New mathematical connections between various solutions of Ramanujan's equations, approximations to π and some parameters of Particle Physics (Yukawa's Pion) and Cosmology (value of Cosmological Constant). XV

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Abstract

In this research thesis, we have analyzed further Ramanujan formulas and described further possible mathematical connections with some parameters of Particle Physics (Yukawa's Pion) and Cosmology, principally the value of Cosmological Constant.

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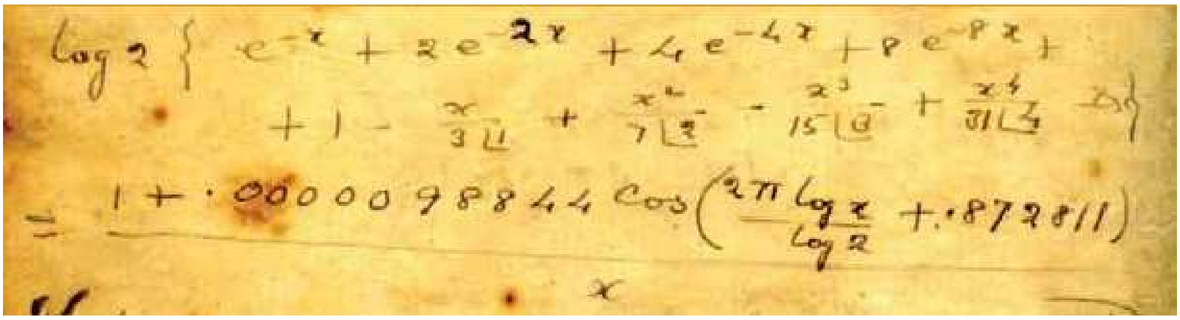
https://www.britannica.com/biography/Srinivasa-Ramanujan

https://it.wikipedia.org/wiki/Hideki_Yukawa

From:

MANUSCRIPT BOOK 3 OF SRINIVASA RAMANUJAN

Page 7



For x = 5

1/5*((((1+0.0000098844 cos ((2Pi*ln(5))/(ln2)+0.872811)))))

Input interpretation:

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)$$

log(x) is the natural logarithm

Result:

0.19999808266...

0.19999808266…

Addition formulas:

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)= 0.2+1.97688\times10^{-6}\cos(0.872811)\cos\left(\frac{2\pi\log(5)}{\log(2)}\right)- 1.97688\times10^{-6}\sin(0.872811)\sin\left(\frac{2\pi\log(5)}{\log(2)}\right)$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)= \frac{1}{5}+1.97688\times10^{-6}\cos(0.872811)\cos\left(-\frac{2\pi\log(5)}{\log(2)}\right)+ 1.97688\times10^{-6}\sin(0.872811)\sin\left(-\frac{2\pi\log(5)}{\log(2)}\right)$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)= 0.2+1.97688\times10^{-6}\cosh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)- 1.97688\times10^{-6}\,i\sinh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}+1.97688\times10^{-6}\cosh\left(\frac{2 i\pi\log(5)}{\log(2)}\right)\cos(0.872811)+$$
$$1.97688\times10^{-6}\, i\sinh\left(\frac{2 i\pi\log(5)}{\log(2)}\right)\sin(0.872811)$$

Alternative representations:

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cosh\left(i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cosh\left(-i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}\left(1+4.9422\times10^{-6}\left(e^{-i(0.872811+(2\pi\log(5))/\log(2))}+e^{i(0.872811+(2\pi\log(5))/\log(2))}\right)\right)$$

Series representations:

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}+1.97688\times10^{-6}\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)^{2k}}{(2k)!}$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}-1.97688\times10^{-6}\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\pi\left(-\frac{1}{2}+\frac{2\log(5)}{\log(2)}\right)\right)^{1+2k}}{(1+2k)!}$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}+1.97688\times10^{-6}\sum_{k=0}^{\infty}\frac{\cos\left(\frac{k\pi}{2}+z_0\right)\left(0.872811+\frac{2\pi\log(5)}{\log(2)}-z_0\right)^k}{k!}$$

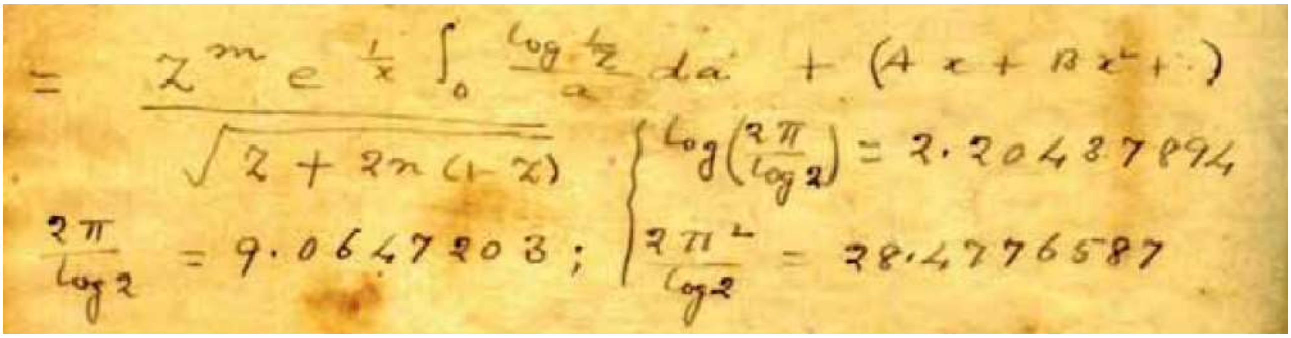
Integral representations:

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}-1.97688\times10^{-6}\int_{\frac{\pi}{2}}^{0.872811+\frac{2\pi\log(5)}{\log(2)}}\sin(t)\,dt$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=0.200002+$$
$$\int_0^1\frac{\left(-1.72544\times10^{-6}\log(2)-3.95376\times10^{-6}\pi\log(5)\right)\sin\left(t\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)}{\log(2)}\,dt$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$\frac{1}{5}+\frac{9.8844\times10^{-7}\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\frac{(0.436406\log(2)+\pi\log(5))^2}{s\log^2(2)}}}{\sqrt{s}}\,ds \quad \text{for } \gamma>0$$

$$\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)=$$
$$0.2+\frac{9.8844\times10^{-7}\sqrt{\pi}}{i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{4^s\,\Gamma(s)\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)^{-2s}}{\Gamma\left(\frac{1}{2}-s\right)}\,ds \quad \text{for } 0<\gamma<\frac{1}{2}$$



(2Pi)/ln2 + ln((2Pi)/(ln2)) + (2Pi^2)/(ln2)

Input:

$$\frac{2\pi}{\log(2)}+\log\left(\frac{2\pi}{\log(2)}\right)+\frac{2\pi^2}{\log(2)}$$

$\log(x)$ is the natural logarithm

Decimal approximation:

39.746768920620408297549815945210929263161338205889567319 96...

39.74676892….

Alternate forms:

$$\frac{2\pi(1+\pi)}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right)$$

$$\frac{2\pi + 2\pi^2 + \log(2)\log\left(\frac{2\pi}{\log(2)}\right)}{\log(2)}$$

$$\frac{2\pi + 2\pi^2 + \log(2)\log(\pi) - \log(2)(\log(\log(2)) - \log(2))}{\log(2)}$$

Alternative representations:

$$\frac{2\pi}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi^2}{\log(2)} = \log_e\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi}{\log_e(2)} + \frac{2\pi^2}{\log_e(2)}$$

$$\frac{2\pi}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi^2}{\log(2)} = \log(a)\log_a\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi}{\log(a)\log_a(2)} + \frac{2\pi^2}{\log(a)\log_a(2)}$$

$$\frac{2\pi}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi^2}{\log(2)} = -\text{Li}_1\left(1 - \frac{2\pi}{\log(2)}\right) + -\frac{2\pi}{\text{Li}_1(-1)} + -\frac{2\pi^2}{\text{Li}_1(-1)}$$

Series representations:

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

$$\frac{2\pi}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi^2}{\log(2)} = \left(-2\pi - 2\pi^2 + 4\pi^2 \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor \left\lfloor \frac{\arg\left(-x + \frac{2\pi}{\log(2)}\right)}{2\pi} \right\rfloor - 2i\pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor \log(x) - 2i\pi \left\lfloor \frac{\arg\left(-x + \frac{2\pi}{\log(2)}\right)}{2\pi} \right\rfloor \log(x) - \log^2(x) + 2i\pi \left\lfloor \frac{\arg\left(-x + \frac{2\pi}{\log(2)}\right)}{2\pi} \right\rfloor \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k} + \log(x) \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k} + 2i\pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor \sum_{k=1}^{\infty} \frac{(-1)^k x^{-k} \left(-x + \frac{2\pi}{\log(2)}\right)^k}{k} + \log(x) \sum_{k=1}^{\infty} \frac{(-1)^k x^{-k} \left(-x + \frac{2\pi}{\log(2)}\right)^k}{k} - \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{(-1)^{k_1+k_2} (2-x)^{k_1} x^{-k_1-k_2} \left(-x + \frac{2\pi}{\log(2)}\right)^{k_2}}{k_1 k_2}\right) \Big/ \left(-2i\pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor - \log(x) + \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k}\right) \quad \text{for } x < 0$$

$$\frac{2\pi}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi^2}{\log(2)} = \left(-2\pi - 2\pi^2 + 4\pi^2 \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor^2 - 4i\pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor \log(z_0) - \log^2(z_0) + 2i\pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k} + \log(z_0) \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k} + 2i\pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{2\pi}{\log(2)} - z_0\right)^k z_0^{-k}}{k} + \log(z_0) \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{2\pi}{\log(2)} - z_0\right)^k z_0^{-k}}{k} - \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{(-1)^{k_1+k_2} (2-z_0)^{k_1} \left(\frac{2\pi}{\log(2)} - z_0\right)^{k_2} z_0^{-k_1-k_2}}{k_1 k_2}\right) \Big/ \left(-2i\pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor - \log(z_0) + \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}\right)$$

Integral representations:

$$\frac{2\pi}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi^2}{\log(2)} = \frac{2\pi + 2\pi^2 + \log(2)\int_0^1\int_0^1 \frac{1}{(1+t_1)(\log(2)+(2\pi-\log(2))t_2)}\,dt_2\,dt_1}{\int_1^2 \frac{1}{t}\,dt}$$

$$\frac{2\pi}{\log(2)} + \log\left(\frac{2\pi}{\log(2)}\right) + \frac{2\pi^2}{\log(2)} = \frac{i\left(8\pi^3 + 8\pi^4 - \left(\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{2\pi}{\log(2)}\right)^{-s}}{\Gamma(1-s)}\,ds\right)}{2\pi\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds} \text{ for } -1 < \gamma < 0$$

sqrt[(2Pi)/ln2 * ln((2Pi)/(ln2)) * (2Pi^2)/(ln2) + 7]

Where 7 is a Lucas number

Input:

$$\sqrt{\frac{2\pi}{\log(2)}\log\left(\frac{2\pi}{\log(2)}\right) \times \frac{2\pi^2}{\log(2)} + 7}$$

log(x) is the natural logarithm

Exact result:

$$\sqrt{7 + \frac{4\pi^3 \log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}}$$

Decimal approximation:

24.000951273972964462435397682978188555276298865466756508 85...

24.0009512739…

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

Alternate forms:

$$\sqrt{7+\frac{4\pi^3(\log(2)+\log(\pi)-\log(\log(2)))}{\log^2(2)}}$$

$$\frac{\sqrt{7\log^2(2)+4\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}}{\log(2)}$$

$$\frac{\sqrt{7\log^2(2)+4\pi^3\log(\pi)-4\pi^3\log\left(\frac{\log(2)}{2}\right)}}{\log(2)}$$

All 2nd roots of 7 + (4 π^3 log((2 π)/log(2)))/(log^2(2)):

$$e^0\sqrt{7+\frac{4\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}}\approx 24.00 \text{ (real, principal root)}$$

$$e^{i\pi}\sqrt{7+\frac{4\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}}\approx -24.00 \text{ (real root)}$$

Alternative representations:

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7}=\sqrt{7+4\pi\log_e\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log_e(2)}\right)^2}$$

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7}=\sqrt{7+4\pi\log(a)\log_a\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log(a)\log_a(2)}\right)^2}$$

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7}=\sqrt{7-4\pi\,\mathrm{Li}_1\left(1-\frac{2\pi}{\log(2)}\right)\pi^2\left(-\frac{1}{\mathrm{Li}_1(-1)}\right)^2}$$

Series representations:

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7} = \sqrt{7+\frac{4\pi^3\left(2i\pi\left\lfloor\frac{\arg\left(-x+\frac{2\pi}{\log(2)}\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}\left(-x+\frac{2\pi}{\log(2)}\right)^k}{k}\right)}{\left(2i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}}{k}\right)^2}} \quad \text{for } x<0$$

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7} = \sqrt{7+\frac{4\pi^3\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{2\pi}{\log(2)}-z_0\right)^k z_0^{-k}}{k}\right)}{\left(2i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}}$$

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7} = \sqrt{7+\frac{4\pi^3\left(\log(z_0)+\left\lfloor\frac{\arg\left(\frac{2\pi}{\log(2)}-z_0\right)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{2\pi}{\log(2)}-z_0\right)^k z_0^{-k}}{k}\right)}{\left(\log(z_0)+\left\lfloor\frac{\arg(2-z_0)}{2\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{(-1)^k(2-z_0)^k z_0^{-k}}{k}\right)^2}}$$

Integral representations:

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7} = \sqrt{7+\frac{4\pi^3\int_1^{\frac{2\pi}{\log(2)}}\frac{1}{t}\,dt}{\left(\int_1^2\frac{1}{t}\,dt\right)^2}}$$

$$\sqrt{\frac{\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)(2\pi)}{\log(2)\log(2)}+7} = \sqrt{7+\frac{8i\pi^4\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)\left(-1+\frac{2\pi}{\log(2)}\right)^{-s}}{\Gamma(1-s)}\,ds}{\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\right)^2}}$$

for $-1<\gamma<0$

(((1/5*((((1+0.0000098844 cos ((2Pi*ln(5))/(ln2)+0.872811))))))) * [(2Pi)/ln2 * ln((2Pi)/(ln2)) * (2Pi^2)/(ln2)]+11+1/golden ratio

Where 11 is a Lucas number

Input interpretation:

$$\left(\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\right)\left(\frac{2\pi}{\log(2)}\log\left(\frac{2\pi}{\log(2)}\right)\times\frac{2\pi^2}{\log(2)}\right)+11+\frac{1}{\phi}$$

log(x) is the natural logarithm

ϕ is the golden ratio

Result:

125.42607534...

125.42607534... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

Addition formulas:

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{1}{\log^2(2)}7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cos(0.872811)\cos\left(-\frac{2\pi\log(5)}{\log(2)}\right)+\sin(0.872811)\sin\left(-\frac{2\pi\log(5)}{\log(2)}\right)\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{1}{\log^2(2)}7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cos(0.872811)\cos\left(\frac{2\pi\log(5)}{\log(2)}\right)-\sin(0.872811)\sin\left(\frac{2\pi\log(5)}{\log(2)}\right)\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{1}{\log^2(2)}7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cosh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)-i\left(\sinh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{1}{\log^2(2)}\,7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cosh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)+i\sinh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)$$

Alternative representations:

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{4}{5}\pi\left(1+9.8844\times10^{-6}\cosh\left(-i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)\log\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log(2)}\right)^2$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{4}{5}\pi\log\left(\frac{2\pi}{\log(2)}\right)\left(1+4.9422\times10^{-6}\left(e^{-i(0.872811+(2\pi\log(5))/\log(2))}+e^{i(0.872811+(2\pi\log(5))/\log(2))}\right)\right)\pi^2\left(\frac{1}{\log(2)}\right)^2$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{4}{5}\pi\left(1+9.8844\times10^{-6}\cosh\left(i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)\log_e\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log_e(2)}\right)^2$$

Series representations:

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{0.8\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}+\frac{7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)^{2k}}{(2k)!}}{\log^2(2)}$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=11+\frac{1}{\phi}+\frac{4\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{5\log^2(2)}-\frac{7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\pi\left(-\frac{1}{2}+\frac{2\log(5)}{\log(2)}\right)\right)^{1+2k}}{(1+2k)!}}{\log^2(2)}$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{0.8\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}+$$
$$\frac{7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\sum_{k=0}^{\infty}\frac{\cos\left(\frac{k\pi}{2}+z_0\right)\left(0.872811+\frac{2\pi\log(5)}{\log(2)}-z_0\right)^k}{k!}}{\log^2(2)}$$

Integral representations:

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}-\frac{1}{\log^3(2)}0.000015815\pi^3\left(-50585.3\log(2)+\right.$$
$$\left.0.436406\log(2)+\pi\log(5)\int_0^1\sin\left(t\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)dt\right)\log\left(\frac{2\pi}{\log(2)}\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{0.8\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}-\frac{7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}\int_{\frac{\pi}{2}}^{0.872811+\frac{2\pi\log(5)}{\log(2)}}\sin(t)\,dt$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+11+\frac{1}{\phi}=$$
$$-\frac{1}{\phi\left(\int_1^2\frac{1}{t}\,dt\right)^2\log(2)}0.000015815$$
$$\left(-63230.9\left(\int_1^2\frac{1}{t}\,dt\right)^2\log(2)-695540.\,\phi\left(\int_1^2\frac{1}{t}\,dt\right)^2\log(2)-50585.3\,\phi\,\pi^3\log(2)\right.$$
$$\left.\int_1^{\frac{2\pi}{\log(2)}}\frac{1}{t}\,dt+2\log(2)\int_0^1\int_0^1\frac{\sin\left(\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)t_2\right)}{\log(2)+(2\pi-\log(2))t_1}\,dt_2\,dt_1\right)$$

and:

(((1/5*(((((1+0.0000098844 cos ((2Pi*ln(5))/(ln2)+0.872811)))))))) * [(2Pi)/ln2 * ln((2Pi)/(ln2)) * (2Pi^2)/(ln2)]+29-Pi

Where 29 is a Lucas number

Input interpretation:

$$\left(\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\right)\left(\frac{2\pi}{\log(2)}\log\left(\frac{2\pi}{\log(2)}\right)\times\frac{2\pi^2}{\log(2)}\right)+29-\pi$$

log(x) is the natural logarithm

Result:

139.66644870...

139.66644870… result practically equal to the rest mass of Pion meson 139.57 MeV

Addition formulas:

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+29-\pi=$$
$$29-\pi+\frac{1}{\log^2(2)}7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cos(0.872811)\cos\left(-\frac{2\pi\log(5)}{\log(2)}\right)+\sin(0.872811)\sin\left(-\frac{2\pi\log(5)}{\log(2)}\right)\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+29-\pi=$$
$$29-\pi+\frac{1}{\log^2(2)}7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cos(0.872811)\cos\left(\frac{2\pi\log(5)}{\log(2)}\right)-\sin(0.872811)\sin\left(\frac{2\pi\log(5)}{\log(2)}\right)\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+29-\pi=$$
$$29-\pi+\frac{1}{\log^2(2)}7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cosh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)-i\left(\sinh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))5}+29-\pi=$$
$$29-\pi+\frac{1}{\log^2(2)}7.90752\times10^{-6}\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\left(101170.+\cosh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)+i\sinh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)$$

Alternative representations:

$$\frac{((2\pi)\log(\frac{2\pi}{\log(2)})(2\pi^2))(1+9.8844\times10^{-6}\cos(\frac{2\pi\log(5)}{\log(2)}+0.872811))}{(\log(2)\log(2))5}+29-\pi = 29-\pi+\frac{4}{5}\pi\left(1+9.8844\times10^{-6}\cosh\left(-i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)\log\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log(2)}\right)^2$$

$$\frac{((2\pi)\log(\frac{2\pi}{\log(2)})(2\pi^2))(1+9.8844\times10^{-6}\cos(\frac{2\pi\log(5)}{\log(2)}+0.872811))}{(\log(2)\log(2))5}+29-\pi = 29-\pi+\frac{4}{5}\pi\log\left(\frac{2\pi}{\log(2)}\right)\left(1+4.9422\times10^{-6}\left(e^{-i(0.872811+(2\pi\log(5))/\log(2))}+e^{i(0.872811+(2\pi\log(5))/\log(2))}\right)\right)\pi^2\left(\frac{1}{\log(2)}\right)^2$$

$$\frac{((2\pi)\log(\frac{2\pi}{\log(2)})(2\pi^2))(1+9.8844\times10^{-6}\cos(\frac{2\pi\log(5)}{\log(2)}+0.872811))}{(\log(2)\log(2))5}+29-\pi = 29-\pi+\frac{4}{5}\pi\left(1+9.8844\times10^{-6}\cosh\left(i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)\log_e\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log_e(2)}\right)^2$$

Series representations:

$$\frac{((2\pi)\log(\frac{2\pi}{\log(2)})(2\pi^2))(1+9.8844\times10^{-6}\cos(\frac{2\pi\log(5)}{\log(2)}+0.872811))}{(\log(2)\log(2))5}+29-\pi = 29-\pi+\frac{0.8\pi^3\log(\frac{2\pi}{\log(2)})}{\log^2(2)}+\frac{7.90752\times10^{-6}\pi^3\log(\frac{2\pi}{\log(2)})\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)^{2k}}{(2k)!}}{\log^2(2)}$$

$$\frac{((2\pi)\log(\frac{2\pi}{\log(2)})(2\pi^2))(1+9.8844\times10^{-6}\cos(\frac{2\pi\log(5)}{\log(2)}+0.872811))}{(\log(2)\log(2))5}+29-\pi = 29-\pi+\frac{4\pi^3\log(\frac{2\pi}{\log(2)})}{5\log^2(2)}-\frac{7.90752\times10^{-6}\pi^3\log(\frac{2\pi}{\log(2)})\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\pi\left(-\frac{1}{2}+\frac{2\log(5)}{\log(2)}\right)\right)^{1+2k}}{(1+2k)!}}{\log^2(2)}$$

$$\frac{((2\pi)\log(\frac{2\pi}{\log(2)})(2\pi^2))(1+9.8844\times10^{-6}\cos(\frac{2\pi\log(5)}{\log(2)}+0.872811))}{(\log(2)\log(2))5}+29-\pi = 29-\pi+\frac{0.8\pi^3\log(\frac{2\pi}{\log(2)})}{\log^2(2)}+\frac{7.90752\times10^{-6}\pi^3\log(\frac{2\pi}{\log(2)})\sum_{k=0}^{\infty}\frac{\cos\left(\frac{k\pi}{2}+z_0\right)\left(0.872811+\frac{2\pi\log(5)}{\log(2)}-z_0\right)^k}{k!}}{\log^2(2)}$$

Integral representations:

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))\,5}+29-\pi=$$
$$29-\pi-\frac{1}{\log^3(2)}\,0.000015815\,\pi^3\left(-50\,585.3\log(2)+0.436406\log(2)+\pi\log(5)\int_0^1\sin\left(t\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)dt\right)\log\left(\frac{2\pi}{\log(2)}\right)$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))\,5}+29-\pi=$$
$$29-\pi+\frac{0.8\,\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}-\frac{7.90752\times10^{-6}\,\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}\int_{\frac{\pi}{2}}^{0.872811+\frac{2\pi\log(5)}{\log(2)}}\sin(t)\,dt$$

$$\frac{\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{(\log(2)\log(2))\,5}+29-\pi=$$
$$-\frac{1}{\left(\int_1^2\frac{1}{t}\,dt\right)^2\log(2)}\,0.000015815\left(-1.8337\times10^6\left(\int_1^2\frac{1}{t}\,dt\right)^2\log(2)+63\,230.9\,\pi\left(\int_1^2\frac{1}{t}\,dt\right)^2\log(2)-50\,585.3\,\pi^3\log(2)\int_1^{\frac{2\pi}{\log(2)}}\frac{1}{t}\,dt+2\log(2)\int_0^1\int_0^1\frac{\sin\left(\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)t_2\right)}{\log(2)+(2\pi-\log(2))\,t_1}\,dt_2\,dt_1\right)$$

[(2Pi)/ln2 * ln((2Pi)/(ln2)) * (2Pi^2)/(ln2)] *1/ (((1/5*((((1+0.0000098844 cos ((2Pi*ln(5))/(ln2)+0.872811))))))))+123+11+4

Where 123, 11 and 4 are Lucas numbers

Input interpretation:

$$\left(\frac{2\pi}{\log(2)}\log\left(\frac{2\pi}{\log(2)}\right)\times\frac{2\pi^2}{\log(2)}\right)\times\frac{1}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}+123+11+4$$

log(x) is the natural logarithm

Result:

2983.2555869...

2983.2555869… result very near to the rest mass of Charmed eta meson 2980.3 MeV

Addition formulas:

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=138+\left(20\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\right)\Big/\left(\log^2(2)\left(1+9.8844\times10^{-6}\cos(0.872811)\cos\left(-\frac{2\pi\log(5)}{\log(2)}\right)+9.8844\times10^{-6}\sin(0.872811)\sin\left(-\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=138+\frac{2.02339\times10^6\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)\left(101170.+\cos(0.872811)\cos\left(\frac{2\pi\log(5)}{\log(2)}\right)-\sin(0.872811)\sin\left(\frac{2\pi\log(5)}{\log(2)}\right)\right)}$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=138+\left(20\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\right)\Big/\left(\log^2(2)\left(1+9.8844\times10^{-6}\cosh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)+9.8844\times10^{-6}\,i\sinh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)\right)$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=138+\left(2.02339\times10^6\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\right)\Big/\left(\log^2(2)\left(101170.+\cosh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)-i\left(\sinh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)\right)\right)$$

Alternative representations:

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=$$
$$138+\frac{4\pi\log\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log(2)}\right)^2}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cosh\left(-i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)}$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=$$
$$138+\frac{4\pi\log_e\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log_e(2)}\right)^2}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cosh\left(i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)}$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=$$
$$138+\frac{4\pi\log_e\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log_e(2)}\right)^2}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cosh\left(-i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)}$$

Series representations:

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=$$
$$138+\frac{20\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)\left(1+9.8844\times10^{-6}\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)^{2k}}{(2k)!}\right)}$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4=$$
$$138+\frac{20\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)\left(1-9.8844\times10^{-6}\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\pi\left(-\frac{1}{2}+\frac{2\log(5)}{\log(2)}\right)\right)^{1+2k}}{(1+2k)!}\right)}$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4 =$$

$$138+\frac{20\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)\left(1+9.8844\times10^{-6}\sum_{k=0}^{\infty}\frac{\cos\left(\frac{k\pi}{2}+z_0\right)\left(0.872811+\frac{2\pi\log(5)}{\log(2)}-z_0\right)^k}{k!}\right)}$$

Integral representations:

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4 =$$

$$138+\frac{20\pi^3\log\left(\frac{2\pi}{\log(2)}\right)}{\left(1-9.8844\times10^{-6}\int_{\frac{\pi}{2}}^{0.872811+\frac{2\pi\log(5)}{\log(2)}}\sin(t)\,dt\right)\log^2(2)}$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4 =$$

$$138-\left(1.0117\times10^6\pi^3\log\left(\frac{2\pi}{\log(2)}\right)\right)\Big/\left(\log(2)\left(-50\,585.3\log(2)+0.436406\log(2)+\pi\log(5)\int_0^1\sin\left(t\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)dt\right)\right)$$

$$\frac{(2\pi)\left(\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)}{\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\log(2)\log(2)}+123+11+4 =$$

$$\left(20\left(6.9\,i\pi\left(\int_1^2\frac{1}{t}\,dt\right)^2+i\pi^4\int_1^{\frac{2\pi}{\log(2)}}\frac{1}{t}\,dt+0.0000341012\left(\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\frac{(0.436406\log(2)+\pi\log(5))^2}{s\log^2(2)}}}{\sqrt{s}}\,ds\right)\left(\int_1^2\frac{1}{t}\,dt\right)^2\sqrt{\pi}\right)\right)\Big/\left(\left(\int_1^2\frac{1}{t}\,dt\right)^2\left(i\pi+4.9422\times10^{-6}\sqrt{\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{s-\frac{(0.436406\log(2)+\pi\log(5))^2}{s\log^2(2)}}}{\sqrt{s}}\,ds\right)\right) \text{ for } \gamma > 0$$

and:

1/10^52[-2/10^4+(29/((843+76+29+2)Pi)) * (((2Pi)/ln2 * ln((2Pi)/(ln2)) * (2Pi^2)/(ln2))) * (((1/5*((((1+0.0000098844 cos ((2Pi*ln(5))/(ln2)+0.872811))))))))]

Where 843, 76, 29 and 2 are Lucas numbers

Input interpretation:

$$\frac{1}{10^{52}}\left(-\frac{2}{10^4}+\frac{29}{(843+76+29+2)\pi}\left(\frac{2\pi}{\log(2)}\log\left(\frac{2\pi}{\log(2)}\right)\times\frac{2\pi^2}{\log(2)}\right)\left(\frac{1}{5}\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)\right)\right)$$

log(x) is the natural logarithm

Result:

$1.1056531748... \times 10^{-52}$

1.1056531748…*10^{-52} result practically equal to the value of Cosmological Constant 1.1056*10^{-52} m^{-2}

Addition formulas:

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} = -2.\times10^{-56}+\frac{1}{\log^2(2)}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)\left(2.44211\times10^{-54}+2.41387\times10^{-59}\cos(0.872811)\cos\left(-\frac{2\pi\log(5)}{\log(2)}\right)+2.41387\times10^{-59}\sin(0.872811)\sin\left(-\frac{2\pi\log(5)}{\log(2)}\right)\right)$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} = -2.\times10^{-56}+\frac{1}{\log^2(2)}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)\left(2.44211\times10^{-54}+2.41387\times10^{-59}\cos(0.872811)\cos\left(\frac{2\pi\log(5)}{\log(2)}\right)-2.41387\times10^{-59}\sin(0.872811)\sin\left(\frac{2\pi\log(5)}{\log(2)}\right)\right)$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} =$$

$$-2.\times10^{-56}+\frac{1}{\log^2(2)}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)\left(2.44211\times10^{-54}+2.41387\times10^{-59}\cosh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)-2.41387\times10^{-59}\,i\sinh\left(-\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} =$$

$$-2.\times10^{-56}+\frac{1}{\log^2(2)}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)\left(2.44211\times10^{-54}+2.41387\times10^{-59}\cosh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\cos(0.872811)+2.41387\times10^{-59}\,i\sinh\left(\frac{2i\pi\log(5)}{\log(2)}\right)\sin(0.872811)\right)$$

Alternative representations:

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} =$$

$$\frac{\frac{116\pi\left(1+9.8844\times10^{-6}\cosh\left(-i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)\log\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log(2)}\right)^2}{5(950\pi)}-\frac{2}{10^4}}{10^{52}}$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} =$$

$$\frac{1}{10^{52}}\left(\frac{1}{5(950\pi)}116\pi\log\left(\frac{2\pi}{\log(2)}\right)\left(1+4.9422\times10^{-6}\left(e^{-i(0.872811+(2\pi\log(5))/\log(2))}+e^{i(0.872811+(2\pi\log(5))/\log(2))}\right)\right)\pi^2\left(\frac{1}{\log(2)}\right)^2-\frac{2}{10^4}\right)$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} = \frac{\frac{116\pi\left(1+9.8844\times10^{-6}\cosh\left(i\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)\right)\log_e\left(\frac{2\pi}{\log(2)}\right)\pi^2\left(\frac{1}{\log_e(2)}\right)^2}{5(950\pi)}-\frac{2}{10^4}}{10^{52}}$$

Series representations:

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} = -2.\times10^{-56}+\frac{2.44211\times10^{-54}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}+\frac{2.41387\times10^{-59}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)^{2k}}{(2k)!}}{\log^2(2)}$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} = -2.\times10^{-56}+\frac{2.44211\times10^{-54}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}+\frac{2.41387\times10^{-59}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)\sum_{k=0}^{\infty}\frac{\cos\left(\frac{k\pi}{2}+z_0\right)\left(0.872811+\frac{2\pi\log(5)}{\log(2)}-z_0\right)^k}{k!}}{\log^2(2)}$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} = -2.\times10^{-56}+\frac{2.44211\times10^{-54}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}+\frac{2.41387\times10^{-59}\pi^2 J_0\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}+\frac{4.82775\times10^{-59}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)\sum_{k=1}^{\infty}(-1)^k J_{2k}\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)}{\log^2(2)}$$

Integral representations:

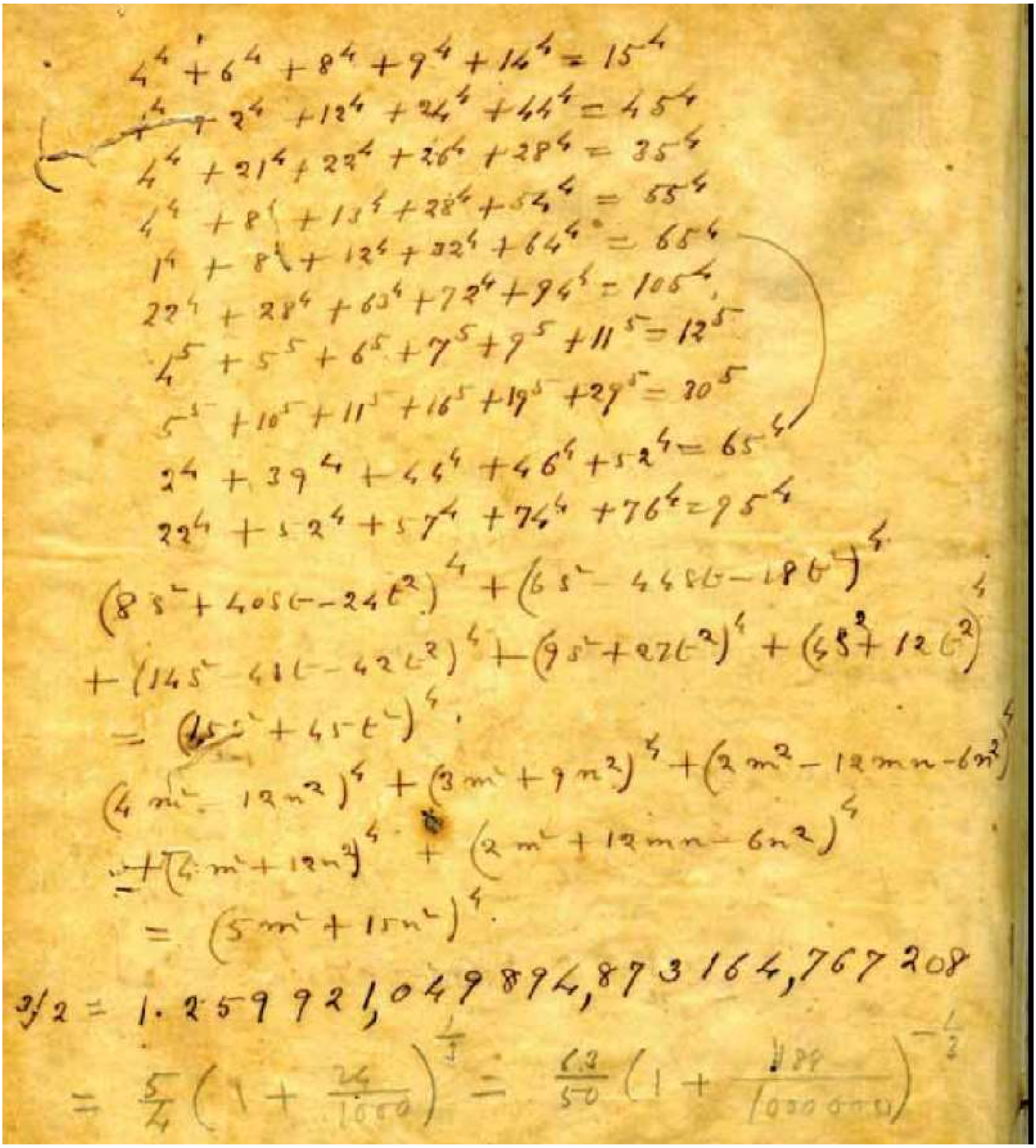
$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} =$$

$$-2.\times10^{-56}+\frac{1}{\log^3(2)}\pi^2\left(2.44213\times10^{-54}\log(2)+-2.10686\times10^{-59}\log(2)-4.82775\times10^{-59}\pi\log(5)\int_0^1\sin\left(t\left(0.872811+\frac{2\pi\log(5)}{\log(2)}\right)\right)dt\right)\log\left(\frac{2\pi}{\log(2)}\right)$$

$$\frac{-\frac{2}{10^4}+\frac{29\left((2\pi)\log\left(\frac{2\pi}{\log(2)}\right)(2\pi^2)\right)\left(1+9.8844\times10^{-6}\cos\left(\frac{2\pi\log(5)}{\log(2)}+0.872811\right)\right)}{((843+76+29+2)\pi)(\log(2)\log(2))5}}{10^{52}} =$$

$$-2.\times10^{-56}+\frac{2.44211\times10^{-54}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}-\frac{2.41387\times10^{-59}\pi^2\log\left(\frac{2\pi}{\log(2)}\right)}{\log^2(2)}\int_{\frac{\pi}{2}}^{0.872811+\frac{2\pi\log(5)}{\log(2)}}\sin(t)\,dt$$

Page 21



$$4^4+6^4+8^4+9^4+14^4=15^4$$
$$1^4+2^4+12^4+24^4+44^4=45^4$$
$$4^4+21^4+23^4+26^4+28^4=35^4$$
$$4^4+8^4+13^4+28^4+54^4=55^4$$
$$1^4+8^4+12^4+32^4+64^4=65^4$$
$$22^4+28^4+63^4+72^4+94^4=105^4$$
$$4^5+5^5+6^5+7^5+9^5+11^5=12^5$$
$$5^5+10^5+11^5+16^5+19^5+29^5=30^5$$
$$2^4+39^4+44^4+46^4+52^4=65^4$$
$$22^4+52^4+57^4+74^4+76^4=95^4$$
$$(8s^2+40st-24t^2)^4+(6s^2-44st-18t^2)^4+(14s^2-4st-42t^2)^4+(9s^2+27t^2)^4+(4s^2+12t^2)^4=(15s^2+45t^2)^4$$
$$(4m^2-12n^2)^4+(3m^2+9n^2)^4+(2m^2-12mn-6n^2)^4+(4m^2+12n^2)^4+(2m^2+12mn-6n^2)^4=(5m^2+15n^2)^4$$
$$\sqrt[3]{2}=1.259921,049894,873164,767208$$
$$=\frac{5}{4}\left(1+\frac{24}{1000}\right)^{\frac{1}{3}}=\frac{63}{50}\left(1+\frac{188}{1000000}\right)^{-\frac{1}{3}}$$

We have that:

5/4(1+24/1000)^1/3 = 63/50(1+188/1000000)^-1/3

Input:

$$\frac{5}{4}\sqrt[3]{1+\frac{24}{1000}}=\frac{63}{50}\left(1+\frac{188}{1\,000\,000}\right)^{-1/3}$$

Result:

True

Left hand side:

$$\frac{5}{4}\sqrt[3]{1+\frac{24}{1000}} = \sqrt[3]{2}$$

Right hand side:

$$\frac{63}{50}\left(1+\frac{188}{1\,000\,000}\right)^{-1/3} = \sqrt[3]{2}$$

5/4(1+24/1000)^1/3

Input:

$$\frac{5}{4}\sqrt[3]{1+\frac{24}{1000}}$$

Result:

$$\sqrt[3]{2}$$

Decimal approximation:

1.2599210498948731647672106072782283505702514647015079800819...

1.259921049....

1+1/(((5/4(1+24/1000)^1/3)))^2 + (11+4)/10^3

Where 11 and 4 are Lucas numbers

Input:

$$1+\frac{1}{\left(\frac{5}{4}\sqrt[3]{1+\frac{24}{1000}}\right)^2}+\frac{11+4}{10^3}$$

Result:

$$\frac{203}{200}+\frac{1}{2^{2/3}}$$

Decimal approximation:

1.6449605249474365823836053036391141752851257323507539900400...

$1.64496052494\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternate forms:

$$\frac{1}{200}\left(203 + 100\sqrt[3]{2}\right)$$

$$\frac{\sqrt[3]{2}}{2} + \frac{203}{200}$$

$$\frac{200 + 203 \times 2^{2/3}}{200 \times 2^{2/3}}$$

Minimal polynomial:

$$8\,000\,000\,x^3 - 24\,360\,000\,x^2 + 24\,725\,400\,x - 10\,365\,427$$

1/10^27*(((1+1/(((5/4(1+24/1000)^1/3)))^2 + (47-4)/10^3)))

Where 47 and 4 are Lucas numbers

Input:

$$\frac{1}{10^{27}}\left(1 + \frac{1}{\left(\frac{5}{4}\sqrt[3]{1+\frac{24}{1000}}\right)^2} + \frac{47-4}{10^3}\right)$$

Result:

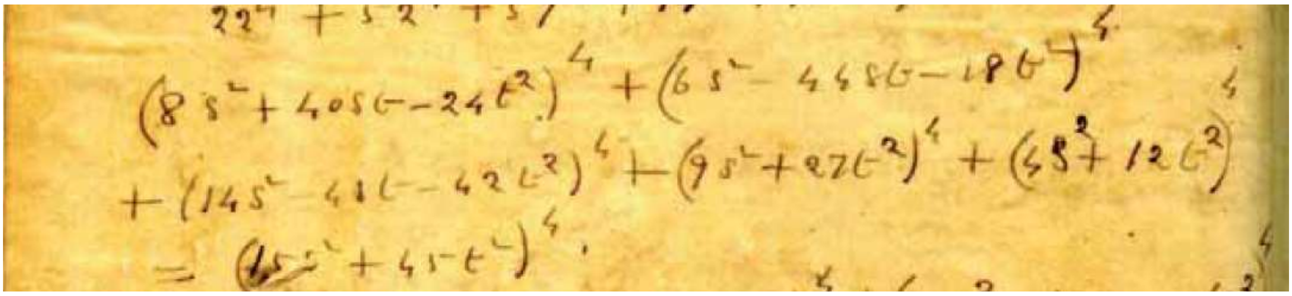
$$\frac{\frac{1043}{1000} + \frac{1}{2^{2/3}}}{1\,000\,000\,000\,000\,000\,000\,000\,000\,000}$$

Decimal approximation:

$$1.672960524947436582383605303639114175285125732350 7539\ldots \times 10^{-27}$$

$1.6729605249\ldots.*10^{-27}$ result practically equal to the proton mass in kg

Now, we have that:


$$(8s^2+40st-24t^2)^4+(6s^2-44st-18t^2)^4+(14s^2-4st-42t^2)^4+(9s^2+27t^2)^4+(4s^2+12t^2)^4=(15s^2+45t^2)^4$$

For s = 1 and t = √2 – 1 , we obtain:

(((8+40((sqrt2)-1)-24((sqrt2)-1)^2)))^4 + (((6-44*((sqrt2)-1)-18((sqrt2)-1)^2)))^4 + (((14-41((sqrt2)-1)-42((sqrt2)-1)^2)))^4 + (((9+27((sqrt2)-1)^2)))^4 + (((4+12((sqrt2)-1)^2)))^4

Input:

$$\left(8+40\left(\sqrt{2}-1\right)-24\left(\sqrt{2}-1\right)^2\right)^4+\left(6-44\left(\sqrt{2}-1\right)-18\left(\sqrt{2}-1\right)^2\right)^4+\left(14-41\left(\sqrt{2}-1\right)-42\left(\sqrt{2}-1\right)^2\right)^4+\left(9+27\left(\sqrt{2}-1\right)^2\right)^4+\left(4+12\left(\sqrt{2}-1\right)^2\right)^4$$

Decimal approximation:

276577.8683745279640708514905690235069071751149137553100813...

276577.8683745….

Alternate form:

$$1\,910\,942\,497-1\,351\,044\,828\sqrt{2}$$

Minimal polynomial:

$$x^2-3\,821\,884\,994\,x+1\,056\,972\,309\,495\,841$$

(((45+45((sqrt2)-1)^2)))^4

Input:

$$\left(45+45\left(\sqrt{2}-1\right)^2\right)^4$$

Decimal approximation:

$7.725512289659224709817734620882035122103756312884972 10... \times 10^6$

$7.725512289659…*10^6$

Alternate forms:

$$262\,440\,000\left(17-12\sqrt{2}\right)$$

$$4\,461\,480\,000-3\,149\,280\,000\sqrt{2}$$

$$\left(180-90\sqrt{2}\right)^4$$

Minimal polynomial:

$$x^2-8\,922\,960\,000\,x+68\,874\,753\,600\,000\,000$$

And:

(((45+45((sqrt2)-1)^2)))^4 / (276577.868374527964)

Input interpretation:

$$\frac{\left(45+45\left(\sqrt{2}-1\right)^2\right)^4}{276577.868374527964}$$

Result:

27.9325035479618385...

27.9325035479….

(((((45+45((sqrt2)-1)^2)))^4 / (276577.868374527964)))^2 + golden ratio^2

Input interpretation:

$$\left(\frac{\left(45+45\left(\sqrt{2}-1\right)^2\right)^4}{276577.868374527964}\right)^2+\phi^2$$

ϕ is the golden ratio

Result:

782.842788445650588...

782.8427884.... result practically equal to the rest mass of Omega meson 782.65 MeV

((1/(sqrt2)))[(((8+40((sqrt2)-1)-24((sqrt2)-1)^2)))^4+(((6-44*((sqrt2)-1)-18((sqrt2)-1)^2)))^4+(((14-41((sqrt2)-1)-42((sqrt2)-1)^2)))^4+(((9+27((sqrt2)-1)^2)))^4+(((4+12((sqrt2)-1)^2)))^4]+1314.5

Where 1314.5 is the average mass of $a_2(1320)$ meson

Input interpretation:

$$\frac{1}{\sqrt{2}}\left(\left(8+40\left(\sqrt{2}-1\right)-24\left(\sqrt{2}-1\right)^2\right)^4+\left(6-44\left(\sqrt{2}-1\right)-18\left(\sqrt{2}-1\right)^2\right)^4+\left(14-41\left(\sqrt{2}-1\right)-42\left(\sqrt{2}-1\right)^2\right)^4+\left(9+27\left(\sqrt{2}-1\right)^2\right)^4+\left(4+12\left(\sqrt{2}-1\right)^2\right)^4\right)+1314.5$$

Result:

196884.6...

196884.6…

196884 is a fundamental number of the following j-invariant

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's j-invariant or j function, regarded as a function of a complex variable τ, is a modular function of weight zero for SL(2, Z) defined on the upper half plane of complex numbers. Several remarkable properties of j have to do with its q expansion (Fourier series expansion), written as a Laurent series in terms of $q = e2\pi i\tau$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that j has a simple pole at the cusp, so its q-expansion has no terms below $q{-}1$.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

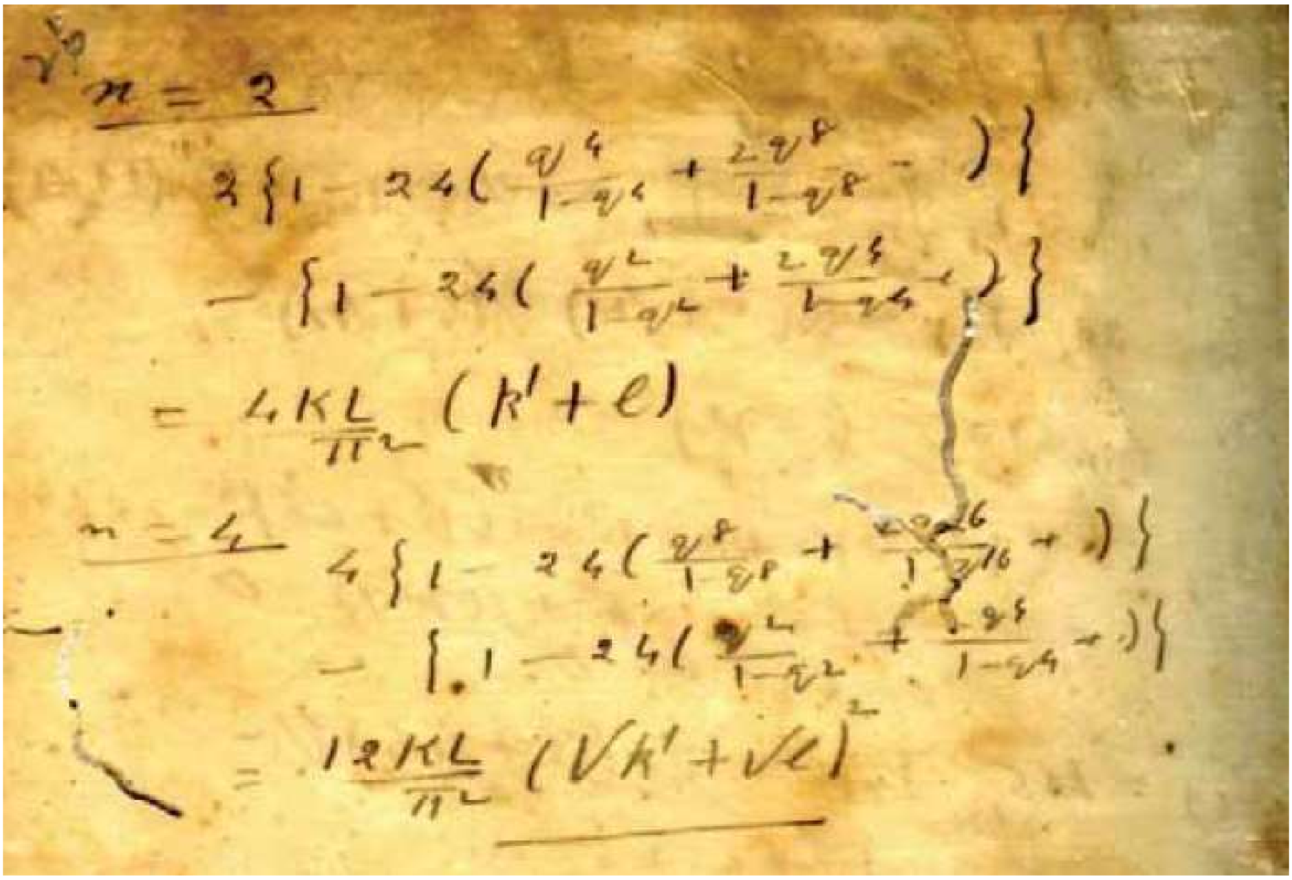
$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of qn is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\,n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

Page 27



$q = e^{-2\pi} = 0.0018674427...$

indeed:

e^(-2*Pi)

Input:

$e^{-2\pi}$

Decimal approximation:

0.001867442731707988814430212934827030393422805002475317199...

0.0018674427…

Property:

$e^{-2\pi}$ is a transcendental number

Alternative representations:

$$e^{-2\pi} = e^{-360^\circ}$$

$$e^{-2\pi} = e^{2 i \log(-1)}$$

$$e^{-2\pi} = \exp^{-2\pi}(z) \quad \text{for } z = 1$$

Series representations:

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

$$e^{-2\pi} = \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{-2\pi}$$

$$e^{-2\pi} = \left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{-2\pi}$$

Integral representations:

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

$$e^{-2\pi} = e^{-4 \int_0^1 1/\sqrt{1-t^2}\, dt}$$

$$e^{-2\pi} = e^{-4 \int_0^{\infty} 1/(1+t^2)\, dt}$$

Note that:

1+e^(-2*Pi)

Input:

$$1 + e^{-2\pi}$$

Decimal approximation:

1.001867442731707988814430212934827030393422805002475317199...

1.00186744273… result practically equal to the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{2\pi}{5}}}{\sqrt{\varphi\sqrt{5}-\varphi}} = 1 + \cfrac{e^{-2\pi}}{1+\cfrac{e^{-4\pi}}{1+\cfrac{e^{-6\pi}}{1+\cfrac{e^{-8\pi}}{1+\ldots}}}} \approx 1.0018674362$$

Property:

$1 + e^{-2\pi}$ is a transcendental number

Alternate form:

$e^{-2\pi}\left(1 + e^{2\pi}\right)$

Alternative representations:

$$1 + e^{-2\pi} = 1 + e^{-360\,°}$$

$$1 + e^{-2\pi} = 1 + e^{2\,i\log(-1)}$$

$$1 + e^{-2\pi} = 1 + \exp^{-2\pi}(z) \quad \text{for } z = 1$$

Series representations:

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

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

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

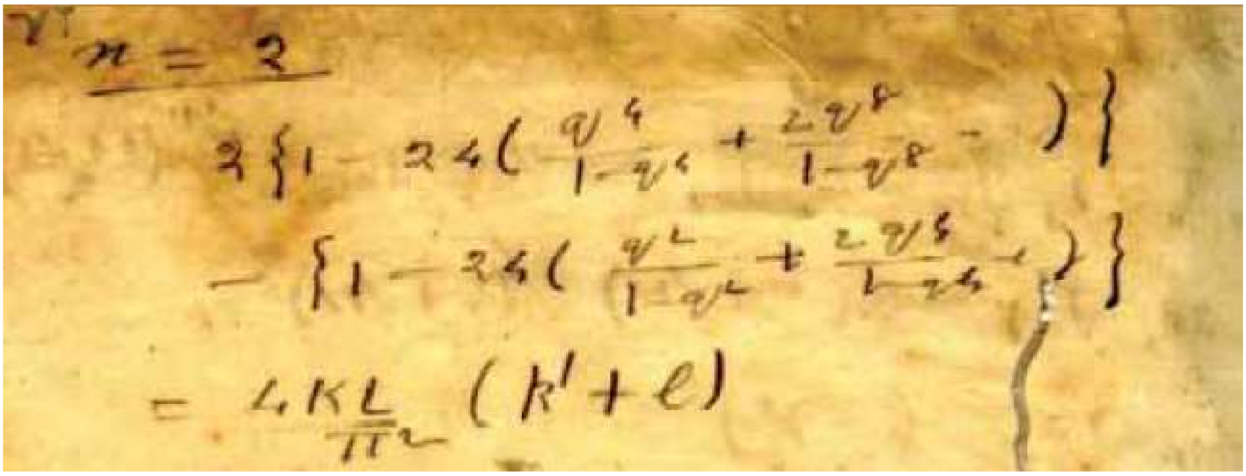
Integral representations:

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

$$1 + e^{-2\pi} = 1 + e^{-4\int_0^1 1/\sqrt{1-t^2}\,dt}$$

$$1 + e^{-2\pi} = 1 + e^{-4\int_0^{\infty} 1/(1+t^2)\,dt}$$

We have that:



For $q = e^{-2\pi} = 0.0018674427...$, we obtain:

2(((1-24(((0.0018674427^4/(1-0.0018674427^4)+2*0.0018674427^8/(1-0.0018674427^8)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+2*0.0018674427^4/(1-0.0018674427^4)))))))

Input interpretation:

$$2\left(1-24\left(\frac{0.0018674427^4}{1-0.0018674427^4}+2\times\frac{0.0018674427^8}{1-0.0018674427^8}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+2\times\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)$$

Result:

1.000083696505558515802778794561560328120030738323170339037 1...

1.0000836965...

((76+29)/10^3+55/10^5)+[2(((1-24(((0.0018674427^4/(1-0.0018674427^4)+2*0.0018674427^8/(1-0.0018674427^8)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+2*0.0018674427^4/(1-0.0018674427^4)))))))]

Where 76 and 29 are Lucas numbers, while 55 is a Fibonacci number

Input interpretation:

$$\left(\frac{76+29}{10^3}+\frac{55}{10^5}\right)+\left(2\left(1-24\left(\frac{0.0018674427^4}{1-0.0018674427^4}+2\times\frac{0.0018674427^8}{1-0.0018674427^8}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+2\times\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)\right)$$

Result:

1.1056336965055585158027787945615603281200307383231703390371...

1.1056336965...

From which:

1/10^52*1.1056336965055585158027787945615603281200307383231703390371

Input interpretation:

$$\frac{1}{10^{52}}\times 1.1056336965055585158027787945615603281200307383231703390371$$

Result:

$1.105633696505558515802778794561560328120030738323170 33... \times 10^{-52}$

$1.1056336965...*10^{-52}$ result practically equal to the value of Cosmological Constant $1.1056*10^{-52}$ m^{-2}

4x/Pi^2 * (y+z) = 2(((1-24(((0.0018674427^4/(1-0.0018674427^4)+2*0.0018674427^8/(1-0.0018674427^8)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+2*0.0018674427^4/(1-0.0018674427^4)))))))

Input interpretation:

$$4\times\frac{x}{\pi^2}(y+z)=2\left(1-24\left(\frac{0.0018674427^4}{1-0.0018674427^4}+2\times\frac{0.0018674427^8}{1-0.0018674427^8}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+2\times\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)$$

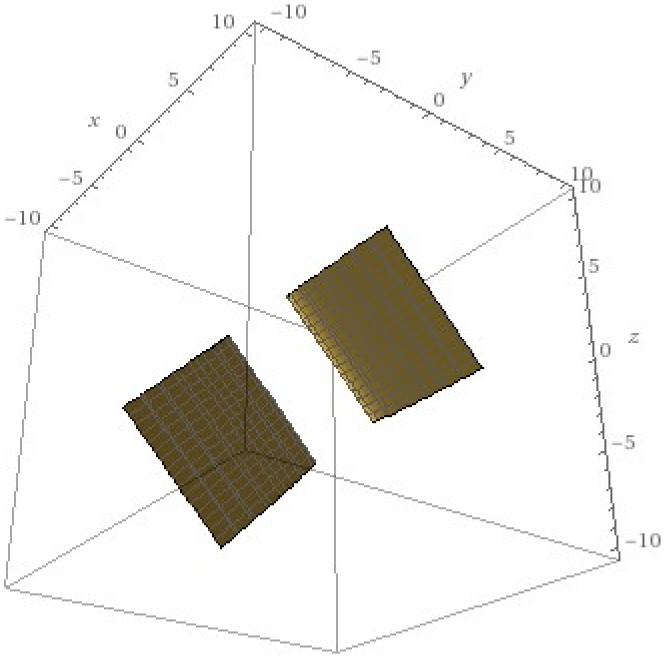
Result:

$$\frac{4x(y+z)}{\pi^2}=1.00008$$

Geometric figure:

hyperbolic cylinder

Surface plot:



Alternate forms:

$x z = 2.46761 - x y$

$$\frac{4 x y}{\pi^2} + \frac{4 x z}{\pi^2} - 1.00008 = 0$$

Expanded form:

$$\frac{4 x y}{\pi^2} + \frac{4 x z}{\pi^2} = 1.00008$$

Solution:

$$x \neq 0, \quad z \approx \frac{5.81818 \times 10^{-15} \left(4.2412 \times 10^{14} - 1.71875 \times 10^{14} \, x y\right)}{x}$$

Solution for the variable z:

$$z \approx \frac{2.4674 (1.00008 - 0.405285 \, x y)}{x}$$

From

$$4\times\frac{x}{\pi^2}(y+z)=2\left(1-24\left(\frac{0.0018674427^4}{1-0.0018674427^4}+2\times\frac{0.0018674427^8}{1-0.0018674427^8}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+2\times\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)$$

for x = 1, we obtain:

$$z\approx\frac{2.4674\,(1.00008-0.405285\,x\,y)}{x}$$

Root:

$$x\neq 0\,,\quad y\approx\frac{2.4676}{x}$$

4/Pi^2 * (2.4676+z)

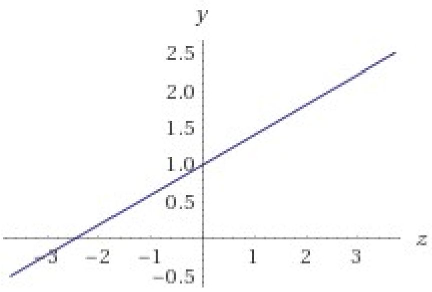
Input interpretation:

$$\frac{4}{\pi^2}(2.4676+z)$$

Result:

$$\frac{4\,(z+2.4676)}{\pi^2}$$

Plot:



(z from −3.7 to 3.7)

Geometric figure:

line

Alternate forms:

$$0.000162114\,(2500\,z+6169)$$

$$0.000162114\,(2500\,z+6169)$$

$$0.101329\,(3.99968\,z+9.8696)$$

Expanded form:

$$\frac{4z}{\pi^2} + 1.00008$$

Root:

$$z \approx -2.4676$$

z = -2.4676

Branch points:

(none; function is entire)

Derivative:

$$\frac{d}{dz}\left(\frac{4(z+2.4676)}{\pi^2}\right) = \frac{4}{\pi^2}$$

Indefinite integral:

$$\int \frac{4(2.4676+z)}{\pi^2}\,dz = 0.405285\left(0.5z^2 + 2.4676z\right) + \text{constant}$$

Definite integral after subtraction of diverging parts:

$$\int_0^\infty \left(\frac{4(2.4676+z)}{\pi^2} - \left(1.00008 + \frac{4z}{\pi^2}\right)\right)dz = 0$$

From

$$x \neq 0, \quad z \approx \frac{5.81818\times10^{-15}\left(4.2412\times10^{14} - 1.71875\times10^{14}\,x\,y\right)}{x}$$

y = 2,4682943473419

Thence:

4/Pi^2 * (2.4682943473419-2.467596876) = 2(((1-24(((0.0018674427^4/(1-0.0018674427^4)+2*0.0018674427^8/(1-0.0018674427^8)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+2*0.0018674427^4/(1-0.0018674427^4)))))))

From

4/Pi^2 * (2.4682943473419-2.467596876)

we obtain:

Input interpretation:

$$\frac{4}{\pi^2}(2.4682943473419 - 2.467596876)$$

Result:

0.000282674487671670620408072438986961669760567041318766132...

0.00028267448…

Alternative representations:

$$\frac{(2.46829434734190000 - 2.4676)\,4}{\pi^2} = \frac{0.00278989}{(180\,°)^2}$$

$$\frac{(2.46829434734190000 - 2.4676)\,4}{\pi^2} = \frac{0.00278989}{6\,\zeta(2)}$$

$$\frac{(2.46829434734190000 - 2.4676)\,4}{\pi^2} = \frac{0.00278989}{(-i\log(-1))^2}$$

Series representations:

$$\frac{(2.46829434734190000 - 2.4676)\,4}{\pi^2} = \frac{0.000174368}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

$$\frac{(2.46829434734190000 - 2.4676)\,4}{\pi^2} = \frac{0.000697471}{\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^2}$$

$$\frac{(2.46829434734190000 - 2.4676)\,4}{\pi^2} = \frac{0.00278989}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Integral representations:

$$\frac{(2.46829434734190000 - 2.4676)\,4}{\pi^2} = \frac{0.000697471}{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}$$

$$\frac{(2.46829434734190000-2.4676)\,4}{\pi^2} = \frac{0.000174368}{\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^2}$$

$$\frac{(2.46829434734190000-2.4676)\,4}{\pi^2} = \frac{0.000697471}{\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^2}$$

And from

2(((1-24(((0.0018674427^4/(1-0.0018674427^4)+2*0.0018674427^8/(1-0.0018674427^8)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+2*0.0018674427^4/(1-0.0018674427^4)))))))

we obtain:

Result:

1.000083696505585158027787945615603281200307383231703390371...

1.0000836965…

We obtain from the difference between the two results:

2(((1-24(((0.0018674427^4/(1-0.0018674427^4)+2*0.0018674427^8/(1-0.0018674427^8)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+2*0.0018674427^4/(1-0.0018674427^4))))))) - 4/Pi^2 * (2.4682943473419-2.467596876)

1.0000836965055851 - 0.00028267448767167

Input interpretation:

1.0000836965055851 − 0.00028267448767167

Result:

0.99980102201791343

0.99980102201791343 result very near to the value of the following Rogers-Ramanujan continued fraction:

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

Repeating decimal:

0.999801022017913430

We have also:

2*1/log base 0.987344899(1.0000836965055851 - 0.00028267448767167)-Pi+1/golden ratio

Input interpretation:

$$2\times\frac{1}{\log_{0.987344899}(1.0000836965055851-0.00028267448767167)}-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4765...

125.4765… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

Alternative representation:

$$\frac{2}{\log_{0.987345}(1.0000836965055851 0000-0.0002826744876716 70000)}-\pi+\frac{1}{\phi} = -\pi+\frac{1}{\phi}+\frac{2}{\frac{\log(0.99980102201791343000)}{\log(0.987345)}}$$

Series representations:

$$\frac{2}{\log_{0.987345}(1.0000836965055851000 - 0.00028267448767167000)} - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{2\log(0.987345)}{\sum_{k=1}^{\infty} \frac{(-1)^k (-0.00019897798208657000)^k}{k}}$$

$$\frac{2}{\log_{0.987345}(1.0000836965055851000 - 0.00028267448767167000)} - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{2}{\log(0.99980102201791343000)\left(78.5195 + \sum_{k=0}^{\infty} (-0.0126551)^k G(k)\right)}$$

$$\text{for } \left(G(0) = 0 \text{ and } G(k) = \frac{(-1)^{1+k} k}{2(1+k)(2+k)} + \sum_{j=1}^{k} \frac{(-1)^{1+j} G(-j+k)}{1+j}\right)$$

And:

2*1/log base 0.987344899(1.0000836965055851 - 0.00028267448767167)+11+1/golden ratio

Where 11 is a Lucas number

Input interpretation:

$$2 \times \frac{1}{\log_{0.987344899}(1.0000836965055851 - 0.00028267448767167)} + 11 + \frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.6180...

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

Alternative representation:

$$\frac{2}{\log_{0.987345}(1.0000836965055851000 - 0.00028267448767167000)} + 11 + \frac{1}{\phi} = 11 + \frac{1}{\phi} + \frac{2}{\frac{\log(0.99980102201791343000)}{\log(0.987345)}}$$

Series representations:

$$\frac{2}{\log_{0.987345}(1.0000836965055851000 - 0.00028267448767167000)} + 11 + \frac{1}{\phi} = 11 + \frac{1}{\phi} - \frac{2\log(0.987345)}{\sum_{k=1}^{\infty} \frac{(-1)^k (-0.00019897798208657000)^k}{k}}$$

$$\frac{2}{\log_{0.987345}(1.0000836965055851000 - 0.00028267448767167000)} + 11 + \frac{1}{\phi} = 11 + \frac{1}{\phi} - \frac{2}{\log(0.99980102201791343000)\left(78.5195 + \sum_{k=0}^{\infty} (-0.0126551)^k G(k)\right)}$$

$$\text{for } \left(G(0) = 0 \text{ and } G(k) = \frac{(-1)^{1+k} k}{2(1+k)(2+k)} + \sum_{j=1}^{k} \frac{(-1)^{1+j} G(-j+k)}{1+j}\right)$$

Now, we have that, from the principal expression:

-0.497614/(((1-[2(((1-24(((0.0018674427^4/(1-0.0018674427^4)+2*0.0018674427^8/(1-0.0018674427^8)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+2*0.0018674427^4/(1-0.0018674427^4))))))))])))

Where 497.614 MeV = 0.497614 GeV (gigaelectronvolts) 0.497614 GeV is the rest mass of Kaon meson

We obtain:

Input interpretation:

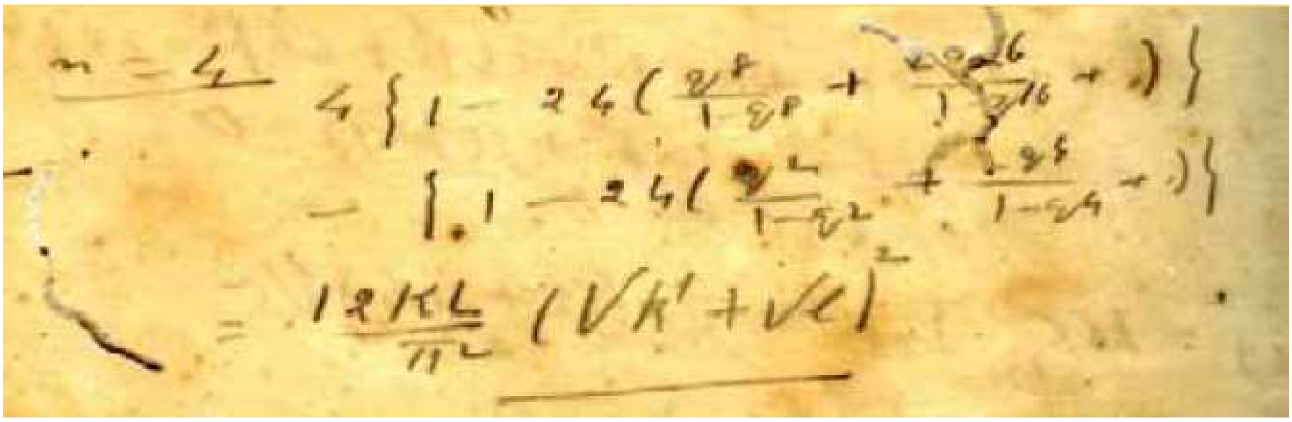
$$-\left(0.497614 \middle/ \left(1 - \left(2\left(1 - 24\left(\frac{0.0018674427^4}{1 - 0.0018674427^4} + 2 \times \frac{0.0018674427^8}{1 - 0.0018674427^8}\right)\right) - \left(1 - 24\left(\frac{0.0018674427^2}{1 - 0.0018674427^2} + 2 \times \frac{0.0018674427^4}{1 - 0.0018674427^4}\right)\right)\right)\right)\right)$$

Result:

5945.457298616805239883593772342282260717620605500346515019...

5945.4572...... result practically equal to the rest mass of bottom Xi baryon 5945.5 MeV

Now, we have that:



$q = e^{-2\pi} = 0.0018674427...$, we obtain:

4(((1-24(((0.0018674427^8/(1-0.0018674427^8)+2*0.0018674427^16/(1-0.0018674427^16)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+0.0018674427^4/(1-0.0018674427^4)))))))

Input interpretation:

$$4\left(1-24\left(\frac{0.0018674427^{8}}{1-0.0018674427^{8}}+2\times\frac{0.0018674427^{16}}{1-0.0018674427^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674427^{2}}{1-0.0018674427^{2}}+\frac{0.0018674427^{4}}{1-0.0018674427^{4}}\right)\right)$$

Result:

3.000083696797462499233594382721855970260810354276485041811...

3.0000836967974.....

And:

4(((1-24(((0.0018674427^8/(1-0.0018674427^8)+2*0.0018674427^16/(1-0.0018674427^16)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+0.0018674427^4/(1-0.0018674427^4)))))))-golden ratio-34/123

Input interpretation:

$$4\left(1-24\left(\frac{0.0018674427^{8}}{1-0.0018674427^{8}}+2\times\frac{0.0018674427^{16}}{1-0.0018674427^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674427^{2}}{1-0.0018674427^{2}}+\frac{0.0018674427^{4}}{1-0.0018674427^{4}}\right)\right)-\phi-\frac{34}{123}$$

ϕ is the golden ratio

Result:

1.10562694382...

1.10562694382…

Alternative representations:

$$4\left(1-24\left(\frac{0.00186744^8}{1-0.00186744^8}+\frac{2\times 0.00186744^{16}}{1-0.00186744^{16}}\right)\right)-\left(1-24\left(\frac{0.00186744^2}{1-0.00186744^2}+\frac{0.00186744^4}{1-0.00186744^4}\right)\right)-\phi-\frac{34}{123}=-1-\frac{34}{123}+24\left(\frac{0.00186744^2}{1-0.00186744^2}+\frac{0.00186744^4}{1-0.00186744^4}\right)+4\left(1-24\left(\frac{0.00186744^8}{1-0.00186744^8}+\frac{2\times 0.00186744^{16}}{1-0.00186744^{16}}\right)\right)-2\sin(54^\circ)$$

$$4\left(1-24\left(\frac{0.00186744^8}{1-0.00186744^8}+\frac{2\times 0.00186744^{16}}{1-0.00186744^{16}}\right)\right)-\left(1-24\left(\frac{0.00186744^2}{1-0.00186744^2}+\frac{0.00186744^4}{1-0.00186744^4}\right)\right)-\phi-\frac{34}{123}=-1+2\cos(216^\circ)-\frac{34}{123}+24\left(\frac{0.00186744^2}{1-0.00186744^2}+\frac{0.00186744^4}{1-0.00186744^4}\right)+4\left(1-24\left(\frac{0.00186744^8}{1-0.00186744^8}+\frac{2\times 0.00186744^{16}}{1-0.00186744^{16}}\right)\right)$$

$$4\left(1-24\left(\frac{0.00186744^8}{1-0.00186744^8}+\frac{2\times 0.00186744^{16}}{1-0.00186744^{16}}\right)\right)-\left(1-24\left(\frac{0.00186744^2}{1-0.00186744^2}+\frac{0.00186744^4}{1-0.00186744^4}\right)\right)-\phi-\frac{34}{123}=-1-\frac{34}{123}+24\left(\frac{0.00186744^2}{1-0.00186744^2}+\frac{0.00186744^4}{1-0.00186744^4}\right)+4\left(1-24\left(\frac{0.00186744^8}{1-0.00186744^8}+\frac{2\times 0.00186744^{16}}{1-0.00186744^{16}}\right)\right)+2\sin(666^\circ)$$

From which:

1/10^52(((((4*((1-24((0.0018674^8/(1-0.0018674^8)+2*0.0018674^16/(1-0.0018674^16)))))-[1-24(((0.0018674^2/(1-0.0018674^2)+0.0018674^4/(1-0.0018674^4))))]-golden ratio-34/123)))))

Input:

$$\frac{1}{10^{52}}\left(4\left(1-24\left(\frac{0.0018674^8}{1-0.0018674^8}+2\times\frac{0.0018674^{16}}{1-0.0018674^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674^2}{1-0.0018674^2}+\frac{0.0018674^4}{1-0.0018674^4}\right)\right)-\phi-\frac{34}{123}\right)$$

ϕ is the golden ratio

Result:

$1.105626940\ldots \times 10^{-52}$

$1.105626940\ldots*10^{-52}$ result practically equal to the value of Cosmological Constant $1.1056*10^{-52}$ m^{-2}

Alternative representations:

$$\frac{4\left(1-24\left(\frac{0.0018674^8}{1-0.0018674^8}+\frac{2\times0.0018674^{16}}{1-0.0018674^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674^2}{1-0.0018674^2}+\frac{0.0018674^4}{1-0.0018674^4}\right)\right)-\phi-\frac{34}{123}}{10^{52}} = \frac{1}{10^{52}}\left(-1-\frac{34}{123}+24\left(\frac{0.0018674^2}{1-0.0018674^2}+\frac{0.0018674^4}{1-0.0018674^4}\right)+4\left(1-24\left(\frac{0.0018674^8}{1-0.0018674^8}+\frac{2\times0.0018674^{16}}{1-0.0018674^{16}}\right)\right)-2\sin(54^\circ)\right)$$

$$\frac{4\left(1-24\left(\frac{0.0018674^8}{1-0.0018674^8}+\frac{2\times0.0018674^{16}}{1-0.0018674^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674^2}{1-0.0018674^2}+\frac{0.0018674^4}{1-0.0018674^4}\right)\right)-\phi-\frac{34}{123}}{10^{52}} = \frac{1}{10^{52}}\left(-1+2\cos(216^\circ)-\frac{34}{123}+24\left(\frac{0.0018674^2}{1-0.0018674^2}+\frac{0.0018674^4}{1-0.0018674^4}\right)+4\left(1-24\left(\frac{0.0018674^8}{1-0.0018674^8}+\frac{2\times0.0018674^{16}}{1-0.0018674^{16}}\right)\right)\right)$$

$$\frac{4\left(1-24\left(\frac{0.0018674^8}{1-0.0018674^8}+\frac{2\times0.0018674^{16}}{1-0.0018674^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674^2}{1-0.0018674^2}+\frac{0.0018674^4}{1-0.0018674^4}\right)\right)-\phi-\frac{34}{123}}{10^{52}}$$

$$=\frac{1}{10^{52}}\left(-1-\frac{34}{123}+24\left(\frac{0.0018674^2}{1-0.0018674^2}+\frac{0.0018674^4}{1-0.0018674^4}\right)+4\left(1-24\left(\frac{0.0018674^8}{1-0.0018674^8}+\frac{2\times0.0018674^{16}}{1-0.0018674^{16}}\right)\right)+2\sin(666°)\right)$$

We have also:

7*(((4(((1-24(((0.0018674427^8/(1-0.0018674427^8)+2*0.0018674427^16/(1-0.0018674427^16)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+0.0018674427^4/(1-0.0018674427^4))))))))))^5+27

Where 7 is a Lucas number

Input interpretation:

$$7\left(4\left(1-24\left(\frac{0.0018674427^8}{1-0.0018674427^8}+2\times\frac{0.0018674427^{16}}{1-0.0018674427^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)\right)^5+27$$

Result:

1728.237293660916446471437056275943959561159893931080735575...

1728.2372936...

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

And again:

1/2(((4(((1-24(((0.0018674427^8/(1-0.0018674427^8)+2*0.0018674427^16/(1-0.0018674427^16)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+0.0018674427^4/(1-0.0018674427^4))))))))))^5+((5+sqrt5)/2

Input interpretation:

$$\frac{1}{2}\left(4\left(1-24\left(\frac{0.0018674427^8}{1-0.0018674427^8}+2\times\frac{0.0018674427^{16}}{1-0.0018674427^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)\right)^5+\frac{1}{2}\left(5+\sqrt{5}\right)$$

Result:

125.134983536...

125.134983536... result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

And:

1/2(((4(((1-24(((0.0018674427^8/(1-0.0018674427^8)+2*0.0018674427^16/(1-0.0018674427^16)))))))-(((1-24(((0.0018674427^2/(1-0.0018674427^2)+0.0018674427^4/(1-0.0018674427^4))))))))))^5+18

Where 18 is a Lucas number

Input interpretation:

$$\frac{1}{2}\left(4\left(1-24\left(\frac{0.0018674427^8}{1-0.0018674427^8}+2\times\frac{0.0018674427^{16}}{1-0.0018674427^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)\right)^5+18$$

Result:

139.51694954720831760510264687685313996865427813793433825 53...

139.5169495472..... result practically equal to the rest mass of Pion meson 139.57 MeV

With regard the previous expression:

$$7\left(4\left(1-24\left(\frac{0.0018674427^8}{1-0.0018674427^8}+2\times\frac{0.0018674427^{16}}{1-0.0018674427^{16}}\right)\right)-\left(1-24\left(\frac{0.0018674427^2}{1-0.0018674427^2}+\frac{0.0018674427^4}{1-0.0018674427^4}\right)\right)\right)^5+27$$

With regard the number 27, we have that:

From:

J. Polchinski, ***String Theory Vol. II: Superstring Theory and Beyond***, Cambridge University Press, 1998

Table 11.3. *Dimensions and Coxeter numbers for simple Lie algebras.*

	$SU(n)$	$SO(n)$, $n \geq 4$	$Sp(k)$	E_6	E_7	E_8	F_4	G_2
dim(g)	n^2-1	$n(n-1)/2$	$2k^2+k$	78	133	248	52	14
$h(g)$	n	$n-2$	$k+1$	12	18	30	9	4

pactification of the heterotic string, and so we record without derivation the necessary results.

The first subgroup is

$$E_8 \to SU(3) \times E_6 \ . \tag{11.4.23}$$

We have not described E_6 explicitly, but the reader can reproduce this and the decomposition (11.4.24) from the known properties of spinor representations, as well as the further decomposition of the E_6 representations in table 11.4 (exercise 11.5). In simple compactifications of the $E_8 \times E_8$ string, the fermions of the Standard Model can all be thought of as arising from the **248**-dimensional adjoint representation of one of the E_8s. It is therefore interesting to trace the fate of this representation under the successive symmetry breakings. Under $E_8 \to SU(3) \times E_6$,

$$\mathbf{248} \to (\mathbf{8}, \mathbf{1}) + (\mathbf{1}, \mathbf{78}) + (\mathbf{3}, \mathbf{27}) + (\bar{\mathbf{3}}, \overline{\mathbf{27}}) \ . \tag{11.4.24}$$

That is, the adjoint of E_8 contains the adjoints of the subgroups, with half the remaining 162 generators transforming as a triplet of $SU(3)$ and a complex **27**-dimensional representation of E_6 and half as the conjugate of this. Further subgroups are shown in table 11.4. The first three subgroups correspond to successive breaking of E_6 down to the Standard Model group through smaller grand unified groups; the fourth is an alternate breaking pattern.

Practically:

$$E_8 = 8*1 + 1*78 + 3*27 + 3*27 = 8 + 78 + 81 + 81 = 248$$

$$E_8 = 8 \times 1 + 1 \times 78 + 3 \times 27 + 3 \times 27 = 248$$

where there are the 27-dimensional representation of E_6

From the following expression

$$\pi = \frac{9801}{\sqrt{8}} \left(\sum_{k=0}^{\infty} \frac{(4k)!(1103+26390k)}{(k!)^4 396^{4k}} \right)^{-1}$$

we obtain:

9801/sqrt8 * [((sum ((((4k)!(1103+26390k)))/(((k!)^4*396^(4k))))^-1, k=0..0.08333))]

Where 0.08333 is 1/12

Input interpretation:

$$\frac{9801}{\sqrt{8}} \sum_{k=0}^{0.08333} \frac{1}{\frac{(4k)!(1103+26390k)}{(k!)^4 \times 396^{4k}}}$$

$n!$ is the factorial function

Result:

$$\frac{9801}{2206\sqrt{2}} \approx 3.14159$$

3.14159 ≈ π

Alternate form:

$$\frac{9801\sqrt{2}}{4412}$$

9801/sqrt8 * [((sum ((((4k)!(1103+26390k)))/(((k!)^4*396^(4k))))^-1, k=0..0.61803398))]

Where 0.61803398 is the golden ratio conjugate

Input interpretation:

$$\frac{9801}{\sqrt{8}} \sum_{k=0}^{0.61803398} \frac{1}{\frac{(4k)!(1103+26390k)}{(k!)^4 \times 396^{4k}}}$$

$n!$ is the factorial function

Result:

$$\frac{9801}{2206\sqrt{2}} \approx 3.14159$$

3.14159 ≈ π

Alternate form:

$$\frac{9801\sqrt{2}}{4412}$$

9801/sqrt8 * [((sum ((((4k)!(1103+26390k)))/(((k!)^4*396^(4k))))^-1, k=0..0.937))]

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

$\omega/\omega_3 \mid 5+3 \mid m_{u/d} = 240 - 345 \mid 0.937 - 1.000$ and we take 0.937 and obtain:

Input interpretation:

$$\frac{9801}{\sqrt{8}} \sum_{k=0}^{0.937} \frac{1}{\frac{(4k)!(1103+26390k)}{(k!)^4 \times 396^{4k}}}$$

$n!$ is the factorial function

Result:

$$\frac{9801}{2206\sqrt{2}} \approx 3.14159$$

3.14159 ≈ π

Alternate form:

$$\frac{9801\sqrt{2}}{4412}$$

9801/sqrt8 * [((sum ((((4k)!(1103+26390k)))/(((k!)^4*396^(4k))))^-1, k=0..1.672e-27))]

Where $1.672*10^{-27}$ is the proton mass in kg

Input interpretation:

$$\frac{9801}{\sqrt{8}} \sum_{k=0}^{1.672\times 10^{-27}} \frac{1}{\frac{(4k)!(1103+26390k)}{(k!)^4\times 396^{4k}}}$$

$n!$ is the factorial function

Result:

$$\frac{9801}{2206\sqrt{2}} \approx 3.14159$$

$3.14159 \approx \pi$

Alternate form:

$$\frac{9801\sqrt{2}}{4412}$$

9801/sqrt8 * [((sum ((((4k)!(1103+26390k)))/(((k!)^4*396^(4k))))^-1, k=0..0.938272))]

Where 0.938272 is the proton mass in GeV

Input interpretation:

$$\frac{9801}{\sqrt{8}} \sum_{k=0}^{0.938272} \frac{1}{\frac{(4k)!(1103+26390k)}{(k!)^4\times 396^{4k}}}$$

$n!$ is the factorial function

Result:

$$\frac{9801}{2206\sqrt{2}} \approx 3.14159$$

$3.14159 \approx \pi$

Alternate form:

$$\frac{9801\sqrt{2}}{4412}$$

9801/sqrt8 * [((sum ((((4k)!(1103+26390k)))/(((k!)^4*396^(4k))))^-1, k=0..1.1056e-52))]

Where $1.1056*10^{-52}$ m^{-2} is the Cosmological Constant

Input interpretation:

$$\frac{9801}{\sqrt{8}} \sum_{k=0}^{1.1056\times 10^{-52}} \frac{1}{\frac{(4k)!(1103+26390k)}{(k!)^4\times 396^{4k}}}$$

$n!$ is the factorial function

Result:

$$\frac{9801}{2206\sqrt{2}} \approx 3.14159$$

3.14159 ≈ π

Alternate form:

$$\frac{9801\sqrt{2}}{4412}$$

9801/sqrt8 * [((sum ((((4k)!(1103+26390k)))/(((k!)^4*396^(4k))))^-1, k=0..0.0072973525693))]

Where 0.0072973525693 is the value of fine-structure constant

Input interpretation:

$$\frac{9801}{\sqrt{8}} \sum_{k=0}^{0.0072973525693} \frac{1}{\frac{(4k)!(1103+26390k)}{(k!)^4\times 396^{4k}}}$$

$n!$ is the factorial function

Result:

$$\frac{9801}{2206\sqrt{2}} \approx 3.14159$$

3.14159 ≈ π

Alternate form:

$$\frac{9801\sqrt{2}}{4412}$$

9801/sqrt8 * [((((((4*x)!(1103+26390*x)))/((((x)!)^4*396^(4*x))))^-1))] = 3.1426352128607319011295937189855948920944776506105316

Input interpretation:

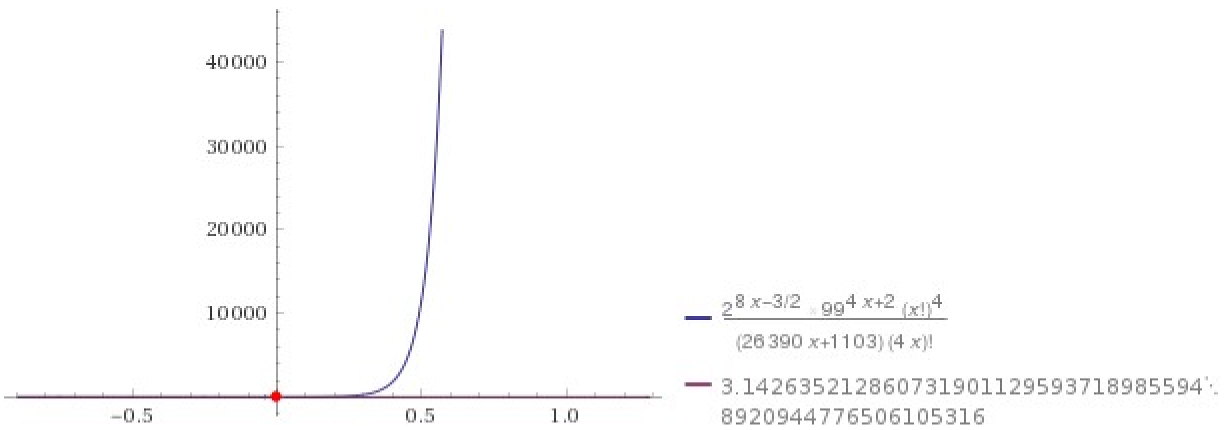
$$\frac{\frac{9801}{\sqrt{8}}}{\frac{(4x)!\,(1103+26390x)}{(x!)^4\times 396^{4x}}} = 3.1426352128607319011295937189855948920944776506105316$$

$n!$ is the factorial function

Result:

$$\frac{2^{8x-3/2}\times 99^{4x+2}\,(x!)^4}{(26\,390\,x+1103)\,(4x)!} = 3.1426352128607319011295937189855948920944776506105316$$

Plot:



Alternate form assuming x is real:

$$(0.0417822701807181864976654092427955497783304717 \times 99^{4x} \times 256^{x} (x!)^4) / ((1.000000000000000000000000000000000000000000000\, x + 0.04179613489958317544524441076165214096248579 01) (4x)!) = 1$$

Alternate form:

$$\frac{2^{8x-3/2} \times 99^{4x+2}\, \Gamma(x+1)^4}{(26\,390\, x + 1103)\, \Gamma(4x+1)} = 3.14263521286073190112959371898559489209447765 06105316$$

$\Gamma(x)$ is the gamma function

Alternate form assuming x is positive:

$$1.0000000000000000000000000000000000000000000000\, x + 0.0417961348995831754452444107616521409624857 9007 = \frac{0.0417822701807181864976654092427955497783304 7167 \times 99^{4x} \times 256^{x} (x!)^4}{(4x)!}$$

Numerical solutions:

$x \approx -0.00108586927073719\ldots$

$x \approx 0.00110560000000000\ldots$

From which:

0.00110560000000000 / 10^49

Input interpretation:

$$\frac{0.00110560000000000}{10^{49}}$$

Result:

1.1056×10^{-52}

$1.1056 \cdot 10^{-52}$ m^{-2} result equal to the value of Cosmological Constant

Ramanujan mathematics applied to the Particle Physics

From:

Yukawa - Tomonaga Centennial Symposium Kyoto Dec. 13 2006

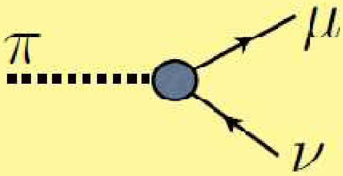
YUKAWA's PION ,
LOW-ENERGY QCD and NUCLEAR CHIRAL DYNAMICS

- **ORDER PARAMETER: PION DECAY CONSTANT**

$$\langle 0|\mathbf{A}_\mu^a(0)|\pi^b(p)\rangle = i\delta^{ab}\, p_\mu\, \mathbf{f}_\pi$$

Axial current

$$\mathbf{f}_\pi = 92.4\,\mathrm{MeV}$$



- **SYMMETRY BREAKING SCALE ⟷ MASS GAP**

$$\Lambda_\chi = 4\pi\,\mathrm{f}_\pi \sim 1\,\mathrm{GeV}$$

- **PCAC:** $\mathrm{m}_\pi^2\,\mathrm{f}_\pi^2 = -\mathrm{m_q}\,\langle\bar\psi\psi\rangle + \mathcal{O}(m_q^2)$

Gell-Mann - Oakes - Renner Relation

From:

$$\Lambda_\chi = 4\pi\,\mathrm{f}_\pi \sim 1\,\mathrm{GeV}$$

we obtain:

4Pi*92.4

Input:

$4\pi \times 92.4$

Result:

1161.1326447667875809357929944601042659992738100090391114 32...

1161.13264476…

Adding π to the above expression, we obtain:

(4Pi*92.4)+Pi

Input:

$4\pi \times 92.4 + \pi$

Result:

1164.2742374203773741742556378433837688834709794084142172 53...

1164.2742....

Note that, from the following Ramanujan's class invariant

$$G_{505} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4} \times \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^{1/2}.$$

we obtain:

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}=\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3$$

that is: $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696.$

Thence, from the Ramanujan expression, we can to obtain a value very near to:

$$f_\pi = 92.4\,\mathrm{MeV}$$

Indeed:

(√((113+5√505)/8)+√((105+5√505)/8))^3

Input:

$$\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3$$

Result:

$$\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(105+5\sqrt{505}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(113+5\sqrt{505}\right)}\right)^3$$

Decimal approximation:

1164.269601267364667589866974010779128760584499596965142888...

1164.26960126736…

Alternate forms:

$$\frac{\left(5\sqrt{10\left(21+\sqrt{505}\right)}+25\sqrt{5}+5\sqrt{101}\right)^3}{8000}$$

$$\frac{1}{64}\left(5\sqrt{5}+\sqrt{101}+\sqrt{105-40\,i}+\sqrt{105+40\,i}\right)^3$$

$$\sqrt{338881+15080\sqrt{505}+4\sqrt{5\left(2871007052+127758137\sqrt{505}\right)}}$$

Minimal polynomial:

$$x^8-1355524\,x^6+400646\,x^4-1355524\,x^2+1$$

From which:

(√((113+5√505)/8)+√((105+5√505)/8))^3 * 1/(4Pi)

Input:

$$\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3\times\frac{1}{4\pi}$$

Result:

$$\frac{\left(\frac{1}{2}\sqrt{\frac{1}{2}\left(105+5\sqrt{505}\right)}+\frac{1}{2}\sqrt{\frac{1}{2}\left(113+5\sqrt{505}\right)}\right)^3}{4\pi}$$

Decimal approximation:

92.64963106666554868222405946213528213380272327498443055873...

92.64963106…

Property:

$$\frac{\left(\frac{1}{2}\sqrt{\frac{1}{2}(105+5\sqrt{505})}+\frac{1}{2}\sqrt{\frac{1}{2}(113+5\sqrt{505})}\right)^3}{4\pi}$$ is a transcendental number

Alternate forms:

$$\frac{\left(5\sqrt{10(21+\sqrt{505})}+25\sqrt{5}+5\sqrt{101}\right)^3}{8000(4\pi)}$$

$$\frac{(5\sqrt{5}+\sqrt{101}+\sqrt{105-40i}+\sqrt{105+40i})^3}{256\pi}$$

$$\frac{\left(5\sqrt{5}+\sqrt{101}+\sqrt{10(21+\sqrt{505})}\right)^3}{256\pi}$$

From:

$$\mathbf{m}_\pi^2\,\mathbf{f}_\pi^2 = -\mathbf{m_q}\,\langle\bar{\psi}\psi\rangle + \mathcal{O}(m_q^2)$$

Gell-Mann - Oakes - Renner Relation

we obtain:

139.57^2*92.4^2

Input interpretation:

$139.57^2 \times 92.4^2$

Result:

$1.66313728327824 \times 10^8$

$1.66313728327824*10^8$

From which:

1/2(((1/11ln(139.57^2*92.4^2) + 1/12ln(139.57^2*92.4^2))))-(34-3)/10^3

Where 34 and 3 are Fibonacci numbers

Input interpretation:

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}$$

log(x) is the natural logarithm

Result:

1.618151095923245472816460822370504627654253925818529440724...

1.61815109592… result that is a very good approximation to the value of the golden ratio 1,618033988749...

Alternative representations:

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$\frac{1}{2}\left(\frac{1}{11}\log(a)\log_a(92.4^2\times 139.57^2)+\frac{1}{12}\log(a)\log_a(92.4^2\times 139.57^2)\right)-\frac{31}{10^3}$$

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$\frac{1}{2}\left(\frac{1}{11}\log_e(92.4^2\times 139.57^2)+\frac{1}{12}\log_e(92.4^2\times 139.57^2)\right)-\frac{31}{10^3}$$

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$\frac{1}{2}\left(-\frac{1}{11}\operatorname{Li}_1(1-92.4^2\times 139.57^2)-\frac{1}{12}\operatorname{Li}_1(1-92.4^2\times 139.57^2)\right)-\frac{31}{10^3}$$

Series representations:

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$-\frac{31}{1000}+\frac{23\log(1.66314\times 10^8)}{264}-\frac{23}{264}\sum_{k=1}^{\infty}\frac{(-1)^k e^{-18.9294k}}{k}$$

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$-\frac{31}{1000}+\frac{23}{132}\,i\,\pi\left\lfloor\frac{\arg(1.66314\times 10^8-x)}{2\,\pi}\right\rfloor+\frac{23\log(x)}{264}-\frac{23}{264}\sum_{k=1}^{\infty}\frac{(-1)^k\,(1.66314\times 10^8-x)^k\,x^{-k}}{k}\quad\text{for } x<0$$

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$-\frac{31}{1000}+\frac{23}{264}\left\lfloor\frac{\arg(1.66314\times 10^8-z_0)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+\frac{23\log(z_0)}{264}+\frac{23}{264}\left\lfloor\frac{\arg(1.66314\times 10^8-z_0)}{2\,\pi}\right\rfloor\log(z_0)-\frac{23}{264}\sum_{k=1}^{\infty}\frac{(-1)^k\,(1.66314\times 10^8-z_0)^k\,z_0^{-k}}{k}$$

Integral representations:

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$-\frac{31}{1000}+\frac{23}{264}\int_1^{1.66314\times 10^8}\frac{1}{t}\,dt$$

$$\frac{1}{2}\left(\frac{1}{11}\log(139.57^2\times 92.4^2)+\frac{1}{12}\log(139.57^2\times 92.4^2)\right)-\frac{34-3}{10^3}=$$
$$-\frac{31}{1000}+\frac{23}{528\,i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-18.9294\,s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds\quad\text{for } -1<\gamma<0$$

Low-Energy Expansion:

CHIRAL PERTURBATION THEORY

small parameter:

- $\frac{Q}{4\pi f_\pi}$ — $\frac{\text{energy / momentum / pion mass}}{\text{mass gap of order 1 GeV}}$

We have that, for pion mass = 139.57, we obtain:

139.57/(4Pi) *1/92.4

Input interpretation:

$$\frac{139.57}{4\pi} \times \frac{1}{92.4}$$

Result:

0.12020159852454454552631551327868955362093903006491074973 8...

0.1202015985…

Alternative representations:

$$\frac{139.57}{92.4(4\pi)} = \frac{139.57}{92.4(720°)}$$

$$\frac{139.57}{92.4(4\pi)} = \frac{139.57}{92.4(-4 i \log(-1))}$$

$$\frac{139.57}{92.4(4\pi)} = \frac{139.57}{92.4(4\cos^{-1}(-1))}$$

Series representations:

$$\frac{139.57}{92.4(4\pi)} = \frac{0.0944061}{\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}}$$

$$\frac{139.57}{92.4(4\pi)} = \frac{0.188812}{-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}}$$

$$\frac{139.57}{92.4(4\pi)} = \frac{0.377624}{\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$\frac{139.57}{92.4(4\pi)} = \frac{0.188812}{\int_0^{\infty} \frac{1}{1+t^2}\,dt}$$

$$\frac{139.57}{92.4(4\pi)} = \frac{0.0944061}{\int_0^1 \sqrt{1-t^2}\,dt}$$

$$\frac{139.57}{92.4(4\pi)} = \frac{0.188812}{\int_0^\infty \frac{\sin(t)}{t}\,dt}$$

and the inverse:

1/(139.57*1/(4Pi) *1/92.4)

Input interpretation:

$$\frac{1}{139.57\times\frac{1}{4\pi}\times\frac{1}{92.4}}$$

Result:

8.31936…

8.31936…

Alternative representations:

$$\frac{1}{\frac{139.57}{92.4(4\pi)}} = \frac{1}{\frac{139.57}{92.4(720\,°)}}$$

$$\frac{1}{\frac{139.57}{92.4(4\pi)}} = \frac{1}{\frac{139.57}{92.4(-4\,i\log(-1))}}$$

$$\frac{1}{\frac{139.57}{92.4(4\pi)}} = \frac{1}{\frac{139.57}{92.4\left(4\cos^{-1}(-1)\right)}}$$

Series representations:

$$\frac{1}{\frac{139.57}{92.4(4\pi)}} = 10.5925\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\frac{1}{\frac{139.57}{92.4(4\pi)}} = -5.29627+5.29627\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$\frac{1}{\frac{139.57}{92.4(4\pi)}} = 2.64813\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$\frac{1}{\frac{139.57}{92.4\,(4\,\pi)}} = 5.29627 \int_0^\infty \frac{1}{1+t^2}\,dt$$

$$\frac{1}{\frac{139.57}{92.4\,(4\,\pi)}} = 10.5925 \int_0^1 \sqrt{1-t^2}\,dt$$

$$\frac{1}{\frac{139.57}{92.4\,(4\,\pi)}} = 5.29627 \int_0^\infty \frac{\sin(t)}{t}\,dt$$

From which we obtain also:

10^3*(((sqrt(((1/Pi *1/((139.57/(4Pi) *1/92.4)))))+(47-2)/10^3)))

Where 47 and 2 are Lucas numbers

Input interpretation:

$$10^3\left(\sqrt{\frac{1}{\pi}\times\frac{1}{\frac{139.57}{4\,\pi}\times\frac{1}{92.4}}}+\frac{47-2}{10^3}\right)$$

Result:

1672.308684010447443399044902755309661568952777220415753714...

1672.30868401… result practically equal to the rest mass of Omega baryon 1672.45 MeV

Series representations:

$$10^3\left(\sqrt{\frac{1}{\frac{139.57\,\pi}{(4\,\pi)\,92.4}}}+\frac{47-2}{10^3}\right) = 45 + 1000\sqrt{1.64813}\sum_{k=0}^{\infty} e^{-0.499643\,k}\binom{\frac{1}{2}}{k}$$

$$10^3\left(\sqrt{\frac{1}{\frac{139.57\,\pi}{(4\,\pi)\,92.4}}}+\frac{47-2}{10^3}\right) = 45 + 1000\sqrt{1.64813}\sum_{k=0}^{\infty} \frac{(-0.606747)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$10^3\left(\sqrt{\frac{1}{\frac{139.57\,\pi}{(4\,\pi)\,92.4}}}+\frac{47-2}{10^3}\right) = 45 + \frac{500\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} e^{-0.499643\,s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

And:

10^3*(((sqrt(((1/Pi *1/((139.57/(4Pi) *1/92.4)))))))))+89+13

Input interpretation:

$$10^3 \sqrt{\frac{1}{\pi} \times \frac{1}{\frac{139.57}{4\pi} \times \frac{1}{92.4}}} + 89 + 13$$

Result:

1729.31...

1729.31…

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

Series representations:

$$10^3 \sqrt{\frac{1}{\frac{139.57\pi}{(4\pi)92.4}}} + 89 + 13 = 102 + 1000\sqrt{1.64813} \sum_{k=0}^{\infty} e^{-0.499643 k} \binom{\frac{1}{2}}{k}$$

$$10^3 \sqrt{\frac{1}{\frac{139.57\pi}{(4\pi)92.4}}} + 89 + 13 = 102 + 1000\sqrt{1.64813} \sum_{k=0}^{\infty} \frac{(-0.606747)^k \left(-\frac{1}{2}\right)_k}{k!}$$

$$10^3 \sqrt{\frac{1}{\frac{139.57\pi}{(4\pi)92.4}}} + 89 + 13 = 102 + \frac{500 \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} e^{-0.499643 s}\, \Gamma\left(-\frac{1}{2} - s\right) \Gamma(s)}{\sqrt{\pi}}$$

We have also:

1/10^52((((1/8)*1/(139.57*1/(4Pi) *1/92.4)+(76-11)/10^3+7/10^4)))

Input interpretation:

$$\frac{1}{10^{52}}\left(\frac{1}{8}\times\frac{1}{139.57\times\frac{1}{4\pi}\times\frac{1}{92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}\right)$$

Result:

$1.10562... \times 10^{-52}$

1.10562…*10^{-52} result practically equal to the value of Cosmological Constant 1.1056*10^{-52} m^{-2}

Alternative representations:

$$\frac{\frac{1}{\frac{8\times139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}}=\frac{\frac{65}{10^3}+\frac{7}{10^4}+\frac{1}{\frac{8\times139.57}{92.4\,(720\,°)}}}{10^{52}}$$

$$\frac{\frac{1}{\frac{8\times139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}}=\frac{\frac{65}{10^3}+\frac{7}{10^4}+\frac{1}{\frac{8\times139.57}{92.4\,(-4\,i\log(-1))}}}{10^{52}}$$

$$\frac{\frac{1}{\frac{8\times139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}}=\frac{\frac{65}{10^3}+\frac{7}{10^4}+\frac{1}{\frac{8\times139.57}{92.4\,(4\cos^{-1}(-1))}}}{10^{52}}$$

Series representations:

$$\frac{\frac{1}{\frac{8\times139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}}=6.57\times10^{-54}+1.32407\times10^{-52}\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\frac{\frac{1}{\frac{8\times139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}}=-5.96333\times10^{-53}+6.62033\times10^{-53}\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$\frac{\frac{1}{\frac{8\times 139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}} = 6.57\times 10^{-54} + 3.31017\times 10^{-53}\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$\frac{\frac{1}{\frac{8\times 139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}} = 6.57\times 10^{-54} + 6.62033\times 10^{-53}\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

$$\frac{\frac{1}{\frac{8\times 139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}} = 6.57\times 10^{-54} + 1.32407\times 10^{-52}\int_0^{1}\sqrt{1-t^2}\,dt$$

$$\frac{\frac{1}{\frac{8\times 139.57}{(4\pi)92.4}}+\frac{76-11}{10^3}+\frac{7}{10^4}}{10^{52}} = 6.57\times 10^{-54} + 6.62033\times 10^{-53}\int_0^{\infty}\frac{\sin(t)}{t}\,dt$$

For Q = 0.284, we obtain:

0.284/(4Pi) *1/92.4

Input:

$$\frac{0.284}{4\pi}\times\frac{1}{92.4}$$

Result:

0.000244589...

0.000244589…

Alternative representations:

$$\frac{0.284}{92.4(4\pi)} = \frac{0.284}{92.4(720\,°)}$$

$$\frac{0.284}{92.4(4\pi)} = \frac{0.284}{92.4(-4i\log(-1))}$$

$$\frac{0.284}{92.4(4\pi)} = \frac{0.284}{92.4(4\cos^{-1}(-1))}$$

Series representations:

$$\frac{0.284}{92.4(4\pi)} = \frac{0.0001921}{\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}}$$

$$\frac{0.284}{92.4(4\pi)} = \frac{0.000384199}{-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}}$$

$$\frac{0.284}{92.4(4\pi)} = \frac{0.000768398}{\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$\frac{0.284}{92.4(4\pi)} = \frac{0.000384199}{\int_0^{\infty} \frac{1}{1+t^2}\,dt}$$

$$\frac{0.284}{92.4(4\pi)} = \frac{0.0001921}{\int_0^1 \sqrt{1-t^2}\,dt}$$

$$\frac{0.284}{92.4(4\pi)} = \frac{0.000384199}{\int_0^{\infty} \frac{\sin(t)}{t}\,dt}$$

And:

1/(sqrt2)*1/(((0.284/(4Pi) *1/92.4)))+89+3

Where 89 and 3 are Fibonacci numbers

Input:

$$\frac{1}{\sqrt{2}} \times \frac{1}{\frac{0.284}{4\pi} \times \frac{1}{92.4}} + 89 + 3$$

Result:

2983.00…

2983.00… result very near to the rest mass of Charmed eta meson 2980.3 MeV

Series representations:

$$\frac{1}{\frac{0.284\sqrt{2}}{(4\pi)92.4}} + 89 + 3 = 92 + \frac{1301.41\pi}{\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (2-z_0)^k z_0^{-k}}{k!}}$$

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

$$\frac{1}{\frac{0.284\sqrt{2}}{(4\pi)92.4}} + 89 + 3 = 92 + \frac{1301.41\pi}{\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

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

$$\frac{1}{\frac{0.284\sqrt{2}}{(4\pi)92.4}} + 89 + 3 = 92 + \frac{1301.41\pi\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2(-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor)}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}$$

Energy Dependent Pion-Nucleus Potential
based on
In-medium Chiral Perturbation Theory

$$f_\pi^*(\rho_0) \simeq 0.8\, f_\pi \quad \sim 1 - \frac{\sigma_N}{2\, m_\pi^2\, f_\pi^2}\rho_0 \qquad (\sigma_N \simeq 50\,\mathrm{MeV})$$

deduced from exp. — theory pred.

Thence:

0.8*92.4 =1-(50/(2*139.57^2*92.4^2))*x

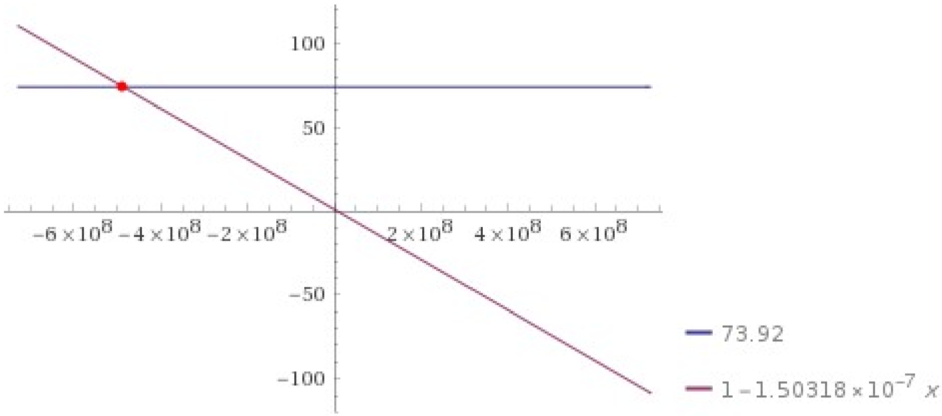
Input interpretation:

$$0.8\times 92.4 = 1 - \frac{50}{2\times 139.57^2\times 92.4^2}\,x$$

Result:

$$73.92 = 1 - 1.50318\times 10^{-7}\,x$$

Plot:



Alternate forms:

$73.92 = -1.50318\times10^{-7}\left(x - 6.65255\times10^{6}\right)$

$1.50318\times10^{-7}\,x + 72.92 = 0$

Alternate form assuming x is real:

$73.92 = 1 - 1.50318\times10^{-7}\,x$

Solution:

$x \approx -4.85104\times10^{8}$

$-4.85104*10^{8}$

We obtain:

1-(50/(2*139.57^2*92.4^2))*(-4.85104e+8)

Input interpretation:

$$1 - \frac{50}{2\times139.57^2\times92.4^2}\left(-4.85104\times10^{8}\right)$$

Result:

73.920017619321648204311191912371105183324703144058934909 46...

73.920017619...

And:

0.8*92.4

Input:

0.8×92.4

Result:

73.92

73.92

We have also:

16((1-(50/(2*139.57^2*92.4^2))*(-4.85104e+8)))+7

Where 7 is a Lucas number

Input interpretation:

$$16\left(1-\frac{50}{2\times139.57^2\times92.4^2}\left(-4.85104\times10^8\right)\right)+7$$

Result:

1189.720281909146371268979070597937682933195250304942958551...

1189.72028.... result practically equal to the rest mass of Sigma baryon 1189.37 MeV

Now, we have that:

$$\mathcal{S}=\sigma_N\left(1-\frac{\vec{\pi}^2}{2f_\pi^2}+...\right)$$

SCALAR

We obtain:

50(((1-(Pi^2)/(2*92.4^2))))

Input:

$$50\left(1-\frac{\pi^2}{2\times92.4^2}\right)$$

Result:

49.9711001...

49.9711001…

Alternative representations:

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50\left(1-\frac{(180\,°)^2}{2\times 92.4^2}\right)$$

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50\left(1-\frac{(-i\log(-1))^2}{2\times 92.4^2}\right)$$

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50\left(1-\frac{6\,\zeta(2)}{2\times 92.4^2}\right)$$

Series representations:

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50-0.0468507\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2$$

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50-0.00292817\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2$$

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50-0.0117127\sqrt{3}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k}{1+2k}\right)^2$$

Integral representations:

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50-0.0117127\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2$$

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50-0.0468507\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2$$

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)=50-0.0117127\left(\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)^2$$

From the sum of the two formulas, we obtain:

50(((1-(Pi^2)/(2*92.4^2)))) + 1-(50/(2*139.57^2*92.4^2))*(-4.85104e+8) + golden ratio

Input interpretation:

$$50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)+1-\frac{50}{2\times 139.57^2\times 92.4^2}\left(-4.85104\times 10^8\right)+\phi$$

ϕ is the golden ratio

Result:

125.509...

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

Dividing the two results, 73.920017619 and 49.9711001, and performing the following calculations, we obtain:

1/2[(((1-(50/(2*139.57^2*92.4^2))*(-4.85104e+8)))) / (((50(((1-(Pi^2)/(2*92.4^2)))))))]^3

Input interpretation:

$$\frac{1}{2}\left(\frac{1-\frac{50}{2\times 139.57^2\times 92.4^2}\left(-4.85104\times 10^8\right)}{50\left(1-\frac{\pi^2}{2\times 92.4^2}\right)}\right)^3$$

Result:

1.618450634959374076296152360895232797644221099033213938520...

1.61845063495… result that is a very good approximation to the value of the golden ratio 1,618033988749...

Now, we have that:

$$\frac{f_\pi^2(T,\rho)}{f_\pi^2(0)} \sim \frac{\langle\bar{q}q\rangle_{T,\rho}}{\langle\bar{q}q\rangle_0} = 1 - \frac{T^2}{8f_\pi^2} - \frac{\sigma_N}{m_\pi^2 f_\pi^2}\rho + \cdots$$

1-(x^2)/(8*92.4^2)-((50*(-4.85104e+8)))/(((139.57^2*92.4^2)))

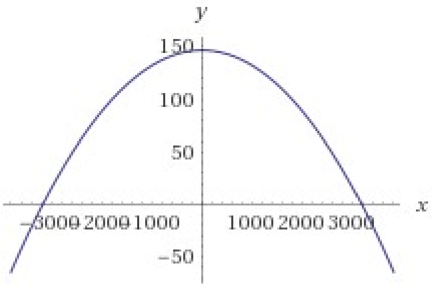
Input interpretation:

$$1-\frac{x^2}{8\times 92.4^2}-\frac{50\left(-4.85104\times 10^8\right)}{139.57^2\times 92.4^2}$$

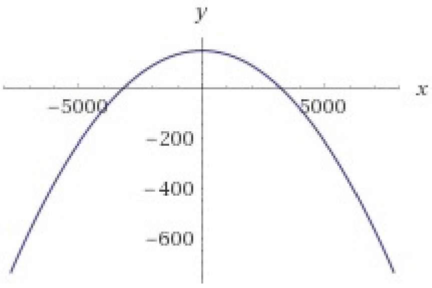
Result:

$146.84 - 0.0000146408\,x^2$

Plots:



(x from −3800 to 3800)



(x from −7757 to 7757)

Geometric figure:

parabola

Alternate forms:

$-0.0000146408\,(x - 3166.94)\,(x + 3166.94)$

$1.22968\times10^{-14}\left(1.19413\times10^{16} - 1.19062\times10^{9}\,x^2\right)$

Roots:

$x \approx -3166.94$

$x \approx 3166.94$

T = 3166.94

Polynomial discriminant:

$\Delta = 0.00859945$

Properties as a real function:

Domain

$\mathbb{R}$ (all real numbers)

Range

$\{y \in \mathbb{R} : y \leq \frac{1468400352386433}{10000000000000}\}$

Parity

even

ℝ is the set of real numbers

Derivative:

$$\frac{d}{dx}(146.84 - 0.0000146408\,x^2) = -0.0000292817\,x$$

Indefinite integral:

$$\int\left(1 - \frac{x^2}{8\times 92.4^2} - \frac{50\,(-4.85104\times 10^8)}{139.57^2\times 92.4^2}\right)dx = 146.84\,x - 4.88028\times 10^{-6}\,x^3 + \text{constant}$$

Global maximum:

$$\max\{146.84 - 0.0000146408\,x^2\} = \frac{6\,993\,255\,063}{47\,624\,989} \quad \text{at } x = 0$$

Definite integral after subtraction of diverging parts:

$$\int_0^\infty((146.84 - 0.0000146408\,x^2) - (146.84 - 0.0000146408\,x^2))\,dx = 0$$

Definite integral area above the axis between the smallest and largest real roots:

$$\int_{-3166.94}^{3166.94}(146.84 - 0.0000146408\,x^2)\,\theta(146.84 - 0.0000146408\,x^2)\,dx = 620\,044.$$

$\theta(x)$ is the Heaviside step function

Definite integral area below the axis between the smallest and largest real roots:

$$\int_{-3166.94}^{3166.94}(146.84 - 0.0000146408\,x^2)\,\theta(-146.84 + 0.0000146408\,x^2)\,dx = -2.16064\times 10^{-28}$$

((((1-(3166.94^2)/(8*92.4^2)-((50*(-4.85104e+8)))/(((139.57^2*92.4^2)))))))

Input interpretation:

$$1 - \frac{3166.94^2}{8\times 92.4^2} - \frac{50\,(-4.85104\times 10^8)}{139.57^2\times 92.4^2}$$

Result:

-0.000426480824104876960719940179736373479152022258622375 74...

-0.00042648082....

From which:

-1/((((1-(3166.94^2)/(8*92.4^2)-((50*(-4.85104e+8)))/(((139.57^2*92.4^2)))))))+123

Where 123 is a Lucas number

Input interpretation:

$$-\frac{1}{1-\frac{3166.94^2}{8\times 92.4^2}-\frac{50\left(-4.85104\times 10^8\right)}{139.57^2\times 92.4^2}}+123$$

Result:

2467.771308531535550536019903260575496284363758783973924355...

2467.7713.... result practically equal to the rest mass of charmed Xi baryon 2467.8 MeV

We have that:

$$\sigma_N(Q^2) = \sigma_N - Q^2 \int_{4m_\pi^2}^{\infty} dt \frac{\eta(t)}{t(Q^2+t)}$$

50*0.284^2 = 50-0.284^2 * integrate [x/(0.284^2)], x,[4*139.57^2 to infinity]

50-0.284^2 * integrate [1/(0.284^2)]x, for x from 4*139.57^2 to 1728

Input interpretation:

$$50-0.284^2 \int_{4\times 139.57^2}^{1728} \frac{1}{0.284^2}\, x\, dx$$

Result:

3.0342×10^9

3.0342*10^9

Computation result:

$$50-0.284^2 \int_{4\times 139.57^2}^{1728} \frac{x}{0.284^2}\, dx = 3.0342\times 10^9$$

From the integral, we obtain also:

((((50-0.284^2 * integrate [1/(0.284^2)]x, for x from 4*139.57^2 to 1728))))^1/44

Where 139.57 is the Pion meson mass and 1728 is a value in the range of the mass of candidate "glueball" $f_0(1710)$

Input interpretation:

$$\sqrt[44]{50 - 0.284^2 \int_{4\times 139.57^2}^{1728} \frac{1}{0.284^2}\, x\, dx}$$

Result:

1.64248

$1.64248 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

And:

1/10^52*(((([(((((50-0.284^2 * integrate [1/(0.284^2)]x, for x from 4*139.57^2 to 1728))))^1/44]-55/10^2+13/10^3+21/10^5))))

Where 55, 13 and 21 are Fibonacci numbers

Input interpretation:

$$\frac{1}{10^{52}}\left(\sqrt[44]{50 - 0.284^2 \int_{4\times 139.57^2}^{1728} \frac{1}{0.284^2}\, x\, dx} - \frac{55}{10^2} + \frac{13}{10^3} + \frac{21}{10^5}\right)$$

Result:

1.10569×10^{-52}

$1.10569 * 10^{-52}$ result practically equal to the value of Cosmological Constant $1.1056*10^{-52}\ m^{-2}$

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