On the mathematical connections between some formulas concerning the Shapiro-Virasoro model in String Theory, Ramanujan equations, ϕ, ζ(2) and various parameters of Particle Physics. III

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Abstract

In this paper we describe and analyze the mathematical connections between some formulas concerning the Shapiro-Virasoro model in String Theory, Ramanujan equations, ϕ, ζ(2) and various parameters of Particle Physics.

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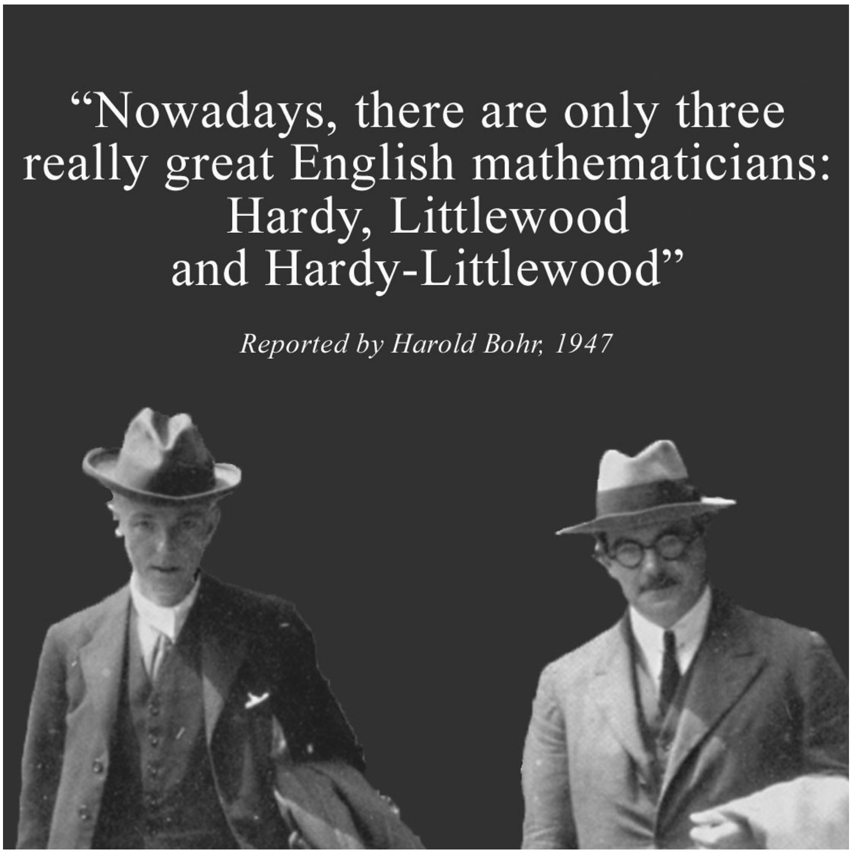

https://www.flickr.com/photos/greshamcollege/26156541272

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

For more information on the data entered for the development of the various equations, see the "Observations" section.

From:

SUPERSTRING THEORY

Volume 2

Loop amplitudes, anomalies and phenomenology

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We have that, from the Closed-String One-Loop Amplitudes, the following equation for to obtain the Cosmological Constant:

$$\begin{aligned}\Lambda &= -\frac{1}{2}\int \frac{d^{26}p}{(2\pi)^{26}}\int d^2\tau \frac{1}{\operatorname{Im}\tau} e^{\pi(4-\alpha' p^2)\operatorname{Im}\tau} \operatorname{tr}\left(z^N \bar{z}^{\tilde{N}}\right) \\ &= -\frac{1}{2}\left(\frac{1}{4\pi^2\alpha'}\right)^{13}\int d^2\tau\,(\operatorname{Im}\tau)^{-14}\, e^{4\pi \operatorname{Im}\tau}\left|f(e^{2i\pi\tau})\right|^{-48}.\end{aligned} \tag{8.2.56}$$

If we took the integration region in (8.2.56) to be the semi-infinite strip consisting of $0 < \operatorname{Im}\tau < \infty, -1/2 \leq \operatorname{Re}\tau \leq 1/2$, then (8.2.56) would correspond rather closely to (8.2.53). In fact, however, this is the wrong choice. The integrand of (8.2.56) is easily seen to be modular invariant by the same reasoning as we used above for the case of the dilaton expectation value. The τ integration region should therefore be restricted to cover a single fundamental region of the modular group shown in fig. 8.21.

Performing the following computations, we obtain:

-1/2(1/(4Pi^2*1/137))^13 integrate(((0.47603)^(-14) e^(4Pi*0.47603)*(e^(2Pi*0.5))^(-48)))x

Input:

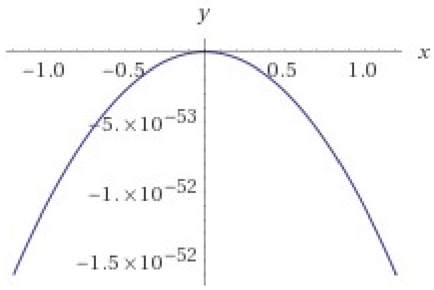
$$-\frac{1}{2}\left(\frac{1}{4\pi^2\times\frac{1}{137}}\right)^{13}\int\frac{e^{4\pi\times 0.47603}}{0.47603^{14}\,(e^{2\pi\times 0.5})^{48}}\,x\,dx$$

Result:

$-1.10566\times10^{-52}\,x^2$

-1.10566*10^-52 that is the value of the Cosmological Constant (with negative sign)

Plot:



(x from -1.2 to 1.2)

Alternate form assuming x is real:

$0-1.10566\times10^{-52}\,x^2$

Indefinite integral assuming all variables are real:

$-3.68553\times10^{-53}\,x^3$ + constant

With regard the open-string loops, we have the following formulas:

$$\psi^T(\rho,w)=-\frac{\pi}{\ln q}q^{-1/4}\prod_1^\infty\frac{1-2q^{2n-1}\cos 2\pi\nu+q^{4n-2}}{(1-q^{2n})^2},\qquad(8.A.32)$$

and

$$\psi^N(\rho,w)=-\frac{4\pi}{\ln q}\sin\frac{\pi\nu}{2}\prod_1^\infty\frac{1-2(-\sqrt{q})^n\cos\pi\nu+q^n}{(1-(-\sqrt{q})^n)^2}.\qquad(8.A.33)$$

q and $z=\exp\{2i\pi\nu\}$

Where $i\nu>0$; $i\nu=1$; q = exp(2Pi) = 535.49165 $\nu=-i$

We obtain (from 8.A.32) for n = 1 to 8:

$$\psi^T(\rho, w) = -\frac{\pi}{\ln q} q^{-1/4} \prod_1^{\infty} \frac{1 - 2q^{2n-1}\cos 2\pi\nu + q^{4n-2}}{(1-q^{2n})^2},$$

(-Pi*(535.49165)^(-0.25)) / (ln(535.49165)) * product (((1-2*535.49165^(2n-1) cos(2Pi*-i)+535.49165^(4n-2)))) / ((((1-535.49165^(2n))^2))), n = 1..8)))

Input interpretation:

$$-\frac{\pi}{535.49165^{0.25}\log(535.49165)} \prod_{n=1}^{8} \frac{1-\left(2\times 535.49165^{2n-1}\right)\cos(2\pi\times(-1)i)+535.49165^{4n-2}}{\left(1-535.49165^{2n}\right)^2}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

2.34585×10^{-53}

$2.34585*10^{-53}$

From which:

((((π log(6) - Catalan) (-Pi*(535.49165)^(-0.25)) / (ln(535.49165)) * product (((1-2*535.49165^(2n-1) cos(2Pi*-i)+535.49165^(4n-2)))) / ((((1-535.49165^(2n))^2))), n = 1..8)))

Input interpretation:

$$(\pi\log(6) - C)\left(-\frac{\pi}{535.49165^{0.25}\log(535.49165)}\right) \prod_{n=1}^{8} \frac{1-\left(2\times 535.49165^{2n-1}\right)\cos(2\pi\times(-1)i)+535.49165^{4n-2}}{\left(1-535.49165^{2n}\right)^2}$$

log(x) is the natural logarithm

C is Catalan's constant

i is the imaginary unit

Result:

1.1056×10^{-52}

$1.1056*10^{-52}$ that is equal to the value of the Cosmological Constant

And from (8.A.33), we obtain:

$$\psi^N(\rho, w) = -\frac{4\pi}{\ln q} \sin \frac{\pi\nu}{2} \prod_1^{\infty} \frac{1 - 2(-\sqrt{q})^n \cos \pi\nu + q^n}{\left(1 - (-\sqrt{q})^n\right)^2}.$$

For ν = - *i*

(-4Pi)/(ln(535.49165)) sin((–i*Pi)/2) product ((((1-2(-sqrt(535.49165)^n) cos(-i*Pi)+535.49165^n))) / ((((1-(-sqrt(535.49165)^n))^2))), n = 1..8

Input interpretation:

$$\frac{-4\pi}{\log(535.49165)} \sin\left(-\frac{i\pi}{2}\right) \prod_{n=1}^{8} \frac{1 - \left(2\left(-\sqrt{535.49165}^{\,n}\right)\right)\cos(-i\pi) + 535.49165^n}{\left(1 - -\sqrt{535.49165}^{\,n}\right)^2}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

8.82388 i

8.82388 i

From which:

7*((((-4Pi)/(ln(535.49165)) sin((–i*Pi)/2) product (((1-2(-sqrt(535.49165)^n) cos(-i*Pi)+535.49165^n))) / ((((1-(-sqrt(535.49165)^n))^2))), n = 1..8)))+(sqrt5)i

where 7 is a Lucas number and the number 5 in the radical, is a Fibonacci number

Input interpretation:

$$7\left(\frac{-4\pi}{\log(535.49165)} \sin\left(-\frac{i\pi}{2}\right) \prod_{n=1}^{8} \frac{1 - \left(2\left(-\sqrt{535.49165}^{\,n}\right)\right)\cos(-i\pi) + 535.49165^n}{\left(1 - -\sqrt{535.49165}^{\,n}\right)^2}\right) + \sqrt{5}\, i$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

64.0032 i

64.0032 i

Multiplying the previous expression by 7 * 2 (where 2 and 7 are Lucas numbers), we obtain:

7*2*((((-4Pi)/(ln(535.49165)) sin((–i*Pi)/2) product (((1-2(-sqrt(535.49165)^n) cos(-i*Pi)+535.49165^n))) / ((((1-(-sqrt(535.49165)^n))^2))), n = 1..8)))+(sqrt5)i

Input interpretation:

$$7\times 2\left(\frac{-4\pi}{\log(535.49165)}\sin\left(-\frac{i\pi}{2}\right)\prod_{n=1}^{8}\frac{1-\left(2\left(-\sqrt{535.49165}^{n}\right)\right)\cos(-i\pi)+535.49165^{n}}{\left(1--\sqrt{535.49165}^{n}\right)^{2}}\right)+\sqrt{5}\,i$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

125.77 i

125.77 i result very near to the Higgs boson mass 125.18 GeV

And:

7*2*((((-4Pi)/(ln(535.49165)) sin((–i*Pi)/2) product (((1-2(-sqrt(535.49165)^n) cos(-i*Pi)+535.49165^n))) / ((((1-(-sqrt(535.49165)^n))^2))), n = 1..8)))+(sqrt5)i +(11+3)i

where 11 and 3 are Lucas numbers

Input interpretation:

$$7\times 2\left(\frac{-4\pi}{\log(535.49165)}\sin\left(-\frac{i\pi}{2}\right)\prod_{n=1}^{8}\frac{1-\left(2\left(-\sqrt{535.49165}^{n}\right)\right)\cos(-i\pi)+535.49165^{n}}{\left(1--\sqrt{535.49165}^{n}\right)^{2}}\right)+\sqrt{5}\,i+(11+3)\,i$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

139.77 i

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

27*[7*((((-4Pi)/(ln(535.49165)) sin((–i*Pi)/2) product (((1-2(-sqrt(535.49165)^n) cos(-i*Pi)+535.49165^n))) / ((((1-(-sqrt(535.49165)^n))^2))), n = 1..8)))+(sqrt5)i]

Input interpretation:

$$27\left(7\left(\frac{-4\pi}{\log(535.49165)}\sin\left(-\frac{i\pi}{2}\right)\prod_{n=1}^{8}\frac{1-\left(2\left(-\sqrt{535.49165}^{\,n}\right)\right)\cos(-i\pi)+535.49165^n}{\left(1--\sqrt{535.49165}^{\,n}\right)^2}\right)+\sqrt{5}\,i\right)$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

Result:

1728.09 i

1728.09i

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

With regard 27 (From Wikipedia):

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

(((27*[7*((((-4Pi)/(ln(535.49165)) sin((–i*Pi)/2) product (((1-2(-sqrt(535.49165)^n) cos(-i*Pi)+535.49165^n))) / ((((1-(-sqrt(535.49165)^n))^2))), n = 1..8)))+(sqrt5)i])))^1/15

Input interpretation:

$$\left(27\left(7\left(\frac{-4\pi}{\log(535.49165)}\sin\left(-\frac{i\pi}{2}\right)\prod_{n=1}^{8}\frac{1-\left(2\left(-\sqrt{535.49165}^{\,n}\right)\right)\cos(-i\pi)+535.49165^{n}}{\left(1--\sqrt{535.49165}^{\,n}\right)^{2}}\right)+\sqrt{5}\,i\right)\right)^{\wedge}(1/15)$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

1.63475 + 0.171819 i

Input interpretation:

1.63475 + 0.171819 i

i is the imaginary unit

Result:

1.63475... +
0.171819... i

Polar coordinates:

$r = 1.64375$ (radius), $\theta = 5.99999°$ (angle)

$1.64375 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Now, we have that:

The Neumann coefficients can be evaluated from (11.4.25) by expanding the integrand in a Taylor expansion to identify the residues of the poles at $z_r = x_r$ and $z_s = x_s$.

Next we define

$$N^r_m \mathcal{P} = \sum_s N^{rs}_{m0} \mathbf{p}_s \tag{11.4.34}$$

where

$$\mathcal{P} = \alpha_1 \mathbf{p}_2 - \alpha_2 \mathbf{p}_1. \tag{11.4.35}$$

Although it is not manifest, $\mathcal{P}$ is symmetric un cyclic permutations of the external states when the conservation conditions $\sum_r \alpha_r$ and $\sum_r \mathbf{p}_r$

are taken into account. Furthermore,

$$\sum_{r=1}^{3} \frac{\mathbf{p}_r^2}{\alpha_r} = -\frac{\mathcal{P}^2}{\hat{\alpha}}, \tag{11.4.36}$$

where

$$\hat{\alpha} = \alpha_1 \alpha_2 \alpha_3. \tag{11.4.37}$$

$$\begin{aligned} \frac{\mathcal{P}^i}{\pi\alpha_1} \sum_{n=1}^{\infty} n e^{in\sigma/\alpha_1} \overline{N}^1_n &= \frac{\mathcal{P}^i}{\pi\alpha_1} \sum_{n=1}^{\infty} \frac{(-1)^n}{n!} e^{in\sigma/\alpha_1} \frac{\Gamma(-n\alpha_2/\alpha_1)}{\Gamma(1-n-n\alpha_2/\alpha_1)} e^{n\tau_0} \\ &\sim -\frac{2\mathcal{P}^i}{(2\pi)^{3/2}\alpha_1\sqrt{-\alpha_2\alpha_3}} \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} e^{in\epsilon/\alpha_1} \\ &\sim \frac{\eta^\star \mathcal{P}^i}{\pi(-2\hat{\alpha})^{1/2}} \epsilon^{-1/2}, \end{aligned} \tag{11.7.89}$$

where

$$\eta = e^{\pi i/4} \tag{11.7.90}$$

$\hat{\alpha} = \alpha_1 \alpha_2 \alpha_3$ (4, 8, 4)

$$\mathcal{P} = \alpha_1 \mathrm{p}_2 - \alpha_2 \mathrm{p}_1. \qquad (11.4.35)$$

$p_1 = p_2 = 4$; $\mathcal{P} = 16 - 32 = -16$; $\eta = (1 + i)/\mathrm{sqrt}(2)$; $\epsilon = 1/4$; $\hat{\alpha} = 128$

From:

$$\frac{\eta^{\star} \mathcal{P}^{i}}{\pi(-2\hat{\alpha})^{1/2}} \epsilon^{-1/2}$$

we obtain:

(((-16 * (1 + i)/sqrt(2) * (1/4)^(-0.5)))) / (((Pi(-2*128)^0.5)))

From which, changing the sign:

(((16 * (1 + i)/sqrt(2) * (1/4)^(0.5)))) / (((Pi(2*128)^0.5)))

Input:

$$\frac{16 \times \frac{1+i}{\sqrt{2}} \sqrt{\frac{1}{4}}}{\sqrt{\pi(2 \times 128)}}$$

$\pi(x)$ is the number of primes less than or equal to x

i is the imaginary unit

Exact result:

$$\frac{\frac{4}{3} + \frac{4i}{3}}{\sqrt{3}}$$

Decimal approximation:

0.76980035891950101934553170733594327419680233502683583469... +
0.76980035891950101934553170733594327419680233502683583469... i

Polar coordinates:

$r \approx 1.08866$ (radius), $\theta = 45°$ (angle)

1.08866

Alternate form:

$$\frac{4}{3}\sqrt[4]{-1}\sqrt{\frac{2}{3}}$$

Alternative representations:

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times128)}\sqrt{2}} = \frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\sum_{i=1}^{n}1}\sqrt{2}} \text{ for } p_n \leq 256 < p_{1+n}$$

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times128)}\sqrt{2}} = \frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\sum_{k=1}^{\lfloor 2\times128\rfloor}\theta(2\times128-p_k)}\sqrt{2}} \text{ for } p_k \in \mathbb{P}$$

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times128)}\sqrt{2}} = \frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{\sum_{k=2}^{\lfloor 256\rfloor}\left\lfloor\frac{\phi(k)}{-1+k}\right\rfloor}\sqrt{2}}$$

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times128)}\sqrt{2}} = \frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{-\sum_{k=1}^{\lfloor\log_2(256)\rfloor}\mu(k)\sum_{n=2}^{\left\lfloor\sqrt[k]{256}\right\rfloor}\left\lfloor\frac{\sqrt[k]{256}}{n}\right\rfloor\mu(n)\,\Omega(n)}\sqrt{2}}$$

Series representations:

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times128)}\sqrt{2}} =$$

$$\frac{8(1+i)}{\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(2-x\$MFID)}{2\pi}\right\rfloor\right)\sqrt{x\$MFID}\sqrt{\sum_{i=1}^{n}1}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x\$MFID)^k\,x\$MFID^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

for ($x\$MFID \in \mathbb{R}$ and $x\$MFID < 0$ and $p_n \leq 256 < p_{1+n}$)

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times 128)}\sqrt{2}} = (8(1+i)) \Big/ \left(\exp\left(\pi\mathcal{A}\left\lfloor\frac{\arg(2-\text{x\$MFID})}{2\pi}\right\rfloor\right)\sqrt{\text{x\$MFID}}\left(\sum_{k=0}^{\infty}\frac{(-1)^k (2-\text{x\$MFID})^k\, \text{x\$MFID}^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sqrt{\sum_{k=1}^{\lfloor 256\rfloor}\theta(256-p_k)}\right)$$

for (x\$MFID ∈ ℝ and x\$MFID < 0 and p_k ∈ ℙ)

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times 128)}\sqrt{2}} = \frac{8(1+i)}{\exp\left(\pi\mathcal{A}\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sqrt{\sum_{k=1}^{256}\left(\begin{cases}1 & k\in\mathbb{P}\\ 0 & \text{otherwise}\end{cases}\right)}\sum_{k=0}^{\infty}\frac{(-1)^k (2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

for (x ∈ ℝ and x < 0)

Integral representation:

$$\frac{16\left((1+i)\sqrt{\frac{1}{4}}\right)}{\sqrt{\pi(2\times 128)}\sqrt{2}} = \frac{8(1+i)}{\sqrt{255-\frac{1}{2\pi}\int_0^{2\pi}\left(\sum_{m=1}^{256}\cos\left(t\prod_{k=1}^{-1+m}\prod_{j=1}^{-1+m}(j\,k-m)\right)\right)dt}\;\sqrt{2}}$$

From which:

1.08866-[1/((((((((16*(1+i)/sqrt(2)*(1/4)^(0.5))))/(((Pi(2*128)^0.5)))))))^5]

Input interpretation:

$$1.08866-\frac{1}{\left(\frac{16\times\frac{1+i}{\sqrt{2}}\sqrt{\frac{1}{4}}}{\sqrt{\pi(2\times 128)}}\right)^5}$$

$\pi(x)$ is the number of primes less than or equal to x

i is the imaginary unit

Result:

1.55106... −
0.462402... i

Polar coordinates:

$r = 1.61852$ (radius), $\theta = -16.6003°$ (angle)

1.61852 result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternative representations:

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times128)}}\right)^5} = 1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\sum_{i=1}^{n}1}}\right)^5} \text{ for } p_n \leq 256 < p_{1+n}$$

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times128)}}\right)^5} = 1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\sum_{k=1}^{\lfloor 2\times128\rfloor}\theta(2\times128-p_k)}}\right)^5} \text{ for } p_k \in \mathbb{P}$$

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times128)}}\right)^5} = 1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{\sum_{k=2}^{\lfloor 256\rfloor}\left\lfloor\frac{\phi(k)}{-1+k}\right\rfloor}\sqrt{2}}\right)^5}$$

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times128)}}\right)^5} =$$

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{-\sum_{k=1}^{\lfloor\log_2(256)\rfloor}\mu(k)\sum_{n=2}^{\left\lfloor\sqrt[k]{256}\right\rfloor}\left\lfloor\frac{\sqrt[k]{256}}{n}\right\rfloor\mu(n)\,\Omega(n)}\sqrt{2}}\right)^5}$$

Series representations:

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times 128)}}\right)^5} = \frac{1}{(1+i)^5}\, 1.08866 \left(1 + 5i + 10i^2 + 10i^3 + 5i^4 + i^5 - 0.0000280322 \exp^5\left(\pi \mathcal{A} \left\lfloor \frac{\arg(2 - \text{x\$MFID})}{2\pi} \right\rfloor\right) \sqrt{\text{x\$MFID}}^5 \left(\sum_{i=1}^{n} 1\right)^{5/2} \left(\sum_{k=0}^{\infty} \frac{(-1)^k (2 - \text{x\$MFID})^k \,\text{x\$MFID}^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)$$

for (x$MFID ∈ ℝ and x$MFID < 0 and $p_n \le 256 < p_{1+n}$)

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times 128)}}\right)^5} = \frac{1}{(1+i)^5}\, 1.08866 \left(1 + 5i + 10i^2 + 10i^3 + 5i^4 + i^5 - 0.0000280322 \exp^5\left(\pi \mathcal{A} \left\lfloor \frac{\arg(2 - \text{x\$MFID})}{2\pi} \right\rfloor\right) \sqrt{\text{x\$MFID}}^5 \left(\sum_{k=0}^{\infty} \frac{(-1)^k (2 - \text{x\$MFID})^k \,\text{x\$MFID}^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^5 \left(\sum_{k=1}^{\lfloor 256 \rfloor} \theta(256 - p_k)\right)^{5/2}\right)$$

for (x$MFID ∈ ℝ and x$MFID < 0 and $p_k \in \mathbb{P}$)

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times 128)}}\right)^5} = \frac{1}{(1+i)^5}\, 1.08866 \left(1 + 5i + 10i^2 + 10i^3 + 5i^4 + i^5 - 0.0000280322 \exp^5\left(\pi \mathcal{A} \left\lfloor \frac{\arg(2 - x)}{2\pi} \right\rfloor\right) \sqrt{x}^5 \left(\sum_{k=1}^{256} \left(\begin{cases} 1 & k \in \mathbb{P} \\ 0 & \text{otherwise} \end{cases}\right)\right)^{5/2} \left(\sum_{k=0}^{\infty} \frac{(-1)^k (2 - x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)$$

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

Integral representation:

$$1.08866 - \frac{1}{\left(\frac{16(1+i)\sqrt{\frac{1}{4}}}{\sqrt{2}\sqrt{\pi(2\times 128)}}\right)^5} =$$

$$1.08866 - \frac{\left(255 - \frac{1}{2\pi}\int_0^{2\pi}\left(\sum_{m=1}^{256}\cos\left(t\prod_{k=1}^{-1+m}\prod_{j=1}^{-1+m}(j\,k-m)\right)\right)dt\right)^{5/2}\sqrt{2}^5}{32768\,(1+i)^5}$$

From

SUPERSTRING THEORY
John H. SCHWARZ
California Institute of Technology, Pasadena, California 91125, US.A.- Received 25 May 1982

We know that (**String Theory Volume 2. Superstring Theory and Beyond** - *Joseph Polchinski*, University of California, Santa Barbara - October 1998):

Einstein metric the metric whose leading low energy action is the *Hilbert action*

$$\frac{1}{2\kappa^2}\int d^d x\,(-G)^{1/2}R\ ;$$

this is independent of other fields. Here κ is the gravitational coupling, related to the Planck length by $\kappa = (8\pi)^{1/2}L_P$. This metric is related to other metrics such as the *sigma-model metric* by a field-dependent Weyl transformation. The existence of distinct metrics would appear to violate the equivalence principle, but when the dilaton and other moduli are massive the distinction disappears.

We consider:

κ = (8π)^(1/2) * (1.616255e-35) = 8.102701×10^{-35}

From:

$$A(1,2,3,4) = \kappa^2 \frac{\Gamma(-1 - s/8)\,\Gamma(-1 - t/8)\,\Gamma(-1 - u/8)}{\Gamma(2 + s/8)\,\Gamma(2 + t/8)\,\Gamma(2 + u/8)}. \qquad (4.47)$$

The $\frac{1}{8}$'s occur because the closed-string Regge slope has been set equal to 1/4, half the open-string slope. (In these units $s + t + u = -32$.)

$$A(1,2,3,4) = \kappa^2 \frac{\Gamma(-1 - s/8)\,\Gamma(-1 - t/8)\,\Gamma(-1 - u/8)}{\Gamma(2 + s/8)\,\Gamma(2 + t/8)\,\Gamma(2 + u/8)}.$$

For s = -8; t = - 8; u = -16

(8.102701e-35)^2 * (((gamma (-1-1) gamma (-1-1) gamma (-1-2)))) / (((gamma (3) gamma (3) gamma (4))))

and changing the sign:

-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4))))

Input interpretation:

$$-(8.102701\times 10^{-35})^2 \left(-\frac{\Gamma(2)\,\Gamma(2)\,\Gamma(3)}{\Gamma(3)\,\Gamma(3)\,\Gamma(4)}\right)$$

$\Gamma(x)$ is the gamma function

Result:

5.471146957950083333333333333333333333333333333333333... × 10^{-70}

5.4711469579…*10^{-70}

From which:

sqrt(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4))))))))

Input interpretation:

$$\sqrt{-(8.102701\times 10^{-35})^2 \left(-\frac{\Gamma(2)\,\Gamma(2)\,\Gamma(3)}{\Gamma(3)\,\Gamma(3)\,\Gamma(4)}\right)}$$

$\Gamma(x)$ is the gamma function

Result:

$2.339048... \times 10^{-35}$

2.339048…*10^{-35}

and:

colog(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4))))))))

Input interpretation:

$$-\log\left(-(8.102701\times 10^{-35})^2\left(-\frac{\Gamma(2)\,\Gamma(2)\,\Gamma(3)}{\Gamma(3)\,\Gamma(3)\,\Gamma(4)}\right)\right)$$

$\Gamma(x)$ is the gamma function

$\log(x)$ is the natural logarithm

Result:

159.481468...

159.481468…

Performing the 10^{th} root, we obtain:

(((colog(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4))))))))))^1/10

Input interpretation:

$$\sqrt[10]{-\log\left(-(8.102701\times 10^{-35})^2\left(-\frac{\Gamma(2)\,\Gamma(2)\,\Gamma(3)}{\Gamma(3)\,\Gamma(3)\,\Gamma(4)}\right)\right)}$$

$\Gamma(x)$ is the gamma function

$\log(x)$ is the natural logarithm

Result:

1.660622900...

1.6606229…. result very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

and inverting and performing the 128th root:

1/(((colog(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4))))))))))^1/128

Input interpretation:

$$\frac{1}{\sqrt[128]{-\log\left(-(8.102701\times 10^{-35})^2\left(-\frac{\Gamma(2)\,\Gamma(2)\,\Gamma(3)}{\Gamma(3)\,\Gamma(3)\,\Gamma(4)}\right)\right)}}$$

$\Gamma(x)$ is the gamma function

$\log(x)$ is the natural logarithm

Result:

0.96115034544...

0.96115034544…. result very near to the spectral index n_s , to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

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

From:

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

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

and:

log base 0.96115034544 (((1/(((colog(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4))))))))))))

Input interpretation:

$$\log_{0.96115034544}\left(-\frac{1}{\log\left(-(8.102701\times 10^{-35})^2\left(-\frac{\Gamma(2)\Gamma(2)\Gamma(3)}{\Gamma(3)\Gamma(3)\Gamma(4)}\right)\right)}\right)$$

$\Gamma(x)$ is the gamma function

$\log(x)$ is the natural logarithm

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

Result:

128.000000...

128

From which:

log base 0.96115034544 (((1/(((colog(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4)))))))))))))-Pi+1/golden ratio

Input interpretation:

$$\log_{0.96115034544}\left(-\frac{1}{\log\left(-(8.102701\times 10^{-35})^2\left(-\frac{\Gamma(2)\Gamma(2)\Gamma(3)}{\Gamma(3)\Gamma(3)\Gamma(4)}\right)\right)}\right)-\pi+\frac{1}{\phi}$$

$\Gamma(x)$ is the gamma function

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

125.476441...

125.476441… result very near to the Higgs boson mass 125.18 GeV log base 0.96115034544 (((1/(((colog(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4))))))))))))+11+1/golden ratio

where 11 is a Lucas number

Input interpretation:

$$\log_{0.96115034544}\left(-\frac{1}{\log\left(-(8.102701\times 10^{-35})^2\left(-\frac{\Gamma(2)\Gamma(2)\Gamma(3)}{\Gamma(3)\Gamma(3)\Gamma(4)}\right)\right)}\right)+11+\frac{1}{\phi}$$

$\Gamma(x)$ is the gamma function

$\log(x)$ is the natural logarithm

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

ϕ is the golden ratio

Result:

139.618034...

139.618034... result practically equal to the rest mass of Pion meson 139.57 MeV

27*1/2*(((log base 0.96115034544 (((1/(((colog(((-(8.102701e-35)^2 * -(((gamma (2) gamma (2) gamma (3)))) / (((gamma (3) gamma (3) gamma (4)))))))))))))))

Input interpretation:

$$27\times\frac{1}{2}\log_{0.96115034544}\left(-\frac{1}{\log\left(-(8.102701\times 10^{-35})^2\left(-\frac{\Gamma(2)\Gamma(2)\Gamma(3)}{\Gamma(3)\Gamma(3)\Gamma(4)}\right)\right)}\right)$$

$\Gamma(x)$ is the gamma function

$\log(x)$ is the natural logarithm

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

Result:

1728.00000...

1728

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Now, we have that:

$$\rho_I = x_1 x_2 \ldots x_I$$

$$w = x_1 x_2 \ldots x_M = \rho_M$$

$$f(w) = \prod_{n=1}^{\infty} (1 - w^n)$$

$$c_{JI} = \rho_J / \rho_I .$$

$$M = \int dp \prod_{I=1}^{M} x_I^{p_I^2/2} = \left(\frac{-2\pi}{\ln w}\right)^{D/2} \prod_{1 \le I < J \le M} \left\{ c_{JI}^{-1/2} \exp\left(\frac{\ln^2 c_{JI}}{2 \ln w}\right) \right\}^{k_I \cdot k_J} . \qquad (5.13)$$

From:

$$\prod_{1 \le I < J \le M} \left\{ c_{JI}^{-1/2} \exp\left(\frac{\ln^2 c_{JI}}{2 \ln w}\right) \right\}^{k_I \cdot k_J} ,$$

((((2^(-1/2)) exp(((ln^2(2))) / (2 ln(3))))))^6

Input:

$$\left(2^{-1/2} \exp\left(\frac{\log^2(2)}{2 \log(3)}\right)\right)^6$$

log(x) is the natural logarithm

Exact result:

$$\frac{1}{8} e^{(3 \log^2(2))/\log(3)}$$

Decimal approximation:

0.4641906153264572655026135592894114196573908256452173638 04...

0.46419061532…

Property:

$\frac{1}{8} e^{(3 \log^2(2))/\log(3)}$ is a transcendental number

Alternative representations:

$$\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6=\left(\frac{\exp\left(\frac{\log_e^2(2)}{2\log_e(3)}\right)}{\sqrt{2}}\right)^6$$

$$\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6=\left(\frac{\exp\left(\frac{(\log(a)\log_a(2))^2}{2\log(a)\log_a(3)}\right)}{\sqrt{2}}\right)^6$$

Series representations:

$$\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6=\frac{1}{8}\exp\left(\frac{3\left(2 i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2}{2 i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}}\right)$$

for $x<0$

$$\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6=$$
$$\frac{1}{8}\exp\left(\frac{3\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)$$

$$\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6=$$
$$\frac{1}{8}\exp\left(\frac{3\left(2 i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{2 i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)$$

Integral representations:

$$\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6=\frac{1}{8}e^{\frac{3\left(\int_1^2\frac{1}{t}dt\right)^2}{\int_1^3\frac{1}{t}dt}}$$

$$\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6=\frac{1}{8}\exp\left(-\frac{3 i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\Gamma(1+s)}{\Gamma(1-s)}ds\right)^2}{2\pi\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\Gamma(-s)^2\Gamma(1+s)}{\Gamma(1-s)}ds}\right)$$ for $-1<\gamma<0$

From which:

1/4*3*1/(((((((2^(-1/2)) exp(((ln^2(2))) / (2 ln(3))))))^6)))

Input:

$$\frac{1}{4}\times 3\times \frac{1}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}$$

log(x) is the natural logarithm

Exact result:

$$6\,e^{-(3\log^2(2))/\log(3)}$$

Decimal approximation:

1.615715560023844765677978548940141703757551562708614564890...

1.61571556…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Property:

$6\,e^{-(3\log^2(2))/\log(3)}$ is a transcendental number

Alternative representations:

$$\frac{3}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6 4} = \frac{3}{4\left(\frac{\exp\left(\frac{\log_e^2(2)}{2\log_e(3)}\right)}{\sqrt{2}}\right)^6}$$

$$\frac{3}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6 4} = \frac{3}{4\left(\frac{\exp\left(\frac{(\log(a)\log_a(2))^2}{2\log(a)\log_a(3)}\right)}{\sqrt{2}}\right)^6}$$

Series representations:

$$\frac{3}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6 4} = 6\exp\left(-\frac{3\left(2 i \pi \left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k (2-x)^k x^{-k}}{k}\right)^2}{2 i \pi \left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k (3-x)^k x^{-k}}{k}}\right) \text{ for } x < 0$$

$$\frac{3}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6 4} = 6\exp\left(-\frac{3\left(\log(z_0) + \left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}\right)^2}{\log(z_0) + \left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k (3-z_0)^k z_0^{-k}}{k}}\right)$$

$$\frac{3}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6 4} = 6\exp\left(-\frac{3\left(2 i \pi \left\lfloor\frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi}\right\rfloor + \log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}\right)^2}{2 i \pi \left\lfloor\frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi}\right\rfloor + \log(z_0) - \sum_{k=1}^{\infty}\frac{(-1)^k (3-z_0)^k z_0^{-k}}{k}}\right)$$

Integral representations:

$$\frac{3}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6 4} = 6 e^{-\frac{3\left(\int_1^2 \frac{1}{t}\,dt\right)^2}{\int_1^3 \frac{1}{t}\,dt}}$$

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

and:

[29/((((2^(-1/2)) exp(((ln^2(2))) / (2 ln(3))))))^6]+golden ratio

where 29 is a Lucas number

Input:

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi$$

$\log(x)$ is the natural logarithm

ϕ is the golden ratio

Exact result:

$$\phi+232\,e^{-(3\log^2(2))/\log(3)}$$

Decimal approximation:

64.09236897633855912108642406005111732967896960453885937123...

64.09236897... ≈ 64

Alternate forms:

$$\frac{1}{2}\left(1+\sqrt{5}\right)+232\,e^{-(3\log^2(2))/\log(3)}$$

$$\frac{1}{2}\,e^{-(3\log^2(2))/\log(3)}\left(464+e^{(3\log^2(2))/\log(3)}+\sqrt{5}\;e^{(3\log^2(2))/\log(3)}\right)$$

Alternative representations:

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi=\phi+\frac{29}{\left(\frac{\exp\left(\frac{\log_e^2(2)}{2\log_e(3)}\right)}{\sqrt{2}}\right)^6}$$

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi=\phi+\frac{29}{\left(\frac{\exp\left(\frac{(\log(a)\log_a(2))^2}{2\log(a)\log_a(3)}\right)}{\sqrt{2}}\right)^6}$$

Series representations:

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi=\frac{1}{2}\exp\left(-\frac{3\left(2\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2}{2\,i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}}\right)\left(464+\exp\left(\frac{3\left(2\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2}{2\,i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}}\right)+\sqrt{5}\exp\left(\frac{3\left(2\,i\,\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2}{2\,i\,\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}}\right)\right)\quad\text{for } x<0$$

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi=\frac{1}{2}\exp\left(-\frac{3\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)\left(464+\exp\left(\frac{3\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)+\sqrt{5}\exp\left(\frac{3\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)\right)$$

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi=\frac{1}{2}\exp\left(-\frac{3\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)\left(464+\exp\left(\frac{3\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)+\sqrt{5}\exp\left(\frac{3\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)\right)$$

Integral representations:

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi=\frac{1}{2}e^{-\frac{3\left(\int_1^2\frac{1}{t}\,dt\right)^2}{\int_1^3\frac{1}{t}\,dt}}\left(464+e^{\frac{3\left(\int_1^2\frac{1}{t}\,dt\right)^2}{\int_1^3\frac{1}{t}\,dt}}+\sqrt{5}\,e^{\frac{3\left(\int_1^2\frac{1}{t}\,dt\right)^2}{\int_1^3\frac{1}{t}\,dt}}\right)$$

$$\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi=\frac{1}{2}\left(1+\sqrt{5}+464\exp\left(\frac{3\,i\left(\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2}{2\,\pi\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)\right)$$

for $-1<\gamma<0$

27(([29/((((2^(-1/2)) exp(((ln^2(2))) / (2 ln(3))))))^6]+golden ratio))-sqrt2

Input:

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Exact result:

$$27\left(\phi+232\,e^{-\left(3\log^2(2)\right)/\log(3)}\right)-\sqrt{2}$$

Decimal approximation:

1729.079748798768001220531760897170469822762507447172254950...

1729.079748798…

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms:

$$\frac{27}{2} - \sqrt{2} + \frac{27\sqrt{5}}{2} + 6264\, e^{-(3\log^2(2))/\log(3)}$$

$$\frac{1}{2}\left(27 - 2\sqrt{2} + 27\sqrt{5}\right) + 6264\, e^{-(3\log^2(2))/\log(3)}$$

$$27\left(\frac{1}{2}\left(1+\sqrt{5}\right) + 232\, e^{-(3\log^2(2))/\log(3)}\right) - \sqrt{2}$$

Alternative representations:

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6} + \phi\right) - \sqrt{2} = 27\left(\phi + \frac{29}{\left(\frac{\exp\left(\frac{\log_e^2(2)}{2\log_e(3)}\right)}{\sqrt{2}}\right)^6}\right) - \sqrt{2}$$

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6} + \phi\right) - \sqrt{2} = 27\left(\phi + \frac{29}{\left(\frac{\exp\left(\frac{(\log(a)\log_a(2))^2}{2\log(a)\log_a(3)}\right)}{\sqrt{2}}\right)^6}\right) - \sqrt{2}$$

Series representations:

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6} + \phi\right) - \sqrt{2} = \frac{27}{2} - \sqrt{2} + \frac{27\sqrt{5}}{2} + 6264\exp\left(-\frac{3\left(2 i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2}{2 i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}}\right) \text{ for } x < 0$$

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6} + \phi\right) - \sqrt{2} = \frac{27}{2} - \sqrt{2} + \frac{27\sqrt{5}}{2} + 6264\exp\left(-\frac{3\left(\log(z_0) + \left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{\log(z_0) + \left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)$$

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2} = \frac{27}{2}-\sqrt{2}+\frac{27\sqrt{5}}{2}+ 6264\exp\left(-\frac{3\left(2 i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{2 i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)$$

Integral representations:

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2} = \frac{1}{2}\left(27-2\sqrt{2}+27\sqrt{5}+12528\exp\left(\frac{3 i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2}{2\pi\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)\right) \quad \text{for } -1<\gamma<0$$

$$27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2} = -\frac{1}{2}e^{-\frac{3\left(\int_1^2\frac{1}{t}dt\right)^2}{\int_1^3\frac{1}{t}dt}}\left(-12528-27e^{\frac{3\left(\int_1^2\frac{1}{t}dt\right)^2}{\int_1^3\frac{1}{t}dt}}+2\sqrt{2}\,e^{\frac{3\left(\int_1^2\frac{1}{t}dt\right)^2}{\int_1^3\frac{1}{t}dt}}-27\sqrt{5}\,e^{\frac{3\left(\int_1^2\frac{1}{t}dt\right)^2}{\int_1^3\frac{1}{t}dt}}\right)$$

(((27(([29/((((2^(-1/2)) exp(((ln^2(2))) / (2 ln(3))))))^6]+golden ratio))-sqrt2)))^1/15

Input:

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Exact result:

$$\sqrt[15]{27\left(\phi+232\,e^{-(3\log^2(2))/\log(3)}\right)-\sqrt{2}}$$

Decimal approximation:

1.6438202832877008899798432395537755387239289113445329839 81...

1.6438202832.... ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Alternate forms:

$$\sqrt[15]{27\,\phi-\sqrt{2}+6264\,e^{-(3\log^2(2))/\log(3)}}$$

$$\sqrt[15]{27\left(\frac{1}{2}\left(1+\sqrt{5}\right)+232\,e^{-(3\log^2(2))/\log(3)}\right)-\sqrt{2}}$$

$$\frac{e^{-\log^2(2)/(5\log(3))}}{\sqrt[15]{-\frac{2}{-12528-27\,e^{(3\log^2(2))/\log(3)}+2\sqrt{2}\,e^{(3\log^2(2))/\log(3)}-27\sqrt{5}\,e^{(3\log^2(2))/\log(3)}}}}$$

All 15th roots of 27 (ϕ + 232 e^(-(3 log^2(2))/log(3))) - sqrt(2):

$$e^0\sqrt[15]{27\left(\phi+232\,e^{-(3\log^2(2))/\log(3)}\right)-\sqrt{2}}\approx 1.64382 \text{ (real, principal root)}$$

$$e^{(2i\pi)/15}\sqrt[15]{27\left(\phi+232\,e^{-(3\log^2(2))/\log(3)}\right)-\sqrt{2}}\approx 1.5017+0.6686\,i$$

$$e^{(4i\pi)/15}\sqrt[15]{27\left(\phi+232\,e^{-(3\log^2(2))/\log(3)}\right)-\sqrt{2}}\approx 1.0999+1.2216\,i$$

$$e^{(2i\pi)/5}\sqrt[15]{27\left(\phi+232\,e^{-(3\log^2(2))/\log(3)}\right)-\sqrt{2}}\approx 0.5080+1.5634\,i$$

$$e^{(8i\pi)/15}\sqrt[15]{27\left(\phi+232\,e^{-(3\log^2(2))/\log(3)}\right)-\sqrt{2}}\approx -0.17183+1.63482\,i$$

Alternative representations:

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}} = \sqrt[15]{27\left(\phi+\frac{29}{\left(\frac{\exp\left(\frac{\log_e^2(2)}{2\log_e(3)}\right)}{\sqrt{2}}\right)^6}\right)-\sqrt{2}}$$

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}} = \sqrt[15]{27\left(\phi+\frac{29}{\left(\frac{\exp\left(\frac{(\log(a)\log_a(2))^2}{2\log(a)\log_a(3)}\right)}{\sqrt{2}}\right)^6}\right)-\sqrt{2}}$$

Series representations:

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}} = \left(-\sqrt{2}+27\left(\frac{1}{2}\left(1+\sqrt{5}\right)+232\exp\left(-\frac{3\left(2 i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2}{2 i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}}{k}}\right)\right)\right)^{\wedge}(1/15) \text{ for } x<0$$

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}} = \left(-\sqrt{2}+27\left(\frac{1}{2}\left(1+\sqrt{5}\right)+232\exp\left(-\frac{3\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{\log(z_0)+\left\lfloor\frac{\arg(3-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)\right)\right)^{\wedge}(1/15)$$

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}} = \left(-\sqrt{2}+27\left(\frac{1}{2}\left(1+\sqrt{5}\right)+ 232\exp\left(-\frac{3\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}{2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(3-z_0)^k z_0^{-k}}{k}}\right)\right)\right)^\wedge (1/15)$$

Integral representations:

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}} = \frac{\sqrt[15]{27-2\sqrt{2}+27\sqrt{5}+12528\exp\left(\frac{3i\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2}{2\pi\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{2^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}\right)}}{\sqrt[15]{2}} \quad \text{for } -1<\gamma<0$$

$$\sqrt[15]{27\left(\frac{29}{\left(2^{-1/2}\exp\left(\frac{\log^2(2)}{2\log(3)}\right)\right)^6}+\phi\right)-\sqrt{2}} = \frac{\sqrt[15]{e^{-\frac{3\left(\int_1^2\frac{1}{t}\,dt\right)^2}{\int_1^3\frac{1}{t}\,dt}}\left(12528+27e^{\frac{3\left(\int_1^2\frac{1}{t}\,dt\right)^2}{\int_1^3\frac{1}{t}\,dt}}-2\sqrt{2}\,e^{\frac{3\left(\int_1^2\frac{1}{t}\,dt\right)^2}{\int_1^3\frac{1}{t}\,dt}}+27\sqrt{5}\,e^{\frac{3\left(\int_1^2\frac{1}{t}\,dt\right)^2}{\int_1^3\frac{1}{t}\,dt}}\right)}}{\sqrt[15]{2}}$$

Now, we have that:

$\nu = \ln x/\ln w$

$q = e^{i\pi\tau}$

$$\psi(x,w) = -\frac{2\pi^2}{\ln q}\vartheta_1\left(\nu \,\middle|\, \frac{\ln q}{i\pi}\right) \Big/ \vartheta_1'\left(0 \,\middle|\, \frac{\ln q}{i\pi}\right)$$

$$= -\frac{2\pi}{\ln q}\sin \pi\nu \prod_1^\infty \frac{1-2q^{2n}\cos 2\pi\nu + q^{4n}}{(1-q^{2n})^2}. \qquad (5.A.19)$$

From

$$-\frac{2\pi}{\ln q}\sin \pi\nu \prod_1^\infty \frac{1-2q^{2n}\cos 2\pi\nu + q^{4n}}{(1-q^{2n})^2}$$

q = exp(Pi) = 23.140692632779269 $\quad v = - i$

(-2Pi*sin(Pi*-i)) / (ln(23.1406926)) * product (((1-2*23.1406926^(2n) cos(2Pi*-i)+ 23.1406926^(4n)))) / ((((1-23.1406926^(2n))^2))), n = 1..8

Input interpretation:

$$\frac{-2\pi\sin(\pi\times(-1)\,i)}{\log(23.1406926)}\prod_{n=1}^{8}\frac{1-(2\times 23.1406926^{2n})\cos(2\pi\times(-1)\,i)+23.1406926^{4n}}{(1-23.1406926^{2n})^2}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$-6.55585\times10^{-8}\,i$

$-6.55585*10^{-8}$ i

or also:

(-2Pi*sin(Pi*-i)) / (ln(23.1406926)) * product (((1-2*23.1406926^(2n) cos(2Pi*-i)+ 23.1406926^(4n)))) / ((((1-23.1406926^(2n))^2))), n = 1..10^4

Input interpretation:

$$\frac{-2\pi\sin(\pi\times(-1)\,i)}{\log(23.1406926)}\prod_{n=1}^{10^4}\frac{1-(2\times 23.1406926^{2n})\cos(2\pi\times(-1)\,i)+23.1406926^{4n}}{(1-23.1406926^{2n})^2}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$-6.55585\times10^{-8}\,i$

-6.55585*10^{-8} i

From which:

1/10ln(((((-2Pi*sin(Pi*-i)) / (ln(23.1406926)) * product (((1-2*23.1406926^(2n) cos(2Pi*-i)+ 23.1406926^(4n)))) / ((((1-23.1406926^(2n))^2))), n = 1..10^4))))

Input interpretation:

$$\frac{1}{10}\log\left(\frac{-2\pi\sin(\pi\times(-1)\,i)}{\log(23.1406926)}\prod_{n=1}^{10^4}\frac{1-(2\times23.1406926^{2n})\cos(2\pi\times(-1)\,i)+23.1406926^{4n}}{(1-23.1406926^{2n})^2}\right)$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$-1.65403 - 0.15708\,i$

Input interpretation:

$-1.65403 - 0.15708\,i$

i is the imaginary unit

Result:

$-1.65403\ldots - 0.15708\ldots\,i$

Polar coordinates:

$r = 1.66147$ (radius), $\theta = -174.575°$ (angle)

1.66147 result very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

7-8*ln(((((-2Pi*sin(Pi*-i)) / (ln(23.1406926)) * product (((1-2*23.1406926^(2n) cos(2Pi*-i)+ 23.1406926^(4n)))) / ((((1-23.1406926^(2n))^2))), n = 1..10^4))))

where 7 is a Lucas number and 8 is a Fibonacci number

Input interpretation:

$$7 - 8 \log\left(\frac{-2\pi \sin(\pi \times (-1)\, i)}{\log(23.1406926)} \prod_{n=1}^{10^4} \frac{1 - (2 \times 23.1406926^{2n}) \cos(2\pi \times (-1)\, i) + 23.1406926^{4n}}{(1 - 23.1406926^{2n})^2}\right)$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$139.323 + 12.5664\, i$

Input interpretation:

$139.323 + 12.5664\, i$

i is the imaginary unit

Result:

139.323... +
12.5664... i

Polar coordinates:

$r = 139.889$ (radius), $\theta = 5.15391°$ (angle)

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

7+8*ln(((((-2Pi*sin(Pi*-i)) / (ln(23.1406926)) * product (((1-2*23.1406926^(2n) cos(2Pi*-i)+ 23.1406926^(4n)))) / ((((1-23.1406926^(2n))^2))), n = 1..10^4))))

Input interpretation:

$$7 + 8 \log\left(\frac{-2\pi \sin(\pi \times (-1)\, i)}{\log(23.1406926)} \prod_{n=1}^{10^4} \frac{1 - (2 \times 23.1406926^{2n}) \cos(2\pi \times (-1)\, i) + 23.1406926^{4n}}{(1 - 23.1406926^{2n})^2}\right)$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$-125.323 - 12.5664\, i$

Input interpretation:

$-125.323 + i \times (-12.5664)$

i is the imaginary unit

Result:

$-125.323... - 12.5664... i$

Polar coordinates:

$r = 125.951$ (radius), $\theta = -174.274°$ (angle)

125.951 result very near to the Higgs boson mass 125.18 GeV

and:

27*1/2((((4+8*ln(((((-2Pi*sin(Pi*-i)) / (ln(23.1406926)) * product (((1-2*23.1406926^(2n) cos(2Pi*-i)+ 23.1406926^(4n)))) / ((((1-23.1406926^(2n))^2))), n = 1..10^4))))))))+11

Input interpretation:

$$27 \times \frac{1}{2} \left(4 + 8 \log\left(\frac{-2 \pi \sin(\pi \times (-1) i)}{\log(23.1406926)} \prod_{n=1}^{10^4} \frac{1 - (2 \times 23.1406926^{2n}) \cos(2 \pi \times (-1) i) + 23.1406926^{4n}}{(1 - 23.1406926^{2n})^2}\right)\right) + 11$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

Result:

$-1721.35 - 169.646 i$

Input interpretation:

$-1721.35 + i \times (-169.646)$

i is the imaginary unit

Result:

$-1721.35... - 169.646... i$

Polar coordinates:

$r = 1729.69$ (radius), $\theta = -174.371°$ (angle)

1729.69

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

From

$$\psi_N(x, w) = \frac{4\pi^2}{\ln q} \vartheta_1\left(-\frac{\nu}{2} \middle| \frac{\ln q}{4\pi i} - \frac{1}{2}\right) \Big/ \vartheta_1'\left(0 \middle| \frac{\ln q}{4\pi i} - \frac{1}{2}\right) - -\frac{4\pi}{\ln q} \sin\frac{\pi\nu}{2} \prod_1^\infty \frac{1-2(-\sqrt{q})^n \cos\pi\nu + q^n}{(1-(-\sqrt{q})^n)^2}. \quad (5.A.21)$$

we have:

$$-\frac{4\pi}{\ln q} \sin\frac{\pi\nu}{2} \prod_1^\infty \frac{1-2(-\sqrt{q})^n \cos\pi\nu + q^n}{(1-(-\sqrt{q})^n)^2}.$$

We obtain:

(-4Pi)/(ln(23.1406926)) sin((–i*Pi)/2) product (((1-2(-sqrt(23.1406926)^n) cos(-i*Pi)+ 23.1406926^n))) / ((((1+(sqrt(23.1406926)^n))^2))), n = 1..8

For ν = -i

Input interpretation:

$$\frac{-4\pi}{\log(23.1406926)} \sin\left(-\frac{i\pi}{2}\right) \prod_{n=1}^{8} \frac{1-\left(2\left(-\sqrt{23.1406926}^{\,n}\right)\right)\cos(-i\pi) + 23.1406926^n}{\left(1+\sqrt{23.1406926}^{\,n}\right)^2}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

$84.8925 i$

84.8925i

2((((-4Pi)/(ln(23.1406926)) sin((–i*Pi)/2) product (((1-2(-sqrt(23.1406926)^n) cos(-i*Pi)+ 23.1406926^n))) / ((((1+(sqrt(23.1406926)^n))^2))), n = 1..8)))-29i-i

where 29 is a Lucas number

Input interpretation:

$$2\left(\frac{-4\pi}{\log(23.1406926)}\sin\left(-\frac{i\pi}{2}\right)\prod_{n=1}^{8}\frac{1-\left(2\left(-\sqrt{23.1406926}^{\,n}\right)\right)\cos(-i\pi)+23.1406926^n}{\left(1+\sqrt{23.1406926}^{\,n}\right)^2}\right)-29i-i$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

139.785 i

139.785i result practically equal to the rest mass of Pion meson 139.57 MeV

Now, we have:

$$\chi(z,w)=\exp\left(\frac{\ln^2|z|}{2\ln|w|}\right)\left|z^{-1/2}(1-z)\prod_{m=1}^{\infty}\frac{(1-w^m z)(1-w^m/z)}{(1-w^m)^2}\right|. \tag{6.7}$$

for z = 5, w = 8, we obtain:

$$\chi(z,w)=\exp\left(\frac{\ln^2|z|}{2\ln|w|}\right)\left|z^{-1/2}(1-z)\prod_{m=1}^{\infty}\frac{(1-w^m z)(1-w^m/z)}{(1-w^m)^2}\right|.$$

We obtain:

exp((ln^2(5))/(2ln(8))) ((((1/sqrt5(1-5)) product ((1-8^m*5)(1-8^m/5))/((1-8^m)^2), m=1..infinity)))

Input interpretation:

$$\exp\left(\frac{\log^2(5)}{2\log(8)}\right)\left(\left(\frac{1}{\sqrt{5}}(1-5)\right)\prod_{m=1}^{\infty}\frac{(1-8^m\times 5)\left(1-\frac{8^m}{5}\right)}{(1-8^m)^2}\right)$$

log(x) is the natural logarithm

Result:

-1.49954

-1.49954 ≈ -1.5 = -3/2

We observe that 3/2 is the isospin of Delta baryon. In nuclear physics and particle physics, **isospin** (***I***) is a quantum number related to the strong interaction. More specifically, isospin symmetry is a subset of the flavour symmetry seen more broadly in the interactions of baryons and mesons.

From which:

1+1/2(((-(exp((ln^2(5))/(2ln(8))) ((((1/sqrt5(1-5)) product ((1-8^m*5)(1-8^m/5))/((1-8^m)^2), m=1..infinity)))))))^1/2

Input interpretation:

$$1+\frac{1}{2}\sqrt{-\left(\exp\left(\frac{\log^2(5)}{2\log(8)}\right)\left(\left(\frac{1}{\sqrt{5}}(1-5)\right)\prod_{m=1}^{\infty}\frac{(1-8^m\times 5)\left(1-\frac{8^m}{5}\right)}{(1-8^m)^2}\right)\right)}$$

log(x) is the natural logarithm

Result:

1.61228

1.61228 result that is a good approximation to the value of the golden ratio 1.618033988749...

From the above expression, for m = 2 to 8, we obtain:

exp((ln^2(5))/(2ln(8))) ((((1/sqrt5(1-5)) product ((1-8^m*5)(1-8^m/5))/((1-8^m)^2), m=2..8)))

Input interpretation:

$$\exp\left(\frac{\log^2(5)}{2\log(8)}\right)\left(\left(\frac{1}{\sqrt{5}}(1-5)\right)\prod_{m=2}^{8}\frac{(1-8^m\times 5)\left(1-\frac{8^m}{5}\right)}{(1-8^m)^2}\right)$$

log(x) is the natural logarithm

Result:

$$-\left(\left(22433591626815105591376811160191761405225079891152496857712788\, e^{\log^2(5)/(2\log(8))}\right) / \left(5956194082133069545888739609925303211195942481962148876953125\sqrt{5}\right)\right) \approx -3.14006$$

Alternate forms:

$$-\left(\left(22433591626815105591376811160191761405225079891152496857712788\, e^{\log^2(5)/\log(64)}\right) / \left(5956194082133069545888739609925303211195942481962148876953125\sqrt{5}\right)\right)$$

$$-\left(\left(22433591626815105591376811160191761405225079891152496857712788\, e^{\log^2(5)/(6\log(2))}\right) / \left(5956194082133069545888739609925303211195942481962148876953125\sqrt{5}\right)\right)$$

Input:

$$-\left(\left(22433591626815105591376811160191761405225079891152496857712788\, e^{\log^2(5)/(2\log(8))}\right) / \left(5956194082133069545888739609925303211195942481962148876953125\sqrt{5}\right)\right)$$

$\log(x)$ is the natural logarithm

Decimal approximation:

-3.1400602560386046341948816242018760297419200970539771401 3...

-3.140060256… ≈ -π

Property:

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\right)$$ is a transcendental number

Alternate forms:

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/\log(64)}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\right)$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(6\log(2))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\right)$$

Alternative representations:

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\right) =$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log_e^2(5)/(2\log_e(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\right)$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right) =$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788 \exp\left(\frac{(\log(a)\log_a(5))^2}{2\log(a)\log_a(8)}\right)\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right)$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right) =$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{-(-\mathrm{Li}_1(-4))^2/(2\,\mathrm{Li}_1(-7))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right)$$

Series representations:

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right) =$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788 \exp\left(\frac{\left(\log(4)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{4}\right)^k}{k}\right)^2}{2\left(\log(7)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{7}\right)^k}{k}\right)}\right)\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right)$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right) =$$

$$-\left(\left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788 \exp\left(\frac{\left(2 i \pi \left\lfloor \frac{\arg(5-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}}{k}\right)^2}{2\left(2 i \pi \left\lfloor \frac{\arg(8-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k (8-x)^k x^{-k}}{k}\right)}\right)\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)\right) \quad \text{for } x < 0$$

$$-\left(\left(22433591626815105591376811160191761405225079891152496857712788\, e^{\log^2(5)/(2\log(8))}\right)/\left(5956194082133069545888739609925303211195942481962148876953125\sqrt{5}\right)\right) =$$

$$-\left(\left(22433591626815105591376811160191761405225079891152496857712788 \exp\left(\frac{\left(\log(z_0)+\left\lfloor\frac{\arg(5-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(5-z_0)^k z_0^{-k}}{k}\right)^2}{2\left(\log(z_0)+\left\lfloor\frac{\arg(8-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(8-z_0)^k z_0^{-k}}{k}\right)}\right)\right)/\left(5956194082133069545888739609925303211195942481962148876953125\sqrt{5}\right)\right)$$

and:

2+ exp((ln^2(5))/(2ln(8))) ((((1/sqrt5(1-5)) product ((1-8^m*5)(1-8^m/5))/((1-8^m)^2), m=2..8)))

Input interpretation:

$$2+\exp\left(\frac{\log^2(5)}{2\log(8)}\right)\left(\left(\frac{1}{\sqrt{5}}(1-5)\right)\prod_{m=2}^{8}\frac{(1-8^m\times 5)\left(1-\frac{8^m}{5}\right)}{(1-8^m)^2}\right)$$

log(x) is the natural logarithm

Result:

$$2-\left(22433591626815105591376811160191761405225079891152496857712788\, e^{\log^2(5)/(2\log(8))}\right)/\left(5956194082133069545888739609925303211195942481962148876953125\sqrt{5}\right) \approx -1.14006$$

Alternate forms:

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/\log(64)}\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)$$

$$-\left(\left(2 \left(11\,216\,795\,813\,407\,552\,795\,688\,405\,580\,095\,880\,702\,612\,539\,945\,576\,248\,428\,856\,394 \sqrt{5}\, e^{\log^2(5)/(2\log(8))} - 29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\,744\,384\,765\,625\right)\right) / 29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\,744\,384\,765\,625\right)$$

$$-\left(\left(2 \left(11\,216\,795\,813\,407\,552\,795\,688\,405\,580\,095\,880\,702\,612\,539\,945\,576\,248\,428\,856\,394\, e^{\log^2(5)/(6\log(2))} - 5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\right)$$

Input:

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)$$

$\log(x)$ is the natural logarithm

Decimal approximation:

-1.140060256038604634194881624201876029741920097053977140 13...

-1.140060256…

Alternate forms:

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/\log(64)}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)$$

$$-\Big(\Big(2 \left(11\,216\,795\,813\,407\,552\,795\,688\,405\,580\,095\,880\,702\,612\,539\,945\,576\,248\,428\,856\,394 \sqrt{5}\, e^{\log^2(5)/(2\log(8))} - 29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\,744\,384\,765\,625\right)\Big) \Big/ 29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\,744\,384\,765\,625\Big)$$

$$-\Big(\Big(2 \left(11\,216\,795\,813\,407\,552\,795\,688\,405\,580\,095\,880\,702\,612\,539\,945\,576\,248\,428\,856\,394\, e^{\log^2(5)/(6\log(2))} - 5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\Big) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)\Big)$$

Alternative representations:

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right) = 2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log_e^2(5)/(2\log_e(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125 \sqrt{5}\right)$$

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right) = 2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\exp\left(\frac{(\log(a)\log_a(5))^2}{2\log(a)\log_a(8)}\right)\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)$$

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right) = 2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\,712\,788\, e^{-(-\text{Li}_1(-4))^2/(2\,\text{Li}_1(-7))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\,953\,125\sqrt{5}\right)$$

Series representations:

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\ddots 712\,788\, e^{\log^2(5)/(2\log(8))}\right) \Big/ \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876\ddots 953\,125\sqrt{5}\right) = -\left(\left(\left(2\left(-29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\ddots 744\,384\,765\,625 + 11\,216\,795\,813\,407\,552\,795\,688\,405\,580\,095\,880\,702\,612\,539\,945\ddots 576\,248\,428\,856\,394\sqrt{5}\, \exp\left(\frac{\left(\log(4) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{4}\right)^k}{k}\right)^2}{2\left(\log(7) - \sum_{k=1}^{\infty}\frac{\left(-\frac{1}{7}\right)^k}{k}\right)}\right)\right)\right)\right) \Big/ 29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\,744\ddots 384\,765\,625\right)$$

$$2 - \Big(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857\ddots$$

$$712\,788\, e^{\log^2(5)/(2\log(8))}\Big) \Big/$$

$$\Big(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\ddots$$

$$876\,953\,125\,\sqrt{5}\Big) = -\Bigg(\Bigg(2$$

$$\Bigg(-29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\ddots$$

$$810\,744\,384\,765\,625 +$$

$$11\,216\,795\,813\,407\,552\,795\,688\,405\,580\,095\,880\,702\,612\,539\,945\ddots$$

$$576\,248\,428\,856\,394\,\sqrt{5}$$

$$\exp\left(\frac{\left(2\,i\,\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(5-x)^k x^{-k}}{k}\right)^2}{2\left(2\,i\,\pi\left\lfloor\frac{\arg(8-x)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k(8-x)^k x^{-k}}{k}\right)}\right)\Bigg)\Bigg)\Bigg) \Big/$$

$$29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\,744\ddots$$

$$384\,765\,625\Bigg) \quad \text{for } x < 0$$

$$2 - \left(22\,433\,591\,626\,815\,105\,591\,376\,811\,160\,191\,761\,405\,225\,079\,891\,152\,496\,857 \cdot 712\,788\, e^{\log^2(5)/(2\log(8))}\right) / \left(5\,956\,194\,082\,133\,069\,545\,888\,739\,609\,925\,303\,211\,195\,942\,481\,962\,148\,876 \cdot 953\,125\sqrt{5}\right) = -\left(\left(\left(2\left(-29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810 \cdot 744\,384\,765\,625 + 11\,216\,795\,813\,407\,552\,795\,688\,405\,580\,095\,880\,702\,612\,539\,945 \cdot 576\,248\,428\,856\,394\sqrt{5}\,\exp\left(\frac{\left(\log(z_0) + \left\lfloor\frac{\arg(5-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k (5-z_0)^k z_0^{-k}}{k}\right)^2}{2\left(\log(z_0) + \left\lfloor\frac{\arg(8-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty}\frac{(-1)^k (8-z_0)^k z_0^{-k}}{k}\right)}\right)\right)\right)\right) / \left(29\,780\,970\,410\,665\,347\,729\,443\,698\,049\,626\,516\,055\,979\,712\,409\,810\,744 \cdot 384\,765\,625\right)$$

From

Ramanujan's ''Lost'' notebook IX: the partial theta function as an entire function

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From:

$$0 \leqq \begin{bmatrix} A \\ B \end{bmatrix}_{q^2} \leqq \sum_{n=0}^{\infty} p(n) q^{2n}$$
$$= \prod_{n=1}^{\infty} \frac{1}{(1-q^{2n})} \quad (\text{by } [2,\ \text{p. } 4])$$
$$= \frac{1}{1-q^2-q^4+q^{10}+q^{14}-\cdots} \quad (\text{by } [2, \text{p. } 11])$$
$$< \frac{1}{1-q^2-q^4} < \frac{1}{1-\frac{1}{16}-\frac{1}{256}} < \frac{1}{1-\frac{2}{16}} = \frac{8}{7}. \qquad (2.2)$$

we obtain:

Input:

$\frac{8}{7}$

Exact result:

$\frac{8}{7}$ (irreducible)

Decimal approximation:

1.142857142857142857142857142857142857142857142857142857142...

1.142857142…

From Ramanujan equation (**Some definite integrals** – *Srinivasa Ramanujan* - Messenger of Mathematics, XLIV, 1915, 10 – 18):

$$\int_0^{\infty} \left(\frac{1+x^2/b^2}{1+x^2/a^2}\right)\left(\frac{1+x^2/(b+1)^2}{1+x^2/(a+1)^2}\right)\left(\frac{1+x^2/(b+2)^2}{1+x^2/(a+2)^2}\right)\cdots\, dx$$
$$= \frac{1}{2}\sqrt{\pi}\frac{\Gamma(a+\frac{1}{2})\Gamma(b)\Gamma(b-a-\frac{1}{2})}{\Gamma(a)\Gamma(b-\frac{1}{2})\Gamma(b-a)}, \qquad (3)$$

$0 < a < b - \frac{1}{2}$

0 < a < 11-1/2; b = 11 and a = 8

we obtain:

1/2*sqrt(Pi)* (((gamma (8+1/2) gamma (11) gamma (11-8-1/2)))) / (((gamma (8) gamma (11-1/2) gamma (11-8))))

Input:

$$\frac{1}{2}\sqrt{\pi}\times\frac{\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)}{\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)}$$

$\Gamma(x)$ is the gamma function

Exact result:

$$\frac{540\,\pi}{323}$$

Decimal approximation:

5.252198244391604794953026089693286555623750698645687750236...

5.2521982443…

Property:

$\frac{540\,\pi}{323}$ is a transcendental number

Alternative representations:

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2}=\frac{\frac{3}{2}!\times\frac{15}{2}!\times 10!\sqrt{\pi}}{2\left(2!\times 7!\times\frac{19}{2}!\right)}$$

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2}=\left(e^{-\log(1834933472251084800000)+\log(6658606584104736522240000000)}e^{-\log G(5/2)+\log G(7/2)}e^{-\log G(17/2)+\log G(19/2)}\sqrt{\pi}\right)/\left(2\left(e^{\log(2)}e^{-\log(24883200)+\log(125411328000)}e^{-\log G(21/2)+\log G(23/2)}\right)\right)$$

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2}=\frac{\Gamma\left(\frac{5}{2},0\right)\Gamma\left(\frac{17}{2},0\right)\Gamma(11,0)\sqrt{\pi}}{2\left(\Gamma(3,0)\Gamma(8,0)\Gamma\left(\frac{21}{2},0\right)\right)}$$

Series representations:

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2} = \frac{2160}{323}\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2} = \sum_{k=0}^{\infty}-\frac{432\left(-\frac{1}{25}\right)^k 239^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{323(1+2k)}$$

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2} = \frac{540}{323}\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)$$

Integral representations:

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2} = \frac{2160}{323}\int_0^1\sqrt{1-t^2}\,dt$$

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2} = \frac{1080}{323}\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

$$\frac{\sqrt{\pi}\left(\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)\right)}{\left(\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)\right)2} = \frac{1080}{323}\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

From which:

1/2*sqrt(x+2)* (((gamma (8+1/2) gamma (11) gamma (11-8-1/2)))) / (((gamma (8) gamma (11-1/2) gamma (11-8)))) = 5.2521982443916

Input interpretation:

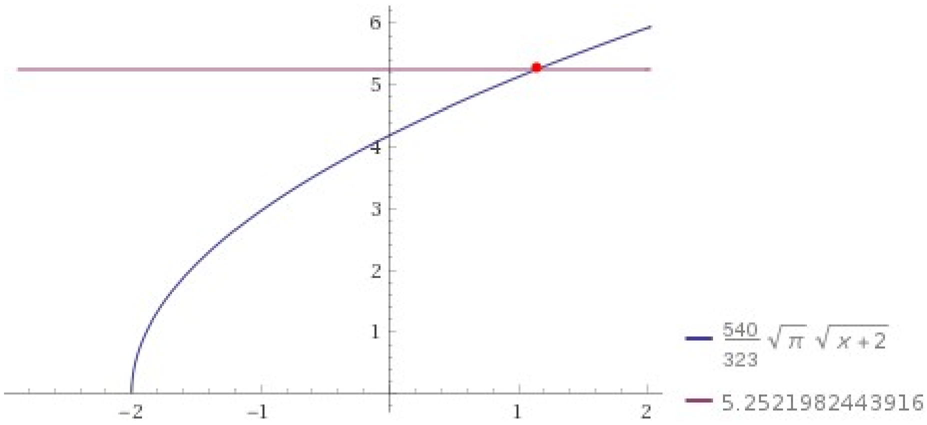
$$\frac{1}{2}\sqrt{x+2}\times\frac{\Gamma\left(8+\frac{1}{2}\right)\Gamma(11)\Gamma\left(11-8-\frac{1}{2}\right)}{\Gamma(8)\Gamma\left(11-\frac{1}{2}\right)\Gamma(11-8)} = 5.2521982443916$$

$\Gamma(x)$ is the gamma function

Result:

$$\frac{540}{323}\sqrt{\pi}\sqrt{x+2} = 5.2521982443916$$

Plot:



Alternate form assuming x is positive:

$$1.0000000000000\sqrt{x+2} = 1.7724538509055$$

Solution:

$$x \approx 1.1415926535897474$$

1.1415926535897474

From:

String Theory
University of Cambridge Part III Mathematical Tripos
David Tong – arXiv:0908.0333v3 [hep-th] 23 Feb 2012

We have:

$$\int d^2z\ |z|^{2a-2}|1-z|^{2b-2} = \frac{2\pi\Gamma(a)\Gamma(b)\Gamma(c)}{\Gamma(1-a)\Gamma(1-b)\Gamma(1-c)} \tag{6.11}$$

where $a+b+c=1$.

a = 0.3 ; b = 0.5 ; c = 0.2

[2Pi*gamma(0.3) gamma (0.5) gamma (0.2)] / [gamma (1-0.3) gamma (1-0.5) gamma (1-0.2)]

Input:

$$\frac{2\pi\,\Gamma(0.3)\,\Gamma(0.5)\,\Gamma(0.2)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}$$

$\Gamma(x)$ is the gamma function

Result:

57.1004...

57.1004…

Alternative representations:

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \frac{2.42006\,\pi}{\frac{0.230419\times0.357616\times0.603244\times1.15602}{0.603244\times0.806872\times0.88667}}$$

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \frac{2\pi\,e^{0.572365}\,e^{1.0958}\,e^{1.52406}}{e^{0.15206}\,e^{0.260867}\,e^{0.572365}}$$

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \frac{2\pi\,(-0.8)!\,(-0.7)!\,(-0.5)!}{(-0.5)!\,(-0.3)!\,(-0.2)!}$$

Series representations:

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \frac{18.6667\,\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.2^{k_1}\times0.3^{k_2}\,\Gamma^{(k_1)}(1)\,\Gamma^{(k_2)}(1)}{k_1!\,k_2!}}{\left(\sum_{k=0}^{\infty}\frac{0.7^k\,\Gamma^{(k)}(1)}{k!}\right)\sum_{k=0}^{\infty}\frac{0.8^k\,\Gamma^{(k)}(1)}{k!}}$$

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \frac{2\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.2-z_0)^{k_1}\,(0.3-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}}{\left(\sum_{k=0}^{\infty}\frac{(0.7-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(0.8-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}}$$

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

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \left(2\pi \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.7-z_0)^{k_1}\,(0.8-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\,\pi^{-j_1-j_2+k_1+k_2}\,\sin\left(\frac{1}{2}\pi(-j_1+k_1+2z_0)\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2+2z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right)\Big/\left(\left(\sum_{k=0}^{\infty}(0.2-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\sum_{k=0}^{\infty}(0.3-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

Integral representations:

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \int_0^1\int_0^1 \frac{1}{\log^{0.8}\left(\frac{1}{t_1}\right)\log^{0.7}\left(\frac{1}{t_2}\right)}\,dt_2\,dt_1$$

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \frac{2\pi\left(\int_0^\infty \frac{e^{-t}}{t^{0.8}}\,dt\right)\int_0^\infty \frac{e^{-t}}{t^{0.7}}\,dt}{\left(\int_0^\infty \frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty \frac{e^{-t}}{t^{0.2}}\,dt}$$

$$\frac{(2\pi\,\Gamma(0.3))\,(\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} = \frac{2\pi\csc(0.1\pi)\csc(0.15\pi)\left(\int_0^\infty \frac{\sin(t)}{t^{0.8}}\,dt\right)\int_0^\infty \frac{\sin(t)}{t^{0.7}}\,dt}{\csc(0.35\pi)\csc(0.4\pi)\left(\int_0^\infty \frac{\sin(t)}{t^{0.3}}\,dt\right)\int_0^\infty \frac{\sin(t)}{t^{0.2}}\,dt}$$

From which:

2((([2Pi*gamma(0.3) gamma (0.5) gamma (0.2)] / [gamma (1-0.3) gamma (1-0.5) gamma (1-0.2)])))+29-4

where 29 and 4 are Lucas numbers

Input:

$$2\times\frac{(2\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} + 29 - 4$$

$\Gamma(x)$ is the gamma function

Result:

139.201…

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

Alternative representations:

$$\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+29-4=25+\frac{4.84011\pi}{\frac{0.230419\times0.357616\times0.603244\times1.15602}{0.603244\times0.806872\times0.88667}}$$

$$\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+29-4=25+\frac{4\pi e^{0.572365}e^{1.0958}e^{1.52406}}{e^{0.15206}e^{0.260867}e^{0.572365}}$$

$$\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+29-4=25+\frac{4\pi(-0.8)!(-0.7)!(-0.5)!}{(-0.5)!(-0.3)!(-0.2)!}$$

Series representations:

$$\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+29-4=\left(37.3333\left(\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.2^{k_1}\times0.3^{k_2}\Gamma^{(k_1)}(1)\Gamma^{(k_2)}(1)}{k_1!k_2!}+0.669643\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.7^{k_1}\times0.8^{k_2}\Gamma^{(k_1)}(1)\Gamma^{(k_2)}(1)}{k_1!k_2!}\right)\right)\Bigg/\left(\left(\sum_{k=0}^{\infty}\frac{0.7^k\Gamma^{(k)}(1)}{k!}\right)\sum_{k=0}^{\infty}\frac{0.8^k\Gamma^{(k)}(1)}{k!}\right)$$

$$\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+29-4=\left(4\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.2-z_0)^{k_1}(0.3-z_0)^{k_2}\Gamma^{(k_1)}(z_0)\Gamma^{(k_2)}(z_0)}{k_1!k_2!}+25\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.7-z_0)^{k_1}(0.8-z_0)^{k_2}\Gamma^{(k_1)}(z_0)\Gamma^{(k_2)}(z_0)}{k_1!k_2!}\right)\Bigg/\left(\left(\sum_{k=0}^{\infty}\frac{(0.7-z_0)^k\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(0.8-z_0)^k\Gamma^{(k)}(z_0)}{k!}\right)\quad\text{for }(z_0\notin\mathbb{Z}\text{ or }z_0>0)$$

$$\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+29-4=$$

$$\left(25\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.2-z_0)^{k_1}\,(0.3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\,\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\,\pi\,(-j_1+k_1+2\,z_0)\right)\sin\left(\frac{1}{2}\,\pi\,(-j_2+k_2+2\,z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/\,(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)+4\,\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.7-z_0)^{k_1}\,(0.8-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\,\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\,\pi\,(-j_1+k_1+2\,z_0)\right)\sin\left(\frac{1}{2}\,\pi\,(-j_2+k_2+2\,z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/\,(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right)\Big/$$

$$\left(\left(\sum_{k=0}^{\infty}(0.2-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\sum_{k=0}^{\infty}(0.3-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

Integral representations:

$$\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+29-4=\frac{\int_0^1\int_0^1\frac{1}{\log^{0.8}\left(\frac{1}{t_1}\right)\log^{0.7}\left(\frac{1}{t_2}\right)}\,dt_2\,dt_1+\int_0^1\int_0^1\frac{1}{\log^{0.3}\left(\frac{1}{t_1}\right)\log^{0.2}\left(\frac{1}{t_2}\right)}\,dt_2\,dt_1}{\left(\int_0^1\frac{1}{\log^{0.3}\left(\frac{1}{t}\right)}\,dt\right)\int_0^1\frac{1}{\log^{0.2}\left(\frac{1}{t}\right)}\,dt}$$

$$\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+29-4=\frac{4\,\pi\left(\int_0^\infty\frac{e^{-t}}{t^{0.8}}\,dt\right)\int_0^\infty\frac{e^{-t}}{t^{0.7}}\,dt+25\left(\int_0^\infty\frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty\frac{e^{-t}}{t^{0.2}}\,dt}{\left(\int_0^\infty\frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty\frac{e^{-t}}{t^{0.2}}\,dt}$$

$$\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+29-4=25+\frac{4\,\pi}{\oint_L\frac{e^t}{t^{0.2}}\,dt\oint_L\frac{e^t}{t^{0.3}}\,dt}\oint_L\frac{e^t}{t^{0.7}}\,dt\oint_L\frac{e^t}{t^{0.8}}\,dt$$

2((([2Pi*gamma(0.3) gamma (0.5) gamma (0.2)] / [gamma (1-0.3) gamma (1-0.5) gamma (1-0.2)])))+18-7

where 18 and 7 are Lucas numbers

Input:

$$2 \times \frac{(2\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} + 18 - 7$$

$\Gamma(x)$ is the gamma function

Result:

125.201...

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

Alternative representations:

$$\frac{2\,((2\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} + 18 - 7 = 11 + \frac{4.84011\,\pi}{\frac{0.230419 \times 0.357616 \times 0.603244 \times 1.15602}{0.603244 \times 0.806872 \times 0.88667}}$$

$$\frac{2\,((2\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} + 18 - 7 = 11 + \frac{4\pi\,e^{0.572365}\,e^{1.0958}\,e^{1.52406}}{e^{0.15206}\,e^{0.260867}\,e^{0.572365}}$$

$$\frac{2\,((2\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} + 18 - 7 = 11 + \frac{4\pi\,(-0.8)!\,(-0.7)!\,(-0.5)!}{(-0.5)!\,(-0.3)!\,(-0.2)!}$$

Series representations:

$$\frac{2\,((2\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)} + 18 - 7 = \left(37.3333\left(\pi \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.2^{k_1} \times 0.3^{k_2}\,\Gamma^{(k_1)}(1)\,\Gamma^{(k_2)}(1)}{k_1!\,k_2!} + 0.294643 \sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.7^{k_1} \times 0.8^{k_2}\,\Gamma^{(k_1)}(1)\,\Gamma^{(k_2)}(1)}{k_1!\,k_2!}\right)\right) \Bigg/ \left(\left(\sum_{k=0}^{\infty}\frac{0.7^k\,\Gamma^{(k)}(1)}{k!}\right)\sum_{k=0}^{\infty}\frac{0.8^k\,\Gamma^{(k)}(1)}{k!}\right)$$

$$\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-7=$$

$$\left(4\,\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.2-z_0)^{k_1}\,(0.3-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}+11\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.7-z_0)^{k_1}\,(0.8-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}\right)\Big/\left(\left(\sum_{k=0}^{\infty}\frac{(0.7-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(0.8-z_0)^k\,\Gamma^{(k)}(z_0)}{k!}\right)\ \text{for } (z_0\notin\mathbb{Z} \text{ or } z_0>0)$$

$$\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-7=$$

$$\left(11\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.2-z_0)^{k_1}\,(0.3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\,\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\,\pi\,(-j_1+k_1+2\,z_0)\right)\sin\left(\frac{1}{2}\,\pi\,(-j_2+k_2+2\,z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)+4\,\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.7-z_0)^{k_1}\,(0.8-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\,\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\,\pi\,(-j_1+k_1+2\,z_0)\right)\sin\left(\frac{1}{2}\,\pi\,(-j_2+k_2+2\,z_0)\right)\Gamma^{(j_1)}(1-z_0)\,\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right)\Big/\left(\left(\sum_{k=0}^{\infty}(0.2-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\sum_{k=0}^{\infty}(0.3-z_0)^k\sum_{j=0}^{k}\frac{(-1)^j\,\pi^{-j+k}\sin\left(\frac{1}{2}\,\pi\,(-j+k+2\,z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)$$

Integral representations:

$$\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-7=$$

$$\frac{\int_0^1\int_0^1\frac{1}{\log^{0.8}\left(\frac{1}{t_1}\right)\log^{0.7}\left(\frac{1}{t_2}\right)}\,dt_2\,dt_1+\int_0^1\int_0^1\frac{1}{\log^{0.3}\left(\frac{1}{t_1}\right)\log^{0.2}\left(\frac{1}{t_2}\right)}\,dt_2\,dt_1}{\left(\int_0^1\frac{1}{\log^{0.3}\left(\frac{1}{t}\right)}\,dt\right)\int_0^1\frac{1}{\log^{0.2}\left(\frac{1}{t}\right)}\,dt}$$

$$\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+18-7=$$
$$\frac{4\pi\left(\int_0^\infty \frac{e^{-t}}{t^{0.8}}\,dt\right)\int_0^\infty \frac{e^{-t}}{t^{0.7}}\,dt+11\left(\int_0^\infty \frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty \frac{e^{-t}}{t^{0.2}}\,dt}{\left(\int_0^\infty \frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty \frac{e^{-t}}{t^{0.2}}\,dt}$$

$$\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+18-7=11+\frac{4\pi}{\oint_L \frac{e^t}{t^{0.2}}\,dt\oint_L \frac{e^t}{t^{0.3}}\,dt}\oint_L \frac{e^t}{t^{0.7}}\,dt\oint_L \frac{e^t}{t^{0.8}}\,dt$$

27*1/2((2((([2Pi*gamma(0.3) gamma (0.5) gamma (0.2)] / [gamma (1-0.3) gamma (1-0.5) gamma (1-0.2)])))+18-4))-golden ratio

Input:

$$27\times\frac{1}{2}\left(2\times\frac{(2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2)}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+18-4\right)-\phi$$

$\Gamma(x)$ is the gamma function

ϕ is the golden ratio

Result:

1729.09...

1729.09…

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternative representations:

$$\frac{27}{2}\left(\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+18-4\right)-\phi=$$
$$-\phi+\frac{27}{2}\left(14+\frac{4.84011\pi}{\frac{0.230419\times0.357616\times0.603244\times1.15602}{0.603244\times0.806872\times0.88667}}\right)$$

$$\frac{27}{2}\left(\frac{2\left(\left(2\pi\,\Gamma(0.3)\right)\Gamma(0.5)\,\Gamma(0.2)\right)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-4\right)-\phi = -\phi+\frac{27}{2}\left(14+\frac{4\pi\,e^{0.572365}\,e^{1.0958}\,e^{1.52406}}{e^{0.15206}\,e^{0.260867}\,e^{0.572365}}\right)$$

$$\frac{27}{2}\left(\frac{2\left(\left(2\pi\,\Gamma(0.3)\right)\Gamma(0.5)\,\Gamma(0.2)\right)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-4\right)-\phi = -\phi+\frac{27}{2}\left(14+\frac{4\pi\,(-0.8)!\,(-0.7)!\,(-0.5)!}{(-0.5)!\,(-0.3)!\,(-0.2)!}\right)$$

Series representations:

$$\frac{27}{2}\left(\frac{2\left(\left(2\pi\,\Gamma(0.3)\right)\Gamma(0.5)\,\Gamma(0.2)\right)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-4\right)-\phi = -\left(\left(-504.\,\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.2^{k_1}\times 0.3^{k_2}\,\Gamma^{(k_1)}(1)\,\Gamma^{(k_2)}(1)}{k_1!\,k_2!} - 189\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.7^{k_1}\times 0.8^{k_2}\,\Gamma^{(k_1)}(1)\,\Gamma^{(k_2)}(1)}{k_1!\,k_2!} + \phi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{0.7^{k_1}\times 0.8^{k_2}\,\Gamma^{(k_1)}(1)\,\Gamma^{(k_2)}(1)}{k_1!\,k_2!}\right)\Bigg/\left(\left(\sum_{k=0}^{\infty}\frac{0.7^{k}\,\Gamma^{(k)}(1)}{k!}\right)\sum_{k=0}^{\infty}\frac{0.8^{k}\,\Gamma^{(k)}(1)}{k!}\right)\right)$$

$$\frac{27}{2}\left(\frac{2\left(\left(2\pi\,\Gamma(0.3)\right)\Gamma(0.5)\,\Gamma(0.2)\right)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-4\right)-\phi = -\left(\left(-54\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.2-z_0)^{k_1}\,(0.3-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!} - 189\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.7-z_0)^{k_1}\,(0.8-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!} + \phi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(0.7-z_0)^{k_1}\,(0.8-z_0)^{k_2}\,\Gamma^{(k_1)}(z_0)\,\Gamma^{(k_2)}(z_0)}{k_1!\,k_2!}\right)\Bigg/\left(\left(\sum_{k=0}^{\infty}\frac{(0.7-z_0)^{k}\,\Gamma^{(k)}(z_0)}{k!}\right)\sum_{k=0}^{\infty}\frac{(0.8-z_0)^{k}\,\Gamma^{(k)}(z_0)}{k!}\right)\right) \quad \text{for } (z_0 \notin \mathbb{Z} \text{ or } z_0 > 0)$$

$$\frac{27}{2}\left(\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+18-4\right)-\phi =$$

$$-\left(\left(-189\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.2-z_0)^{k_1}(0.3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\pi(-j_1+k_1)+\pi z_0\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2)+\pi z_0\right)\Gamma^{(j_1)}(1-z_0)\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)+\right.\right.$$

$$\phi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.2-z_0)^{k_1}(0.3-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\pi(-j_1+k_1)+\pi z_0\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2)+\pi z_0\right)\Gamma^{(j_1)}(1-z_0)\Gamma^{(j_2)}(1-z_0)\right)\Big/(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)-$$

$$54\pi\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}(0.7-z_0)^{k_1}(0.8-z_0)^{k_2}\sum_{j_1=0}^{k_1}\sum_{j_2=0}^{k_2}\left((-1)^{j_1+j_2}\pi^{-j_1-j_2+k_1+k_2}\sin\left(\frac{1}{2}\pi(-j_1+k_1)+\pi z_0\right)\sin\left(\frac{1}{2}\pi(-j_2+k_2)+\pi z_0\right)\Gamma^{(j_1)}(1-z_0)\Gamma^{(j_2)}(1-z_0)\right)\Big/$$

$$\left.(j_1!\,j_2!\,(-j_1+k_1)!\,(-j_2+k_2)!)\right)\Big/$$

$$\left(\left(\sum_{k=0}^{\infty}(0.2-z_0)^{k}\sum_{j=0}^{k}\frac{(-1)^{j}\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\sum_{k=0}^{\infty}(0.3-z_0)^{k}\sum_{j=0}^{k}\frac{(-1)^{j}\pi^{-j+k}\sin\left(\frac{1}{2}\pi(-j+k+2z_0)\right)\Gamma^{(j)}(1-z_0)}{j!\,(-j+k)!}\right)\right)$$

Integral representations:

$$\frac{27}{2}\left(\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+18-4\right)-\phi =$$

$$-\frac{\int_0^1\int_0^1\frac{1}{\log^{0.8}\left(\frac{1}{t_1}\right)\log^{0.7}\left(\frac{1}{t_2}\right)}\,dt_2\,dt_1+2\int_0^1\int_0^1\frac{1}{\log^{0.3}\left(\frac{1}{t_1}\right)\log^{0.2}\left(\frac{1}{t_2}\right)}\,dt_2\,dt_1}{\left(\int_0^1\frac{1}{\log^{0.3}\left(\frac{1}{t}\right)}\,dt\right)\int_0^1\frac{1}{\log^{0.2}\left(\frac{1}{t}\right)}\,dt}$$

$$\frac{27}{2}\left(\frac{2((2\pi\Gamma(0.3))\Gamma(0.5)\Gamma(0.2))}{\Gamma(1-0.3)\Gamma(1-0.5)\Gamma(1-0.2)}+18-4\right)-\phi =$$

$$-\frac{-54\pi\left(\int_0^\infty\frac{e^{-t}}{t^{0.8}}\,dt\right)\int_0^\infty\frac{e^{-t}}{t^{0.7}}\,dt-189\left(\int_0^\infty\frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty\frac{e^{-t}}{t^{0.2}}\,dt+\phi\left(\int_0^\infty\frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty\frac{e^{-t}}{t^{0.2}}\,dt}{\left(\int_0^\infty\frac{e^{-t}}{t^{0.3}}\,dt\right)\int_0^\infty\frac{e^{-t}}{t^{0.2}}\,dt}$$

$$\frac{27}{2}\left(\frac{2\,((2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2))}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-4\right)-\phi = 189-\phi+\frac{54\,\pi}{\oint_L \frac{e^t}{t^{0.2}}\,dt \oint_L \frac{e^t}{t^{0.3}}\,dt}\oint_L \frac{e^t}{t^{0.7}}\,dt \oint_L \frac{e^t}{t^{0.8}}\,dt$$

and:

((27*1/2((2((([2Pi*gamma(0.3) gamma (0.5) gamma (0.2)] / [gamma (1-0.3) gamma (1-0.5) gamma (1-0.2)])))+18-4))-golden ratio))^1/15

Input:

$$\sqrt[15]{27\times\frac{1}{2}\left(2\times\frac{(2\,\pi\,\Gamma(0.3))\,\Gamma(0.5)\,\Gamma(0.2)}{\Gamma(1-0.3)\,\Gamma(1-0.5)\,\Gamma(1-0.2)}+18-4\right)-\phi}$$

$\Gamma(x)$ is the gamma function

ϕ is the golden ratio

Result:

1.643821...

$1.643821\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Observations

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

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

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

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

From Wikipedia

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

Can be this the motivation that from the development of the Ramanujan's equations we obtain results very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV and practically equal to the rest mass of Pion meson 139.57 MeV

Note that:

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

Hence

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

so that

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

Hence

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

Thence:

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

And

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

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

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

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

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

The beginning of the sequence is thus:

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

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

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

The sequence of Lucas numbers is:

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

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

A Lucas prime is a Lucas number that is prime. The first few Lucas primes are:
2, 3, 7, 11, 29, 47, 199, 521, 2207, 3571, 9349, 3010349, 54018521, 370248451, 6643838879, ... (sequence A005479 in the OEIS).

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

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

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

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

References

SUPERSTRING THEORY
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