi}\exp\left(3\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\sqrt{203}}+11=\left(110\exp\left(i\pi\left\lfloor\frac{\arg(203-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(203-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(3\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{203}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{203}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(203-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(203-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\exp\left(3\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\sqrt{203}}+11=\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor}z_0^{-1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor}\left(110\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(203-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(203-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(3\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{203}{15}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{203}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{203}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(203-z_0)^k z_0^{-k}}{k!}\right)$$

Therefore, it is not π that causes the result to be a transcendental number when the expression is developed. So is it the expression itself that, once developed, leads to results that are transcendental numbers? And why are the masses of the mesons under examination ALL values ascribable to transcendental numbers, expressible through infinite continued fractions? It would therefore seem that the strings that constitute the mesons are expressions of irrational and transcendental numbers (infinite continuous fractions like the Rogers-Ramanujan). Having the strings a frequency linked to their vibration, it is possible to hypothesize that the frequencies of the strings / branes coincide with transcendental numbers and that they are also an uncountable infinite set

We note that, from the above six mesons mass, except the expression concerning the mass of the Pion, we obtain, performing several computations with Lucas numbers, the following interesting results:

For 9462.651..., we obtain:

sqrt(((sqrt(golden ratio) * exp(Pi*sqrt(248/15)) / (2*5^(1/4)*sqrt(248))-76+4+2)))+29+11+2

where 29, 11 and 2 are Lucas number

Input:

$$\sqrt{\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{248}{15}}\right)}{2\sqrt[4]{5}\sqrt{248}}-76+4+2}+29+11+2$$

ϕ is the golden ratio

Exact result:

$$\sqrt{\frac{e^{2\sqrt{62/15}\,\pi}\sqrt{\frac{\phi}{62}}}{4\sqrt[4]{5}}-70}+42$$

Decimal approximation:

139.27616042366498122293112219559325696518793314689179397 32...

139.2761604…

Property:

$$42+\sqrt{-70+\frac{e^{2\sqrt{62/15}\,\pi}\sqrt{\frac{\phi}{62}}}{4\sqrt[4]{5}}}$$ is a transcendental number

Alternate forms:

$$42+\sqrt{\frac{1}{8}\sqrt{\frac{1}{155}\left(5+\sqrt{5}\right)}\, e^{2\sqrt{62/15}\,\pi}-70}$$

$$42+\sqrt{\frac{\sqrt{\frac{1}{31}\left(1+\sqrt{5}\right)}\, e^{2\sqrt{62/15}\,\pi}}{8\sqrt[4]{5}}-70}$$

$$\frac{1}{620}\left(26\,040+\sqrt{310\left(5^{3/4}\sqrt{31\left(1+\sqrt{5}\right)}\, e^{2\sqrt{62/15}\,\pi}-86\,800\right)}\right)$$

Series representations:

$$\sqrt{\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{248}{15}}\right)}{2\sqrt[4]{5}\sqrt{248}}-76+4+2}+29+11+2=$$
$$42+\sqrt{-71+\frac{\exp\left(\pi\sqrt{\frac{248}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{248}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-71+\frac{\exp\left(\pi\sqrt{\frac{248}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{248}}\right)^{-k}$$

$$\sqrt{\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{248}{15}}\right)}{2\sqrt[4]{5}\sqrt{248}}-76+4+2}+29+11+2=$$
$$42+\sqrt{-71+\frac{\exp\left(\pi\sqrt{\frac{248}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{248}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-71+\frac{\exp\left(\pi\sqrt{\frac{248}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{248}}\right)^{-k}}{k!}$$

$$\sqrt{\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{248}{15}}\right)}{2\sqrt[4]{5}\sqrt{248}}-76+4+2}+29+11+2=$$
$$42+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-70+\frac{\exp\left(\pi\sqrt{\frac{248}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{248}}-z_0\right)^k z_0^{-k}}{k!}$$

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

For 5279.676..., we obtain:

2sqrt(((sqrt(golden ratio) * exp(Pi*sqrt(224/15)) / (2*5^(1/4)*sqrt(224))-29-7-4-2)))-11+3+2

Where 11, 3 and 2 are Lucas numbers

Input:

$$2\sqrt{\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\sqrt{224}}-29-7-4-2}-11+3+2$$

ϕ is the golden ratio

Exact result:

$$2\sqrt{\frac{e^{4\sqrt{14/15}\,\pi}\sqrt{\frac{\phi}{14}}}{8\sqrt[4]{5}}-42}-6$$

Decimal approximation:

139.32276178071095519773217796369087120110651336731181763 53...

139.322761….

Property:

$$-6+2\sqrt{-42+\frac{e^{4\sqrt{14/15}\,\pi}\sqrt{\frac{\phi}{14}}}{8\sqrt[4]{5}}}$$ is a transcendental number

Alternate forms:

$$2\sqrt{\frac{1}{16}\sqrt{\frac{1}{35}\left(5+\sqrt{5}\right)}\,e^{4\sqrt{14/15}\,\pi}-42}-6$$

$$2\sqrt{\frac{\sqrt{\frac{1}{7}\left(1+\sqrt{5}\right)}\, e^{4\sqrt{14/15}\,\pi}}{16\sqrt[4]{5}} - 42} - 6$$

$$\frac{1}{70}\left(\sqrt{35\left(5^{3/4}\sqrt{7\left(1+\sqrt{5}\right)}\, e^{4\sqrt{14/15}\,\pi} - 23520\right)} - 420\right)$$

Series representations:

$$2\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{224}} - 29 - 7 - 4 - 2} - 11 + 3 + 2 = -6 + 2\sqrt{-43 + \frac{\exp\left(\pi\sqrt{\frac{224}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{224}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-43 + \frac{\exp\left(\pi\sqrt{\frac{224}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{224}}\right)^{-k}$$

$$2\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{224}} - 29 - 7 - 4 - 2} - 11 + 3 + 2 = -6 + 2\sqrt{-43 + \frac{\exp\left(\pi\sqrt{\frac{224}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{224}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-43 + \frac{\exp\left(\pi\sqrt{\frac{224}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{224}}\right)^{-k}}{k!}$$

$$2\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{224}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{224}} - 29 - 7 - 4 - 2} - 11 + 3 + 2 = -6 + 2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-42 + \frac{\exp\left(\pi\sqrt{\frac{224}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{224}} - z_0\right)^k z_0^{-k}}{k!}$$

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

For 3098.30647..., we obtain:

5/2sqrt(((sqrt(golden ratio) * exp(Pi*sqrt(203/15)) / (2*5^(1/4)*sqrt(203))-29+7)))

Input:

$$\frac{5}{2}\sqrt{\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\sqrt{203}}-29+7}$$

ϕ is the golden ratio

Exact result:

$$\frac{5}{2}\sqrt{\frac{e^{\sqrt{203/15}\,\pi}\sqrt{\frac{\phi}{203}}}{2\sqrt[4]{5}}-22}$$

Decimal approximation:

139.1560830146594354319465568452764690266115933026037262939...

139.156083….

Property:

$$\frac{5}{2}\sqrt{-22+\frac{e^{\sqrt{203/15}\,\pi}\sqrt{\frac{\phi}{203}}}{2\sqrt[4]{5}}}$$ is a transcendental number

Alternate forms:

$$\frac{5}{2}\sqrt{\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2030}}\,e^{\sqrt{203/15}\,\pi}-22}$$

$$\frac{5}{2}\sqrt{\frac{\sqrt{\frac{1}{406}\left(1+\sqrt{5}\right)}\,e^{\sqrt{203/15}\,\pi}}{2\sqrt[4]{5}}-22}$$

$$\frac{1}{4}\sqrt{\frac{5}{203}\left(5^{3/4}\sqrt{406\left(1+\sqrt{5}\right)}\,e^{\sqrt{203/15}\,\pi}-89\,320\right)}$$

Series representations:

$$\frac{1}{2}\sqrt{\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\sqrt{203}}-29+7}\;5 = \frac{5}{2}\sqrt{-23+\frac{\exp\left(\pi\sqrt{\frac{203}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{203}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-23+\frac{\exp\left(\pi\sqrt{\frac{203}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{203}}\right)^{-k}$$

$$\frac{1}{2}\sqrt{\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\sqrt{203}}-29+7}\;5 = \frac{5}{2}\sqrt{-23+\frac{\exp\left(\pi\sqrt{\frac{203}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{203}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-23+\frac{\exp\left(\pi\sqrt{\frac{203}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{203}}\right)^{-k}}{k!}$$

$$\frac{1}{2}\sqrt{\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{203}{15}}\right)}{2\sqrt[4]{5}\sqrt{203}}-29+7}\;5 = \frac{5}{2}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-22+\frac{\exp\left(\pi\sqrt{\frac{203}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{203}}-z_0\right)^k z_0^{-k}}{k!}$$

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

For 771.3345..., we obtain:

1/5(((sqrt(golden ratio) * exp(Pi*sqrt(152/15)) / (2*5^(1/4)*sqrt(152))+11)))-11-4

Where 11 and 4 are Lucas numbers

Input:

$$\frac{1}{5}\left(\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\sqrt{152}}+11\right)-11-4$$

ϕ is the golden ratio

Exact result:

$$\frac{1}{5}\left(\frac{e^{2\sqrt{38/15}\,\pi}\sqrt{\frac{\phi}{38}}}{4\sqrt[4]{5}}+11\right)-15$$

Decimal approximation:

139.2669107441723722217545715003330917659171603186865735325...

139.26691….

Property:

$$-15+\frac{1}{5}\left(11+\frac{e^{2\sqrt{38/15}\,\pi}\sqrt{\frac{\phi}{38}}}{4\sqrt[4]{5}}\right)$$ is a transcendental number

Alternate forms:

$$\frac{e^{2\sqrt{38/15}\,\pi}\sqrt{\frac{\phi}{38}}}{20\sqrt[4]{5}}-\frac{64}{5}$$

$$\frac{5^{3/4}\,e^{2\sqrt{38/15}\,\pi}\sqrt{38\,\phi}+8360}{3800}-15$$

$$\frac{1}{40}\sqrt{\frac{1}{95}\left(5+\sqrt{5}\right)}\,e^{2\sqrt{38/15}\,\pi}-\frac{64}{5}$$

Series representations:

$$\frac{1}{5}\left(\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{152}}+11\right)-11-4=\left(-640\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k\,z_0^{-k}}{k!}+5^{3/4}\right.$$

$$\left.\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{152}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k\,z_0^{-k}}{k!}\right)\Big/$$

$$\left(50\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k\,z_0^{-k}}{k!}\right)\text{ for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{1}{5}\left(\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{152}}+11\right)-11-4=$$

$$\left(-640\exp\left(i\pi\left\lfloor\frac{\arg(152-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(152-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+\right.$$

$$5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{152}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{152}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$

$$\left(50\exp\left(i\pi\left\lfloor\frac{\arg(152-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(152-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\text{ for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{1}{5}\left(\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{152}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{152}}+11\right)-11-4=$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor}\left(-640\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor}\right.\right.$$
$$z_0^{1/2\lfloor\arg(152-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k z_0^{-k}}{k!}+$$
$$5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{152}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{152}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{152}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}$$
$$\left.\left.z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/$$
$$\left(50\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(152-z_0)^k z_0^{-k}}{k!}\right)$$

For 9914.26836..., we obtain:

sqrt(((sqrt(golden ratio) * exp(Pi*sqrt(250/15)) / (2*5^(1/4)*sqrt(250))-76-3-2)))+29+11

where 29 and 11 are Lucas numbers

Input:

$$\sqrt{\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{250}}-76-3-2}+29+11$$

ϕ is the golden ratio

Exact result:

$$\sqrt{\frac{e^{5\sqrt{2/3}\,\pi}\sqrt{\frac{\phi}{2}}}{10\times 5^{3/4}}-81}+40$$

Decimal approximation:

139.5704191288665481900321865698209577071282492727801662146...

139.570419…

Property:

$$40+\sqrt{-81+\frac{e^{5\sqrt{2/3}\,\pi}\sqrt{\frac{\phi}{2}}}{10\times 5^{3/4}}}$$ is a transcendental number

Alternate forms:

$$40+\sqrt{\frac{1}{100}\sqrt{5+\sqrt{5}}\;e^{5\sqrt{2/3}\,\pi}-81}$$

$$40+\frac{1}{10}\sqrt{\sqrt{5+\sqrt{5}}\;e^{5\sqrt{2/3}\,\pi}-8100}$$

$$40+\sqrt{\frac{\sqrt{1+\sqrt{5}}\;e^{5\sqrt{2/3}\,\pi}}{20\times 5^{3/4}}-81}$$

Series representations:

$$\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{250}}-76-3-2}+29+11=$$

$$40+\sqrt{-82+\frac{\exp\left(\pi\sqrt{\frac{50}{3}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{250}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-82+\frac{\exp\left(\pi\sqrt{\frac{50}{3}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{250}}\right)^{-k}$$

$$\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{250}}-76-3-2}+29+11=$$

$$40+\sqrt{-82+\frac{\exp\left(\pi\sqrt{\frac{50}{3}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{250}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-82+\frac{\exp\left(\pi\sqrt{\frac{50}{3}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{250}}\right)^{-k}}{k!}$$

$$\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{250}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{250}}-76-3-2}+29+11=$$

$$40+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-81+\frac{\exp\left(\pi\sqrt{\frac{50}{3}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{250}}-z_0\right)^k z_0^{-k}}{k!}$$

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

For 1717.1255..., we obtain:

3*sqrt(((sqrt(golden ratio) * exp(Pi*sqrt(181/15)) / (2*5^(1/4)*sqrt(181))-18)))+11+4

Where 11 and 4 are Lucas numbers

Input:

$$3\sqrt{\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{181}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{181}}-18}+11+4$$

ϕ is the golden ratio

Exact result:

$$3\sqrt{\frac{e^{\sqrt{181/15}\,\pi}\sqrt{\frac{\phi}{181}}}{2\sqrt[4]{5}}-18}+15$$

Decimal approximation:

139.3146403219552378300821545642660695061741041646012700848...

139.31464.....

Property:

$$15+3\sqrt{-18+\frac{e^{\sqrt{181/15}\,\pi}\sqrt{\frac{\phi}{181}}}{2\sqrt[4]{5}}}$$ is a transcendental number

Alternate forms:

$$15+3\sqrt{\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{1810}}\,e^{\sqrt{181/15}\,\pi}-18}$$

$$15+3\sqrt{\frac{\sqrt{\frac{1}{362}(1+\sqrt{5})}\,e^{\sqrt{181/15}\,\pi}}{2\sqrt[4]{5}}-18}$$

$$\frac{3\left(9050+\sqrt{905\left(5^{3/4}\sqrt{362(1+\sqrt{5})}\,e^{\sqrt{181/15}\,\pi}-65\,160\right)}\right)}{1810}$$

Series representations:

$$3\sqrt{\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{181}{15}}\right)}{2\sqrt[4]{5}\sqrt{181}}-18}+11+4=$$
$$15+3\sqrt{-19+\frac{\exp\left(\pi\sqrt{\frac{181}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{181}}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-19+\frac{\exp\left(\pi\sqrt{\frac{181}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\sqrt{181}}\right)^{-k}$$

$$3\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{181}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{181}}-18}+11+4=$$

$$15+3\sqrt{-19+\frac{\exp\left(\pi\sqrt{\frac{181}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{181}}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-19+\frac{\exp\left(\pi\sqrt{\frac{181}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{181}}\right)^{-k}}{k!}$$

$$3\sqrt{\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{181}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{181}}-18}+11+4=$$

$$15+3\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-18+\frac{\exp\left(\pi\sqrt{\frac{181}{15}}\right)\sqrt{\phi}}{2\sqrt[4]{5}\,\sqrt{181}}-z_0\right)^k z_0^{-k}}{k!}$$

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

We observe that all the six results 139.2761604… 139.322761… 139.156083…

139.26691…. 139.570419… 139.31464….. are practically equal to the rest mass of Pion meson 139.57 and are all transcendental numbers

But what can be further obtained from this value, and why is it so recurrent? The average of the six results is:

$$\frac{1}{6}(139.2761604+139.322761+139.156083+139.26691+139.570419+139.31464)$$

139.3178289

139.3178289

Multiplying this value by 12.61803398... = 11 + golden ratio and subtracting 29 (where 11 and 29 are Lucas numbers), we obtain:

(11+golden ratio) (139.3178289) – 29

$$(11+\phi)\times 139.3178289-29$$

1728.917100...

1728.9171....

This result, 1728.9171… is practically equal to the Hardy-Ramanujan number and very near to the mass of candidate glueball $f_0(1710)$ meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. As a consequence, it is sometimes called a Zagier as a pun on the Gross–Zagier theorem.

Furthermore, we have that performing the 10th root of this value, we obtain:

(139.3178289)^1/10

$$\sqrt[10]{139.3178289}$$

1.6383273063...

1.6383273063....result $\approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

COSMOLOGICAL APPLICATIONS OF RAMANUJAN'S MATHEMATICS

From:

Spectral distortions in CMB by the bulk Comptonization due to Zeldovich pancakes - *G.S. Bisnovatyi-Kogan* - arXiv:1902.01113v1 [astro-ph.CO] 4 Feb 2019

$$f(\tilde{\nu}) = \frac{C_f}{e^{\tilde{\nu}} - 1}\left[1 + \frac{1}{12}\frac{\beta_0\tau}{1 + \frac{\beta_0\tau}{4}}\frac{\tilde{\nu}e^{\tilde{\nu}}}{e^{\tilde{\nu}} - 1}\right]. \qquad (26)$$

For $C_f = 0.7744$ and $\beta_0\tau = 1.2$, we obtain:

0.7744/(e^x-1) ((((1+1/12*(1.2)/(1+(1.2/4))*(x*e^x)/(e^x-1))))

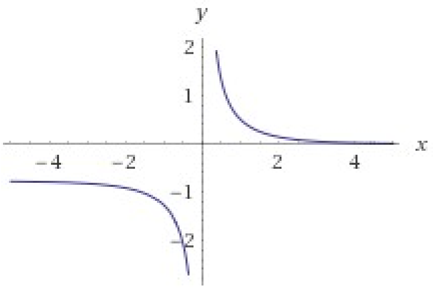
Input:

$$\frac{0.7744}{e^x - 1}\left(1 + \frac{1}{12} \times \frac{1.2}{1 + \frac{1.2}{4}} \times \frac{x\, e^x}{e^x - 1}\right)$$

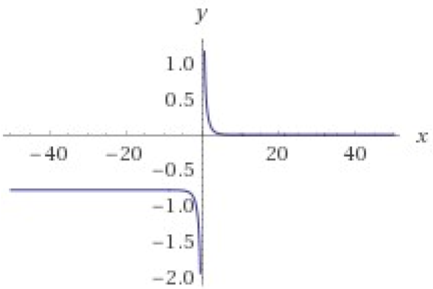
Result:

$$\frac{0.7744\left(\frac{0.0769231\, e^x\, x}{e^x - 1} + 1\right)}{e^x - 1}$$

Plots:



(x from -5 to 5)



(x from -50 to 50)

Alternate forms:

$$\frac{e^x\,(0.0595692\, x + 0.7744) - 0.7744}{(e^x - 1)^2}$$

$$\frac{0.0595692\,(e^x\, x + 13.\, e^x - 13.)}{(e^x - 1)^2}$$

$$\frac{0.0595692\,(13\,(e^x - 1) + 1.\, e^x\, x)}{(e^x - 1)^2}$$

Expanded form:

$$\frac{0.0595692\, e^x\, x}{(e^x - 1)^2} + \frac{0.7744}{e^x - 1}$$

Roots:

$x \approx W_n\left(5.75137 \times 10^6\right) - 13\,, \quad 2.71828^{W_n\left(5.75137\times 10^6\right)} - 442\,413. \neq 0$

$W_k(z)$ is the analytic continuation of the product log function

Properties as a real function:

Domain

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

Range

$\{y \in \mathbb{R} : y < -\frac{484}{625} \text{ or } y > 0\}$

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

Series expansion at x = 0:

$$\frac{0.833969}{x} - 0.3872 + 0.0595692\, x - 0.00082735\, x^3 + O(x^4)$$

(Laurent series)

Derivative:

$$\frac{d}{dx}\left(\frac{0.7744\left(1 + \frac{1.2\,(x\,e^x)}{12\left(1+\frac{1.2}{4}\right)(e^x-1)}\right)}{e^x - 1}\right) = \frac{e^x\,(e^x\,(-0.0595692\,x - 0.714831) - 0.0595692\,x + 0.714831)}{(e^x - 1)^3}$$

Indefinite integral:

$$\int \frac{0.7744\left(1 + \frac{0.0769231\,e^x\,x}{-1+e^x}\right)}{-1 + e^x}\,dx = \left(-\frac{0.0595692}{2.71828^x - 1} - 0.833969\right)x + 0.833969\,\log(1 - 2.71828^x) + \text{constant}$$

(assuming a complex-valued logarithm)

$\log(x)$ is the natural logarithm

Limit:

$$\lim_{x\to-\infty} \frac{0.7744\left(1 + \frac{0.0769231\,e^x\,x}{-1+e^x}\right)}{-1 + e^x} = -0.7744$$

$$\lim_{x\to\infty} \frac{0.7744\left(1+\frac{0.0769231\, e^x\, x}{-1+e^x}\right)}{-1+e^x} = 0 \approx 0$$

Alternative representations:

$$\frac{\left(1+\frac{1.2(x e^x)}{12\left(1+\frac{1.2}{4}\right)(e^x-1)}\right)0.7744}{e^x-1} = \frac{\left(1+\frac{1.2(x z^x)}{12\left(1+\frac{1.2}{4}\right)(z^x-1)}\right)0.7744}{z^x-1} \quad \text{for } z=e$$

$$\frac{\left(1+\frac{1.2(x e^x)}{12\left(1+\frac{1.2}{4}\right)(e^x-1)}\right)0.7744}{e^x-1} = \frac{\left(1+\frac{1.2(x w^a)}{12\left(1+\frac{1.2}{4}\right)(w^a-1)}\right)0.7744}{w^a-1} \quad \text{for } a=\frac{x}{\log(w)}$$

$$\frac{\left(1+\frac{1.2(x e^x)}{12\left(1+\frac{1.2}{4}\right)(e^x-1)}\right)0.7744}{e^x-1} = \frac{0.7744\left(1+\frac{1.2\,x\left(1+\frac{2}{-1+\coth\left(\frac{x}{2}\right)}\right)}{\frac{12\left(1+\frac{1.2}{4}\right)2}{-1+\coth\left(\frac{x}{2}\right)}}\right)}{\frac{2}{-1+\coth\left(\frac{x}{2}\right)}}$$

Definite integral after subtraction of diverging parts:

$$\int_0^\infty \left(\frac{0.7744\left(1+\frac{0.0769231\, e^x\, x}{-1+e^x}\right)}{-1+e^x} - \left(\frac{0.7744}{-1+e^x} + \frac{0.0595692\, e^x\, x}{(-1+e^x)^2}\right)\right)dx = 0$$

From:

x≈W_n(5.75137×10^6) – 13

Input interpretation:

$$-13 + W_n\left(5.75137\times 10^6\right)$$

$W_k(z)$ is the analytic continuation of the product log function

Values:

n	1	2	3	4	5
$W_n(5.75137\times 10^6)-13$	$-0.086848 + 5.85735 i$	$-0.288973 + 11.8174 i$	$-0.517543 + 17.888 i$	$-0.730323 + 24.034 i$	$-0.917853 + 30.2254 i$

Global maximum:

$\max\{W_n(5\,751\,370)-13\} = W(5\,751\,370)-13$ at $n=0$

$W(z)$ is the product log function

Global minimum:

$\min\{W_n(5\,751\,370)-13\} = W(5\,751\,370)-13$ at $n=0$

Now, we have that:

(((0.7744/(e^(-0.086848+5.85735i)-1))))* ((((1+1/12*(1.2/(1+(1.2/4)))*(((-0.086848+5.85735i)*e^(-0.086848+5.85735i)))/(((e^(-0.086848+5.85735i)-1)))))))

Input interpretation:

$$\frac{0.7744}{e^{-0.086848+5.85735\,i}-1}\left(1+\frac{1}{12}\times\frac{1.2}{1+\frac{1.2}{4}}\times\frac{(-0.086848+5.85735\,i)\,e^{-0.086848+5.85735\,i}}{e^{-0.086848+5.85735\,i}-1}\right)$$

i is the imaginary unit

Result:

$0.0000174964\ldots - 0.0000129317\ldots\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.0000217567$ (radius), $\theta = -36.4684°$ (angle)

0.0000217567

Alternative representation:

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right) 0.7744}{e^{-0.086848+5.85735 i}-1}=\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) \exp^{-0.086848+5.85735 i}(z)\right)}{12\left(1+\frac{1.2}{4}\right)\left(\exp^{-0.086848+5.85735 i}(z)-1\right)}\right) 0.7744}{\exp^{-0.086848+5.85735 i}(z)-1} \text{ for } z=1$$

Series representations:

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right) 0.7744}{e^{-0.086848+5.85735 i}-1}=-\left(\left(0.7744\left(\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{0.173696}-0.993319\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{0.086848+5.85735 i}-0.450565 i\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{0.086848+5.85735 i}\right)\right) / \left(\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{0.086848}-\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{5.85735 i}\right)^2\right)$$

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right) 0.7744}{e^{-0.086848+5.85735 i}-1}=-\left(\left(0.7744\left(\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.173696}-0.993319\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.086848+5.85735 i}-0.450565 i\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.086848+5.85735 i}\right)\right) / \left(\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.086848}-\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{5.85735 i}\right)^2\right)$$

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right) 0.7744}{e^{-0.086848+5.85735 i}-1}=\left(0.348918\left(-2.21943\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.173696}+2.20461\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.086848+5.85735 i}+i\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.086848+5.85735 i}\right)\right) / \left(-\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{0.086848}+\left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{5.85735 i}\right)^2$$

[(((0.7744/(e^(-0.086848+5.85735i)-1))))* ((((1+1/12*(1.2/(1+(1.2/4)))*(((-0.086848+5.85735i)*e^(-0.086848+5.85735i)))/(((e^(-0.086848+5.85735i)-1)))))))]^1/(64^2*8)

Input interpretation:

$$\left(\frac{0.7744}{e^{-0.086848+5.85735 i}-1}\left(1+\frac{1}{12}\times\frac{1.2}{1+\frac{1.2}{4}}\times\frac{(-0.086848+5.85735 i)\, e^{-0.086848+5.85735 i}}{e^{-0.086848+5.85735 i}-1}\right)\right)^\wedge\left(\frac{1}{64^2\times 8}\right)$$

i is the imaginary unit

Result:

0.999672... −
0.0000194179... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.999672$ (radius), $\theta = -0.00111293°$ (angle)

0.999672 result very near to the value of the following Rogers-Ramanujan continued fraction:

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

From the inversion, we obtain:

1/[(((0.7744/(e^(-0.086848+5.85735i)-1))))* ((((1+1/12*(1.2/(1+(1.2/4)))*(((-0.086848+5.85735i)*e^(-0.086848+5.85735i)))/(((e^(-0.086848+5.85735i)-1)))))))]

Input interpretation:

$$\frac{1}{\frac{0.7744}{e^{-0.086848+5.85735 i}-1}\left(1+\frac{1}{12}\times\frac{1.2}{1+\frac{1.2}{4}}\times\frac{(-0.086848+5.85735 i)\, e^{-0.086848+5.85735 i}}{e^{-0.086848+5.85735 i}-1}\right)}$$

i is the imaginary unit

Result:

36962.7044800993722034825744870185106833352857721026166116... +
27319.3785617287432693543536971720283618893708915266875571... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 45962.9$ (radius), $\theta = 36.4684°$ (angle)

45962.9

Alternative representation:

$$\frac{1}{\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right)^{0.7744}}{e^{-0.086848+5.85735 i}-1}} = \frac{1}{\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) \exp^{-0.086848+5.85735 i}(z)\right)}{12\left(1+\frac{1.2}{4}\right)\left(\exp^{-0.086848+5.85735 i}(z)-1\right)}\right)^{0.7744}}{\exp^{-0.086848+5.85735 i}(z)-1}} \text{ for } z=1$$

Series representations:

$$\frac{1}{\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right)^{0.7744}}{e^{-0.086848+5.85735 i}-1}} = \left(2.866\left(-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848}+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{5.85735 i}\right)^{2}\right) \Big/ \left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848} \left(-2.21943\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848}+2.20461\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{5.85735 i}+i\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{5.85735 i}\right)\right)$$

$$\frac{1}{\frac{\left(1+\frac{1.2\left((-0.086848+5.85735\,i)\,e^{-0.086848+5.85735\,i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735\,i}-1\right)}\right)0.7744}{e^{-0.086848+5.85735\,i}-1}} =$$

$$\left(2.866\left(-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.086848}+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{5.85735\,i}\right)^2\right)\Big/$$
$$\left(\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.086848}\left(-2.21943\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.086848}+\right.\right.$$
$$\left.\left.2.20461\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{5.85735\,i}+i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{5.85735\,i}\right)\right)$$

$$\frac{1}{\frac{\left(1+\frac{1.2\left((-0.086848+5.85735\,i)\,e^{-0.086848+5.85735\,i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735\,i}-1\right)}\right)0.7744}{e^{-0.086848+5.85735\,i}-1}} =$$

$$-\left(\left(1.29132\times 2^{-5.85735\,i}\left(2^{5.85735\,i}\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.086848}-1.06205\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{5.85735\,i}\right)^2\right)\Big/\right.$$
$$\left(\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.086848}\left(2^{5.85735\,i}\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.086848}-\right.\right.$$
$$\left.\left.\left.1.05495\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{5.85735\,i}-0.478522\,i\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{5.85735\,i}\right)\right)\right)$$

Note that, from the formula concerning the Coefficients of the '5th order' mock theta function ψ_1(q), for n = 318, and performing calculations with the Fibonacci numbers 8, 5 and 21, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(318/15)) / (2*5^(1/4)*sqrt(318))+8^2*5-21

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{318}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{318}}+8^2\times 5-21$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{106/5}\,\pi}\sqrt{\frac{\phi}{318}}}{2\sqrt[4]{5}}+299$$

Decimal approximation:

45962.40172081978946797289972227124481441370285990011194842...

45962.4017208…

Property:

$$299+\frac{e^{\sqrt{106/5}\,\pi}\sqrt{\frac{\phi}{318}}}{2\sqrt[4]{5}} \text{ is a transcendental number}$$

Alternate forms:

$$299+\frac{1}{4}\sqrt{\frac{1}{795}\left(5+\sqrt{5}\right)}\,e^{\sqrt{106/5}\,\pi}$$

$$299+\frac{\sqrt{\frac{1}{159}\left(1+\sqrt{5}\right)}\,e^{\sqrt{106/5}\,\pi}}{4\sqrt[4]{5}}$$

$$\frac{950\,820+5^{3/4}\sqrt{159\left(1+\sqrt{5}\right)}\,e^{\sqrt{106/5}\,\pi}}{3180}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{318}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{318}}+8^2\times 5-21=\left(2990\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(318-z_0)^k z_0^{-k}}{k!}+5^{3/4}\right.$$
$$\left.\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{106}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/$$
$$\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(318-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{318}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{318}} + 8^2 \times 5 - 21 = \left(2990 \exp\left(i\pi\left\lfloor\frac{\arg(318-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\ (318-x)^k\ x^{-k}\left(-\frac{1}{2}\right)_k}{k!} + 5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{106}{5}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{106}{5}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\ (\phi-x)^k\ x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \Big/ \left(10\exp\left(i\pi\left\lfloor\frac{\arg(318-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\ (318-x)^k\ x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{318}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{318}} + 8^2 \times 5 - 21 = \left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(318-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(318-z_0)/(2\pi)\rfloor}\left(2990\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(318-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(318-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(318-z_0)^k z_0^{-k}}{k!} + 5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{106}{5}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{106}{5}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{106}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(318-z_0)^k z_0^{-k}}{k!}\right)$$

or:

(((0.7744/(e^(-0.917853+30.2254i)-1))))*((((1+1/12*(1.2/(1+(1.2/4)))*((((((((-0.917853+30.2254i))*e^(-0.917853+30.2254i)))/(((e^(-0.917853+30.2254i)-1)))))))

Input interpretation:

$$\frac{0.7744}{e^{-0.917853+30.2254 i}-1}\left(1+\frac{1}{12}\times\frac{1.2}{1+\frac{1.2}{4}}\times\frac{(-0.917853+30.2254 i)\, e^{-0.917853+30.2254 i}}{e^{-0.917853+30.2254 i}-1}\right)$$

i is the imaginary unit

Result:

$-5.95448\ldots\times 10^{-6} - 4.17010\ldots\times 10^{-6}\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 7.2695\times 10^{-6}$ (radius), $\theta = -144.995°$ (angle)

$7.2695*10^{-6}$

Alternative representation:

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254 i)\, e^{-0.917853+30.2254 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254 i}-1\right)}\right)0.7744}{e^{-0.917853+30.2254 i}-1} = \frac{\left(1+\frac{1.2\left((-0.917853+30.2254 i)\exp^{-0.917853+30.2254 i}(z)\right)}{12\left(1+\frac{1.2}{4}\right)\left(\exp^{-0.917853+30.2254 i}(z)-1\right)}\right)0.7744}{\exp^{-0.917853+30.2254 i}(z)-1} \text{ for } z=1$$

Series representations:

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254 i)\, e^{-0.917853+30.2254 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254 i}-1\right)}\right)0.7744}{e^{-0.917853+30.2254 i}-1} = -\left(\left(0.7744\left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.83571} - 0.929396\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853+30.2254 i} - 2.32503 i\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853+30.2254 i}\right)\right)\Big/\left(\left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853} - \left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{30.2254 i}\right)^2\right)\right)$$

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254\,i}-1\right)}\right)0.7744}{e^{-0.917853+30.2254\,i}-1} = -\left(\left(0.7744\left(\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571} - 0.929396\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254\,i} - 2.32503\,i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254\,i}\right)\right)\Big/\left(\left(\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853} - \left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{30.2254\,i}\right)^2\right)\right)$$

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254\,i}-1\right)}\right)0.7744}{e^{-0.917853+30.2254\,i}-1} = \left(1.8005\left(-0.430102\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571} + 0.399735\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254\,i} + i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254\,i}\right)\right)\Big/\left(-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853} + \left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{30.2254\,i}\right)^2$$

From the formula

$$\delta_{Bulk} = \frac{f_1(\tilde{\nu})}{f_0(\tilde{\nu})} = \frac{1}{12}\frac{\beta_0\tau}{1+\frac{\beta_0\tau}{4}}\frac{\tilde{\nu}e^{\tilde{\nu}}}{e^{\tilde{\nu}}-1}. \quad (33)$$

we obtain:

1/12*(1.2/(1+(1.2/4)))*(((-0.917853+30.2254i)*e^(-0.917853+30.2254i)))/(((e^(-0.917853+30.2254i)-1)))

Input interpretation:

$$\frac{1}{12}\times\frac{1.2}{1+\frac{1.2}{4}}\times\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{e^{-0.917853+30.2254\,i}-1}$$

i is the imaginary unit

Result:

$-0.999995... + 7.43819... \times 10^{-6}\, i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.999995$ (radius), $\theta = 180.°$ (angle)

0.999995

Alternative representation:

$$\frac{1.2\left((-0.917853 + 30.2254\, i)\, e^{-0.917853+30.2254\, i}\right)}{\left(\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254\, i}-1\right)\right)12} = \frac{1.2\left((-0.917853 + 30.2254\, i)\exp^{-0.917853+30.2254\, i}(z)\right)}{\left(\left(1+\frac{1.2}{4}\right)\left(\exp^{-0.917853+30.2254\, i}(z)-1\right)\right)12} \text{ for } z = 1$$

Series representations:

$$\frac{1.2\left((-0.917853 + 30.2254\, i)\, e^{-0.917853+30.2254\, i}\right)}{\left(\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254\, i}-1\right)\right)12} = \frac{2.32503\,(-0.0303669 + i)\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{30.2254\, i}}{-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853} + \left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{30.2254\, i}}$$

$$\frac{1.2\left((-0.917853 + 30.2254\, i)\, e^{-0.917853+30.2254\, i}\right)}{\left(\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254\, i}-1\right)\right)12} = \frac{2.32503\,(-0.0303669 + i)\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{30.2254\, i}}{-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853} + \left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{30.2254\, i}}$$

$$\frac{1.2\left((-0.917853 + 30.2254\, i)\, e^{-0.917853+30.2254\, i}\right)}{\left(\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254\, i}-1\right)\right)12} = \frac{2.32503\,(-0.0303669 + i)\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{30.2254\, i}}{-0.529296\, e^{20.9507\, i}\left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{0.917853} + \left(\sum_{k=0}^{\infty}\frac{1+k}{k!}\right)^{30.2254\, i}}$$

[1/12*(1.2/(1+(1.2/4)))*(((-0.917853+30.2254i)*e^(-0.917853+30.2254i)))/(((e^(-0.917853+30.2254i)-1)))]^64

Input interpretation:

$$\left(\frac{1}{12}\times\frac{1.2}{1+\frac{1.2}{4}}\times\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{e^{-0.917853+30.2254\,i}-1}\right)^{64}$$

i is the imaginary unit

Result:

0.999709... −
0.000475908... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.999709$ (radius), $\theta = -0.0272755°$ (angle)

0.999709 result very near to the value of the following Rogers-Ramanujan continued fraction:

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

From the formula

$$f_{ETh}(\tilde{\nu})=\frac{\tilde{\nu}^3}{e^{\tilde{\nu}}-1}\left\{1+y\tilde{\nu}\frac{e^{\tilde{\nu}}}{e^{\tilde{\nu}}-1}\left[\frac{\tilde{\nu}}{\tanh(\tilde{\nu}/2)}-4\right]\right\}. \qquad (32)$$

we obtain:

((-0.917853+30.2254i)^3/(e^(-0.917853+30.2254i)-1))*(((((1+1/60*(-0.917853+30.2254i)*(e^(-0.917853+30.2254i))/(e^(-0.917853+30.2254i)-1))*((-0.917853+30.2254i)/(tanh((-0.917853+30.2254i)/2))-4)))))

Input interpretation:

$$\frac{(-0.917853+30.2254\,i)^3}{e^{-0.917853+30.2254\,i}-1}\left(\left(1+\frac{1}{60}\times(-0.917853+30.2254\,i)\times\frac{e^{-0.917853+30.2254\,i}}{e^{-0.917853+30.2254\,i}-1}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}\times(-0.917853+30.2254\,i)\right)}-4\right)\right)$$

tanh(x) is the hyperbolic tangent function

i is the imaginary unit

Result:

$4.56033\ldots\times10^5-$
$8.65133\ldots\times10^5\,i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r=977968.$ (radius), $\theta=-62.2052°$ (angle)

977968

Alternative representations:

$$\left(\left(\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)\right)(-0.917853+30.2254\,i)^3\right)\Big/\left(e^{-0.917853+30.2254\,i}-1\right)=$$

$$\left((-0.917853+30.2254\,i)^3\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(-1+e^{-0.917853+30.2254\,i}\right)}\right)\left(-4+\frac{-0.917853+30.2254\,i}{-1+\frac{2}{1+e^{0.917853-30.2254\,i}}}\right)\right)\Big/\left(-1+e^{-0.917853+30.2254\,i}\right)$$

$$\left(\left(\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)\right)(-0.917853+30.2254\,i)^3\right)\Big/\left(e^{-0.917853+30.2254\,i}-1\right)=$$

$$\left((-0.917853+30.2254\,i)^3\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(-1+e^{-0.917853+30.2254\,i}\right)}\right)\left(-4+\frac{-0.917853+30.2254\,i}{\frac{1}{\coth\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}}\right)\right)\Big/\left(-1+e^{-0.917853+30.2254\,i}\right)$$

$$\left(\left(\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)\right)(-0.917853+30.2254\,i)^3\right)\Big/\left(e^{-0.917853+30.2254\,i}-1\right)=$$

$$\left((-0.917853+30.2254\,i)^3\left(-4+\frac{-0.917853+30.2254\,i}{\coth\left(\frac{1}{2}(-0.917853+30.2254\,i)-\frac{i\pi}{2}\right)}\right)\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(-1+e^{-0.917853+30.2254\,i}\right)}\right)\right)\Big/\left(-1+e^{-0.917853+30.2254\,i}\right)$$

Series representations:

$$\left(\left(\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)\right)(-0.917853+30.2254\,i)^3\right)\Big/\left(e^{-0.917853+30.2254\,i}-1\right)=$$

$$\left((-0.917853+30.2254\,i)^3\left(1+\frac{e^{-0.917853+30.2254\,i}(-0.917853+30.2254\,i)}{60\left(-1+e^{-0.917853+30.2254\,i}\right)}\right)\left(-4+\frac{-0.917853+30.2254\,i}{-1-2\sum_{k=1}^{\infty}(-1)^k q^{2k}}\right)\right)\Big/\left(-1+e^{-0.917853+30.2254\,i}\right)\text{ for } q=-0.523265+0.354358\,i$$

$$\left(\left(\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)\right)(-0.917853+30.2254\,i)^3\right)\Big/\left(e^{-0.917853+30.2254\,i}-1\right)=$$

$$\left((-0.917853+30.2254\,i)^3\left(1+\frac{0.503757\,e^{30.2254\,i}(-0.0303669+i)}{-e^{0.917853}+e^{30.2254\,i}}\right)\left(-4+\frac{-0.917853+30.2254\,i}{-1+2\sum_{k=0}^{\infty}(-1)^k\,\mathcal{A}^{(-0.917853+30.2254\,i)(1+k)}}\right)\right)\Big/\left(-1+e^{-0.917853+30.2254\,i}\right)$$

$$\left(\left(\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)\right)(-0.917853+30.2254\,i)^3\right)\Big/\left(e^{-0.917853+30.2254\,i}-1\right)=$$

$$\left((-0.917853+30.2254\,i)^3\left(1+\frac{0.503757\,e^{30.2254\,i}(-0.0303669+i)}{-e^{0.917853}+e^{30.2254\,i}}\right)\left(-4+\frac{1}{4\sum_{k=1}^{\infty}\frac{1}{(0.917853-30.2254\,i)^2+(1-2k)^2\pi^2}}\right)\right)\Big/\left(-1+e^{-0.917853+30.2254\,i}\right)$$

Integral representation:

$$\left(\left(\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)\right)(-0.917853+30.2254\,i)^3\right)\Big/\left(e^{-0.917853+30.2254\,i}-1\right)=$$

$$\left((-0.917853+30.2254\,i)^3\left(1+\frac{e^{-0.917853+30.2254\,i}(-0.917853+30.2254\,i)}{60\left(-1+e^{-0.917853+30.2254\,i}\right)}\right)\left(-4+\frac{-0.917853+30.2254\,i}{\int_0^{\frac{1}{2}(-0.917853+30.2254\,i)}\operatorname{sech}^2(t)\,dt}\right)\right)\Big/\left(-1+e^{-0.917853+30.2254\,i}\right)$$

From which:

sqrt(977968)

Input:

$$\sqrt{977968}$$

Result:

$$4\sqrt{61123}$$

Decimal approximation:

988.92264611545831461658598603166048179128035770214687005490...

988.92264611…

From which:

1/8*sqrt(977968)+golden ratio

Input:

$$\frac{1}{8}\sqrt{977968}+\phi$$

ϕ is the golden ratio

Result:

$$\phi+\frac{\sqrt{61123}}{2}$$

Decimal approximation:

125.23336475318218417527783508832319834163035389257412161900...

125.23336475… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

Alternate forms:

$$\frac{1}{2}\left(\sqrt{61123}+1+\sqrt{5}\right)$$

$$\frac{1}{2}\left(2\phi+\sqrt{61123}\right)$$

$$\frac{1}{2}\left(1+\sqrt{2\left(30564+\sqrt{305615}\right)}\right)$$

Minimal polynomial:

$$16x^4-32x^3-489000x^2+489016x+3735287669$$

Series representations:

$$\frac{\sqrt{977968}}{8}+\phi=\phi+\frac{1}{8}\sqrt{977967}\sum_{k=0}^{\infty}977967^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{\sqrt{977968}}{8}+\phi=\phi+\frac{1}{8}\sqrt{977967}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{977967}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{\sqrt{977968}}{8}+\phi=\phi+\frac{\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}\,977967^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{16\sqrt{\pi}}$$

And:

1/8*sqrt(977968)+13+Pi

Input:

$$\frac{1}{8}\sqrt{977968}+13+\pi$$

Result:

$$13+\frac{\sqrt{61123}}{2}+\pi$$

Decimal approximation:

139.7569234180220825655358916372370631081072141121434645778...

139.7569234… result practically equal to the rest mass of Pion meson 139.57 MeV

Property:

$13+\frac{\sqrt{61123}}{2}+\pi$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\left(\sqrt{61123}+26+2\pi\right)$$

$$\frac{1}{2}\left(26+\sqrt{61123}\right)+\pi$$

Series representations:

$$\frac{\sqrt{977968}}{8}+13+\pi=13+\pi+\frac{1}{8}\sqrt{977967}\sum_{k=0}^{\infty}977967^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{\sqrt{977968}}{8}+13+\pi=13+\pi+\frac{1}{8}\sqrt{977967}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{977967}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{\sqrt{977968}}{8}+13+\pi=13+\pi+\frac{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}977967^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{16\sqrt{\pi}}$$

Note that, from the formula concerning the Coefficients of the '5th order' mock theta function ψ_1(q), for n = 161, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(161/15)) / (2*5^(1/4)*sqrt(161))

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{161}{15}}\right)}{2\sqrt[4]{5}\sqrt{161}}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{161/15}\,\pi}\sqrt{\frac{\phi}{161}}}{2\sqrt[4]{5}}$$

Decimal approximation:

989.1139226912270618582583933900009064774141355274909551997...

989.1139226…

Property:

$\frac{e^{\sqrt{161/15}\,\pi}\sqrt{\frac{\phi}{161}}}{2\sqrt[4]{5}}$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{1610}}\, e^{\sqrt{161/15}\,\pi}$$

$$\frac{\sqrt{\frac{1}{322}\left(1+\sqrt{5}\right)}\, e^{\sqrt{161/15}\,\pi}}{2\sqrt[4]{5}}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{161}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{161}} = \frac{\exp\left(\pi\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{161}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}}{2\sqrt[4]{5}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(161-z_0)^k z_0^{-k}}{k!}}$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{161}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{161}} = \left(\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{161}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{161}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \Big/ \left(2\sqrt[4]{5}\,\exp\left(i\pi\left\lfloor\frac{\arg(161-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(161-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{161}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{161}} = \left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{161}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{161}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{161}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(161-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(161-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(2\sqrt[4]{5}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(161-z_0)^k z_0^{-k}}{k!}\right)$$

Now, we have that:

$$\frac{1}{e^{\tilde{\nu}}-1}\left\{1+y\tilde{\nu}\frac{e^{\tilde{\nu}}}{e^{\tilde{\nu}}-1}\left[\frac{\tilde{\nu}}{\tanh(\tilde{\nu}/2)}-4\right]\right\}. \quad (31)$$

(1/(e^(-0.917853+30.2254i)-1))*(((((1+1/60*(-0.917853+30.2254i)*(e^(-0.917853+30.2254i))/(e^(-0.917853+30.2254i)-1))*((-0.917853+30.2254i)/(tanh((-0.917853+30.2254i)/2))-4)))))

Input interpretation:

$$\frac{1}{e^{-0.917853+30.2254\,i}-1}\left(\left(1+\frac{1}{60}\times(-0.917853+30.2254\,i)\times\frac{e^{-0.917853+30.2254\,i}}{e^{-0.917853+30.2254\,i}-1}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}\times(-0.917853+30.2254\,i)\right)}-4\right)\right)$$

tanh(x) is the hyperbolic tangent function

i is the imaginary unit

Result:

32.6574... +
13.5784... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 35.3678$ (radius), $\theta = 22.5767°$ (angle)

35.3678

Alternative representations:

$$\frac{\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)}{e^{-0.917853+30.2254\,i}-1}=$$

$$\frac{\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(-1+e^{-0.917853+30.2254\,i}\right)}\right)\left(-4+\frac{-0.917853+30.2254\,i}{-1+\frac{2}{1+e^{0.917853-30.2254\,i}}}\right)}{-1+e^{-0.917853+30.2254\,i}}$$

$$\frac{\left(1+\frac{(-0.917853+30.2254 i) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)}{e^{-0.917853+30.2254 i}-1}=$$
$$\frac{\left(1+\frac{(-0.917853+30.2254 i) e^{-0.917853+30.2254 i}}{60\left(-1+e^{-0.917853+30.2254 i}\right)}\right)\left(-4+\frac{-0.917853+30.2254 i}{\frac{1}{\coth\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}}\right)}{-1+e^{-0.917853+30.2254 i}}$$

$$\frac{\left(1+\frac{(-0.917853+30.2254 i) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)}{e^{-0.917853+30.2254 i}-1}=$$
$$\frac{\left(-4+\frac{-0.917853+30.2254 i}{\coth\left(\frac{1}{2}(-0.917853+30.2254 i)-\frac{i \pi}{2}\right)}\right)\left(1+\frac{(-0.917853+30.2254 i) e^{-0.917853+30.2254 i}}{60\left(-1+e^{-0.917853+30.2254 i}\right)}\right)}{-1+e^{-0.917853+30.2254 i}}$$

Series representations:

$$\frac{\left(1+\frac{(-0.917853+30.2254 i) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)}{e^{-0.917853+30.2254 i}-1}=$$
$$\frac{\left(1+\frac{e^{-0.917853+30.2254 i}(-0.917853+30.2254 i)}{60\left(-1+e^{-0.917853+30.2254 i}\right)}\right)\left(-4+\frac{-0.917853+30.2254 i}{-1-2 \sum_{k=1}^{\infty}(-1)^k q^{2 k}}\right)}{-1+e^{-0.917853+30.2254 i}}$$
for $q=-0.523265+0.354358 i$

$$\frac{\left(1+\frac{(-0.917853+30.2254 i) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)}{e^{-0.917853+30.2254 i}-1}=$$
$$\frac{\left(1+\frac{0.503757 e^{30.2254 i}(-0.0303669+i)}{-e^{0.917853}+e^{30.2254 i}}\right)\left(-4+\frac{-0.917853+30.2254 i}{-1+2 \sum_{k=0}^{\infty}(-1)^k \mathcal{A}^{(-0.917853+30.2254 i)(1+k)}}\right)}{-1+e^{-0.917853+30.2254 i}}$$

$$\frac{\left(1+\frac{(-0.917853+30.2254 i) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)}{e^{-0.917853+30.2254 i}-1}=$$
$$\frac{\left(1+\frac{0.503757 e^{30.2254 i}(-0.0303669+i)}{-e^{0.917853}+e^{30.2254 i}}\right)\left(-4+\frac{1}{4 \sum_{k=1}^{\infty} \frac{1}{(0.917853-30.2254 i)^2+(1-2 k)^2 \pi^2}}\right)}{-1+e^{-0.917853+30.2254 i}}$$

Integral representation:

$$\frac{\left(1+\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{60\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\,i)\right)}-4\right)}{e^{-0.917853+30.2254\,i}-1}=$$

$$\frac{\left(1+\frac{e^{-0.917853+30.2254\,i}(-0.917853+30.2254\,i)}{60\left(-1+e^{-0.917853+30.2254\,i}\right)}\right)\left(-4+\frac{-0.917853+30.2254\,i}{\int_0^{\frac{1}{2}(-0.917853+30.2254\,i)}\operatorname{sech}^2(t)\,dt}\right)}{-1+e^{-0.917853+30.2254\,i}}$$

From the ratio of two previous results, we obtain:

(977968/35.3678)*1/16

Input interpretation:

$$\frac{977968}{35.3678}\times\frac{1}{16}$$

Result:

1728.210406075582874818337583904003076244493578905105774178...

1728.2104…

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

(((977968/35.3678)^1/2-(29+11+1/golden ratio)

Input interpretation:

$$\sqrt{\frac{977968}{35.3678}}-\left(29+11+\frac{1}{\phi}\right)$$

ϕ is the golden ratio

Result:

125.669...

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

And:

(977968/35.3678)^1/2-21-5-1/golden ratio

Input interpretation:

$$\sqrt{\frac{977968}{35.3678}} - 21 - 5 - \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.669...

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

$$f_{Eb}(\tilde{\nu}) = \frac{C_f \tilde{\nu}^3}{e^{\tilde{\nu}} - 1}\left[1 + \frac{1}{12}\frac{\beta_0 \tau}{1 + \frac{\beta_0 \tau}{4}}\frac{\tilde{\nu} e^{\tilde{\nu}}}{e^{\tilde{\nu}} - 1}\right], \quad f_{E0}(\tilde{\nu}) = \frac{\tilde{\nu}^3}{e^{\tilde{\nu}} - 1}. \qquad (27)$$

(((0.7744*(-0.086848+5.85735i)^3))/(e^(-0.086848+5.85735i)-1))))*((((1+1/12*(1.2/(1+(1.2/4))*(((-0.086848+5.85735i)*e^(-0.086848+5.85735i)))/(((e^(-0.086848+5.85735i)-1)))))))

Input interpretation:

$$\frac{0.7744\,(-0.086848 + 5.85735\,i)^3}{e^{-0.086848+5.85735\,i} - 1}\left(1 + \frac{1}{12} \times \frac{1.2}{1 + \frac{1.2}{4}} \times \frac{(-0.086848 + 5.85735\,i)\,e^{-0.086848+5.85735\,i}}{e^{-0.086848+5.85735\,i} - 1}\right)$$

i is the imaginary unit

Result:

$-0.00244062\ldots - 0.00362929\ldots i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.0043736$ (radius), $\theta = -123.92°$ (angle)

0.0043736

Alternative representation:

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right)\left(0.7744(-0.086848+5.85735 i)^{3}\right)}{e^{-0.086848+5.85735 i}-1} = \left(\left(1+\frac{1.2\left((-0.086848+5.85735 i) \exp^{-0.086848+5.85735 i}(z)\right)}{12\left(1+\frac{1.2}{4}\right)\left(\exp^{-0.086848+5.85735 i}(z)-1\right)}\right)\left(0.7744(-0.086848+5.85735 i)^{3}\right)\right) / \left(\exp^{-0.086848+5.85735 i}(z)-1\right) \text{ for } z=1$$

Series representations:

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735 i}-1\right)}\right)\left(0.7744(-0.086848+5.85735 i)^{3}\right)}{e^{-0.086848+5.85735 i}-1} = \left(70.1175\left(7.23466\times 10^{-6}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.173696} - 0.0014638 i\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.173696} + 0.0987238 i^{2}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.173696} - 2.21943 i^{3}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.173696} - 7.18633\times 10^{-6}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848+5.85735 i} + 0.00145076 i\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848+5.85735 i} - 0.0974048 i^{2}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848+5.85735 i} + 2.16012 i^{3}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848+5.85735 i} + i^{4}\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848+5.85735 i}\right)\right) / \left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.086848} - \left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{5.85735 i}\right)^{2}$$

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735\, i)\, e^{-0.086848+5.85735\, i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735\, i}-1\right)}\right)\left(0.7744\,(-0.086848+5.85735\, i)^{3}\right)}{e^{-0.086848+5.85735\, i}-1}=$$

$$\left(70.1175\left(7.23466\times 10^{-6}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}-0.0014638\, i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}+\right.\right.$$

$$0.0987238\, i^{2}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}-2.21943\, i^{3}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}-$$

$$7.18633\times 10^{-6}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}+$$

$$0.00145076\, i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}-$$

$$0.0974048\, i^{2}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}+2.16012\, i^{3}$$

$$\left.\left.\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}+i^{4}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}\right)\right)\Big/$$

$$\left(-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848}+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{5.85735\, i}\right)^{2}$$

$$\frac{\left(1+\frac{1.2\left((-0.086848+5.85735\, i)\, e^{-0.086848+5.85735\, i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.086848+5.85735\, i}-1\right)}\right)\left(0.7744\,(-0.086848+5.85735\, i)^{3}\right)}{e^{-0.086848+5.85735\, i}-1}=$$

$$\left(70.1175\left(7.23466\times 10^{-6}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}-0.0014638\, i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}+\right.\right.$$

$$0.0987238\, i^{2}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}-2.21943\, i^{3}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.173696}-$$

$$7.18633\times 10^{-6}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}+$$

$$0.00145076\, i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}-$$

$$0.0974048\, i^{2}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}+2.16012\, i^{3}$$

$$\left.\left.\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}+i^{4}\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848+5.85735\, i}\right)\right)\Big/$$

$$\left(\left(\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{0.086848}-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^{2}}{k!}\right)^{5.85735\, i}\right)^{2}\right.$$

or:

(((0.7744*(-0.917853+30.2254i)^3))/(e^(-0.917853+30.2254i)-1))*((1+1/12*(1.2/(1+(1.2/4)))*((((-0.917853+30.2254i)*e^(-0.917853+30.2254i))/(((e^(-0.917853+30.2254i)-1)))))))

Input interpretation:

$$\frac{0.7744\,(-0.917853+30.2254\,i)^3}{e^{-0.917853+30.2254\,i}-1}\left(1+\frac{1}{12}\times\frac{1.2}{1+\frac{1.2}{4}}\times\frac{(-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}}{e^{-0.917853+30.2254\,i}-1}\right)$$

i is the imaginary unit

Result:

$-0.129806\ldots + 0.153480\ldots\,i$

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 0.201012$ (radius), $\theta = 130.223°$ (angle)

0.201012

Alternative representation:

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254\,i)\,e^{-0.917853+30.2254\,i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254\,i}-1\right)}\right)\left(0.7744\,(-0.917853+30.2254\,i)^3\right)}{e^{-0.917853+30.2254\,i}-1} = \left(\left(1+\frac{1.2\left((-0.917853+30.2254\,i)\exp^{-0.917853+30.2254\,i}(z)\right)}{12\left(1+\frac{1.2}{4}\right)\left(\exp^{-0.917853+30.2254\,i}(z)-1\right)}\right)\left(0.7744\,(-0.917853+30.2254\,i)^3\right)\right)\Big/\left(\exp^{-0.917853+30.2254\,i}(z)-1\right) \text{ for } z=1$$

Series representations:

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254 i) e^{-0.917853+30.2254 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(0.7744(-0.917853+30.2254 i)^3\right)}{e^{-0.917853+30.2254 i}-1}=$$
$$\left(49717.6\left(0.0000120441\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.83571}-0.00118986 i\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.83571}+0.0391826 i^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.83571}-0.430102 i^3\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{1.83571}-0.0000111937\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853+30.2254 i}+0.00107785 i\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853+30.2254 i}-0.0336497 i^2\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853+30.2254 i}+0.308634 i^3\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853+30.2254 i}+i^4\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853+30.2254 i}\right)\right)\Big/\left(\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{0.917853}-\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{30.2254 i}\right)^2$$

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254 i) e^{-0.917853+30.2254 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(0.7744(-0.917853+30.2254 i)^3\right)}{e^{-0.917853+30.2254 i}-1}=$$
$$\left(49717.6\left(0.0000120441\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571}-0.00118986 i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571}+0.0391826 i^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571}-0.430102 i^3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571}-0.0000111937\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i}+0.00107785 i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i}-0.0336497 i^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i}+0.308634 i^3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i}+i^4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i}\right)\right)\Big/\left(-\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853}+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{30.2254 i}\right)^2$$

$$\frac{\left(1+\frac{1.2\left((-0.917853+30.2254 i) e^{-0.917853+30.2254 i}\right)}{12\left(1+\frac{1.2}{4}\right)\left(e^{-0.917853+30.2254 i}-1\right)}\right)\left(0.7744(-0.917853+30.2254 i)^3\right)}{e^{-0.917853+30.2254 i}-1} =$$

$$\left(49717.6\left(0.0000120441\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571} - 0.00118986 i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571} + 0.0391826 i^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571} - 0.430102 i^3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{1.83571} - 0.0000111937\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i} + 0.00107785 i\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i} - 0.0336497 i^2\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i} + 0.308634 i^3\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i} + i^4\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853+30.2254 i}\right)\right) \Big/ \left(\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{0.917853} - \left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{30.2254 i}\right)^2$$

(-0.086848+5.85735i)^3))/(e^(-0.086848+5.85735i)-1))))

Input interpretation:

$$\frac{(-0.086848+5.85735 i)^3}{e^{-0.086848+5.85735 i}-1}$$

i is the imaginary unit

Result:

436.979... +
214.054... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 486.59$ (radius), $\theta = 26.0978°$ (angle)

486.59

Alternative representation:

$$\frac{(-0.086848 + 5.85735\, i)^3}{e^{-0.086848+5.85735\, i} - 1} = \frac{(-0.086848 + 5.85735\, i)^3}{\exp^{-0.086848+5.85735\, i}(z) - 1} \text{ for } z = 1$$

Series representations:

$$\frac{(-0.086848 + 5.85735\, i)^3}{e^{-0.086848+5.85735\, i} - 1} = \frac{(-0.086848 + 5.85735\, i)^3}{-1 + \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-0.086848+5.85735\, i}}$$

$$\frac{(-0.086848 + 5.85735\, i)^3}{e^{-0.086848+5.85735\, i} - 1} = \frac{(-0.086848 + 5.85735\, i)^3}{-1 + \left(\sum_{k=0}^{\infty} \frac{(-1+k)^2}{k!}\right)^{-0.086848+5.85735\, i}}$$

$$\frac{(-0.086848 + 5.85735\, i)^3}{e^{-0.086848+5.85735\, i} - 1} = \frac{(-0.086848 + 5.85735\, i)^3}{-1 + \left(\sum_{k=0}^{\infty} \frac{1+2k}{(2k)!}\right)^{-0.086848+5.85735\, i}}$$

or:

(((-0.917853+30.2254i)^3))/(e^(-0.917853+30.2254i)-1)

Input interpretation:

$$\frac{(-0.917853 + 30.2254\, i)^3}{e^{-0.917853+30.2254\, i} - 1}$$

i is the imaginary unit

Result:

9350.66... +
28258.0... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 29764.9$ (radius), $\theta = 71.6904°$ (angle)

29764.9

Alternative representation:

$$\frac{(-0.917853+30.2254\,i)^3}{e^{-0.917853+30.2254\,i}-1}=\frac{(-0.917853+30.2254\,i)^3}{\exp^{-0.917853+30.2254\,i}(z)-1} \text{ for } z=1$$

Series representations:

$$\frac{(-0.917853+30.2254\,i)^3}{e^{-0.917853+30.2254\,i}-1}=\frac{(-0.917853+30.2254\,i)^3}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-0.917853+30.2254\,i}}$$

$$\frac{(-0.917853+30.2254\,i)^3}{e^{-0.917853+30.2254\,i}-1}=\frac{(-0.917853+30.2254\,i)^3}{-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{-0.917853+30.2254\,i}}$$

$$\frac{(-0.917853+30.2254\,i)^3}{e^{-0.917853+30.2254\,i}-1}=\frac{(-0.917853+30.2254\,i)^3}{-1+\left(\sum_{k=0}^{\infty}\frac{1+2k}{(2k)!}\right)^{-0.917853+30.2254\,i}}$$

From the formula

$$\delta_{Th}=y\tilde{\nu}\frac{e^{\tilde{\nu}}}{e^{\tilde{\nu}}-1}\left[\frac{\tilde{\nu}}{\tanh(\tilde{\nu}/2)}-\mathbf{4}\right]. \qquad (28)$$

we obtain:

1/60*(-0.086848+5.85735i)*((e^(-0.086848+5.85735i)))/((e^(-0.086848+5.85735i)-1))*(((((-0.086848+5.85735i))/((tanh(((-0.086848+5.85735i)/2))))-4

Input interpretation:

$$\frac{1}{60}\times(-0.086848+5.85735\,i)\times\frac{e^{-0.086848+5.85735\,i}}{e^{-0.086848+5.85735\,i}-1}\left(\frac{-0.086848+5.85735\,i}{\tanh\left(\frac{1}{2}\times(-0.086848+5.85735\,i)\right)}-4\right)$$

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

i is the imaginary unit

Result:

6.48130... +
1.26918... i

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 6.60439$ (radius), $\theta = 11.0795°$ (angle)

6.60439

Alternative representations:

$$\frac{\left((-0.086848+5.85735 i)\left(\frac{-0.086848+5.85735 i}{\tanh\left(\frac{1}{2}(-0.086848+5.85735 i)\right)}-4\right)\right) e^{-0.086848+5.85735 i}}{60\left(e^{-0.086848+5.85735 i}-1\right)}=\frac{(-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\left(-4+\frac{-0.086848+5.85735 i}{-1+\frac{2}{1+e^{0.086848-5.85735 i}}}\right)}{60\left(-1+e^{-0.086848+5.85735 i}\right)}$$

$$\frac{\left((-0.086848+5.85735 i)\left(\frac{-0.086848+5.85735 i}{\tanh\left(\frac{1}{2}(-0.086848+5.85735 i)\right)}-4\right)\right) e^{-0.086848+5.85735 i}}{60\left(e^{-0.086848+5.85735 i}-1\right)}=\frac{(-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\left(-4+\frac{-0.086848+5.85735 i}{\frac{1}{\coth\left(\frac{1}{2}(-0.086848+5.85735 i)\right)}}\right)}{60\left(-1+e^{-0.086848+5.85735 i}\right)}$$

$$\frac{\left((-0.086848+5.85735 i)\left(\frac{-0.086848+5.85735 i}{\tanh\left(\frac{1}{2}(-0.086848+5.85735 i)\right)}-4\right)\right) e^{-0.086848+5.85735 i}}{60\left(e^{-0.086848+5.85735 i}-1\right)}=\frac{(-0.086848+5.85735 i) e^{-0.086848+5.85735 i}\left(-4+\frac{-0.086848+5.85735 i}{\coth\left(\frac{1}{2}(-0.086848+5.85735 i)-\frac{i\pi}{2}\right)}\right)}{60\left(-1+e^{-0.086848+5.85735 i}\right)}$$

Series representations:

$$\frac{\left((-0.086848+5.85735 i)\left(\frac{-0.086848+5.85735 i}{\tanh\left(\frac{1}{2}(-0.086848+5.85735 i)\right)}-4\right)\right) e^{-0.086848+5.85735 i}}{60\left(e^{-0.086848+5.85735 i}-1\right)}=\frac{e^{-0.086848+5.85735 i}(-0.086848+5.85735 i)\left(-4+\frac{-0.086848+5.85735 i}{-1-2\sum_{k=1}^{\infty}(-1)^k q^{2k}}\right)}{60\left(-1+e^{-0.086848+5.85735 i}\right)}$$

for $q = -0.935883 + 0.202333 i$

$$\frac{\left((-0.086848+5.85735\,i)\left(\frac{-0.086848+5.85735\,i}{\tanh\left(\frac{1}{2}(-0.086848+5.85735\,i)\right)}-4\right)\right)e^{-0.086848+5.85735\,i}}{60\left(e^{-0.086848+5.85735\,i}-1\right)}=$$
$$\left(e^{-0.086848+5.85735\,i}(-0.086848+5.85735\,i)\left(-4+\frac{-0.086848+5.85735\,i}{-1+2\sum_{k=0}^{\infty}(-1)^k\,\mathcal{A}^{(-0.086848+5.85735\,i)(1+k)}}\right)\right)\Big/\left(60\left(-1+e^{-0.086848+5.85735\,i}\right)\right)$$

$$\frac{\left((-0.086848+5.85735\,i)\left(\frac{-0.086848+5.85735\,i}{\tanh\left(\frac{1}{2}(-0.086848+5.85735\,i)\right)}-4\right)\right)e^{-0.086848+5.85735\,i}}{60\left(e^{-0.086848+5.85735\,i}-1\right)}=$$
$$\frac{e^{-0.086848+5.85735\,i}(-0.086848+5.85735\,i)\left(-4+\frac{1}{4\sum_{k=1}^{\infty}\frac{1}{(0.086848-5.85735\,i)^2+(1-2k)^2\pi^2}}\right)}{60\left(-1+e^{-0.086848+5.85735\,i}\right)}$$

Integral representation:

$$\frac{\left((-0.086848+5.85735\,i)\left(\frac{-0.086848+5.85735\,i}{\tanh\left(\frac{1}{2}(-0.086848+5.85735\,i)\right)}-4\right)\right)e^{-0.086848+5.85735\,i}}{60\left(e^{-0.086848+5.85735\,i}-1\right)}=$$
$$\frac{e^{-0.086848+5.85735\,i}(-0.086848+5.85735\,i)\left(-4+\frac{-0.086848+5.85735\,i}{\int_0^{-0.043424+2.92868\,i}\operatorname{sech}^2(t)\,dt}\right)}{60\left(-1+e^{-0.086848+5.85735\,i}\right)}$$

or:

1/60*(-0.917853+30.2254i)*((e^(-0.917853+30.2254i)))/((e^(-0.917853+30.2254i)-1))*(((((-0.917853+30.2254i))/((tanh(((-0.917853+30.2254i)/2))))-4)))

Input interpretation:

$$\frac{1}{60}\times(-0.917853+30.2254\,i)\times\frac{e^{-0.917853+30.2254\,i}}{e^{-0.917853+30.2254\,i}-1}\left(\frac{-0.917853+30.2254\,i}{\tanh\left(\frac{1}{2}\times(-0.917853+30.2254\,i)\right)}-4\right)$$

$\tanh(x)$ is the hyperbolic tangent function *i* is the imaginary unit

Result:

6.30113... +
6.54872... *i*

(using the principal branch of the logarithm for complex exponentiation)

Polar coordinates:

$r = 9.0879$ (radius), $\theta = 46.1038°$ (angle)

9.0879

Alternative representations:

$$\frac{\left((-0.917853 + 30.2254\, i)\left(\frac{-0.917853+30.2254\, i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\, i)\right)} - 4\right)\right) e^{-0.917853+30.2254\, i}}{60\left(e^{-0.917853+30.2254\, i} - 1\right)} = \frac{(-0.917853 + 30.2254\, i)\, e^{-0.917853+30.2254\, i}\left(-4 + \frac{-0.917853+30.2254\, i}{-1+\frac{2}{1+e^{0.917853-30.2254\, i}}}\right)}{60\left(-1 + e^{-0.917853+30.2254\, i}\right)}$$

$$\frac{\left((-0.917853 + 30.2254\, i)\left(\frac{-0.917853+30.2254\, i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\, i)\right)} - 4\right)\right) e^{-0.917853+30.2254\, i}}{60\left(e^{-0.917853+30.2254\, i} - 1\right)} = \frac{(-0.917853 + 30.2254\, i)\, e^{-0.917853+30.2254\, i}\left(-4 + \frac{-0.917853+30.2254\, i}{\frac{1}{\coth\left(\frac{1}{2}(-0.917853+30.2254\, i)\right)}}\right)}{60\left(-1 + e^{-0.917853+30.2254\, i}\right)}$$

$$\frac{\left((-0.917853 + 30.2254\, i)\left(\frac{-0.917853+30.2254\, i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254\, i)\right)} - 4\right)\right) e^{-0.917853+30.2254\, i}}{60\left(e^{-0.917853+30.2254\, i} - 1\right)} = \frac{(-0.917853 + 30.2254\, i)\, e^{-0.917853+30.2254\, i}\left(-4 + \frac{-0.917853+30.2254\, i}{\coth\left(\frac{1}{2}(-0.917853+30.2254\, i) - \frac{i\pi}{2}\right)}\right)}{60\left(-1 + e^{-0.917853+30.2254\, i}\right)}$$

Series representations:

$$\frac{\left((-0.917853+30.2254 i)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)\right) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}=$$

$$\frac{e^{-0.917853+30.2254 i}(-0.917853+30.2254 i)\left(-4+\frac{-0.917853+30.2254 i}{-1-2 \sum_{k=1}^{\infty}(-1)^k q^{2 k}}\right)}{60\left(-1+e^{-0.917853+30.2254 i}\right)}$$

for $q=-0.523265+0.354358 i$

$$\frac{\left((-0.917853+30.2254 i)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)\right) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}=$$

$$\left(e^{-0.917853+30.2254 i}(-0.917853+30.2254 i)\left(-4+\frac{-0.917853+30.2254 i}{-1+2 \sum_{k=0}^{\infty}(-1)^k \mathcal{A}^{(-0.917853+30.2254 i)(1+k)}}\right)\right) / \left(60\left(-1+e^{-0.917853+30.2254 i}\right)\right)$$

$$\frac{\left((-0.917853+30.2254 i)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)\right) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}=$$

$$\frac{e^{-0.917853+30.2254 i}(-0.917853+30.2254 i)\left(-4+\frac{1}{4 \sum_{k=1}^{\infty} \frac{1}{(0.917853-30.2254 i)^2+(1-2 k)^2 \pi^2}}\right)}{60\left(-1+e^{-0.917853+30.2254 i}\right)}$$

Integral representation:

$$\frac{\left((-0.917853+30.2254 i)\left(\frac{-0.917853+30.2254 i}{\tanh\left(\frac{1}{2}(-0.917853+30.2254 i)\right)}-4\right)\right) e^{-0.917853+30.2254 i}}{60\left(e^{-0.917853+30.2254 i}-1\right)}=$$

$$\frac{e^{-0.917853+30.2254 i}(-0.917853+30.2254 i)\left(-4+\frac{-0.917853+30.2254 i}{\int_0^{-0.458927+15.1127 i} \operatorname{sech}^2(t)\, dt}\right)}{60\left(-1+e^{-0.917853+30.2254 i}\right)}$$

From the results of eqs. (26), (27), (31) and (32), we obtain:

a)

34((977968/(29764.9+0.201012)))-1/golden ratio-89-8

Input interpretation:

$$34\times\frac{977968}{29764.9+0.201012}-\frac{1}{\phi}-89-8$$

ϕ is the golden ratio

Result:

1019.49...

1019.49… result practically equal to the rest mass of Phi meson 1019.445

Alternative representations:

$$\frac{34\times977968}{29764.9+0.201012}-\frac{1}{\phi}-89-8=-97+\frac{33250912}{29765.1}-\frac{1}{2\sin(54°)}$$

$$\frac{34\times977968}{29764.9+0.201012}-\frac{1}{\phi}-89-8=-97+\frac{33250912}{29765.1}--\frac{1}{2\cos(216°)}$$

$$\frac{34\times977968}{29764.9+0.201012}-\frac{1}{\phi}-89-8=-97+\frac{33250912}{29765.1}--\frac{1}{2\sin(666°)}$$

b)

(((977968/(29764.9+0.201012+35.3678)))+7.2695e-6

Input interpretation:

$$\frac{977968}{29764.9+0.201012+35.3678}+7.2695\times10^{-6}$$

Result:

32.817209111847982723406827993226672463665401479724882121 42...

32.817209...

And also:

1/(((((977968*1/(29764.9+0.201012+35.3678))))))+1/(((7.2695e-6)))

Input interpretation:

$$\frac{1}{977968\times\frac{1}{29764.9+0.201012+35.3678}}+\frac{1}{7.2695\times10^{-6}}$$

Result:

137561.0731845278015268857136755871865958852765119812887634...

137561.0731845...

From which:

1/10^3* [1/(((((977968*1/(29764.9+0.201012+35.3678))))))+1/(((7.2695e-6)))]+Pi/2+1/golden ratio

Input interpretation:

$$\frac{1}{10^3}\left(\frac{1}{977968\times\frac{1}{29764.9+0.201012+35.3678}}+\frac{1}{7.2695\times10^{-6}}\right)+\frac{\pi}{2}+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.750...

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

1/10^3* [1/(((((977968*1/(29764.9+0.201012+35.3678))))))+1/(((7.2695e-6)))]-13+1/golden ratio

Input interpretation:

$$\frac{1}{10^3}\left(\frac{1}{977968\times\frac{1}{29764.9+0.201012+35.3678}}+\frac{1}{7.2695\times10^{-6}}\right)-13+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.179...

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

1/10^52(((1/29((((977968/(29764.9+0.201012+35.3678)))+7.2695e-6))-Pi/10^2+(47+7)/10^4)))

Input interpretation:

$$\frac{1}{10^{52}}\left(\frac{1}{29}\left(\frac{977\,968}{29\,764.9+0.201012+35.3678}+7.2695\times 10^{-6}\right)-\frac{\pi}{10^2}+\frac{47+7}{10^4}\right)$$

Result:

$1.10561... \times 10^{-52}$

1.10561...*10^{-52} result practically equal to the value of Cosmological Constant 1.1056*10^{-52} m^{-2}

Note that, from the formula concerning the Coefficients of the '5th order' mock theta function $\psi_1(q)$, for n = 372 and adding 144, 13, that are Fibonacci numbers, and π, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(372/15)) / (2*5^(1/4)*sqrt(372))+144+13+Pi

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{372}{15}}\right)}{2\sqrt[4]{5}\sqrt{372}}+144+13+\pi$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{2\sqrt{31/5}\,\pi}\sqrt{\frac{\phi}{93}}}{4\sqrt[4]{5}}+157+\pi$$

Decimal approximation:

137560.9541708438968779934653662573441257102139759735825035...

137560.9541708…

Alternate forms:

$$157+\frac{1}{4}\sqrt{\frac{1}{930}\left(5+\sqrt{5}\right)}\,e^{2\sqrt{31/5}\,\pi}+\pi$$

$$157+\frac{\sqrt{\frac{1}{186}\left(1+\sqrt{5}\right)}\, e^{2\sqrt{31/5}\,\pi}}{4\sqrt[4]{5}}+\pi$$

$$\frac{584040+5^{3/4}\sqrt{186\left(1+\sqrt{5}\right)}\, e^{2\sqrt{31/5}\,\pi}+3720\,\pi}{3720}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{372}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{372}}+144+13+\pi=\left(1570\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(372-z_0)^k z_0^{-k}}{k!}+10\,\pi\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(372-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{124}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(372-z_0)^k z_0^{-k}}{k!}\right)\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{372}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{372}}+144+13+\pi=\left(1570\exp\left(i\,\pi\left\lfloor\frac{\arg(372-x)}{2\,\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(372-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+10\,\pi\exp\left(i\,\pi\left\lfloor\frac{\arg(372-x)}{2\,\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(372-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\,\pi\left\lfloor\frac{\arg(\phi-x)}{2\,\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\,\pi\left\lfloor\frac{\arg\left(\frac{124}{5}-x\right)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{124}{5}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(10\exp\left(i\,\pi\left\lfloor\frac{\arg(372-x)}{2\,\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(372-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{372}{15}}\right)}{2\sqrt[4]{5}\sqrt{372}} + 144 + 13 + \pi =$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(372-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(372-z_0)/(2\pi)\rfloor}\left(1570\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(372-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(372-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (372-z_0)^k z_0^{-k}}{k!} + 10\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(372-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(372-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (372-z_0)^k z_0^{-k}}{k!} + 5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{124}{5}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{124}{5}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{124}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (\phi-z_0)^k z_0^{-k}}{k!}\right)\right) / \left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (372-z_0)^k z_0^{-k}}{k!}\right)$$

From the value of Cosmological Constant, we obtain:

(1/(1.1056e-52))^1/16

Input interpretation:

$$\sqrt[16]{\frac{1}{1.1056\times10^{-52}}}$$

Result:

1767.16...

1767.16... result in the range of the mass of candidate “glueball” $f_0(1710)$ (“glueball” =1760 ± 15 MeV).

We observe that, for n = 182, from the previous formula concerning the Coefficients of the '5th order' mock theta function ψ_1(q), subtracting 16, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(182/15)) / (2*5^(1/4)*sqrt(182))-16

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{182}{15}}\right)}{2 \sqrt[4]{5} \sqrt{182}} - 16$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{182/15}\,\pi} \sqrt{\frac{\phi}{182}}}{2 \sqrt[4]{5}} - 16$$

Decimal approximation:

1767.236154164859098625330490739993663216984415742076667965...

1767.236154… as above

Property:

$$-16 + \frac{e^{\sqrt{182/15}\,\pi} \sqrt{\frac{\phi}{182}}}{2 \sqrt[4]{5}}$$ is a transcendental number

Alternate forms:

$$\frac{1}{4} \sqrt{\frac{1}{455} \left(5 + \sqrt{5}\right)} \, e^{\sqrt{182/15}\,\pi} - 16$$

$$\frac{\sqrt{\frac{1}{91} \left(1 + \sqrt{5}\right)} \, e^{\sqrt{182/15}\,\pi}}{4 \sqrt[4]{5}} - 16$$

$$\frac{5^{3/4} \sqrt{91 \left(1 + \sqrt{5}\right)} \, e^{\sqrt{182/15}\,\pi} - 29120}{1820}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{182}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{182}}-16=\left(-160\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(182-z_0)^k z_0^{-k}}{k!}+5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{182}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(182-z_0)^k z_0^{-k}}{k!}\right)\quad\text{for not }((z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{182}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{182}}-16=\left(-160\exp\left(i\pi\left\lfloor\frac{\arg(182-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(182-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{182}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{182}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(182-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(182-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{182}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{182}} - 16 =$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(182-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(182-z_0)/(2\pi)\rfloor}\left(-160\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(182-z_0)/(2\pi)\rfloor}\right.\right.$$

$$z_0^{1/2\lfloor\arg(182-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(182-z_0)^k z_0^{-k}}{k!} +$$

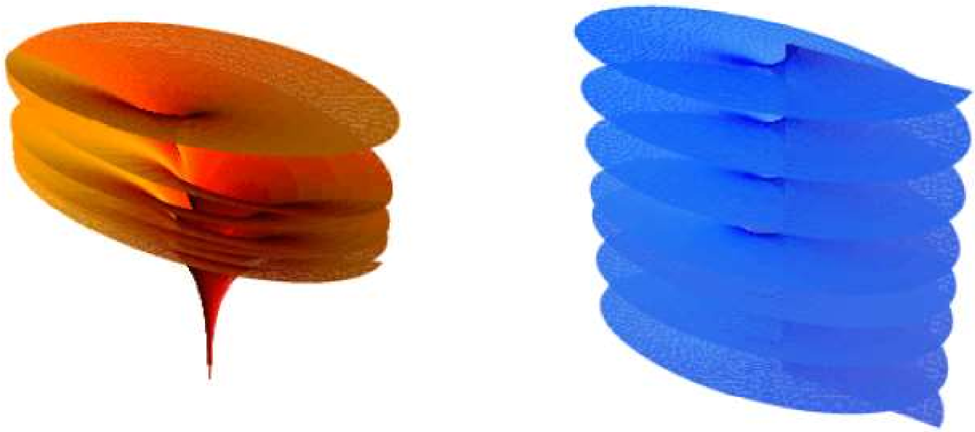
$$5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{182}{15}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{182}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{182}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}$$

$$\left.\left.z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/$$

$$\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(182-z_0)^k z_0^{-k}}{k!}\right)$$

Lambert W-Function -- from Wolfram MathWorld



The real (left) and imaginary (right) parts of the analytic continuation of $W(z)$ over the complex plane are illustrated above (M. Trott, pers. comm.).

$W(x)$ is real for $x \geq -1/e$. It has the special values

$$W\left(-\frac{1}{2}\pi\right) = \frac{1}{2} i \pi \quad (5)$$
$$W\left(-e^{-1}\right) = -1 \quad (6)$$
$$W(0) = 0 \quad (7)$$
$$W(1) = 0.567143 \ldots. \quad (8)$$

$W(1) = 0.567143 \ldots$ (OEIS A030178) is called the omega constant and can be considered a sort of "golden ratio" of exponentials since

$$\exp[-W(1)] = W(1), \quad (9)$$

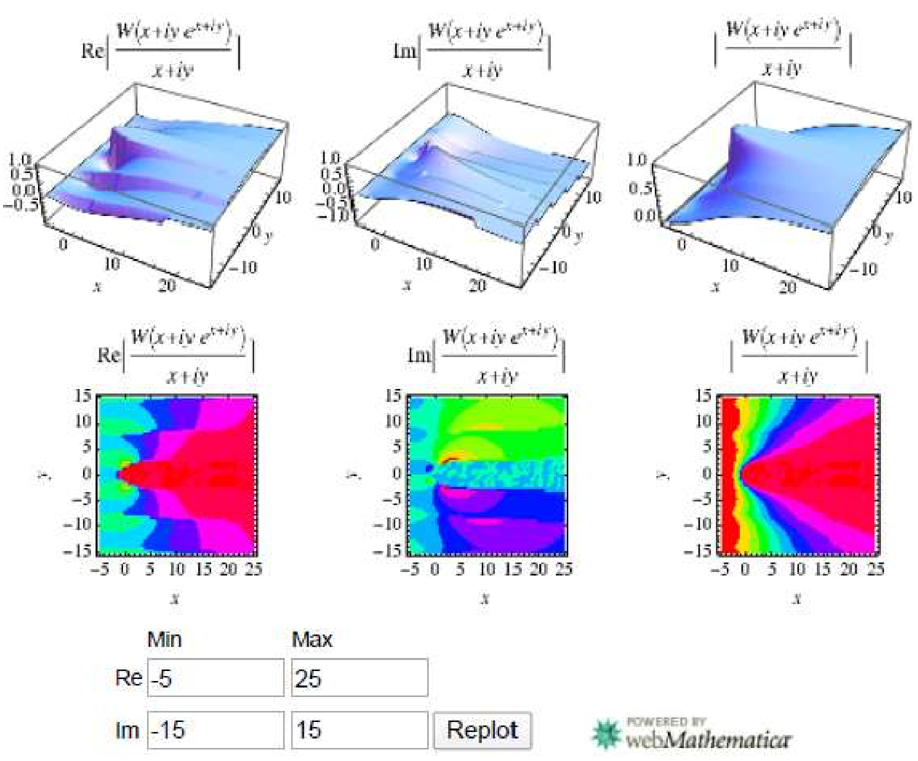
giving

$$\ln\left[\frac{1}{W(1)}\right] = W(1). \quad (10)$$

The Lambert W-function obeys the identity

$$W(x) + W(y) = W\left(x\, y\left(\frac{1}{W(x)} + \frac{1}{W(y)}\right)\right) \quad (11)$$

(pers. comm. from R. Corless to O. Marichev, Sep. 29, 2015).



The function $W(z\,e^z)/z$ has a very complicated structure in the complex plane, but is simply equal to 1 for $\mathbb{R}[z] \geq 1$ and a slightly extended region above and below the real axis.

The Lambert W-function has the series expansion

$$W(x) = \sum_{n=1}^{\infty} \frac{(-1)^{n-1}\, n^{n-2}}{(n-1)!}\, x^n \tag{12}$$

$$= x - x^2 + \tfrac{3}{2}\, x^3 - \tfrac{8}{3}\, x^4 + \tfrac{125}{24}\, x^5 - \tfrac{54}{5}\, x^6 + \tfrac{16\,807}{720}\, x^7 + \ldots. \tag{13}$$

The Lagrange inversion theorem gives the equivalent series expansion

$$W(z) = \sum_{n=1}^{\infty} \frac{(-n)^{n-1}}{n!}\, z^n, \tag{14}$$

where $n!$ is a factorial. However, this series oscillates between ever larger positive and negative values for real $z \gtrsim 0.4$, and so cannot be used for practical numerical computation.

An asymptotic formula which yields reasonably accurate results for $z \gtrsim 3$ is

$$W(z) = \ln z - \ln \ln z + \sum_{k=0}^{\infty} \sum_{m=0}^{\infty} c_{k\,m}\, (\ln \ln z)^{m+1}\, (\ln z)^{-k-m-1} \tag{15}$$

$$= L_1 - L_2 + \frac{L_2}{L_1} + \frac{L_2\,(-2 + L_2)}{2\,L_1^2} + \frac{L_2\,(6 - 9\,L_2 + 2\,L_2^2)}{6\,L_1^3} + \frac{L_2\,(-12 + 36\,L_2 - 22\,L_2^2 + 3\,L_2^3)}{12\,L_1^4} + \frac{L_2\,(60 - 300\,L_2 + 350\,L_2^2 - 125\,L_2^3 + 12\,L_2^4)}{60\,L_1^5} + O\left[\left(\frac{L_2}{L_1}\right)^6\right], \tag{16}$$

where

$$L_1 = \ln z \tag{17}$$
$$L_2 = \ln \ln z \tag{18}$$

(Corless *et al.* 1996), correcting a typographical error in de Bruijn (1981). Another expansion due to Gosper (pers. comm., July 22, 1996) is the double series

$$W(x) = a + \sum_{n=0}^{\infty} \left\{ \sum_{k=0}^{n} \frac{S_1(n, k)}{\left[\ln\left(\frac{x}{a}\right) - a\right]^{k-1} (n-k+1)!} \right\} \left[1 - \frac{\ln\left(\frac{x}{a}\right)}{a}\right]^n, \tag{19}$$

where S_1 is a *nonnegative* Stirling number of the first kind and a is a first approximation which can be used to select between branches. The Lambert W-function is two-valued for $-1/e \le x < 0$. For $W(x) \ge -1$, the function is denoted $W_0(x)$ or simply $W(x)$, and this is called the principal branch. For $W(x) \le -1$, the function is denoted $W_{-1}(x)$. The derivative of W is

$$W'(x) = \frac{1}{[1 + W(x)] \exp[W(x)]} \tag{20}$$
$$= \frac{W(x)}{x[1 + W(x)]} \tag{21}$$

for $x \ne 0$. For the principal branch when $z > 0$,

$$\ln[W(z)] = \ln z - W(z). \tag{22}$$

The nth derivatives of the Lambert W-function are given by

$$W^{(n)}(z) = \frac{W^{n-1}(z)}{z^n [1 + W(z)]^{2n-1}} \sum_{k=1}^{n} a_{kn} W^k(z), \tag{23}$$

where a_{kn} is the number triangle

$$\begin{array}{lllll} 1 \\ -2 & -1 \\ 9 & 8 & 2 \\ -64 & -79 & -36 & -6 \\ 625 & 974 & 622 & 192 & 24 \end{array} \tag{24}$$

(OEIS A042977). This has exponential generating function

$$f(x) = \frac{W\left(e^x\left(x + y(1+x)^2\right)\right) - x}{1 + x} \tag{25}$$
$$= y - \frac{1}{2!}(x+2)y^2 + \frac{1}{3!}\left(2x^2 + 8x + 9\right)y^3 - \frac{1}{4!}\left(6x^3 + 36x^2 + 79x + 64\right)y^4 + \dots. \tag{26}$$

From:

Implications of Symmetry and Pressure in Friedmann Cosmology. I. Formalism

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We have that:

$$\frac{\Delta E_{\rm star}}{E_{\rm star}} = \left(\frac{1}{1+2}\right)^{3\times 10^{-7}} - 1 \simeq -10^{-7}.$$

(1/(1+2))^(3e-7)-1

Input interpretation:

$$\left(\frac{1}{1+2}\right)^{3\times 10^{-7}} - 1$$

Result:

$$\frac{1}{3^{3/10000000}} - 1$$

Decimal approximation:

$-3.2958363228773563771221357076658377159557377944950 12\ldots \times 10^{-7}$

$-3.29583632\ldots*10^{-7}$

Alternate forms:

$$\frac{1}{3}\left(3^{9999997/10000000} - 3\right)$$

$$\frac{1-3^{3/10000000}}{3^{3/10000000}}$$

$$\frac{\Delta E_{\text{cluster}}}{E_{\text{cluster}}} = \left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}} - 1 \simeq -10^{-8}. \qquad (116)$$

(((1+1)/(1+1.001)))^(3e-5)-1

Input interpretation:

$$\left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}} - 1$$

Result:

$-1.499625113708766221445023725294060759470745149850823... \times 10^{-8}$

$-1.49962511...*10^{-8}$

From the sum of the two results, we obtain:

((((1/(1+2))^(3e-7)-1))) + ((((((1+1)/(1+1.001)))^(3e-5)-1)))

Input interpretation:

$$\left(\left(\frac{1}{1+2}\right)^{3\times 10^{-7}} - 1\right) + \left(\left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}} - 1\right)$$

Result:

$-3.44580... \times 10^{-7}$

$-3.4458...*10^{-7}$

-1/[((((1/(1+2))^(3e-7)-1))) + ((((((1+1)/(1+1.001)))^(3e-5)-1)))]

Input interpretation:

$$-\frac{1}{\left(\left(\frac{1}{1+2}\right)^{3\times 10^{-7}} - 1\right) + \left(\left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}} - 1\right)}$$

Result:

$2.90208467790073168742587892519336198124721057203979193... \times 10^{6}$

2902084.6779....

ln^2((((-1/[((((1/(1+2))^(3e-7)-1))) + ((((((1+1)/(1+1.001)))^(3e-5)-1)))]))))+34+1/golden ratio

Input interpretation:

$$\log^2\left(-\frac{1}{\left(\left(\frac{1}{1+2}\right)^{3\times 10^{-7}}-1\right)+\left(\left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}}-1\right)}\right)+34+\frac{1}{\phi}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

256.060...

256.060...

8sqrt((((((ln^2((((-1/[((((1/(1+2))^(3e-7)-1))) + ((((((1+1)/(1+1.001)))^(3e-5)-1)))]))))+34))))))-Pi+1/golden ratio

Input interpretation:

$$8\sqrt{\log^2\left(-\frac{1}{\left(\left(\frac{1}{1+2}\right)^{3\times 10^{-7}}-1\right)+\left(\left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}}-1\right)}\right)+34}-\pi+\frac{1}{\phi}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

125.337...

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

8sqrt((((((ln^2((((-1/[((((1/(1+2))^(3e-7)-1))) + ((((((1+1)/(1+1.001)))^(3e-5)-1)))]))))+55))))))+7-1/golden ratio

Input interpretation:

$$8\sqrt{\log^2\left(-\frac{1}{\left(\left(\frac{1}{1+2}\right)^{3\times 10^{-7}}-1\right)+\left(\left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}}-1\right)}\right)+55}+7-\frac{1}{\phi}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

139.394...

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

Note that, from the formula concerning the Coefficients of the '5th order' mock theta function ψ_1(q), for n = 541.94201, we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(541.94201/15)) / (2*5^(1/4)*sqrt(541.94201))

Input interpretation:

$$\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{541.94201}{15}}\right)}{2 \sqrt[4]{5} \sqrt{541.94201}}$$

ϕ is the golden ratio

Result:

$2.902084190886685301167433243099521468221850399724687\ldots \times 10^6$

2902084.19….

Series representations:

$$\frac{\sqrt{\phi} \exp\left(\pi \sqrt{\frac{541.942}{15}}\right)}{2 \sqrt[4]{5} \sqrt{541.942}} = \frac{\exp\left(\pi \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (36.1295 - z_0)^k z_0^{-k}}{k!}\right) \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (\phi - z_0)^k z_0^{-k}}{k!}}{2 \sqrt[4]{5} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (541.942 - z_0)^k z_0^{-k}}{k!}}$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{541.942}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{541.942}} = \left(\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(36.1295-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(36.1295-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(2\sqrt[4]{5}\,\exp\left(i\pi\left\lfloor\frac{\arg(541.942-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(541.942-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{541.942}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{541.942}} = \left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(36.1295-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(36.1295-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(36.1295-z_0)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(541.942-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(541.942-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Bigg/\left(2\sqrt[4]{5}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(541.942-z_0)^k z_0^{-k}}{k!}\right)$$

We have also that:

((ln(((-1/[(((((1/(1+2))^(3e-7)-1))) + ((((((1+1)/(1+1.001)))^(3e-5)-1)))]))))) +4-1/golden ratio

Input interpretation:

$$\log\left(-\frac{1}{\left(\left(\frac{1}{1+2}\right)^{3\times 10^{-7}}-1\right)+\left(\left(\frac{1+1}{1+1.001}\right)^{3\times 10^{-5}}-1\right)}\right)+4-\frac{1}{\phi}$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Result:

18.2629...

18.2629…. result very near to the black hole entropy 18.2773

$$E_{\rm dS} = 3M_\odot \left(\frac{1+1.5}{1+0.1}\right)^3 = 35.2M_\odot.$$

(3*1.9891e+30)*((1+1.5)/(1+0.1))^3

Input interpretation:

$$(3\times 1.9891\times 10^{30})\left(\frac{1+1.5}{1+0.1}\right)^3$$

Result:

$7.005188767843726521412471825694966190833959429000 7513... \times 10^{31}$

$7.00518876...*10^{31}$

1/Pi*ln((((3*1.9891e+30)*((1+1.5)/(1+0.1))^3)))

Input interpretation:

$$\frac{1}{\pi}\log\left((3\times 1.9891\times 10^{30})\left(\frac{1+1.5}{1+0.1}\right)^3\right)$$

log(x) is the natural logarithm

Result:

23.340641863941135229950253385509793099953108892267323707 14...

23.34064.... result very near to the black hole entropy 23.3621

From:

Dark Energy

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$$v = \sqrt{\frac{2m^2}{\lambda}} = 2^{-1/4} G_F^{-1/2} \sim 246 GeV \ , \qquad (16)$$

$$V(\phi = v) = -\frac{m^4}{2\lambda} = -\frac{1}{8\sqrt{2}} M_F^2 M_H^2 = \mathcal{O}(M_F^4) \ . \qquad (17)$$

$$M_F = G_F^{-1/2} \approx 300 GeV$$

M_H = 125.18 GeV

-1/(8sqrt2)*(300^2*125.18^2)

Input interpretation:

$$-\frac{300^2 \times 125.18^2}{8\sqrt{2}}$$

Result:

$-1.246543444288452392043864945923285622304003346879561 5... \times 10^8$

-124654344.428

For n = 792.384

-sqrt(golden ratio) * exp(Pi*sqrt(792.384/15)) / (2*5^(1/4)*sqrt(792.384)) -sqrt729

Input interpretation:

$$-\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{792.384}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{792.384}} - \sqrt{729}$$

ϕ is the golden ratio

Result:

$-1.246543979974991004237197648986606842204260369377313 8... \times 10^8$

$-1.246543979... * 10^8$

Series representations:

$$-\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{792.384}{15}}\right)}{2\sqrt[4]{5}\sqrt{792.384}}-\sqrt{729}=$$

$$-\left(\left(5^{3/4}\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52.8256-z_0)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}+10\sqrt{z_0}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(729-z_0)^{k_1}(792.384-z_0)^{k_2}z_0^{-k_1-k_2}}{k_1!k_2!}\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(792.384-z_0)^k z_0^{-k}}{k!}\right)\right)$$ for not $((z_0\in\mathbb{R}$ and $-\infty<z_0\leq 0))$

$$-\frac{\sqrt{\phi}\exp\left(\pi\sqrt{\frac{792.384}{15}}\right)}{2\sqrt[4]{5}\sqrt{792.384}}-\sqrt{729}=$$

$$-\left(\left(5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(52.8256-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(52.8256-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+10\exp\left(i\pi\left\lfloor\frac{\arg(729-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg(792.384-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(729-x)^{k_1}(792.384-x)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!k_2!}\right)\Bigg/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(792.384-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(792.384-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$ for $(x\in\mathbb{R}$ and $x<0)$

$$-\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{792.384}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{792.384}}-\sqrt{729}=$$

$$-\left(\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(792.384-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(792.384-z_0)/(2\pi)\rfloor}\right.\right.$$

$$\left(5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(52.8256-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(52.8256-z_0)/(2\pi)\rfloor)}\right.\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(52.8256-z_0)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\right.$$

$$\left.z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}+\right.$$

$$10\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(729-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(792.384-z_0)/(2\pi)\rfloor}$$

$$z_0^{1/2+1/2\lfloor\arg(729-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(792.384-z_0)/(2\pi)\rfloor}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}$$

$$\left.\left.\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(729-z_0)^{k_1}(792.384-z_0)^{k_2} z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)\right)$$

$$\left/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(792.384-z_0)^k z_0^{-k}}{k!}\right)\right)$$

ln(((-((-1)/(8sqrt2))*(300^2*125.18^2))))

Input interpretation:

$$\log\left(-\frac{-(300^2\times 125.18^2)}{8\sqrt{2}}\right)$$

log(x) is the natural logarithm

Result:

18.6411...

18.6411… result very near to the black hole entropy 18.7328

Alternative representations:

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = \log_e\left(\frac{125.18^2 \times 300^2}{8\sqrt{2}}\right)$$

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = \log(a)\log_a\left(\frac{125.18^2 \times 300^2}{8\sqrt{2}}\right)$$

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = -\text{Li}_1\left(1 - \frac{125.18^2 \times 300^2}{8\sqrt{2}}\right)$$

Series representations:

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = \log\left(-1 + \frac{1.76288 \times 10^8}{\sqrt{2}}\right) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(-1 + \frac{1.76288\times 10^8}{\sqrt{2}}\right)^{-k}}{k}$$

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = 2 i \pi \left\lfloor \frac{\arg\left(-x + \frac{1.76288\times 10^8}{\sqrt{2}}\right)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k x^{-k} \left(-x + \frac{1.76288\times 10^8}{\sqrt{2}}\right)^k}{k} \quad \text{for } x < 0$$

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = \left\lfloor \frac{\arg\left(\frac{1.76288\times 10^8}{\sqrt{2}} - z_0\right)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg\left(\frac{1.76288\times 10^8}{\sqrt{2}} - z_0\right)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{1.76288\times 10^8}{\sqrt{2}} - z_0\right)^k z_0^{-k}}{k}$$

Integral representations:

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = \int_1^{\frac{1.76288\times 10^8}{\sqrt{2}}} \frac{1}{t}\, dt$$

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) = \frac{1}{2 i \pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\, \Gamma(1+s) \left(-1 + \frac{1.76288\times 10^8}{\sqrt{2}}\right)^{-s}}{\Gamma(1-s)}\, ds \quad \text{for } -1 < \gamma < 0$$

ln(((-((-1)/(8sqrt2))*(300^2*125.18^2))))-2

Input interpretation:

$$\log\left(-\frac{-(300^2\times 125.18^2)}{8\sqrt{2}}\right)-2$$

log(x) is the natural logarithm

Result:

16.6411...

16.6411... result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representations:

$$\log\left(-\frac{(300^2\times 125.18^2)(-1)}{8\sqrt{2}}\right)-2=-2+\log_e\left(\frac{125.18^2\times 300^2}{8\sqrt{2}}\right)$$

$$\log\left(-\frac{(300^2\times 125.18^2)(-1)}{8\sqrt{2}}\right)-2=-2+\log(a)\log_a\left(\frac{125.18^2\times 300^2}{8\sqrt{2}}\right)$$

$$\log\left(-\frac{(300^2\times 125.18^2)(-1)}{8\sqrt{2}}\right)-2=-2-\text{Li}_1\left(1-\frac{125.18^2\times 300^2}{8\sqrt{2}}\right)$$

Series representations:

$$\log\left(-\frac{(300^2\times 125.18^2)(-1)}{8\sqrt{2}}\right)-2=$$
$$-2+\log\left(-1+\frac{1.76288\times 10^8}{\sqrt{2}}\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1.76288\times 10^8}{\sqrt{2}}\right)^{-k}}{k}$$

$$\log\left(-\frac{(300^2\times 125.18^2)(-1)}{8\sqrt{2}}\right)-2=-2+2\,i\,\pi\left\lfloor\frac{\arg\left(-x+\frac{1.76288\times 10^8}{\sqrt{2}}\right)}{2\,\pi}\right\rfloor+$$
$$\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,x^{-k}\left(-x+\frac{1.76288\times 10^8}{\sqrt{2}}\right)^k}{k}\quad\text{for } x<0$$

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) - 2 = -2 + \left\lfloor \frac{\arg\left(\frac{1.76288\times10^8}{\sqrt{2}} - z_0\right)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg\left(\frac{1.76288\times10^8}{\sqrt{2}} - z_0\right)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{1.76288\times10^8}{\sqrt{2}} - z_0\right)^k z_0^{-k}}{k}$$

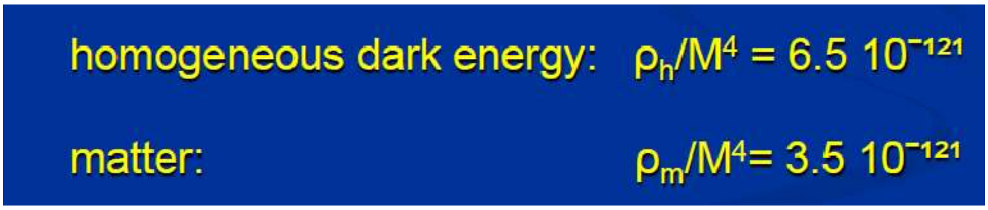
Integral representations:

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) - 2 = -2 + \int_1^{\frac{1.76288\times10^8}{\sqrt{2}}} \frac{1}{t}\,dt$$

$$\log\left(-\frac{(300^2 \times 125.18^2)(-1)}{8\sqrt{2}}\right) - 2 = -2 + \frac{1}{2 i \pi} \int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1 + \frac{1.76288\times10^8}{\sqrt{2}}\right)^{-s}}{\Gamma(1-s)}\,ds \quad \text{for } -1 < \gamma < 0$$

From:

http://www.mpia.de/~maccio/ringberg/Talks/Wetterich.pdf



$6.5 * 10^{-121}$

((-(1/ln(6.5e-121))))^1/512

Input:

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}$$

log(x) is the natural logarithm

Result:

0.98907750629...

0.98907750629... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

And:

((-(1/ln(3.5e-121))))^1/512

Input:

$$\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}$$

log(x) is the natural logarithm

Result:

0.98907318992...

0.98907318992... as above

(e)*1/-(((1*1/ln(6.5e-121))))+8Pi+3*golden ratio

Input:

$$e\left(-\frac{1}{1\times\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}\right)+8\pi+3\phi$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

782.24686...

782.24686… result practically equal to the rest mass of Omega meson 782.65 MeV

Alternative representations:

$$-\frac{e}{\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+8\pi+3\phi=3\phi+8\pi+-\frac{e}{\frac{1}{\log_e\left(\frac{6.5}{10^{121}}\right)}}$$

$$-\frac{e}{\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+8\pi+3\phi=3\phi+8\pi+-\frac{e}{\frac{1}{\log(a)\log_a\left(\frac{6.5}{10^{121}}\right)}}$$

$$-\frac{e}{\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+8\pi+3\phi=\left(3\phi+8\pi+-\frac{e}{-\frac{1}{\text{Li}_1\left(1-\frac{6.5}{10^{121}}\right)}}=3\phi+8\pi+e\,\text{Li}_1(1)\right)$$

Series representations:

$$-\frac{e}{\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+8\pi+3\phi=3\phi+8\pi-2\,e\,i\,\pi\left\lfloor\frac{\arg(6.5\times10^{-121}-x)}{2\pi}\right\rfloor-e\log(x)+e\sum_{k=1}^{\infty}\frac{(-1)^k\,(6.5\times10^{-121}-x)^k\,x^{-k}}{k}\quad\text{for } x<0$$

$$-\frac{e}{\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+8\pi+3\phi=3\phi+8\pi-e\left\lfloor\frac{\arg(6.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)-e\log(z_0)-e\left\lfloor\frac{\arg(6.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log(z_0)+e\sum_{k=1}^{\infty}\frac{(-1)^k\,(6.5\times10^{-121}-z_0)^k\,z_0^{-k}}{k}$$

$$-\frac{e}{\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+8\pi+3\phi=3\phi+8\pi-2\,e\,i\,\pi\left\lfloor-\frac{-\pi+\arg\left(\frac{6.5\times10^{-121}}{z_0}\right)+\arg(z_0)}{2\pi}\right\rfloor-e\log(z_0)+e\sum_{k=1}^{\infty}\frac{(-1)^k\,(6.5\times10^{-121}-z_0)^k\,z_0^{-k}}{k}$$

Integral representation:

$$-\frac{e}{\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+8\pi+3\phi=3\phi+8\pi-e\int_1^{6.5\times10^{-121}}\frac{1}{t}\,dt$$

(((((-(1/ln(6.5e-121))))^1/512 + ((-(1/ln(3.5e-121))))^1/512)))

Input:

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}$$

log(x) is the natural logarithm

Result:

1.9781506962...

1.9781506962…

Alternative representations:

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}=\sqrt[512]{-\frac{1}{\log_e\left(\frac{3.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log_e\left(\frac{6.5}{10^{121}}\right)}}$$

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}=\sqrt[512]{-\frac{1}{\log(a)\log_a\left(\frac{3.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log(a)\log_a\left(\frac{6.5}{10^{121}}\right)}}$$

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}=\left(\sqrt[512]{\frac{-1}{-\text{Li}_1\left(1-\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{\frac{-1}{-\text{Li}_1\left(1-\frac{3.5}{10^{121}}\right)}}=2\sqrt[512]{\frac{1}{\text{Li}_1(1)}}\right)$$

Series representations:

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}=$$

$$\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor \frac{\arg(3.5\times 10^{-121}-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (3.5\times 10^{-121}-x)^k x^{-k}}{k}}} + \sqrt[512]{-\frac{1}{2 i \pi \left\lfloor \frac{\arg(6.5\times 10^{-121}-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (6.5\times 10^{-121}-x)^k x^{-k}}{k}}} \quad \text{for } x < 0$$

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}=$$

$$\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor \frac{\pi-\arg\left(\frac{3.5\times 10^{-121}}{z_0}\right)-\arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (3.5\times 10^{-121}-z_0)^k z_0^{-k}}{k}}} + \sqrt[512]{-\frac{1}{2 i \pi \left\lfloor \frac{\pi-\arg\left(\frac{6.5\times 10^{-121}}{z_0}\right)-\arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (6.5\times 10^{-121}-z_0)^k z_0^{-k}}{k}}}$$

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}=$$

$$\left(-\left(1\middle/\left(\left\lfloor \frac{\arg(3.5\times 10^{-121}-z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(3.5\times 10^{-121}-z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (3.5\times 10^{-121}-z_0)^k z_0^{-k}}{k}\right)\right)\right)^\wedge(1/512) + \left(-\left(1\middle/\left(\left\lfloor \frac{\arg(6.5\times 10^{-121}-z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(6.5\times 10^{-121}-z_0)}{2\pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (6.5\times 10^{-121}-z_0)^k z_0^{-k}}{k}\right)\right)\right)^\wedge(1/512)$$

Integral representation:

$$\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}=\sqrt[512]{-\frac{1}{\int_1^{3.5\times 10^{-121}} \frac{1}{t}\, dt}}+\sqrt[512]{-\frac{1}{\int_1^{6.5\times 10^{-121}} \frac{1}{t}\, dt}}$$

64*[(((((-(1/ln(6.5e-121))))^1/512 + ((-(1/ln(3.5e-121))))^1/512))))]-Pi+golden ratio

Input:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

125.07808589...

125.07808589... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

Alternative representations:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi=$$
$$\phi-\pi+64\left(\sqrt[512]{-\frac{1}{\log_e\left(\frac{3.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log_e\left(\frac{6.5}{10^{121}}\right)}}\right)$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi=$$
$$\phi-\pi+64\left(\sqrt[512]{-\frac{1}{\log(a)\log_a\left(\frac{3.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log(a)\log_a\left(\frac{6.5}{10^{121}}\right)}}\right)$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi=$$
$$\left(\phi-\pi+64\left(\sqrt[512]{\frac{-1}{-\mathrm{Li}_1\left(1-\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{\frac{-1}{-\mathrm{Li}_1\left(1-\frac{3.5}{10^{121}}\right)}}\right)=\phi-\pi+128\sqrt[512]{\frac{1}{\mathrm{Li}_1(1)}}\right)$$

Series representations:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi=$$
$$\phi-\pi+64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\arg(3.5\times10^{-121}-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k (3.5\times10^{-121}-x)^k x^{-k}}{k}}}+$$
$$64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\arg(6.5\times10^{-121}-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k (6.5\times10^{-121}-x)^k x^{-k}}{k}}} \quad \text{for } x<0$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi=\phi-\pi+$$
$$64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\pi-\arg\left(\frac{3.5\times10^{-121}}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k (3.5\times10^{-121}-z_0)^k z_0^{-k}}{k}}}+$$
$$64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\pi-\arg\left(\frac{6.5\times10^{-121}}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k (6.5\times10^{-121}-z_0)^k z_0^{-k}}{k}}}$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi=$$
$$\phi-\pi+64\left(-\left(1\Big/\left(\left\lfloor\frac{\arg(3.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(3.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\right.\right.\right.$$
$$\left.\left.\left.\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(3.5\times10^{-121}-z_0)^k\,z_0^{-k}}{k}\right)\right)\right)\text{^}(1/512)+$$
$$64\left(-\left(1\Big/\left(\left\lfloor\frac{\arg(6.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(6.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\right.\right.\right.$$
$$\left.\left.\left.\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(6.5\times10^{-121}-z_0)^k\,z_0^{-k}}{k}\right)\right)\right)\text{^}(1/512)$$

Integral representation:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)-\pi+\phi=$$
$$\phi-\pi+64\sqrt[512]{-\frac{1}{\int_1^{3.5\times10^{-121}}\frac{1}{t}\,dt}}+64\sqrt[512]{-\frac{1}{\int_1^{6.5\times10^{-121}}\frac{1}{t}\,dt}}$$

64*[(((((-(1/ln(6.5e-121))))^1/512 + ((-(1/ln(3.5e-121))))^1/512)))]+13

Input:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13$$

log(x) is the natural logarithm

Result:

139.60164456...

139.60164456… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternative representations:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13=$$
$$13+64\left(\sqrt[512]{-\frac{1}{\log_e\left(\frac{3.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log_e\left(\frac{6.5}{10^{121}}\right)}}\right)$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13=$$
$$13+64\left(\sqrt[512]{-\frac{1}{\log(a)\log_a\left(\frac{3.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log(a)\log_a\left(\frac{6.5}{10^{121}}\right)}}\right)$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13=$$
$$\left(13+64\left(\sqrt[512]{\frac{-1}{-\text{Li}_1\left(1-\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{\frac{-1}{-\text{Li}_1\left(1-\frac{3.5}{10^{121}}\right)}}\right)=13+128\sqrt[512]{\frac{1}{\text{Li}_1(1)}}\right)$$

Series representations:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13=$$
$$13+64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\arg(3.5\times10^{-121}-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k (3.5\times10^{-121}-x)^k x^{-k}}{k}}}+$$
$$64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\arg(6.5\times10^{-121}-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k (6.5\times10^{-121}-x)^k x^{-k}}{k}}} \quad \text{for } x<0$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13=$$
$$13+64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\pi-\arg\left(\frac{3.5\times10^{-121}}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k (3.5\times10^{-121}-z_0)^k z_0^{-k}}{k}}}+$$
$$64\sqrt[512]{-\frac{1}{2 i \pi \left\lfloor\frac{\pi-\arg\left(\frac{6.5\times10^{-121}}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k (6.5\times10^{-121}-z_0)^k z_0^{-k}}{k}}}$$

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13=$$
$$13+64\left(-\left(1\Big/\left(\left\lfloor\frac{\arg(3.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(3.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k (3.5\times10^{-121}-z_0)^k z_0^{-k}}{k}\right)\right)\right)^{\wedge}(1/512)+$$
$$64\left(-\left(1\Big/\left(\left\lfloor\frac{\arg(6.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\log(z_0)+\left\lfloor\frac{\arg(6.5\times10^{-121}-z_0)}{2\pi}\right\rfloor\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k (6.5\times10^{-121}-z_0)^k z_0^{-k}}{k}\right)\right)\right)^{\wedge}(1/512)$$

Integral representation:

$$64\left(\sqrt[512]{-\frac{1}{\log\left(\frac{6.5}{10^{121}}\right)}}+\sqrt[512]{-\frac{1}{\log\left(\frac{3.5}{10^{121}}\right)}}\right)+13=$$
$$13+64\sqrt[512]{-\frac{1}{\int_1^{3.5\times10^{-121}}\frac{1}{t}\,dt}}+64\sqrt[512]{-\frac{1}{\int_1^{6.5\times10^{-121}}\frac{1}{t}\,dt}}$$

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