Analyzing a formula concerning the Zeros of the Davenport Heilbronn Function. Further new possible mathematical connections with some equations concerning some sectors of String Theory and Supersymmetry Breaking. III

Michele Nardelli[1], **Antonio Nardelli**[2]

Abstract

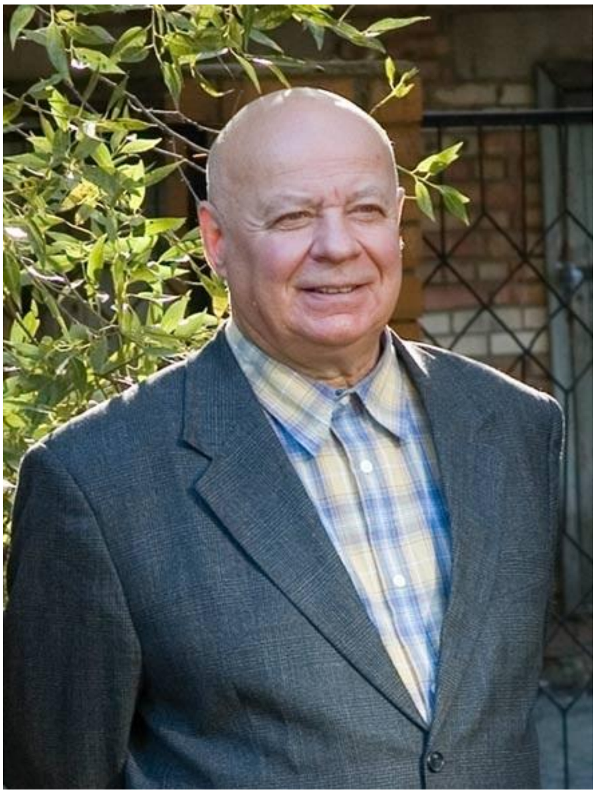
In this research thesis (part III), we analyze a formula concerning the Zeros of the Davenport Heilbronn Function. We describe further new possible mathematical connections with some equations concerning some sectors of String Theory and Supersymmetry Breaking.

[1] M.Nardelli studied at Dipartimento di Scienze della Terra Università degli Studi di Napoli Federico II, Largo S. Marcellino, 10 - 80138 Napoli, Dipartimento di Matematica ed Applicazioni "R. Caccioppoli" - Università degli Studi di Napoli "Federico II" – Polo delle Scienze e delle Tecnologie Monte S. Angelo, Via Cintia (Fuorigrotta), 80126 Napoli, Italy

[2] A. Nardelli studies at the Università degli Studi di Napoli Federico II - Dipartimento di Studi Umanistici – **Sezione Filosofia - scholar of Theoretical Philosophy**

Anatoly A. Karatsuba

(Mathematician)



Vesuvius landscape with gorse – Naples

https://www.pinterest.it/pin/950682421145899001/

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

From:

On the Zeros of the Davenport Heilbronn Function
S. A. Gritsenko - Received May 15, 2016 - ISSN 0081-5438, Proceedings of the Steklov Institute of Mathematics, 2017, Vol. 296, pp. 65–87.

We have:

Let

$$\varkappa = \frac{\sqrt{10 - 2\sqrt{5}} - 2}{\sqrt{5} - 1}$$

and χ_1 be a character modulo 5 such that $\chi_1(2) = i$.

The Davenport–Heilbronn function $f(s)$ is defined by the equality

$$f(s) = \frac{1 - i\varkappa}{2} L(s, \chi_1) + \frac{1 + i\varkappa}{2} L(s, \overline{\chi}_1), \qquad \text{where} \quad L(s, \chi) = \sum_{n=1}^{\infty} \frac{\chi(n)}{n^s}.$$

The function $f(s)$ satisfies the Riemann-type functional equation

$$g(s) = g(1 - s), \qquad \text{where} \quad g(s) = \left(\frac{\pi}{5}\right)^{-s/2} \Gamma\left(\frac{s+1}{2}\right) f(s),$$

but there is no Euler product for it.

$$(\sqrt{10 - 2\sqrt{5}} - 2)/(\sqrt{5} - 1) = \kappa$$

Input:

$$\frac{\sqrt{10 - 2\sqrt{5}} - 2}{\sqrt{5} - 1}$$

Decimal approximation:

0.2840790438404122960282918323931261690910880884457375827591626661
…

0.28407904384….

Alternate forms:

$$\frac{1}{4}\left(\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2\right)$$

$$\frac{1}{4}\left(1+\sqrt{5}\right)\left(\sqrt{10-2\sqrt{5}}-2\right)$$

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

Minimal polynomial:

$$x^4+2x^3-6x^2-2x+1$$

Expanded forms:

$$\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-\frac{2}{\sqrt{5}-1}$$

$$\frac{1}{4}\sqrt{10-2\sqrt{5}}+\frac{1}{4}\sqrt{5\left(10-2\sqrt{5}\right)}+\frac{1}{2}\left(-1-\sqrt{5}\right)$$

For

(√(10-2√5) -2)/(√5-1) = κ

From:

Bouncing Cosmology in f(Q) Symmetric Teleparallel Gravity - *Francesco Bajardi, Daniele Vernieri and Salvatore Capozziello* - arXiv:2011.01248v1 [gr-qc] 2 Nov 2020

We have:

$$Q = 6\frac{H^2}{N^2}\,,$$

For N = 1 and H is equal to

2.184×10^{-18} per second

2.184×10^{-18} Hz (hertz)

We obtain:

6(2.184*10^-18)^2

Input interpretation:

$6\left(2.184 \times 10^{-18}\right)^2$

Result:

$2.8619136 \times 10^{-35}$

Q = $2.8619136 * 10^{-35}$

$$f(Q) = \kappa Q + \frac{\kappa^2 Q^2}{6\rho_c} + \tilde{c}_1 \sqrt{Q}\,,$$

$$\rho_c = \sqrt{3}/(32\pi^2\gamma^3 G_N l_{Pl}^2),$$

$1.616255(18)\times 10^{-35}$ m

γ = ln(3) / √8 * π

sqrt3 / (32*π^2*(ln(3) / (√8 * π))^3*6.67408*10^-11*(1.61625518×10^-35)^2)

Input interpretation:

$$\frac{\sqrt{3}}{32\,\pi^2 \left(\frac{\log(3)}{\sqrt{8}\,\pi}\right)^3 \times 6.67408 \times 10^{-11} \left(1.61625518 \times 10^{-35}\right)^2}$$

log(x) is the natural logarithm

Result:

$1.66437\ldots \times 10^{80}$

$1.66437\ldots{*}10^{80}$

From:

$$f(Q) = \kappa Q + \frac{\kappa^2 Q^2}{6\rho_c} + \tilde{c}_1 \sqrt{Q}\,,$$

for (√(10-2√5) -2)/(√5-1) = κ

(((√(10-2√5) -2)/(√5-1)))*(2.8619136 * 10^-35)+ (((√(10-2√5) -2)/(√5-1)))^2*(2.8619136 * 10^-35)^2*1/(6*1.66437e+80)+sqrt(2.8619136 * 10^-35)

Input interpretation:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\times\frac{2.8619136}{10^{35}}+\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\left(\frac{2.8619136}{10^{35}}\right)^2\times\frac{1}{6\times1.66437\times10^{80}}+\sqrt{\frac{2.8619136}{10^{35}}}$$

Result:

$5.3496856\ldots\times10^{-18}$

5.3496856…*10^-18^

From which:

((256 2^(1/4)log^(3/2)(3))/(729 sqrt(3)e log^(5/4)(2)))((-1/(4Pi)(ln[(((√(10-2√5)-2)/(√5-1)))(2.8619136e-35)+(((√(10-2√5) -2)/(√5-1)))^2(2.8619136e-35)^2*1/(6*1.66437e+80)+sqrt(2.8619136e-35)])))^2

where

$$\frac{11}{22\pi-1}$$

is equal to

$$\frac{256\sqrt[4]{2}\log^{3/2}(3)}{729\sqrt{3}\,e\log^{5/4}(2)}\approx0.16149150399908$$

Input interpretation:

$$\frac{256\sqrt[4]{2}\log^{3/2}(3)}{729\left(\sqrt{3}\,e\right)\log^{5/4}(2)}\left(-\frac{1}{4\pi}\log\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\times2.8619136\times10^{-35}+\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2(2.8619136\times10^{-35})^2\times\frac{1}{6\times1.66437\times10^{80}}+\sqrt{2.8619136\times10^{-35}}\right)\right)^2$$

$\log(x)$ is the natural logarithm

Result:

1.617447076...

1.617447076…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Or, for k = 8πG:

(((8Pi*6.674e-11)))*(2.8619136 * 10^-35)+ (((8Pi*6.674e-11)))^2*(2.8619136 * 10^-35)^2*1/(6*1.66437e+80)+sqrt(2.8619136 * 10^-35)

Input interpretation:

$$\left(8\,\pi\times 6.674\times 10^{-11}\right)\times \frac{2.8619136}{10^{35}}+\left(8\,\pi\times 6.674\times 10^{-11}\right)^2\left(\frac{2.8619136}{10^{35}}\right)^2\times\frac{1}{6\times 1.66437\times 10^{80}}+\sqrt{\frac{2.8619136}{10^{35}}}$$

Result:

$5.3496856\ldots\times 10^{-18}$

5.3496856…*10^{-18} as above

From:

$$\varphi(Q)=\frac{\kappa^2Q^2}{6\varepsilon\rho_c}+c_1\sqrt{Q}\,,$$

we obtain:

(((√(10-2√5) -2)/(√5-1)))^2 * (2.8619136 * 10^-35)^2*1/(6*1/24*1.66437e+80) + sqrt(2.8619136 * 10^-35)

Input interpretation:

$$\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2 \left(\frac{2.8619136}{10^{35}}\right)^2 \times \frac{1}{6\times\frac{1}{24}\times 1.66437\times 10^{80}} + \sqrt{\frac{2.8619136}{10^{35}}}$$

Result:

$5.3496856... \times 10^{-18}$

5.3496856…*10^-18

And also:

(((8Pi*6.674e-11)))^2 * (2.8619136 * 10^-35)^2*1/(6*1/24*1.66437e+80) + sqrt(2.8619136 * 10^-35)

Input interpretation:

$$(8\pi\times 6.674\times 10^{-11})^2 \left(\frac{2.8619136}{10^{35}}\right)^2 \times \frac{1}{6\times\frac{1}{24}\times 1.66437\times 10^{80}} + \sqrt{\frac{2.8619136}{10^{35}}}$$

Result:

$5.3496856... \times 10^{-18}$

5.3496856…*10^-18

We have that:

Considering the quantization rule in Eq. (A13), the Wheeler–DeWitt equation reads

$$\frac{a^4}{6}\left(\kappa^2\frac{Q^2}{\rho_c}-3\sqrt{Q}\,\tilde{c}_1\right)\psi(a,Q)-\left(\frac{\rho_c\sqrt{Q}}{3\tilde{c}_1\rho_c+6\kappa\rho_c\sqrt{Q}+2\kappa^2Q^{3/2}}\right)\frac{\partial^2\psi(a,Q)}{\partial a^2}=0\,, \qquad (35)$$

where $\psi(a,Q)$ is the Wave Function of the Universe. With the definition

$$\alpha(Q,N)\equiv\frac{6\rho_c\sqrt{Q}}{\left(\kappa^2\frac{Q^2}{\rho_c}-3\sqrt{Q}\,\tilde{c}_1\right)\left(3\tilde{c}_1\rho_c+6\kappa\rho_c\sqrt{Q}+2\kappa^2Q^{3/2}\right)}\,, \qquad (36)$$

From:

$$\alpha(Q,N) \equiv \frac{6\rho_c\sqrt{Q}}{\left(\kappa^2\frac{Q^2}{\rho_c} - 3\sqrt{Q}\,\tilde{c}_1\right)\left(3\tilde{c}_1\rho_c + 6\kappa\rho_c\sqrt{Q} + 2\kappa^2 Q^{3/2}\right)},$$

(6*(1.66437e+80) sqrt(2.8619136 * 10^-35)) / (((((((√(10-2√5) -2)/(√5-1)))^2*(2.8619136 * 10^-35)^2*1/(1.66437e+80)-3*sqrt(2.8619136 * 10^-35)))))

Input interpretation:

$$\frac{6\times 1.66437\times 10^{80}\sqrt{\frac{2.8619136}{10^{35}}}}{\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\left(\frac{2.8619136}{10^{35}}\right)^2\times\frac{1}{1.66437\times 10^{80}} - 3\sqrt{\frac{2.8619136}{10^{35}}}}$$

Result:

$-3.32874\ldots\times 10^{80}$

$-3.32874\ldots*10^{80}$

(-3.32874 × 10^80)1/(3*(1.66437e+80)+6*(((√(10-2√5) -2)/(√5-1))) (1.66437e+80)* sqrt(2.8619136 * 10^-35)+2*(((√(10-2√5) -2)/(√5-1)))^2 (2.8619136 * 10^-35)^1.5)

Input interpretation:

$$-3.32874\times 10^{80}\times 1\Bigg/\left(3\times 1.66437\times 10^{80} + 6\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\left(1.66437\times 10^{80}\sqrt{\frac{2.8619136}{10^{35}}}\right) + 2\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\left(\frac{2.8619136}{10^{35}}\right)^{1.5}\right)$$

Result:

−0.666666666666666666464035524054079196110464339322980824679600987 8
…

Result:

$-0.666667\ldots$

-0.666667…

Or, for κ = 8πG:

(6*(1.66437e+80) sqrt(2.8619136 * 10^-35)) / (((((((8Pi*6.674e-11)))^2*(2.8619136 * 10^-35)^2*1/(1.66437e+80)-3*sqrt(2.8619136 * 10^-35)))))

Input interpretation:

$$\frac{6\times 1.66437\times 10^{80}\sqrt{\frac{2.8619136}{10^{35}}}}{(8\pi\times 6.674\times 10^{-11})^2\left(\frac{2.8619136}{10^{35}}\right)^2\times\frac{1}{1.66437\times 10^{80}}-3\sqrt{\frac{2.8619136}{10^{35}}}}$$

Result:

$-3.32874\ldots\times 10^{80}$

-3.32874…*10^{80}

(-3.32874 × 10^80)1/(3*(1.66437e+80)+6*(((8Pi*6.674e-11))) (1.66437e+80)* sqrt(2.8619136 * 10^-35)+2*(((8Pi*6.674e-11)))^2 (2.8619136 * 10^-35)^1.5)

Input interpretation:

$$-3.32874\times 10^{80}\times 1\Bigg/\left(3\times 1.66437\times 10^{80}+6\,(8\pi\times 6.674\times 10^{-11})\left(1.66437\times 10^{80}\sqrt{\frac{2.8619136}{10^{35}}}\right)+2\,(8\pi\times 6.674\times 10^{-11})^2\left(\frac{2.8619136}{10^{35}}\right)^{1.5}\right)$$

Result:

−0.6666666666666666666666666654702207885715233932922409164175417266

...

Result:

−0.666667...

-0.666667….

Now, we have:

(√(10-2√5) -2)/(√5-1) = κ

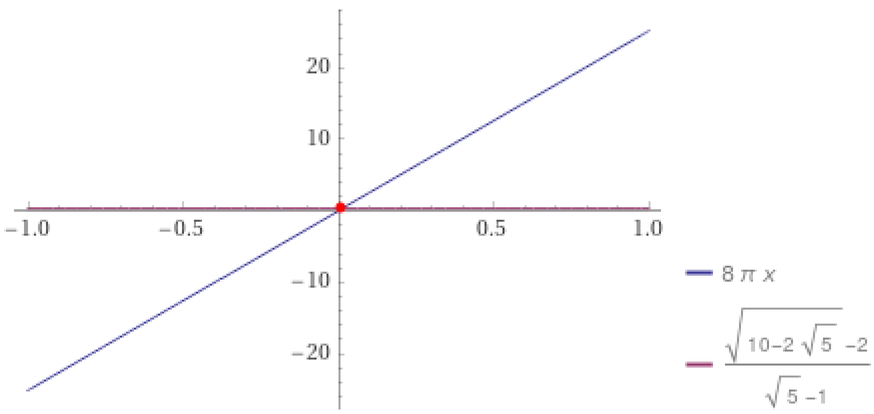
8πG = κ

8π* x = (√(10-2√5) -2)/(√5-1)

Input:

$$8\pi x = \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

Plot:



Alternate forms:

$$8\pi x = \frac{1}{2}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)$$

$$8\pi x = \frac{\sqrt{2(5-\sqrt{5})} - 2}{\sqrt{5} - 1}$$

$$8\pi x = \text{root of } x^4 + 2x^3 - 6x^2 - 2x + 1 \text{ near } x = 0.284079$$

Expanded forms:

$$x = -\frac{1}{16\pi} - \frac{\sqrt{5}}{16\pi} + \frac{\sqrt{10-2\sqrt{5}}}{32\pi} + \frac{\sqrt{5(10-2\sqrt{5})}}{32\pi}$$

$$8\pi x = \frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5} - 1} - \frac{2}{\sqrt{5} - 1}$$

Solution:

$$x = \frac{\sqrt{2(5-\sqrt{5})} - 2}{8\sqrt{5}\,\pi - 8\pi}$$

$$x \approx 0.0113031460140052$$

x = 0.0113031460140052 = G

Indeed, from the previous expression, replacing G = $6.674*10^{-11}$ with the obtained value, i.e. 0.0113031460140052, we obtain:

(-3.32874 × 10^80)1/(3*(1.66437e+80)+6*(((8Pi*0.0113031460140052))) (1.66437e+80)* sqrt(2.8619136 * 10^-35)+2*(((8Pi*0.0113031460140052)))^2 (2.8619136 * 10^-35)^1.5)

Input interpretation:

$$-3.32874\times 10^{80}\times 1\Big/\left(3\times 1.66437\times 10^{80}+6\,(8\,\pi\times 0.0113031460140052)\left(1.66437\times 10^{80}\sqrt{\frac{2.8619136}{10^{35}}}\right)+2\,(8\,\pi\times 0.0113031460140052)^2\left(\frac{2.8619136}{10^{35}}\right)^{1.5}\right)$$

Result:

$-0.666667\ldots$

-0.666667…

Rational approximation:

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

From

x = 0.0113031460140052 = G

Newtonian gravitational coupling

we obtain:

1.13031460140052×10^-2 m^3*kg^–1*s^–2

Input interpretation:

$1.13031460140052\times 10^{-2}\ m^3/(kg\,s^2)$ (meters cubed per kilogram second squared)

Unit conversions:

$0.011303146014005\ N\,m^2/kg^2$ (newton square meters per kilogram squared)

$11.303146014005\ \mathrm{dyne\ cm^2/g^2}$ (dyne square centimeters per gram squared)

$5.8254020368238\ \mathrm{ft^3/(slug\ s^2)}$ (feet cubed per slug per second squared)

Interpretation:

Newtonian gravitational coupling

Basic unit dimensions:

$[\mathrm{mass}]^{-1}\ [\mathrm{length}]^{3}\ [\mathrm{time}]^{-2}$

1.13031460140052×10^-2 pc/(solar mass) *(km/s)^2

Input interpretation:

$1.13031460140052 \times 10^{-2}\ \mathrm{pc}/M_\odot$ (parsecs per solar mass)
$(\mathrm{km/s}$ (kilometer per second)$)^2$

Result:

$1.754 \times 10^{-10}\ \mathrm{m^3/(kg\ s^2)}$ (meters cubed per kilogram second squared)

Unit conversions:

$\approx 1.754 \times 10^{-10}\ \mathrm{N\ m^2/kg^2}$ (newton square meters per kilogram squared)

$\approx 1.754 \times 10^{-7}\ \mathrm{dyne\ cm^2/g^2}$ (dyne square centimeters per gram squared)

$\approx 9.04 \times 10^{-8}\ \mathrm{ft^3/(slug\ s^2)}$ (feet cubed per slug per second squared)

Interpretation:

Newtonian gravitational coupling

Basic unit dimensions:

$[\text{mass}]^{-1}\ [\text{length}]^3\ [\text{time}]^{-2}$

((1.754×10^-10 newton square meters per kilogram squared * 9.1093837015×10^−31 kg*(2.176434×10^−8)kg))

Input interpretation:

$1.754\times10^{-10}\ \text{N m}^2/\text{kg}^2$ (newton square meters per kilogram squared) $\times$ $9.1093837015\times10^{-31}$ kg (kilograms) $\times$ 2.176434×10^{-8} kg (kilograms)

Result:

$3.477\times10^{-48}\ \text{N m}^2$ (newton meters squared)

Interpretation:

bending stiffness

Basic unit dimensions:

$[\text{mass}]\ [\text{length}]^3\ [\text{time}]^{-2}$

(3.477×10^-48) N m^2 /2e-3 N m^2

Input interpretation:

$$\frac{3.477\times10^{-48}\ \text{N m}^2 \text{ (newton meters squared)}}{2\times10^{-3}\ \text{N m}^2 \text{ (newton meters squared)}}$$

Result:

1.739×10^{-45}

$1.739*10^{-45}$

3.018×10^27 km/s

Input interpretation:

3.018×10^{27} km/s (kilometers per second)

Unit conversions:

3.018×10^{30} m/s (meters per second)

1.007×10^{22} c (speed of light)

Interpretations:

tachyonic speed

Basic unit dimensions:

$[\text{length}]\,[\text{time}]^{-1}$

Corresponding quantities:

Time to travel 1 meter from $t = d/v$:

3.3×10^{-31} seconds

Time to travel 1 kilometer from $t = d/v$:

3.3×10^{-28} seconds

We note that:

(3.477×10^-48)*(496+Pi^2-2)

Input interpretation:

$3.477\times 10^{-48}\,(496+\pi^2-2)$

Result:

$1.75195\ldots\times 10^{-45}$

1.75195…*10^-45

From Wikipedia:

α_G is typically defined in terms of the gravitational attraction between two electrons. More precisely,

$$\alpha_G = \frac{Gm_e^2}{\hbar c} = \left(\frac{m_e}{m_P}\right)^2 \approx 1.7518\times 10^{-45}$$

From:

Cosmology - *Steven Weinberg* - University of Texas at Austin - Published in the United States by Oxford University Press Inc., New York © Steven Weinberg 2008

We have that:

tion becomes a linear combination of the solutions (6.4.36) of the Mészáros equation, which in the radiation-dominated era when $y \ll 1$ become

$$\delta^{(1)}_{Dq} \to 1\,, \quad \delta^{(2)}_{Dq} \to -\ln(y/4) - 3\,. \tag{6.4.49}$$

The linear combination of these two solutions that fits smoothly with Eq. (6.4.43) is then

$$\delta^{\rm slow}_{Dq} = 6\mathcal{R}^0_q \left\{\left[-\frac{7}{2}+\gamma+\ln\left(\frac{4q\sqrt{2}}{\sqrt{3}H_{\rm EQ}a_{\rm EQ}}\right)\right]\delta^{(1)}_{Dq} - \delta^{(2)}_{Dq}\right\}\,, \tag{6.4.50}$$

For:

$\gamma = 0.5772\ldots$ is the Euler constant.

$$\kappa \equiv \frac{q\sqrt{2}}{a_{\mathrm{EQ}}H_{\mathrm{EQ}}} = \frac{(q/a_0)\sqrt{\Omega_R}}{H_0\Omega_M} = \frac{19.3(q/a_0)[\mathrm{Mpc}^{-1}]}{\Omega_M h^2},$$

$$\kappa = \sqrt{2}q/q_{\mathrm{EQ}},$$

$$H_{\mathrm{EQ}} = \sqrt{2}(H_0\sqrt{\Omega_M})(a_0/a_{\mathrm{EQ}})^{3/2}$$

we consider:

(√(10-2√5) -2)/(√5-1) = κ

8πG = κ

(√(10-2√5) -2)/(√5-1) = ((x*sqrt2)) / ((((y * (sqrt2*((((2.184*10^-18)*sqrt(0.6889))) * (z/y)^1.5))))))

Input interpretation:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} = \frac{x\sqrt{2}}{y\left(\sqrt{2}\left(\left(2.184\times 10^{-18}\sqrt{0.6889}\right)\left(\frac{z}{y}\right)^{1.5}\right)\right)}$$

Result:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} = \frac{5.51657\times 10^{17}\,x}{y\left(\frac{z}{y}\right)^{1.5}}$$

Alternate forms:

$$\frac{1}{2}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right) = \frac{5.51657\times 10^{17}\,x}{y\left(\frac{z}{y}\right)^{1.5}}$$

$$\frac{\sqrt{2\left(5-\sqrt{5}\right)}-2}{\sqrt{5}-1}=\frac{5.51657\times 10^{17}\,x}{y\left(\frac{z}{y}\right)^{1.5}}$$

$$\text{root of } x^4+2x^3-6x^2-2x+1 \text{ near } x=0.284079 = \frac{5.51657\times 10^{17}\,x}{y\left(\frac{z}{y}\right)^{1.5}}$$

Alternate form assuming x, y, and z are positive:

$$\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-\frac{2}{\sqrt{5}-1}=\frac{\left(5.51657\times 10^{17}+0\,i\right)x\,y^{0.5}}{z^{1.5}}$$

Expanded forms:

$$\frac{1}{4}\sqrt{10-2\sqrt{5}}+\frac{1}{4}\sqrt{5\left(10-2\sqrt{5}\right)}+\frac{1}{2}\left(-1-\sqrt{5}\right)=\frac{551\,657\,178\,163\,202\,304\,x\left(\frac{y}{z}\right)^{1.5}}{y}$$

$$\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-\frac{2}{\sqrt{5}-1}=\frac{551\,657\,178\,163\,202\,304\,x}{y\left(\frac{z}{y}\right)^{1.5}}$$

Real solutions:

$$x<0,\quad y<0,\quad z\approx\left(-7.78258\times 10^{11}+1.34798\times 10^{12}\,i\right)x^{2/3}\sqrt[3]{y}$$

$$x>0,\quad y>0,\quad z\approx\left(-7.78258\times 10^{11}+1.34798\times 10^{12}\,i\right)x^{2/3}\sqrt[3]{y}$$

Solution for the variable z:

$$z \approx \frac{1.55652 \times 10^{12}\, y}{\left(\frac{y}{x}\right)^{0.6666666666666667}}$$

Implicit derivatives:

$$\frac{\partial x(y, z)}{\partial z} = \frac{\left(-2 + \sqrt{2\left(5 - \sqrt{5}\right)}\right) z}{367\,771\,452\,108\,801\,536\left(-1 + \sqrt{5}\right) y \sqrt{\frac{z}{y}}}$$

$$\frac{\partial x(y, z)}{\partial y} = -\frac{\left(-2 + \sqrt{2\left(5 - \sqrt{5}\right)}\right) z^2}{1\,103\,314\,356\,326\,404\,608\left(-1 + \sqrt{5}\right) y^2 \sqrt{\frac{z}{y}}}$$

$$\frac{\partial y(x, z)}{\partial z} = \frac{3\, y}{z}$$

$$\frac{\partial y(x, z)}{\partial x} = -\frac{1\,103\,314\,356\,326\,404\,608\left(-1 + \sqrt{5}\right)}{\left(-2 + \sqrt{10 - 2\sqrt{5}}\right)\left(\frac{z}{y}\right)^{3/2}}$$

$$\frac{\partial z(x, y)}{\partial y} = \frac{z}{3\, y}$$

$$\frac{\partial z(x, y)}{\partial x} = \frac{367\,771\,452\,108\,801\,536\left(-1 + \sqrt{5}\right)}{\left(-2 + \sqrt{10 - 2\sqrt{5}}\right)\sqrt{\frac{z}{y}}}$$

From

$$\boxed{\text{root of } x^4+2x^3-6x^2-2x+1 \text{ near } x=0.284079} = \frac{5.51657\times10^{17}\,x}{y\left(\frac{z}{y}\right)^{1.5}}$$

x = 0.284079

(√(10-2√5) -2)/(√5-1) = ((0.284079*sqrt2)) / ((((y * (sqrt2*((((2.184*10^-18)*sqrt(0.6889))) * (z/y)^1.5))))))

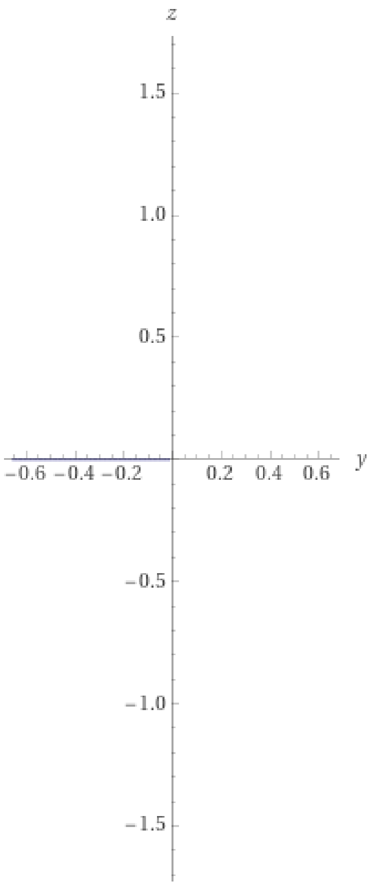
Input interpretation:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} = \frac{0.284079\sqrt{2}}{y\left(\sqrt{2}\left(\left(2.184\times10^{-18}\sqrt{0.6889}\right)\left(\frac{z}{y}\right)^{1.5}\right)\right)}$$

Result:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} = \frac{1.56714\times10^{17}}{y\left(\frac{z}{y}\right)^{1.5}}$$

Implicit plot:



Alternate forms:

$$\frac{1}{2}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)=\frac{1.56714\times 10^{17}}{y\left(\frac{z}{y}\right)^{1.5}}$$

$$\frac{\sqrt{2\left(5-\sqrt{5}\right)}-2}{\sqrt{5}-1}=\frac{1.56714\times 10^{17}}{y\left(\frac{z}{y}\right)^{1.5}}$$

$$\text{root of } x^4 + 2x^3 - 6x^2 - 2x + 1 \text{ near } x = 0.284079 = \frac{1.56714 \times 10^{17}}{y\left(\frac{z}{y}\right)^{1.5}}$$

Alternate form assuming y and z are positive:

$$\frac{\sqrt{10 - 2\sqrt{5}}}{\sqrt{5} - 1} - \frac{2}{\sqrt{5} - 1} = \frac{(1.56714 \times 10^{17} + 0\,i)\, y^{0.5}}{z^{1.5}}$$

Expanded forms:

$$\frac{1}{4}\sqrt{10 - 2\sqrt{5}} + \frac{1}{4}\sqrt{5(10 - 2\sqrt{5})} + \frac{1}{2}(-1 - \sqrt{5}) = \frac{156\,714\,219\,515\,424\,352\left(\frac{y}{z}\right)^{1.5}}{y}$$

$$\frac{\sqrt{10 - 2\sqrt{5}}}{\sqrt{5} - 1} - \frac{2}{\sqrt{5} - 1} = \frac{156\,714\,219\,515\,424\,352}{y\left(\frac{z}{y}\right)^{1.5}}$$

Real solution:

$$y > 0, \quad z \approx (-3.36318 \times 10^{11} + 5.82519 \times 10^{11}\, i)\sqrt[3]{y}$$

Solution for the variable z:

$$z \approx 6.72635 \times 10^{11}\, y^{0.3333333333333333}$$

Implicit derivatives:

$$\frac{\partial y(z)}{\partial z} = \frac{3\left(-2 + \sqrt{10 - 2\sqrt{5}}\right) y \sqrt{\frac{z}{y}}}{156\,714\,219\,515\,424\,352\,(-1 + \sqrt{5})}$$

$$\frac{\partial z(y)}{\partial y} = \frac{156714219515424352\left(-1+\sqrt{5}\right)\sqrt{\frac{z}{y}}}{3\left(-2+\sqrt{10-2\sqrt{5}}\right)z}$$

(√(10-2√5) -2)/(√5-1) = ((0.284079*sqrt2)) / ((((y * (sqrt2*((((2.184*10^-18)*sqrt(0.6889))) * ((6.72635×10^11 y^0.33333)/y)^1.5))))))

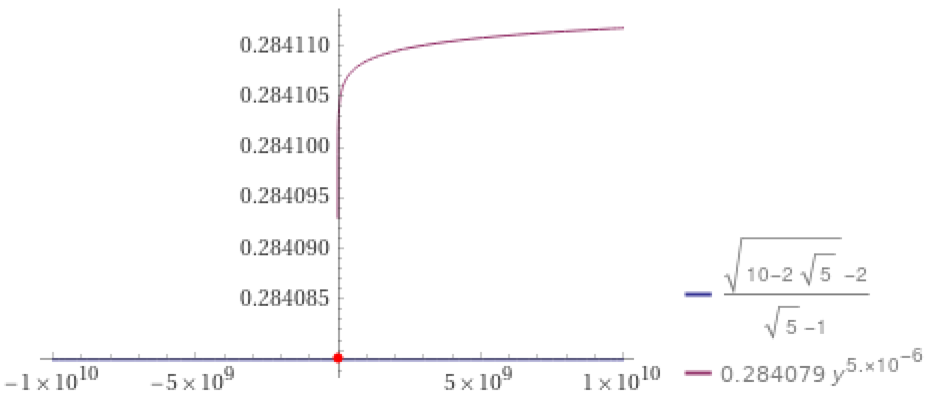
Input interpretation:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} = \frac{0.284079\sqrt{2}}{y\left(\sqrt{2}\left(\left(2.184\times 10^{-18}\sqrt{0.6889}\right)\left(\frac{6.72635\times 10^{11}\ y^{0.33333}}{y}\right)^{1.5}\right)\right)}$$

Result:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1} = 0.284079\, y^{5.\times 10^{-6}}$$

Plot:



Alternate form assuming y is real:

$y^{5.\times 10^{-6}} = 1.$

Alternate forms:

$$\frac{1}{2}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right) = 0.284079\, y^{5.\times 10^{-6}}$$

$$\frac{\sqrt{2\left(5-\sqrt{5}\right)}-2}{\sqrt{5}-1} = 0.284079\, y^{5.\times 10^{-6}}$$

$$\boxed{\text{root of } x^4+2x^3-6x^2-2x+1 \text{ near } x = 0.284079} = 0.284079\, y^{5.\times 10^{-6}}$$

Expanded forms:

$$\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}-1}-\frac{2}{\sqrt{5}-1} = 0.284079\, y^{5.\times 10^{-6}}$$

$$y^{5.\times 10^{-6}} = 1.$$

Numerical solution:

$y \approx 0.993576494740273\ldots$

y ≈ 0.993576494740273...

from:

$z \approx 6.72635\times 10^{11}\, y^{0.3333333333333333}$

6.72635×10^11 (0.993576494740273)^0.3333333333333333

Input interpretation:

$6.72635\times 10^{11}\times 0.993576494740273^{0.33333}$

Result:

$6.71192\ldots \times 10^{11}$

z = 6.71192…*10^{11}

Thence:

(√(10-2√5) -2)/(√5-1) =

(((0.284079)*sqrt2)) / ((((0.993576494740273 * (sqrt2*((((2.184*10^-18)*sqrt(0.6889))) *(6.71192*10^11/0.993576494740273)^1.5))))))

Input interpretation:

$$\frac{0.284079\sqrt{2}}{0.993576494740273\left(\sqrt{2}\left(\left(2.184\times 10^{-18}\sqrt{0.6889}\right)\left(\frac{6.71192\times 10^{11}}{0.993576494740273}\right)^{1.5}\right)\right)}$$

Result:

0.28407885006690316966135935137918404155356370674004383520010409 69…

0.28407885…

(√(10-2√5) -2)/(√5-1) = κ (a)

8πG = κ (b)

From (a):

8π* x = (√(10-2√5) -2)/(√5-1)

i.e.

[(√(10-2√5) -2)/(√5-1)]/(8π)

Input:

$$\frac{\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}}{8\pi}$$

Result:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{8\left(\sqrt{5}-1\right)\pi}$$

Decimal approximation:

0.0113031460140052147973750129442035744685760313920017808594909667 …

0.0113031…. = G

Property:

$$\frac{-2+\sqrt{10-2\sqrt{5}}}{8\left(-1+\sqrt{5}\right)\pi}$$ is a transcendental number

Alternate forms:

$$\frac{\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2}{32\pi}$$

$$-\frac{1+\sqrt{5}-\sqrt{2\left(5+\sqrt{5}\right)}}{16\pi}$$

$$\frac{-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}}{16\pi}$$

Expanded forms:

$$-\frac{1}{16\pi}-\frac{\sqrt{5}}{16\pi}+\frac{\sqrt{10-2\sqrt{5}}}{32\pi}+\frac{\sqrt{5\left(10-2\sqrt{5}\right)}}{32\pi}$$

$$\frac{\sqrt{10-2\sqrt{5}}}{8\left(\sqrt{5}-1\right)\pi}-\frac{1}{4\left(\sqrt{5}-1\right)\pi}$$

Series representations:

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)\left(\sqrt{5}-1\right)}=\frac{-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}}{8\pi\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)}$$

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)\left(\sqrt{5}-1\right)}=\frac{-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}}{8\pi\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

$$\frac{\sqrt{10-2\sqrt{5}}-2}{(8\pi)\left(\sqrt{5}-1\right)}=\frac{-2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}}{8\pi\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5-z_0\right)^k z_0^{-k}}{k!}\right)}$$

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

And:

1/(8Pi)[(((0.284079)*sqrt2)) / ((((0.993576494740273 * (sqrt2*((((2.184*10^-18)*sqrt(0.6889))) *(6.71192*10^11/0.993576494740273)^1.5))))))]

Input interpretation:

$$\frac{1}{8\pi} \times \frac{0.284079\sqrt{2}}{0.993576494740273\left(\sqrt{2}\left(\left(2.184\times 10^{-18}\sqrt{0.6889}\right)\left(\frac{6.71192\times 10^{11}}{0.993576494740273}\right)^{1.5}\right)\right)}$$

Result:

0.011303138304002260366427357848460056029087163649951519053815103 9...

0.0113031.... as above

From:

sqrt2*(((2.184*10^-18)*sqrt(0.6889))) *[((6.71192*10^11)/(0.993576494740273))]^1.5

Input interpretation:

$$\sqrt{2}\left(2.184\times 10^{-18}\sqrt{0.6889}\right)\left(\frac{6.71192\times 10^{11}}{0.993576494740273}\right)^{1.5}$$

Result:

1.4233572515684133049900521914245739591170567091775371311516084954...

1.4233572515684133.... = H_{EQ}

x = 0.284079 = q

y ≈ 0.993576494740273 = a_{EQ}

$z = 6.71192\ldots * 10^{11} = a_0$

From:

$$\delta_{Dq}^{\mathrm{slow}} = 6\mathcal{R}_q^0 \left\{ \left[-\frac{7}{2} + \gamma + \ln\left(\frac{4q\sqrt{2}}{\sqrt{3}H_{\mathrm{EQ}}a_{\mathrm{EQ}}} \right) \right] \delta_{Dq}^{(1)} - \delta_{Dq}^{(2)} \right\}$$

$y \ll 1$

6*x [(-7/2+0.5772+ln[(((4*0.284079*sqrt2)))/(((sqrt3*(1.4233572515684133)*(0.993576494740273))))] * 1-(-ln((1/12)*1/4)-3))] = z

Input interpretation:

$$6\,x\left(-\frac{7}{2} + 0.5772 + \log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\times 1.4233572515684133\times 0.993576494740273}\right)\times 1 - \left(-\log\left(\frac{1}{12}\times\frac{1}{4}\right) - 3\right)\right) = z$$

$\log(x)$ is the natural logarithm

Result:

$6\,x(-4.21552) = z$

Alternate forms:

$$x(-4.21552) = \frac{z}{6}$$

$6\,x(-4.21552) - z = 0$

Solution:

$z \approx 6\,x(-4.21552)\,,\quad x(-4.21552) \in \mathbb{R}$

For x = 1;

Z = -25.29312

For x = 1/2 :

Input interpretation:

$$6\times\frac{1}{2}\times(-4.21552)$$

Result:

-12.64656

Z = -12.64656

6*1/2 [(-7/2+0.5772+ln[(((4*0.284079*sqrt2)))/(((sqrt3*(1.4233572515684133)*(0.993576494740273))))] * 1-(-ln((1/12)*1/4)-3))]

Input interpretation:

$$6\times\frac{1}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times0.284079\sqrt{2}}{\sqrt{3}\times1.4233572515684133\times0.993576494740273}\right)\times1-\left(-\log\left(\frac{1}{12}\times\frac{1}{4}\right)-3\right)\right)$$

$\log(x)$ is the natural logarithm

Result:

$-12.6465\ldots$

-12.6465…. ≈ -4π

Alternative representations:

$$\frac{6}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)\right.$$
$$\left.1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)=$$
$$3\left(0.0772+\log_e\left(\frac{1}{4\times 12}\right)+\log_e\left(\frac{1.13632\sqrt{2}}{1.414214308776493030\sqrt{3}}\right)\right)$$

$$\frac{6}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)\right.$$
$$\left.1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)=$$
$$3\left(0.0772+\log(a)\log_a\left(\frac{1}{4\times 12}\right)+\log(a)\log_a\left(\frac{1.13632\sqrt{2}}{1.414214308776493030\sqrt{3}}\right)\right)$$

$$\frac{6}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)\right.$$
$$\left.1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)=$$
$$3\left(0.0772-\text{Li}_1\left(1-\frac{1}{4\times 12}\right)-\text{Li}_1\left(1-\frac{1.13632\sqrt{2}}{1.414214308776493030\sqrt{3}}\right)\right)$$

Series representations:

$$\frac{6}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)\right.$$
$$\left.1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)=$$
$$0.2316+3\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\left(\left(-\frac{47}{48}\right)^k+\left(-1+\frac{0.803496\sqrt{2}}{\sqrt{3}}\right)^k\right)}{k}$$

$$\frac{6}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)\right.$$
$$\left.1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)=$$
$$0.2316+6\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1}{48}-x\right)}{2\,\pi}\right\rfloor+6\,i\,\pi\left\lfloor\frac{\arg\left(-x+\frac{0.803496\sqrt{2}}{\sqrt{3}}\right)}{2\,\pi}\right\rfloor+6\log(x)+$$
$$3\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\,x^{-k}\left(\left(\frac{1}{48}-x\right)^k+\left(-x+\frac{0.803496\sqrt{2}}{\sqrt{3}}\right)^k\right)}{k}\quad\text{for } x<0$$

$$\frac{6}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)\right.$$
$$\left.1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)=$$
$$0.2316+3\left\lfloor\frac{\arg\left(\frac{1}{48}-z_0\right)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+3\left\lfloor\frac{\arg\left(\frac{0.803496\sqrt{2}}{\sqrt{3}}-z_0\right)}{2\,\pi}\right\rfloor\log\left(\frac{1}{z_0}\right)+$$
$$6\log(z_0)+3\left\lfloor\frac{\arg\left(\frac{1}{48}-z_0\right)}{2\,\pi}\right\rfloor\log(z_0)+3\left\lfloor\frac{\arg\left(\frac{0.803496\sqrt{2}}{\sqrt{3}}-z_0\right)}{2\,\pi}\right\rfloor\log(z_0)+$$
$$3\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\left(\left(\frac{1}{48}-z_0\right)^k+\left(\frac{0.803496\sqrt{2}}{\sqrt{3}}-z_0\right)^k\right)z_0^{-k}}{k}$$

Integral representation:

$$\frac{6}{2}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)\right.$$
$$\left.1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)=$$
$$0.2316+\int_1^{\frac{1}{48}}\frac{(-3+6\,t)\sqrt{2}+(0.077785-7.46736\,t)\sqrt{3}}{t\left((-1+t)\sqrt{2}+(0.0259283-1.24456\,t)\sqrt{3}\right)}\,dt$$

1/(6+0.08333)(((6*1/8 [(-7/2+0.5772+ln[(((4*0.284079*sqrt2)))/(((sqrt3*(1.4233572515684133)*(0.993576494740273))))] * 1-(-ln((1/12)*1/4)-3))])))^2

Input interpretation:

$$\frac{1}{6+0.08333}\left(6\times\frac{1}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\times 1.4233572515684133\times 0.993576494740273}\right)\times 1-\left(-\log\left(\frac{1}{12}\times\frac{1}{4}\right)-3\right)\right)\right)^2$$

$\log(x)$ is the natural logarithm

Result:

1.6431707012284064718455855618746836437460175243031202109274635746...

1.6431707….. ≈ $\zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

Alternative representations:

$$\frac{1}{6+0.08333}\left(\frac{6}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)\right)^2 = \frac{\left(\frac{6}{8}\left(0.0772+\log_e\left(\frac{1}{4\times 12}\right)+\log_e\left(\frac{1.13632\sqrt{2}}{1.41421430877649303 0\sqrt{3}}\right)\right)\right)^2}{6.08333}$$

$$\frac{1}{6+0.08333}\left(\frac{6}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)\right)^2=$$

$$\frac{\left(\frac{6}{8}\left(0.0772+\log(a)\log_a\left(\frac{1}{4\times 12}\right)+\log(a)\log_a\left(\frac{1.13632\sqrt{2}}{1.414214308776493030\sqrt{3}}\right)\right)\right)^2}{6.08333}$$

$$\frac{1}{6+0.08333}\left(\frac{6}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)\right)^2=$$

$$\frac{\left(\frac{6}{8}\left(0.0772-\mathrm{Li}_1\left(1-\frac{1}{4\times 12}\right)-\mathrm{Li}_1\left(1-\frac{1.13632\sqrt{2}}{1.414214308776493030\sqrt{3}}\right)\right)\right)^2}{6.08333}$$

Series representations:

$$\frac{1}{6+0.08333}\left(\frac{6}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)\right)^2=$$

$$0.0924658\left(0.0772+\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\left(\left(-\frac{47}{48}\right)^k+\left(-1+\frac{0.803496\sqrt{2}}{\sqrt{3}}\right)^k\right)}{k}\right)^2$$

$$\frac{1}{6+0.08333}\left(\frac{6}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)\right)^{2}=0.0924658$$

$$\left(0.0772+2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1}{48}-x\right)}{2\,\pi}\right\rfloor+2\,i\,\pi\left\lfloor\frac{\arg\left(-x+\frac{0.803496\sqrt{2}}{\sqrt{3}}\right)}{2\,\pi}\right\rfloor+2\log(x)+\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\,x^{-k}\left(\left(\frac{1}{48}-x\right)^{k}+\left(-x+\frac{0.803496\sqrt{2}}{\sqrt{3}}\right)^{k}\right)}{k}\right)^{2}\quad \text{for } x<0$$

$$\frac{1}{6+0.08333}\left(\frac{6}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)\right)^{2}=$$

$$0.0924658\left(0.0772+2\log(z_0)+\left\lfloor\frac{\arg\left(\frac{1}{48}-z_0\right)}{2\,\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)+\left\lfloor\frac{\arg\left(\frac{0.803496\sqrt{2}}{\sqrt{3}}-z_0\right)}{2\,\pi}\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)+\sum_{k=1}^{\infty}\frac{(-1)^{1+k}\left(\left(\frac{1}{48}-z_0\right)^{k}+\left(\frac{0.803496\sqrt{2}}{\sqrt{3}}-z_0\right)^{k}\right)z_0^{-k}}{k}\right)^{2}$$

Integral representation:

$$\frac{1}{6+0.08333}\left(\frac{6}{8}\left(-\frac{7}{2}+0.5772+\log\left(\frac{4\times 0.284079\sqrt{2}}{\sqrt{3}\ 1.42335725156841330000\times 0.99357649474027300000}\right)1-\left(-\log\left(\frac{1}{12\times 4}\right)-3\right)\right)\right)^2=$$

$$0.0924658\left(0.00595984+\left(\int_1^{\frac{1}{48}}\frac{1}{t}\,dt\right)^2+\left(\int_1^{\frac{0.803496\sqrt{2}}{\sqrt{3}}}\frac{1}{t}\,dt\right)^2+10.8148\int_1^{\frac{1}{48}}\frac{(-0.0142767+0.0285534\,t)\sqrt{2}+(0.000370172-0.0355365\,t)\sqrt{3}}{t\left((-1+t)\sqrt{2}+(0.0259283-1.24456\,t)\sqrt{3}\right)}\,dt-1.27104\sqrt{3}\int_0^1\int_0^1-\frac{0.803496}{(-1.02128+t_1)\left(-\sqrt{3}+\left(-0.803496\sqrt{2}+\sqrt{3}\right)t_2\right)}\,dt_2\,dt_1\right)$$

From:

Locally Supersymmetric Maxwell-Einstein Theory
S. Ferrara, J. Scherk and P. van Nieuwenhuizent - Physical Review Letters - Volume 37 - 18 October 1976 - Number 16 - (Received 26 August 1976)

We have that:

$$\hat{\mathfrak{L}}^{M}=-\tfrac{1}{4}eg^{\mu\rho}g^{\nu\sigma}F_{\mu\nu}F_{\rho\sigma}-\tfrac{1}{2}e\bar{\lambda}\gamma^{\mu}D_{\mu}\lambda+\tfrac{1}{4}e\kappa\bar{\psi}_{\mu}\gamma^{\alpha}\gamma^{\beta}\gamma^{\mu}\lambda F_{\alpha\beta},$$

[-1/4*e*4-1/2*e*1/2*1/2*1/2*sqrt5+1/4*e*((√(10-2√5) -2)/(√5-1))*1/2*5*sqrt5*1/2*2]

Input:

$$-\frac{e\times 4}{4}-\frac{1}{2}e\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\sqrt{5}+\frac{1}{4}e\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\times\frac{1}{2}\times 5\sqrt{5}\times\frac{1}{2}\times 2$$

Result:

$$-e-\frac{\sqrt{5}\,e}{16}+\frac{5\sqrt{5}\left(\sqrt{10-2\sqrt{5}}-2\right)e}{8\left(\sqrt{5}-1\right)}$$

Decimal approximation:

−2.018981308379658827739572576943037139122984768391347108277784979...

-2.0189813…

Property:

$$-e-\frac{\sqrt{5}\,e}{16}+\frac{5\sqrt{5}\left(-2+\sqrt{10-2\sqrt{5}}\right)e}{8\left(-1+\sqrt{5}\right)}$$ is a transcendental number

Alternate forms:

$$\frac{1}{32}\left(\left(5\sqrt{5\left(10-2\sqrt{5}\right)}-10\sqrt{5}+25\sqrt{2\left(5-\sqrt{5}\right)}-82\right)e-2\sqrt{5}\,e\right)$$

$$\frac{1}{16}\left(-41-6\sqrt{5}+5\sqrt{10\left(5+\sqrt{5}\right)}\right)e$$

$$\frac{\left(11-35\sqrt{5}+10\sqrt{50-10\sqrt{5}}\right)e}{16\left(\sqrt{5}-1\right)}$$

Expanded forms:

$$-\frac{41\,e}{16}-\frac{3\sqrt{5}\,e}{8}+\frac{5}{32}\sqrt{250-50\sqrt{5}}\,e+\frac{5}{32}\sqrt{50-10\sqrt{5}}\,e$$

$$-e-\frac{\sqrt{5}\,e}{16}-\frac{5\sqrt{5}\,e}{4\left(\sqrt{5}-1\right)}+\frac{5\sqrt{5\left(10-2\sqrt{5}\right)}\,e}{8\left(\sqrt{5}-1\right)}$$

From which:

(-[-1/4*e*4-1/2*e*1/2*1/2*1/2*sqrt5+1/4*e*((√(10-2√5) -2)/(√5-1))*1/2*5*sqrt5*1/2*2])-((6Pi)/47)

Input:

$$-\left(-\frac{e\times 4}{4}-\frac{1}{2}\,e\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\sqrt{5}+\frac{1}{4}\,e\times\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\times\frac{1}{2}\times 5\sqrt{5}\times\frac{1}{2}\times 2\right)-\frac{6\pi}{47}$$

Result:

$$e+\frac{\sqrt{5}\,e}{16}-\frac{5\sqrt{5}\left(\sqrt{10-2\sqrt{5}}-2\right)e}{8\left(\sqrt{5}-1\right)}-\frac{6\pi}{47}$$

Decimal approximation:

1.617926927070323520701788315247781451778665270598780407727792053 1...

1.617926927…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternate forms:

$$\frac{47\left(2\sqrt{5}\,e-\left(5\sqrt{5\left(10-2\sqrt{5}\right)}-10\sqrt{5}+25\sqrt{2\left(5-\sqrt{5}\right)}-82\right)e\right)-192\pi}{1504}$$

$$\frac{1}{16}\left(41+6\sqrt{5}-5\sqrt{10\left(5+\sqrt{5}\right)}\right)e-\frac{6\pi}{47}$$

$$-\frac{\left(11-35\sqrt{5}+10\sqrt{50-10\sqrt{5}}\right)e}{16\left(\sqrt{5}-1\right)}-\frac{6\pi}{47}$$

Expanded forms:

$$\frac{41e}{16}+\frac{3\sqrt{5}\,e}{8}-\frac{5}{32}\sqrt{250-50\sqrt{5}}\;e-\frac{5}{32}\sqrt{50-10\sqrt{5}}\;e-\frac{6\pi}{47}$$

$$e+\frac{\sqrt{5}\,e}{16}+\frac{5\sqrt{5}\,e}{4\left(\sqrt{5}-1\right)}-\frac{5\sqrt{5\left(10-2\sqrt{5}\right)}\;e}{8\left(\sqrt{5}-1\right)}-\frac{6\pi}{47}$$

Series representations:

$$-\left(\frac{1}{4}\,(e\,4)\,(-1)-\frac{e\sqrt{5}}{2\times 2\,(2\times 2)}+\frac{\left(e\,(5\sqrt{5}\;2)\right)\left(\sqrt{10-2\sqrt{5}}-2\right)}{(4\,(2\times 2))\left(\sqrt{5}-1\right)}\right)-\frac{6\pi}{47}=$$
$$\left(-752\,e+96\,\pi+1645\,e\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-96\,\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}+\right.$$
$$47\,e\sqrt{4}^{\,2}\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2-470\,e\sqrt{4}\sqrt{9-2\sqrt{5}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}4^{-k_1}\binom{\frac{1}{2}}{k_1}\binom{\frac{1}{2}}{k_2}\left(9-2\sqrt{5}\right)^{-k_2}\right)\Bigg/\left(752\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$-\left(\frac{1}{4}(e\,4)(-1)-\frac{e\sqrt{5}}{2\times 2\,(2\times 2)}+\frac{\left(e\left(5\sqrt{5}\;2\right)\right)\left(\sqrt{10-2\sqrt{5}}\;-2\right)}{(4\,(2\times 2))\left(\sqrt{5}\;-1\right)}\right)-\frac{6\pi}{47}=$$

$$\left(-752\,e+96\,\pi+1645\,e\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-96\,\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}+\right.$$
$$47\,e\sqrt{4}^{\,2}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-470\,e\sqrt{4}\;\sqrt{9-2\sqrt{5}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,4^{-k_1}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(9-2\sqrt{5}\right)^{-k_2}}{k_1!\,k_2!}\right)\Big/$$
$$\left(752\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$-\left(\frac{1}{4}(e\,4)(-1)-\frac{e\sqrt{5}}{2\times 2\,(2\times 2)}+\frac{\left(e\left(5\sqrt{5}\;2\right)\right)\left(\sqrt{10-2\sqrt{5}}\;-2\right)}{(4\,(2\times 2))\left(\sqrt{5}\;-1\right)}\right)-\frac{6\pi}{47}=$$

$$\left(3008\,e\sqrt{\pi}^{\,2}-384\,\pi\sqrt{\pi}^{\,2}-3290\,e\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)+\right.$$
$$192\,\pi\sqrt{\pi}\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)-$$
$$47\,e\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2+$$
$$470\,e\sum_{j_1=0}^{\infty}\sum_{j_2=0}^{\infty}\left(\operatorname{Res}_{s=-\frac{1}{2}+j_1}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)$$
$$\left.\left(\operatorname{Res}_{s=-\frac{1}{2}+j_2}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(9-2\sqrt{5}\right)^{-s}\right)\right)\Big/$$
$$\left(1504\sqrt{\pi}\left(2\sqrt{\pi}-\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)\right)$$

From:

$$\mathfrak{L}_4{}^{M} = (e\kappa^2/8)[-(\bar{\psi}\cdot\psi)(\bar{\lambda}\lambda) + (\bar{\psi}_\alpha\gamma_5\psi^\alpha)(\bar{\lambda}\gamma_5\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma\cdot\psi)(\bar{\lambda}\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma_5\gamma\cdot\psi)(\bar{\lambda}\gamma_5\lambda) - \tfrac{1}{2}(\bar{\psi}\cdot\gamma\gamma_5\psi_\alpha)(\bar{\lambda}\gamma_5\gamma^\alpha\lambda) + \tfrac{1}{4}(\bar{\psi}_\alpha\gamma_5\gamma_\rho\psi^\alpha)(\bar{\lambda}\gamma_5\gamma^\rho\lambda) + \tfrac{3}{2}(\bar{\lambda}\lambda)(\bar{\lambda}\lambda)].$$

$$(e\kappa^2/8)[-(\bar{\psi}\cdot\psi)(\bar{\lambda}\lambda) + (\bar{\psi}_\alpha\gamma_5\psi^\alpha)(\bar{\lambda}\gamma_5\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma\cdot\psi)(\bar{\lambda}\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma_5\gamma\cdot\psi)(\bar{\lambda}\gamma_5\lambda) - \tfrac{1}{2}(\bar{\psi}\cdot\gamma\gamma_5\psi_\alpha)(\bar{\lambda}\gamma_5\gamma^\alpha\lambda) + \tfrac{1}{4}(\bar{\psi}_\alpha\gamma_5\gamma_\rho\psi^\alpha)(\bar{\lambda}\gamma_5\gamma^\rho\lambda) + \tfrac{3}{2}(\bar{\lambda}\lambda)(\bar{\lambda}\lambda)].$$

$$(\sqrt{10-2\sqrt{5}}-2)/(\sqrt{5}-1) = \kappa$$

1/8(e*((√(10-2√5) -2)/(√5-1))^2)[-1/16+5*1/16+1/4*5*1/16+1/4*25*1/16-1/2*25*1/16+1/4*25*1/16+3/2*1/16]

Input:

$$\frac{1}{8}\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+5\times\frac{1}{16}+\frac{1}{4}\times5\times\frac{1}{16}+\frac{1}{4}\times25\times\frac{1}{16}-\frac{1}{2}\times25\times\frac{1}{16}+\frac{1}{4}\times25\times\frac{1}{16}+\frac{3}{2}\times\frac{1}{16}\right)$$

Result:

$$\frac{27\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{512\left(\sqrt{5}-1\right)^2}$$

Decimal approximation:

0.011568223752763835020429611970426052542890026288284760142620870 4
…

0.011568223…

Property:

$$\frac{27\left(-2+\sqrt{10-2\sqrt{5}}\right)^2 e}{512\left(-1+\sqrt{5}\right)^2}$$ is a transcendental number

Alternate forms:

$$\frac{e\left(\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2\right)^2 27}{8192}$$

$$\frac{27}{512}\left(4+\sqrt{5}-2\sqrt{5+2\sqrt{5}}\right)e$$

$$\frac{1}{512}\left(108+27\sqrt{5}-256\sqrt{\frac{3645}{16384}+\frac{729\sqrt{5}}{8192}}\right)e$$

Expanded forms:

$$\frac{27e}{128}+\frac{27\sqrt{5}\,e}{512}-\frac{81\sqrt{10-2\sqrt{5}}\,e}{1024}-\frac{27\sqrt{5\left(10-2\sqrt{5}\right)}\,e}{1024}$$

$$\frac{189e}{256\left(\sqrt{5}-1\right)^2}-\frac{27\sqrt{5}\,e}{256\left(\sqrt{5}-1\right)^2}-\frac{27\sqrt{10-2\sqrt{5}}\,e}{128\left(\sqrt{5}-1\right)^2}$$

Series representations:

$$\frac{1}{8}\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=\frac{27\,e\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)^2}{512\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2}$$

$$\frac{1}{8}\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=\frac{27\,e\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)^2}{512\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}$$

$$\frac{1}{8}\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=\frac{27\,e\left(-2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)^2}{512\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5-z_0\right)^k z_0^{-k}}{k!}\right)^2}$$

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

From which:

(71*2)((1/8(e*((√(10-2√5) -2)/(√5-1))^2)[-1/16+5*1/16+1/4*5*1/16+1/4*25*1/16-1/2*25*1/16+1/4*25*1/16+3/2*1/16]))

Input:

$$(71\times 2)\left(\frac{1}{8}\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+5\times\frac{1}{16}+\frac{1}{4}\times 5\times\frac{1}{16}+\frac{1}{4}\times 25\times\frac{1}{16}-\frac{1}{2}\times 25\times\frac{1}{16}+\frac{1}{4}\times 25\times\frac{1}{16}+\frac{3}{2}\times\frac{1}{16}\right)\right)$$

Result:

$$\frac{1917\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{256\left(\sqrt{5}-1\right)^2}$$

Decimal approximation:

1.642687772892464572901004899800499461090383732936435940252163597 8

...

$1.64268777.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934...$

Property:

$$\frac{1917\left(-2+\sqrt{10-2\sqrt{5}}\right)^2 e}{256\left(-1+\sqrt{5}\right)^2}$$ is a transcendental number

Alternate forms:

$$\frac{1917\, e\left(\sqrt{10-2\sqrt{5}}-2\sqrt{5}+\sqrt{5\left(10-2\sqrt{5}\right)}-2\right)^2}{4096}$$

$$\frac{1917}{256}\left(4+\sqrt{5}-2\sqrt{5+2\sqrt{5}}\right)e$$

$$\frac{1}{256}\left(7668+1917\sqrt{5}-128\sqrt{\frac{18\,374\,445}{4096}+\frac{3\,674\,889\sqrt{5}}{2048}}\right)e$$

Expanded forms:

$$\frac{1917\,e}{64}+\frac{1917\sqrt{5}\,e}{256}-\frac{5751}{512}\sqrt{10-2\sqrt{5}}\,e-\frac{1917}{512}\sqrt{5\left(10-2\sqrt{5}\right)}\,e$$

$$\frac{13\,419\,e}{128\left(\sqrt{5}-1\right)^2}-\frac{1917\sqrt{5}\,e}{128\left(\sqrt{5}-1\right)^2}-\frac{1917\sqrt{10-2\sqrt{5}}\,e}{64\left(\sqrt{5}-1\right)^2}$$

Series representations:

$$\frac{1}{8}\left(\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)\right)71\times2=$$

$$\frac{1917\,e\left(-2+\sqrt{9-2\sqrt{5}}\,\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)^2}{256\left(-1+\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2}$$

$$\frac{1}{8}\left(\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)\right)71\times2=$$

$$\frac{1917\,e\left(-2+\sqrt{9-2\sqrt{5}}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)^2}{256\left(-1+\sqrt{4}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}$$

$$\frac{1}{8}\left(\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)\right)71\times2=$$

$$\frac{1917\,e\left(-2+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)^2}{256\left(-1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5-z_0\right)^k z_0^{-k}}{k!}\right)^2}$$

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

And:

(((172^3-1-135^3)^1/3)+3/2+1/Pi)((1/8(e*((√(10-2√5) -2)/(√5-1))^2)[-1/16+5*1/16+1/4*5*1/16+1/4*25*1/16-1/2*25*1/16+1/4*25*1/16+3/2*1/16]))

Where $(172^3-1-135^3)^{1/3} = 138$ is given by the following Ramanujan expression:

$$135^3 + 138^3 = 172^3 - 1$$

Input:

$$\left(\sqrt[3]{172^3 - 1 - 135^3} + \frac{3}{2} + \frac{1}{\pi}\right)$$
$$\left(\frac{1}{8}\left(e\left(\frac{\sqrt{10 - 2\sqrt{5}} - 2}{\sqrt{5} - 1}\right)^2\right)\left(-\frac{1}{16} + 5\times\frac{1}{16} + \frac{1}{4}\times 5\times\frac{1}{16} + \frac{1}{4}\times 25\times\frac{1}{16} - \frac{1}{2}\times 25\times\frac{1}{16} + \frac{1}{4}\times 25\times\frac{1}{16} + \frac{3}{2}\times\frac{1}{16}\right)\right)$$

Result:

$$\frac{27\left(\sqrt{10 - 2\sqrt{5}} - 2\right)^2 e\left(\frac{279}{2} + \frac{1}{\pi}\right)}{512\left(\sqrt{5} - 1\right)^2}$$

Decimal approximation:

1.6174494934966458654722262457510598411853042350966503212268205258
...

1.6174494934….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternate forms:

$$\frac{e\left(\sqrt{10 - 2\sqrt{5}} - 2\sqrt{5} + \sqrt{5\left(10 - 2\sqrt{5}\right)} - 2\right)^2 27\,(2 + 279\,\pi)}{16384\,\pi}$$

$$\frac{27\left(4 + \sqrt{5} - 2\sqrt{5 + 2\sqrt{5}}\right)e\,(2 + 279\,\pi)}{1024\,\pi}$$

$$\frac{1}{512}\left(108 + 27\sqrt{5} - 256\sqrt{\frac{3645}{16384} + \frac{729\sqrt{5}}{8192}}\right)e\left(\frac{279}{2} + \frac{1}{\pi}\right)$$

Expanded form:

$$\frac{52731\,e}{512\left(\sqrt{5}-1\right)^2}-\frac{7533\sqrt{5}\,e}{512\left(\sqrt{5}-1\right)^2}-\frac{7533\sqrt{10-2\sqrt{5}}\,e}{256\left(\sqrt{5}-1\right)^2}+\frac{189\,e}{256\left(\sqrt{5}-1\right)^2\pi}-\frac{27\sqrt{5}\,e}{256\left(\sqrt{5}-1\right)^2\pi}-\frac{27\sqrt{10-2\sqrt{5}}\,e}{128\left(\sqrt{5}-1\right)^2\pi}$$

Series representations:

$$\frac{1}{8}\left(\sqrt[3]{172^3-1-135^3}+\frac{3}{2}+\frac{1}{\pi}\right)\left(\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)\right)=\frac{27\,e\,(2+279\pi)\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)^2}{1024\,\pi\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2}$$

$$\frac{1}{8}\left(\sqrt[3]{172^3-1-135^3}+\frac{3}{2}+\frac{1}{\pi}\right)\left(\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)\right)=\frac{27\,e\,(2+279\pi)\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)^2}{1024\,\pi\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}$$

$$\frac{1}{8}\left(\sqrt[3]{172^3-1-135^3}+\frac{3}{2}+\frac{1}{\pi}\right)\left(\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\right.$$

$$\left.\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)\right)=$$

$$\frac{27\,e\,(2+279\,\pi)\left(-2+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)^2}{1024\,\pi\left(-1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^2}$$

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

From ratio between the two expressions, after some calculations, we obtain:

27*1/2(-([-e - (sqrt(5) e)/16 + (5 sqrt(5) (-2 + sqrt(10 - 2 sqrt(5))) e)/(8 (-1 + sqrt(5)))]
*1/ [(27 (-2 + sqrt(10 - 2 sqrt(5)))^2 e)/(512 (-1 + sqrt(5))^2)])-47+1/2)+1/sqrt2

Input:

$$27\times\frac{1}{2}\left(-\left(\left(-e-\frac{1}{16}\left(\sqrt{5}\,e\right)+\frac{5\sqrt{5}\left(-2+\sqrt{10-2\sqrt{5}}\right)e}{8\left(-1+\sqrt{5}\right)}\right)\times\frac{1}{\frac{27\left(-2+\sqrt{10-2\sqrt{5}}\right)^2 e}{512\left(-1+\sqrt{5}\right)^2}}\right)-47+\frac{1}{2}\right)+\frac{1}{\sqrt{2}}$$

Exact result:

$$\frac{1}{\sqrt{2}}+\frac{27}{2}\left(-\frac{93}{2}-\frac{512\left(\sqrt{5}-1\right)^2\left(-e-\frac{\sqrt{5}\,e}{16}+\frac{5\sqrt{5}\left(\sqrt{10-2\sqrt{5}}-2\right)e}{8\left(\sqrt{5}-1\right)}\right)}{27\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}\right)$$

Decimal approximation:

1729.0878530086216371465124352438421463682875104852562511747676075

…

1729.087853….

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

From:

$$\mathfrak{L}^G = -\tfrac{1}{2}\kappa^{-2}eR - \tfrac{1}{2}\epsilon^{\mu\nu\rho\sigma}\overline{\psi}_\mu\gamma_5\gamma_\nu D_\rho\psi_\sigma - (e\kappa^2/32)[(\overline{\psi}^b\gamma^a\psi^c)(\overline{\psi}_b\gamma_a\psi_c + 2\overline{\psi}_a\gamma_b\psi_c) - 4(\overline{\psi}_a\gamma\cdot\psi)^2].$$

$$-\tfrac{1}{2}\kappa^{-2}eR - \tfrac{1}{2}\epsilon^{\mu\nu\rho\sigma}\overline{\psi}_\mu\gamma_5\gamma_\nu D_\rho\psi_\sigma - (e\kappa^2/32)$$
$$[(\overline{\psi}^b\gamma^a\psi^c)(\overline{\psi}_b\gamma_a\psi_c + 2\overline{\psi}_a\gamma_b\psi_c) - 4(\overline{\psi}_a\gamma\cdot\psi)^2].$$

-1/2*((√(10-2√5) -2)/(√5-1))^-2*e-1/2*1/24*5*1/8-(1/32(e*((√(10-2√5) -2)/(√5-1))^2))*(1/4*sqrt5)*(1/4*sqrt5+2*1/4*sqrt5)-4(1/4*sqrt5)^2

Input:

$$-\frac{e}{2\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2} - \frac{1}{2}\times\frac{1}{24}\times 5\times\frac{1}{8} - \left(\frac{1}{32}\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\right)\left(\frac{1}{4}\sqrt{5}\right)\left(\frac{1}{4}\sqrt{5}+2\times\frac{1}{4}\sqrt{5}\right) - 4\left(\frac{1}{4}\sqrt{5}\right)^2$$

Exact result:

$$-\frac{485}{384} - \frac{(\sqrt{5}-1)^2 e}{2\left(\sqrt{10-2\sqrt{5}}-2\right)^2} - \frac{15\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{512(\sqrt{5}-1)^2}$$

Decimal approximation:

$-18.111153989294655007657298084315141502592018709076932736963334 99$

...

-18.11115398929….

Property:

$$-\frac{485}{384}-\frac{(-1+\sqrt{5})^2 e}{2\left(-2+\sqrt{10-2\sqrt{5}}\right)^2}-\frac{15\left(-2+\sqrt{10-2\sqrt{5}}\right)^2 e}{512(-1+\sqrt{5})^2}$$

is a transcendental number

Alternate forms:

$$-\frac{485}{384}+\frac{1}{512}\left(-60-15\sqrt{5}+256\sqrt{\frac{1125}{16384}+\frac{225\sqrt{5}}{8192}}\right)e+\frac{1}{2}\left(-4-\sqrt{5}-2\sqrt{5+2\sqrt{5}}\right)e$$

$$-\left(\left(50440-19400\sqrt{5}-11640\sqrt{2(5-\sqrt{5})}+3880\sqrt{10(5-\sqrt{5})}+14982e-5598\sqrt{5}\,e-180\sqrt{2}\,(5-\sqrt{5})^{3/2}e-360\sqrt{2(5-\sqrt{5})}\,e\right)\Big/\left(384(\sqrt{5}-1)^2\left(\sqrt{2(5-\sqrt{5})}-2\right)^2\right)\right)$$

$$-\frac{6305}{48\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}+\frac{2425\sqrt{5}}{48\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}+$$
$$\frac{485\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}}{8\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}-\frac{485\sqrt{\frac{5}{2}\left(5-\sqrt{5}\right)}}{24\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}-$$
$$\frac{2497\,e}{64\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}+\frac{933\sqrt{5}\,e}{64\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}+$$
$$\frac{105\sqrt{\frac{1}{2}\left(5-\sqrt{5}\right)}\,e}{16\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}-\frac{15\sqrt{\frac{5}{2}\left(5-\sqrt{5}\right)}\,e}{16\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2}$$

Expanded forms:

$$-\frac{485}{384}-\frac{105\,e}{256\left(\sqrt{5}-1\right)^2}+\frac{15\sqrt{5}\,e}{256\left(\sqrt{5}-1\right)^2}+$$
$$\frac{15\sqrt{10-2\sqrt{5}}\,e}{128\left(\sqrt{5}-1\right)^2}-\frac{3\,e}{\left(\sqrt{10-2\sqrt{5}}-2\right)^2}+\frac{\sqrt{5}\,e}{\left(\sqrt{10-2\sqrt{5}}-2\right)^2}$$

$$-\frac{485}{384}-\frac{15\,e}{128}-\frac{15\sqrt{5}\,e}{512}+\frac{45\sqrt{10-2\sqrt{5}}\,e}{1024}+\frac{15\sqrt{5\left(10-2\sqrt{5}\right)}\,e}{1024}-$$
$$\frac{6\,e}{28-4\sqrt{5}-8\sqrt{10-2\sqrt{5}}}+\frac{2\sqrt{5}\,e}{28-4\sqrt{5}-8\sqrt{10-2\sqrt{5}}}$$

From which:

-(26+4)/[-1/2*((√(10-2√5) -2)/(√5-1))^-2*e-1/2*1/24*5*1/8-(1/32(e*((√(10-2√5) -2)/(√5-1))^2))*(1/4*sqrt5)*(1/4*sqrt5+2*1/4*sqrt5)-4(1/4*sqrt5)^2]

Input:

$$-\left((26+4)\Big/\left(-\frac{e}{2\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2}-\frac{1}{2}\times\frac{1}{24}\times5\times\frac{1}{8}-\left(\frac{1}{32}\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\right)\right.\right.$$
$$\left.\left.\left(\frac{1}{4}\sqrt{5}\right)\left(\frac{1}{4}\sqrt{5}+2\times\frac{1}{4}\sqrt{5}\right)-4\left(\frac{1}{4}\sqrt{5}\right)^2\right)\right)$$

Exact result:

$$-\frac{30}{-\frac{485}{384}-\frac{(\sqrt{5}-1)^2 e}{2\left(\sqrt{10-2\sqrt{5}}-2\right)^2}-\frac{15\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{512(\sqrt{5}-1)^2}}$$

Decimal approximation:

1.6564377961632228441259534812028937713524057342994938910599837785

...

1.656437796….

Property:

$$-\frac{30}{-\frac{485}{384}-\frac{(-1+\sqrt{5})^2 e}{2\left(-2+\sqrt{10-2\sqrt{5}}\right)^2}-\frac{15\left(-2+\sqrt{10-2\sqrt{5}}\right)^2 e}{512(-1+\sqrt{5})^2}}$$ is a transcendental number

Alternate forms:

$$-\left(30\Big/\left(-\frac{485}{384}+\frac{1}{512}\left(-60-15\sqrt{5}+256\sqrt{\frac{1125}{16\,384}+\frac{225\sqrt{5}}{8192}}\right)e+\right.\right.$$
$$\left.\left.\frac{1}{2}\left(-4-\sqrt{5}-2\sqrt{5+2\sqrt{5}}\right)e\right)\right)$$

$$\left(5760\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2\right)\Big/$$
$$\left(25\,220-9700\sqrt{5}-5820\sqrt{2\left(5-\sqrt{5}\right)}+1940\sqrt{10\left(5-\sqrt{5}\right)}+\right.$$
$$\left.7491\,e-2799\sqrt{5}\,e-630\sqrt{2\left(5-\sqrt{5}\right)}\,e+90\sqrt{10\left(5-\sqrt{5}\right)}\,e\right)$$

$$\left(11\,520\left(\sqrt{5}-1\right)^2\left(\sqrt{2\left(5-\sqrt{5}\right)}-2\right)^2\right)\Big/$$
$$\left(50\,440-19\,400\sqrt{5}-11\,640\sqrt{2\left(5-\sqrt{5}\right)}+3880\sqrt{10\left(5-\sqrt{5}\right)}+\right.$$
$$\left.14\,982\,e-5598\sqrt{5}\,e-180\sqrt{2}\left(5-\sqrt{5}\right)^{3/2}e-360\sqrt{2\left(5-\sqrt{5}\right)}\,e\right)$$

Series representations:

$$-\frac{26+4}{-\frac{e}{2\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2}-\frac{5}{2\times24\times8}-\frac{\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\sqrt{5}\left(\frac{\sqrt{5}}{4}+\frac{2\sqrt{5}}{4}\right)}{32\times4}-4\left(\frac{\sqrt{5}}{4}\right)^2}=$$
$$-\left(30\Big/\left(-\frac{5}{384}-\frac{1}{4}\sqrt{4}^2\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2-\right.\right.$$
$$\frac{e\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2}{2\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)^2}-$$
$$\left(3\,e\sqrt{4}^2\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)^2\right)\Big/$$
$$\left.\left.\left(512\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2\right)\right)\right)$$

$$-\frac{26+4}{-\frac{e}{2\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2}-\frac{5}{2\times 24\times 8}-\frac{\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\sqrt{5}\left(\frac{\sqrt{5}}{4}+\frac{2\sqrt{5}}{4}\right)}{32\times 4}-4\left(\frac{\sqrt{5}}{4}\right)^2}=$$

$$-\left(30\Big/\left(-\frac{5}{384}-\frac{1}{4}\sqrt{4}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2-\frac{e\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}{2\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)^2}-\left(3e\sqrt{4}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(9-2\sqrt{5}\right)^{-k}}{k!}\right)^2\right)\Big/\left(512\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2\right)\right)\right)$$

$$-\frac{26+4}{-\frac{e}{2\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2}-\frac{5}{2\times 24\times 8}-\frac{\left(e\left(\frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}\right)^2\right)\sqrt{5}\left(\frac{\sqrt{5}}{4}+\frac{2\sqrt{5}}{4}\right)}{32\times 4}-4\left(\frac{\sqrt{5}}{4}\right)^2}=$$

$$-\left(30\Big/\left(-\frac{5}{384}-\frac{1}{4}\sqrt{z_0}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^2-\right.\right.$$

$$\frac{e\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^2}{2\left(-2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)^2}-$$

$$\left(3\,e\sqrt{z_0}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^2\right.$$

$$\left.\left(-2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)^2\right)\Big/$$

$$\left.\left.\left(512\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^2\right)\right)\right)$$

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

The result 1.656437796…. is very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

Indeed, from:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4} \times \left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

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

which is straightforward. □

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

Note that (**A. Nardelli**), from the above result we obtain:

[-30/(-485/384 - ((sqrt(5) - 1)^2 e)/(2 (sqrt(10 - 2 sqrt(5)) - 2)^2) - (15 (sqrt(10 - 2 sqrt(5)) - 2)^2 e)/(512 (sqrt(5) - 1)^2))]-0.0113031460140052

where 0.0113031460140052 is given by:

(√(10-2√5) -2)/(√5-1) = κ

8πG = κ

8π* x = (√(10-2√5) -2)/(√5-1)

$$8\pi x = \frac{\sqrt{10-2\sqrt{5}}-2}{\sqrt{5}-1}$$

$$x = \frac{\sqrt{2\left(5-\sqrt{5}\right)}-2}{8\sqrt{5}\,\pi - 8\,\pi}$$

x = 0.0113031460140052 = G

Input interpretation:

$$-\frac{30}{-\frac{485}{384}-\frac{(\sqrt{5}-1)^2\,e}{2\left(\sqrt{10-2\sqrt{5}}-2\right)^2}-\frac{15\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{512(\sqrt{5}-1)^2}} - 0.0113031460140052$$

Result:

1.6451346501492176...

$1.64513465\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Series representations:

$$-\frac{30}{-\frac{485}{384}-\frac{(\sqrt{5}-1)^2\,e}{2\left(\sqrt{10-2\sqrt{5}}-2\right)^2}-\frac{15\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{512(\sqrt{5}-1)^2}} - 0.01130314601400520000 =$$

$$-0.01130314601400520000 - 30 \Bigg/ \left(-\frac{485}{384} - \frac{e\left(-1+\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}\right)^2}{2\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)^2} - \frac{15\,e\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(9-2\sqrt{5}\right)^{-k}\right)^2}{512\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2}\right)$$

$$-\frac{30}{-\frac{485}{384}-\frac{(\sqrt{5}-1)^2 e}{2\left(\sqrt{10-2\sqrt{5}}-2\right)^2}-\frac{15\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{512(\sqrt{5}-1)^2}} - 0.01130314601400520000 =$$

$$-0.01130314601400520000 - 30 \Bigg/ \left(-\frac{485}{384} - \frac{e\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}{2\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(9-2\sqrt{5})^{-k}}{k!}\right)^2} - \frac{15\,e\left(-2+\sqrt{9-2\sqrt{5}}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(9-2\sqrt{5})^{-k}}{k!}\right)^2}{512\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2}\right)$$

$$-\frac{30}{-\frac{485}{384}-\frac{(\sqrt{5}-1)^2 e}{2\left(\sqrt{10-2\sqrt{5}}-2\right)^2}-\frac{15\left(\sqrt{10-2\sqrt{5}}-2\right)^2 e}{512(\sqrt{5}-1)^2}} - 0.01130314601400520000 =$$

$$-0.01130314601400520000 - 30 \Bigg/ \left(-\frac{485}{384} - \frac{e\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^2}{2\left(-2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)^2} - \frac{15\,e\left(-2+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(10-2\sqrt{5}-z_0\right)^k z_0^{-k}}{k!}\right)^2}{512\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^2}\right)$$

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

From the

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

we obtain:

((√((113+5√505)/8)+√((105+5√505)/8))^3)^1/14 - 0.0113031460140052

Input interpretation:

$$\sqrt[14]{\left(\sqrt{\frac{1}{8}\left(113+5\sqrt{505}\right)}+\sqrt{\frac{1}{8}\left(105+5\sqrt{505}\right)}\right)^3} - 0.0113031460140052$$

Result:

1.6444814027907395…

$1.6444814027\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Considering 8πG = κ in the three previous equations, we obtain:

[-1/4*e*4-1/2*e*1/2*1/2*1/2*sqrt5+1/4*e*(8Pi*6.674e-11)*1/2*5*sqrt5*1/2*2]

Input interpretation:

$$-\frac{e\times 4}{4}-\frac{1}{2}e\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\sqrt{5}+\frac{1}{4}e\left(8\pi\times 6.674\times 10^{-11}\right)\times\frac{1}{2}\times 5\sqrt{5}\times\frac{1}{2}\times 2$$

Result:

−3.09817325648920…

-3.09817325648920

1/8(e*(8Pi*6.674e-11)^2)[-1/16+5*1/16+1/4*5*1/16+1/4*25*1/16-1/2*25*1/16+1/4*25*1/16+3/2*1/16]

Input interpretation:

$$\frac{1}{8}\left(e\left(8\pi\times 6.674\times 10^{-11}\right)^2\right)\left(-\frac{1}{16}+5\times\frac{1}{16}+\frac{1}{4}\times 5\times\frac{1}{16}+\frac{1}{4}\times 25\times\frac{1}{16}-\frac{1}{2}\times 25\times\frac{1}{16}+\frac{1}{4}\times 25\times\frac{1}{16}+\frac{3}{2}\times\frac{1}{16}\right)$$

Result:

$4.03311\ldots\times 10^{-19}$

$4.03311\ldots*10^{-19}$

-1/2*(8Pi*6.674e-11)^-2*e-1/2*1/24*5*1/8-(1/32(e*(8Pi*6.674e-11)^2))*(1/4*sqrt5)*(1/4*sqrt5+2*1/4*sqrt5)-4(1/4*sqrt5)^2

Input interpretation:

$$-\frac{e}{2\left(8\pi\times 6.674\times 10^{-11}\right)^2}-\frac{1}{2}\times\frac{1}{24}\times 5\times\frac{1}{8}-\left(\frac{1}{32}\left(e\left(8\pi\times 6.674\times 10^{-11}\right)^2\right)\right)\left(\frac{1}{4}\sqrt{5}\right)\left(\frac{1}{4}\sqrt{5}+2\times\frac{1}{4}\sqrt{5}\right)-4\left(\frac{1}{4}\sqrt{5}\right)^2$$

Result:

$-4.83073\ldots\times 10^{17}$

$-4.83073\ldots*10^{17}$

From the three results, after some calculations, we obtain:

-1/2((-3.09817325648920+(4.03311× 10^-19)((((-1/2*(8Pi*6.674e-11)^-2*e-1/2*1/24*5*1/8-(1/32(e*(8Pi*6.674e-11)^2))*(1/4*sqrt5)*(1/4*sqrt5+2*1/4*sqrt5)-4(1/4*sqrt5)^2))))))

Input interpretation:

$$-\frac{1}{2}\left(-3.09817325648920+4.03311\times10^{-19}\left(-\frac{e}{2\left(8\pi\times6.674\times10^{-11}\right)^2}-\frac{1}{2}\times\frac{1}{24}\times5\times\frac{1}{8}-\left(\frac{1}{32}\left(e\left(8\pi\times6.674\times10^{-11}\right)^2\right)\right)\left(\frac{1}{4}\sqrt{5}\right)\left(\frac{1}{4}\sqrt{5}+2\times\frac{1}{4}\sqrt{5}\right)-4\left(\frac{1}{4}\sqrt{5}\right)^2\right)\right)$$

Result:

1.6465008653644566642136046728378665349286194903135072262785685668
...

1.646500865364….. ≈ ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

Now, considering κ = 8πG , where 0.0113031460140052 = G, we obtain also:

$$\hat{\mathfrak{L}}^{M}=-\tfrac{1}{4}eg^{\mu\rho}g^{\nu\sigma}F_{\mu\nu}F_{\rho\sigma}-\tfrac{1}{2}e\bar{\lambda}\gamma^{\mu}D_{\mu}\lambda+\tfrac{1}{4}e\kappa\bar{\psi}_{\mu}\gamma^{\alpha}\gamma^{\beta}\gamma^{\mu}\lambda F_{\alpha\beta},$$

[-1/4*e*4-1/2*e*1/2*1/2*1/2*sqrt5+1/4*e*(8Pi*0.0113031460140052)*1/2*5*sqrt5*1/2*2]

Input interpretation:

$$-\frac{e\times4}{4}-\frac{1}{2}e\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\sqrt{5}+\frac{1}{4}e\left(8\pi\times0.0113031460140052\right)\times\frac{1}{2}\times5\sqrt{5}\times\frac{1}{2}\times2$$

Result:

−2.01898130837966…

-2.0189813…. as above

$$\mathfrak{L}_4{}^{M} = (e\,\kappa^2/8)[-(\bar{\psi}\cdot\psi)(\bar{\lambda}\lambda) + (\bar{\psi}_\alpha\gamma_5\psi^\alpha)(\bar{\lambda}\gamma_5\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma\cdot\psi)(\bar{\lambda}\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma_5\gamma\cdot\psi)(\bar{\lambda}\gamma_5\lambda)$$
$$-\tfrac{1}{2}(\bar{\psi}\cdot\gamma\gamma_5\psi_\alpha)(\bar{\lambda}\gamma_5\gamma^\alpha\lambda) + \tfrac{1}{4}(\bar{\psi}_\alpha\gamma_5\gamma_\rho\psi^\alpha)(\bar{\lambda}\gamma_5\gamma^\rho\lambda) + \tfrac{3}{2}(\bar{\lambda}\lambda)(\bar{\lambda}\lambda)].$$

$$(e\,\kappa^2/8)[-(\bar{\psi}\cdot\psi)(\bar{\lambda}\lambda) + (\bar{\psi}_\alpha\gamma_5\psi^\alpha)(\bar{\lambda}\gamma_5\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma\cdot\psi)(\bar{\lambda}\lambda) + \tfrac{1}{4}(\bar{\psi}\cdot\gamma\gamma_5\gamma\cdot\psi)(\bar{\lambda}\gamma_5\lambda)$$
$$-\tfrac{1}{2}(\bar{\psi}\cdot\gamma\gamma_5\psi_\alpha)(\bar{\lambda}\gamma_5\gamma^\alpha\lambda) + \tfrac{1}{4}(\bar{\psi}_\alpha\gamma_5\gamma_\rho\psi^\alpha)(\bar{\lambda}\gamma_5\gamma^\rho\lambda) + \tfrac{3}{2}(\bar{\lambda}\lambda)(\bar{\lambda}\lambda)].$$

1/8(e*(8Pi*0.0113031460140052)^2)[-1/16+5*1/16+1/4*5*1/16+1/4*25*1/16-1/2*25*1/16+1/4*25*1/16+3/2*1/16]

Input interpretation:

$$\frac{1}{8}\left(e\,(8\,\pi\times 0.0113031460140052)^2\right)\left(-\frac{1}{16}+5\times\frac{1}{16}+\frac{1}{4}\times 5\times\frac{1}{16}+\frac{1}{4}\times 25\times\frac{1}{16}-\frac{1}{2}\times 25\times\frac{1}{16}+\frac{1}{4}\times 25\times\frac{1}{16}+\frac{3}{2}\times\frac{1}{16}\right)$$

Result:

0.0115682237527638…

0.01156822…. as above

Alternative representations:

$$\frac{1}{8}\left(e\,(8\,\pi\,0.011303146014005200000)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=\frac{1}{8}\,e\left(-\frac{7}{16}+\frac{55}{4\times 16}\right)(16.276530260167488800\,°)^2$$

$$\frac{1}{8}\left(e\,(8\,\pi\,0.011303146014005200000)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=\frac{1}{8}\,e\left(-\frac{7}{16}+\frac{55}{4\times 16}\right)(-0.090425168112041600000\,i\,\log(-1))^2$$

$$\frac{1}{8}\left(e\,(8\,\pi\,0.01130314601400520000)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)=\frac{1}{8}\,e\left(-\frac{7}{16}+\frac{55}{4\times16}\right)\left(0.1808503362240832000\,i\log\left(\frac{1-i}{1+i}\right)\right)^2$$

Series representations:

$$\frac{1}{8}\left(e\,(8\,\pi\,0.01130314601400520000)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)=0.006890999299517686\,1\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)^2\sum_{k=0}^{\infty}\frac{1}{k!}$$

$$\frac{1}{8}\left(e\,(8\,\pi\,0.01130314601400520000)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)=0.0068909099929951768 61\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)^2\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}$$

$$\frac{1}{8}\left(e\,(8\,\pi\,0.01130314601400520000)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times16}+\frac{25}{4\times16}-\frac{25}{2\times16}+\frac{25}{4\times16}+\frac{3}{2\times16}\right)=\frac{0.006890909992995176861\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2\,k}\right)^2}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}$$

Integral representations:

$$\frac{1}{8}\left(e\left(8\pi\, 0.0113031460140052000\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=0.00172477498248794215 2\, e\left(\int_0^\infty \frac{1}{1+t^2}\, dt\right)^2$$

$$\frac{1}{8}\left(e\left(8\pi\, 0.0113031460140052000\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=0.00689909992995176861\, e\left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2$$

$$\frac{1}{8}\left(e\left(8\pi\, 0.0113031460140052000\right)^2\right)\left(-\frac{1}{16}+\frac{5}{16}+\frac{5}{4\times 16}+\frac{25}{4\times 16}-\frac{25}{2\times 16}+\frac{25}{4\times 16}+\frac{3}{2\times 16}\right)=0.00172477498248794215 2\, e\left(\int_0^\infty \frac{\sin(t)}{t}\, dt\right)^2$$

$$\mathfrak{L}^G = -\tfrac{1}{2}\kappa^{-2}eR - \tfrac{1}{2}\epsilon^{\mu\nu\rho\sigma}\overline{\psi}_\mu\gamma_5\gamma_\nu D_\rho\psi_\sigma - (e\kappa^2/32)\left[(\overline{\psi}^b\gamma^a\psi^c)(\overline{\psi}_b\gamma_a\psi_c + 2\,\overline{\psi}_a\gamma_b\psi_c) - 4(\overline{\psi}_a\gamma\cdot\psi)^2\right].$$

$$-\tfrac{1}{2}\kappa^{-2}eR - \tfrac{1}{2}\epsilon^{\mu\nu\rho\sigma}\overline{\psi}_\mu\gamma_5\gamma_\nu D_\rho\psi_\sigma - (e\kappa^2/32)$$
$$\left[(\overline{\psi}^b\gamma^a\psi^c)(\overline{\psi}_b\gamma_a\psi_c + 2\,\overline{\psi}_a\gamma_b\psi_c) - 4(\overline{\psi}_a\gamma\cdot\psi)^2\right].$$

-1/2*(8Pi*0.0113031460140052)^-2*e-1/2*1/24*5*1/8-(1/32(e*(8π*0.0113031460140052)^2))*(1/4*sqrt5)*(1/4*sqrt5+2*1/4*sqrt5)-4(1/4*sqrt5)^2

Input interpretation:

$$-\frac{e}{2(8\pi\times 0.0113031460140052)^2}-\frac{1}{2}\times\frac{1}{24}\times 5\times\frac{1}{8}-\left(\frac{1}{32}\left(e\,(8\pi\times 0.0113031460140052)^2\right)\right)\left(\frac{1}{4}\sqrt{5}\right)\left(\frac{1}{4}\sqrt{5}+2\times\frac{1}{4}\sqrt{5}\right)-4\left(\frac{1}{4}\sqrt{5}\right)^2$$

Result:

$-18.1111539892947\ldots$

-18.11115398…. as above

Series representations:

$$\frac{e(-1)}{(8\pi\, 0.01130314601400520000)^2\, 2}-\frac{5}{(2\times 8)\, 24}-\frac{\left(e\,(8\pi\, 0.01130314601400520000)^2\right)\sqrt{5}\left(\frac{\sqrt{5}}{4}+\frac{2\sqrt{5}}{4}\right)}{4\times 32}-4\left(\frac{\sqrt{5}}{4}\right)^2=$$
$$-0.01302083333333333333-\frac{61.149280961777476\, e}{\pi^2}+\left(-0.2500000000000000000-0.0000479104161802206153\, e\,\pi^2\right)\sqrt{4}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2$$

$$\frac{e(-1)}{(8\pi\, 0.01130314601400520000)^2\, 2}-\frac{5}{(2\times 8)\, 24}-\frac{\left(e\,(8\pi\, 0.01130314601400520000)^2\right)\sqrt{5}\left(\frac{\sqrt{5}}{4}+\frac{2\sqrt{5}}{4}\right)}{4\times 32}-4\left(\frac{\sqrt{5}}{4}\right)^2=$$
$$-\frac{1}{\pi^2}\,0.0000479104161618022062\left(1.2763253972112730\times 10^6\, e+271.77458205234434\,\pi^2+5218.0719754050113\,\pi^2\sqrt{4}^2\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2+1.0000000000000000\, e\,\pi^4\sqrt{4}^2\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2\right)$$

$$\frac{e\,(-1)}{(8\,\pi\,0.01130314601400520000)^2\,2} - \frac{5}{(2\times 8)\,24} - \frac{\left(e\,(8\,\pi\,0.01130314601400520000)^2\right)\sqrt{5}\,\left(\frac{\sqrt{5}}{4}+\frac{2\sqrt{5}}{4}\right)}{4\times 32} - 4\left(\frac{\sqrt{5}}{4}\right)^2 =$$

$$-0.01302083333333333333 - \frac{61.149280961777476\,e}{\pi^2} + \frac{1}{\sqrt{\pi}^2}\left(-0.06250000000000000000 - 0.000011977604045055153 8\,e\,\pi^2\right) \left(\sum_{j=0}^{\infty} \mathrm{Res}_{s=-\frac{1}{2}+j}\, 4^{-s}\,\Gamma\!\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^2$$

Mathematical connections with some sectors of String Theory

From:

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

We have that:

Hence

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

so that

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

Hence

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

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$64 G_{37}^{24} = e^{\pi\sqrt{37}} + 24 + 276 e^{-\pi\sqrt{37}} + \cdots,$$
$$64 G_{37}^{-24} = 4096 e^{-\pi\sqrt{37}} - \cdots,$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372 e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372 e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\,-\,2\,C} \;=\; \frac{h^2\left(p\;+\;1\;-\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}}{(7\;-\;p)}$$

$$(A')^2 \;=\; k\,e^{\,-\,2\,A} \;+\; \frac{h^2}{16(p\;+\;1)}\left(7\;-\;p\;+\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)\,e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 642, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18)) we obtain:

Input:

$\exp\left(-\pi\sqrt{18}\right)$

Exact result:

$e^{-3\sqrt{2}\,\pi}$

Decimal approximation:

$1.6272016226072509292942156739117979541838581136954016\ldots \times 10^{-6}$

$1.6272016\ldots * 10^{-6}$

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$$e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^-}6$$

from which:

$$\frac{1}{4096} e^{-6C+\phi} = 1.6272016\ldots * 10\text{^-}6$$

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}} = 1.6272016\ldots * 10\text{^-}6$$

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi \sqrt{18}\right) \times \frac{1}{0.000244140625}$$

Result:

0.00666501785…

0.00666501785…

Series representations:

$$\frac{\exp\left(-\pi \sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\pi \sqrt{17} \sum_{k=0}^{\infty} 17^{-k} \binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp\left(-\pi \sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\pi \sqrt{17} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{17}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp\left(-\pi \sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\, \Gamma\left(-\frac{1}{2} - s\right) \Gamma(s)}{2 \sqrt{\pi}}\right)$$

Now:

$e^{-6C+\phi}$ = 0.0066650177536

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

= 0.00666501785…

From:

ln(0.00666501784619)

Input interpretation:

$\log(0.00666501784619)$

Result:

$-5.010882647757\ldots$

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\mathrm{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty}\frac{(-1)^k(-0.993334982153810000)^k}{k}$$

$$\log(0.00666501784619000) = 2 i \pi \left\lfloor \frac{\arg(0.00666501784619000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.00666501784619000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.00666501784619000) = \left\lfloor \frac{\arg(0.00666501784619000 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.00666501784619000 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.00666501784619000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.00666501784619000) = \int_1^{0.00666501784619000} \frac{1}{t} \, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

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

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

(http://www.bitman.name/math/article/102/109/)

The mean between the two results of the above Rogers-Ramanujan continued fractions is 0.97798855285, value very near to the ψ Regge slope 0.979:

Ψ	3	$m_c = 1500$	0.979	-0.09

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.99040073270864402755097375571330141546073279617855555 1684...

0.99040073.... result very near to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

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

From

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

We have:

$$\begin{aligned} e^{2C} &= \frac{2\,\xi\,e^{\frac{\phi}{2}}}{1\,\pm\,\sqrt{1\,-\,\frac{\xi T}{3}\,e^{2\phi}}} \\ \frac{h^2}{32} &= \frac{\xi^7\,e^{4\phi}}{\left(1\,\pm\,\sqrt{1\,-\,\frac{\xi T}{3}\,e^{2\phi}}\right)^7}\left[\frac{42}{\xi}\left(1\,\pm\,\sqrt{1\,-\,\frac{\xi\,T}{3}\,e^{2\phi}}\right)\,+\,5\,T\,e^{2\phi}\right]\,. \end{aligned} \qquad (2.7)$$

For

$T = \frac{16}{\pi^2}$

$\xi = 1$

we obtain:

(2*e^(0.989117352243/2)) / (1+sqrt(((1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))

Input interpretation:

$$\frac{2\,e^{0.989117352243/2}}{1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times0.989117352243}}}$$

Result:

0.83941881822… −
1.4311851867… i

Polar coordinates:

$r = 1.65919106525$ (radius), $\theta = -59.607521917°$ (angle)

1.65919106525….. result very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.49455867612150000}}{1+\sqrt{-\frac{16\,e^{1.97823470448600000}}{3\,\pi^2}}\,\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.49455867612150000}}{1+\sqrt{-\frac{16\,e^{1.97823470448600000}}{3\,\pi^2}}\,\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.49455867612150000}}{1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.97823470448600000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}}$$

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

From

$$\frac{h^2}{32} = \frac{\xi^7 e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right) + 5 T e^{2\phi}\right]$$

We obtain:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7
[42(1+sqrt(1-
1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)$$

Result:

50.84107889… −
20.34506335… i

Polar coordinates:

$r = 54.76072411$ (radius), $\theta = -21.80979492°$ (angle)

54.76072411…..

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Bigg/$$

$$\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg/$$

$$\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

From which:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]*1/34

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)\times\frac{1}{34}$$

Result:

1.495325850… −
0.5983842161… i

Polar coordinates:

$r = 1.610609533$ (radius), $\theta = -21.80979492°$ (angle)

1.610609533…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right) \Big/ \left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right) =$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2 \sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right) \Big/ \left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right) \Big/ \left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right) =$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2 \sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \Big/ \left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$

$$\left(17\,\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

Now, we have:

$$e^{2C} \;=\; \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1\;+\;\sqrt{1\;+\;\frac{\xi\Lambda}{3}\,e^{2\phi}}}\;, \qquad (2.9)$$

$$\frac{h^2}{32} \;=\; \frac{e^{-4\phi}}{\left[1\;+\;\sqrt{1\;+\;\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\;\left[42\left(1\;+\;\sqrt{1\;+\;\frac{\Lambda}{3}\,e^{2\phi}}\right)\;-\;13\,\Lambda\,e^{2\phi}\right]\;. \qquad (2.10)$$

For:

$\xi = 1$

$\Lambda \simeq \frac{4\pi^2}{25}$

$\phi = 0.989117352243$

From

$$e^{2C} = \frac{2\xi e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3} e^{2\phi}}},$$

we obtain:

((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))

Input interpretation:

$$\frac{2 e^{-0.989117352243/2}}{1 + \sqrt{1 + \frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right) e^{2\times 0.989117352243}}}$$

Result:

0.382082347529...

0.382082347529….

Series representations:

$$\frac{2 e^{-0.98911735224300000/2}}{1 + \sqrt{1 + \frac{(4\pi^2) e^{2\times 0.98911735224300000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.49455867612150000} \left(1 + \sqrt{\frac{4 e^{1.978234704486000}\pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{2 e^{-0.98911735224300000/2}}{1 + \sqrt{1 + \frac{(4\pi^2) e^{2\times 0.98911735224300000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.49455867612150000} \left(1 + \sqrt{\frac{4 e^{1.978234704486000}\pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{2\, e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.98911735224300000}}{3\times 25}}} = \frac{2}{e^{0.49455867612150000}\left(1+\sqrt{z_0}\, \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.97823470448600000}\, \pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)}$$

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

From which:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))))

Input interpretation:

$$1+\frac{1}{4\times \frac{2\, e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right) e^{2\times 0.989117352243}}}}$$

Result:

1.65430921270...

1.6543092….. We note that, the result 1.6543092... is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Indeed:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4}$$
$$\times\left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

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

which is straightforward. □

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

Series representations:

$$1+\frac{1}{\frac{4\left(2e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}e^{0.49455867612150000}\sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}e^{0.49455867612150000}\sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} = 1+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

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

And from

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right].$$

we obtain:

e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))-13*(4Pi^2)/25*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\,(4\,\pi^2)\right)e^{2\times 0.989117352243}\right)\right)$$

Result:

$-0.034547055658\ldots$

-0.034547055658…

Series representations:

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.\left. e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

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

From which:

47 *1/(((-1/((((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))))))

Input interpretation:

$$47\left(-\left(1/1/\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)\right)$$

Result:

1.6237116159...

1.6237116159…. result that is an approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$-\left(47/1/\left(e^{-4\times 0.98911735224300000}\left(42\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}-\frac{1}{25}\left(4\pi^2\right)13\,e^{2\times 0.98911735224300000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}\right)^7\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Bigg/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\, \pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

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

And again:

32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))

Input interpretation:

$$32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)$$

Result:

−1.1055057810...

-1.1055057810….

We note that the result -1.1055057810…. is very near to the value of Cosmological Constant, less 10^{-52} , thence 1.1056, with minus sign

Series representations:

$$\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right.\right.\right. -$$

$$\left.\left.\left.\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/$$

$$\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000}+52\, e^{3.956469408972000}\,\pi^2 -\right.\right.\right.$$

$$25\, e^{1.978234704486000}\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\, e^{5.934704113458000}\right.$$

$$\left.\left.\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(1344\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(1344\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

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

And:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))]^5

Input interpretation:

$$-\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)^5$$

Result:

1.651220569...

1.651220569…. result very near to the 14th root of the following Ramanujan's class invariant $Q=\left(G_{505}/G_{101/5}\right)^3$ = 1164.2696 i.e. 1.65578...

Series representations:

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^{35}\right)$$

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

We obtain also:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))]^1/2

Input interpretation:

$$-\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}$$

Result:

-0
$1.0514303501\ldots i$

Polar coordinates:

$r = 1.05143035007$ (radius), $\theta = -90°$ (angle)

1.05143035007

Series representations:

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right. - \right.\right.\right.}$$

$$\left.\left.\left.\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/$$

$$\left.\left.\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)\right) = -\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\right.\right.\right.}$$

$$\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\right.$$

$$\left.\left.\left.\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)\right)$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)} = -\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)} = -\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}$$

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

1 / -[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))- 13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\left(1\middle/\left(\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}\right)\right)$$

Result:

$0.95108534763\ldots i$

Polar coordinates:

$r = 0.95108534763$ (radius), $\theta = 90°$ (angle)

0.95108534763

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

Thence 0.95108534763 is a result very near to the spectral index n_s, to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

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

Series representations:

$$-\left(1\Big/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)}\right)\right)$$

$$-\left(1\middle/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\middle/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\middle/\left(8\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\middle/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}\right)\right)$$

$$-\left(1\Big/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}\right)\right)$$

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

From the previous expression

$$\frac{\dfrac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}}{\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)}$$

= -0.034547055658…

we have also:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))) + (-0.034547055658)

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}}}-0.034547055658$$

Result:

1.61976215705...

1.61976215705….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$
$$0.9654529443420000+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$
$$0.9654529443420000+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.9891173522430000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}}}-0.0345470556580000 =$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

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

From

Properties of Nilpotent Supergravity

E. Dudas, S. Ferrara, A. Kehagias and A. Sagnotti - arXiv:1507.07842v2 [hep-th] 14 Sep 2015

We have that:

Cosmological inflation with a tiny tensor–to–scalar ratio r, consistently with PLANCK data, may also be described within the present framework, for instance choosing

$$\alpha(\Phi) \;=\; i\,M\left(\Phi \;+\; b\,\Phi\,e^{ik\,\Phi}\right)\;. \tag{4.35}$$

This potential bears some similarities with the Kähler moduli inflation of [32] and with the poly–instanton inflation of [33]. One can verify that $\chi = 0$ solves the field equations, and that the potential along the $\chi = 0$ trajectory is now

$$V \;=\; \frac{M^2}{3}\left(1 \;-\; a\,\phi\,e^{-\gamma\,\phi}\right)^2\;. \tag{4.36}$$

We analyzing the following equation:

$$V \;=\; \frac{M^2}{3}\left(1 \;-\; a\,\phi\,e^{-\gamma\,\phi}\right)^2\;.$$

$$\phi \;=\; \varphi \;-\; \frac{\sqrt{6}}{k}\;,$$

$$a = \frac{b\gamma}{e} < 0 \,, \qquad \gamma = \frac{k}{\sqrt{6}} < 0 \,.$$

We have:

(M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

i.e.

V = (M^2)/3*[1-(b/euler number * k/sqrt6) * (φ- sqrt6/k) * exp(-(k/sqrt6)(φ- sqrt6/k))]^2

For k = 2 and φ = 0.9991104684, that is the value of the scalar field that is equal to the value of the following Rogers-Ramanujan continued fraction:

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

we obtain:

V = (M^2)/3*[1-(b/euler number * 2/sqrt6) * (0.9991104684- sqrt6/2) * exp(-(2/sqrt6)(0.9991104684- sqrt6/2))]^2

Input interpretation:

$$V = \frac{M^2}{3}\left(1-\left(\frac{b}{e}\times\frac{2}{\sqrt{6}}\right)\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2}{\sqrt{6}}\left(0.9991104684-\frac{\sqrt{6}}{2}\right)\right)\right)^2$$

Result:

$$V = \frac{1}{3}(0.0814845\,b+1)^2 M^2$$

Solutions:

$$b = \frac{225.913\left(-0.054323\,M^2 \pm 6.58545\times 10^{-10}\,\sqrt{M^4}\right)}{M^2} \quad (M \neq 0)$$

Alternate forms:

$$V = 0.00221324\,(b + 12.2723)^2\,M^2$$

$$V = 0.00221324\left(b^2\,M^2 + 24.5445\,b\,M^2 + 150.609\,M^2\right)$$

$$-0.00221324\,b^2\,M^2 - 0.054323\,b\,M^2 - \frac{M^2}{3} + V = 0$$

Expanded form:

$$V = 0.00221324\,b^2\,M^2 + 0.054323\,b\,M^2 + \frac{M^2}{3}$$

Alternate form assuming b, M, and V are positive:

$$V = 0.00221324\,(b + 12.2723)^2\,M^2$$

Alternate form assuming b, M, and V are real:

$$V = 0.00221324\,b^2\,M^2 + 0.054323\,b\,M^2 + 0.333333\,M^2 + 0$$

Derivative:

$$\frac{\partial}{\partial b}\left(\frac{1}{3}\,(0.0814845\,b + 1)^2\,M^2\right) = 0.054323\,(0.0814845\,b + 1)\,M^2$$

Implicit derivatives:

$$\frac{\partial b(M, V)}{\partial V} = \frac{154\,317\,775\,011\,120\,075}{36\,961\,748\,(226\,802\,245 + 18\,480\,874\,b)\,M^2}$$

$$\frac{\partial b(M, V)}{\partial M} = -\frac{\frac{226\,802\,245}{18\,480\,874} + b}{M}$$

$$\frac{\partial M(b, V)}{\partial V} = \frac{154\,317\,775\,011\,120\,075}{2\,(226\,802\,245 + 18\,480\,874\,b)^2\,M}$$

$$\frac{\partial M(b, V)}{\partial b} = -\frac{18\,480\,874\,M}{226\,802\,245 + 18\,480\,874\,b}$$

$$\frac{\partial V(b, M)}{\partial M} = \frac{2\,(226\,802\,245 + 18\,480\,874\,b)^2\,M}{154\,317\,775\,011\,120\,075}$$

$$\frac{\partial V(b, M)}{\partial b} = \frac{36\,961\,748\,(226\,802\,245 + 18\,480\,874\,b)\,M^2}{154\,317\,775\,011\,120\,075}$$

Global minimum:

$$\min\left\{\frac{1}{3}\,(0.0814845\,b + 1)^2\,M^2\right\} = 0 \ \text{at}\ (b, M) = (-16, 0)$$

Global minima:

$$\min\left\{\frac{1}{3} M^2 \left(1 - \frac{(b\ 2)\left(0.9991104684 - \frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2\left(0.9991104684-\frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\} = 0$$

for $b = -\frac{226802245}{18480874}$

$$\min\left\{\frac{1}{3} M^2 \left(1 - \frac{(b\ 2)\left(0.9991104684 - \frac{\sqrt{6}}{2}\right)\exp\left(-\frac{2\left(0.9991104684-\frac{\sqrt{6}}{2}\right)}{\sqrt{6}}\right)}{e\sqrt{6}}\right)^2\right\} = 0$$

for $M = 0$

From:

$$b = \frac{225.913\left(-0.054323\, M^2 \pm 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2} \quad (M \neq 0)$$

we obtain

(225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2

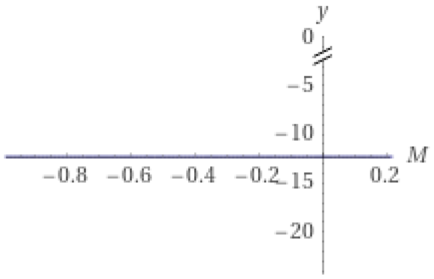
Input interpretation:

$$\frac{225.913\left(-0.054323\, M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

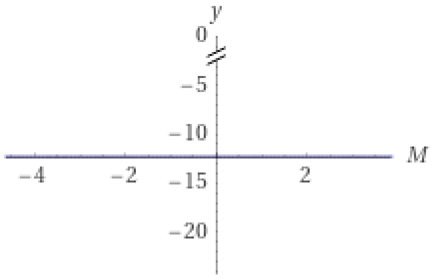
Result:

$$\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4} - 0.054323\, M^2\right)}{M^2}$$

Plots:



(M from −1 to 0.2)



(M from −4.6 to 3.9)

Alternate form assuming M is real:

-12.2723

-12.2723 result very near to the black hole entropy value 12.1904 = ln(196884)

Alternate forms:

$$-\frac{12.2723\left(M^2 - 1.21228\times 10^{-8}\sqrt{M^4}\right)}{M^2}$$

$$\frac{1.48774\times 10^{-7}\sqrt{M^4} - 12.2723\,M^2}{M^2}$$

Expanded form:

$$\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2}-12.2723$$

Property as a function:

Parity

even

Series expansion at M = 0:

$$\left(\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M^2}-12.2723\right)+O\left(M^6\right)$$

(generalized Puiseux series)

Series expansion at M = ∞:

$$-12.2723$$

Derivative:

$$\frac{d}{dM}\left(\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}\right)=\frac{3.55271\times 10^{-15}}{M}$$

Indefinite integral:

$$\int \frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}\,dM=$$
$$\frac{1.48774\times 10^{-7}\sqrt{M^4}}{M}-12.2723\,M+\text{constant}$$

Global maximum:

$$\max\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}\right\}=$$
$$-\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000}\ \text{at}\ M=-1$$

Global minimum:

$$\min\left\{\frac{225.913\left(6.58545\times 10^{-10}\sqrt{M^4}-0.054323\,M^2\right)}{M^2}\right\}=$$
$$-\frac{140\,119\,826\,723\,990\,341\,497\,649}{11\,417\,594\,849\,251\,000\,000\,000}\ \text{at}\ M=-1$$

Limit:

$$\lim_{M\to\pm\infty}\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}=-12.2723$$

Definite integral after subtraction of diverging parts:

$$\int_0^\infty\left(\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}--12.2723\right)dM=0$$

From b that is equal to

$$\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}$$

from:

Result:

$$V = \frac{1}{3}(0.0814845\, b + 1)^2 M^2$$

we obtain:

1/3 (0.0814845 ((225.913 (-0.054323 M^2 + 6.58545×10^-10 sqrt(M^4)))/M^2) + 1)^2 M^2

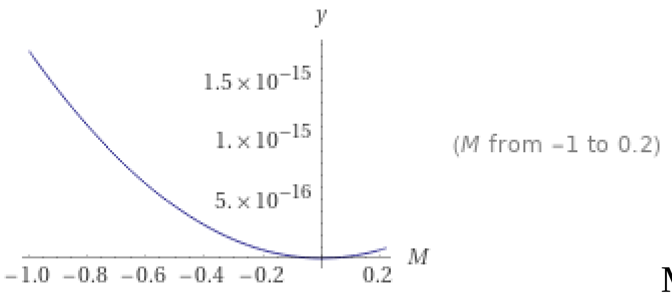
Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\, M^2 + 6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

Result:

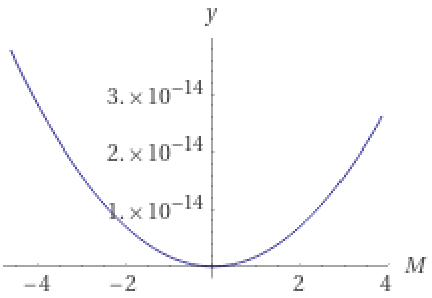
0

Plots: **(possible mathematical connection with an open string)**



M = -0.5; M = 0.2

(possible mathematical connection with an open string)



(M from −4.6 to 3.9)

M = 2 ; M = 3

Root:

$M = 0$

Property as a function:

Parity

even

Series expansion at M = 0:

$O(M^{62194})$

(Taylor series)

Series expansion at M = ∞:

$1.75541 \times 10^{-15} M^2 + O\left(\left(\frac{1}{M}\right)^{62194}\right)$

(Taylor series)

Definite integral after subtraction of diverging parts:

$$\int_0^\infty \left(\frac{1}{3} M^2 \left(1 + \frac{18.4084 \left(-0.054323 M^2 + 6.58545 \times 10^{-10} \sqrt{M^4}\right)}{M^2}\right)^2 - 1.75541 \times 10^{-15} M^2\right) dM = 0$$

For M = - 0.5 , we obtain:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323 M^2 + 6.58545 \times 10^{-10} \sqrt{M^4}\right)}{M^2} + 1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 (-0.5)^2 + 6.58545×10^-10 sqrt((-0.5)^4)))/(-0.5)^2) + 1)^2 * (-0.5^2)

Input interpretation:

$$\frac{1}{3} \left(0.0814845 \times \frac{225.913 \left(-0.054323 (-0.5)^2 + 6.58545 \times 10^{-10} \sqrt{(-0.5)^4}\right)}{(-0.5)^2} + 1\right)^2 \left(-0.5^2\right)$$

Result:

$$-4.388513449474645453489707833780880208333333333333333333\ldots \times 10^{-16}$$

-4.38851344947*10^{-16}

For M = 0.2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 0.2^2 + 6.58545×10^-10 sqrt(0.2^4)))/0.2^2) + 1)^2 0.2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times0.2^2+6.58545\times10^{-10}\sqrt{0.2^4}\right)}{0.2^2}+1\right)^2\times0.2^2$$

Result:

$7.02162151915943272558353253404940833333333333333333333333333\ldots\times 10^{-17}$

7.021621519159*10^-17

For M = 3:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 3^2 + 6.58545×10^-10 sqrt(3^4)))/3^2) + 1)^2 3^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times 3^2+6.58545\times 10^{-10}\sqrt{3^4}\right)}{3^2}+1\right)^2\times 3^2$$

Result:

$1.579864841810872363256294820161116875\times 10^{-14}$

$1.57986484181*10^{-14}$

For M = 2:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\,M^2+6.58545\times 10^{-10}\sqrt{M^4}\right)}{M^2}+1\right)^2 M^2$$

1/3 (0.0814845 ((225.913 (-0.054323 2^2 + 6.58545×10^-10 sqrt(2^4)))/2^2) + 1)^2 2^2

Input interpretation:

$$\frac{1}{3}\left(0.0814845\times\frac{225.913\left(-0.054323\times 2^2+6.58545\times 10^{-10}\sqrt{2^4}\right)}{2^2}+1\right)^2\times 2^2$$

Result:

$7.0216215191594327255835325340494083333333333333333333333333\ldots \times 10^{-15}$

$7.021621519*10^{-15}$

From the four results

7.021621519*10^-15 ; 1.57986484181*10^-14 ; 7.021621519159*10^-17 ;

-4.38851344947*10^-16

we obtain, after some calculations:

sqrt[1/(2Pi)(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 - 4.38851344947*10^-16)]

Input interpretation:

$$\sqrt{\left(\frac{1}{2\pi}\left(7.021621519\times 10^{-15} + 1.57986484181\times 10^{-14} + 7.021621519\times 10^{-17} - 4.38851344947\times 10^{-16}\right)\right)}$$

Result:

$5.9776991059\ldots \times 10^{-8}$

$5.9776991059*10^{-8}$ result very near to the Planck's electric flow 5.975498×10^{-8} that is equal to the following formula:

$$\phi_P^E = \mathbf{E}_P l_P^2 = \phi_P l_P = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

We note that:

1/55*(([(((1/[(7.021621519*10^-15 + 1.57986484181*10^-14 +7.021621519*10^-17 -4.38851344947*10^-16)])))^1/7]-((log^(5/8)(2))/(2 2^(1/8) 3^(1/4) e log^(3/2)(3)))))

Input interpretation:

$$\frac{1}{55}\left((1/(7.021621519\times 10^{-15}+1.57986484181\times 10^{-14}+7.021621519\times 10^{-17}-4.38851344947\times 10^{-16}))\ \hat{}\ (1/7)-\frac{\log^{5/8}(2)}{2\sqrt[8]{2}\sqrt[4]{3}\ e\log^{3/2}(3)}\right)$$

log(x) is the natural logarithm

Result:

1.6181818182…

1.6181818182… result that is a very good approximation to the value of the golden ratio 1.618033988749...

From the Planck units:

Planck Length

$$l_P = \sqrt{\frac{4\pi\hbar G}{c^3}}$$

$5.729475 * 10^{-35}$ Lorentz-Heaviside value

Planck's Electric field strength

$$\mathbf{E}_{\mathrm{P}} = \frac{F_{\mathrm{P}}}{q_{\mathrm{P}}} = \sqrt{\frac{c^7}{16\pi^2 \varepsilon_0 \hbar G^2}}$$

1.820306 * 10^{61} V*m Lorentz-Heaviside value

Planck's Electric flux

$$\phi_{\mathrm{P}}^{E} = \mathbf{E}_{\mathrm{P}} l_{\mathrm{P}}^2 = \phi_{\mathrm{P}} l_{\mathrm{P}} = \sqrt{\frac{\hbar c}{\varepsilon_0}}$$

5.975498*10^{-8} V*m Lorentz-Heaviside value

Planck's Electric potential

$$\phi_P = V_P = \frac{E_P}{q_P} = \sqrt{\frac{c^4}{4\pi\varepsilon_0 G}}$$

1.042940*10^{27} V Lorentz-Heaviside value

Relationship between Planck's Electric Flux and Planck's Electric Potential

E_P * l_P = (1.820306 * 10^{61}) * 5.729475 * 10^{-35}

Input interpretation:

$$\frac{(1.820306\times 10^{61})\times 5.729475}{10^{35}}$$

Result:

1 042 939 771 935 000 000 000 000 000

Scientific notation:

$1.042939771935\times 10^{27}$

$1.042939771935*10^{27} \approx 1.042940*10^{27}$

Or:

$\mathbf{E_P * l_P^2 / l_P}$ = ($5.975498*10^{-8}$)*1/(5.729475 * 10^{-35})

Input interpretation:

$$5.975498\times 10^{-8}\times \frac{1}{\frac{5.729475}{10^{35}}}$$

Result:

$1.042939885417075735560413475929295441554418162222542205001 33\ldots\times 10^{27}$

$1.042939885417*10^{27} \approx 1.042940*10^{27}$

Observations

We note that, from the number 8, we obtain as follows:

8^2

64

$8^2 \times 2 \times 8$

1024

$8^4 = 8^2 \times 2^6$

True

$8^4 = 4096$

$8^2 \times 2^6 = 4096$

$2^{13} = 2 \times 8^4$

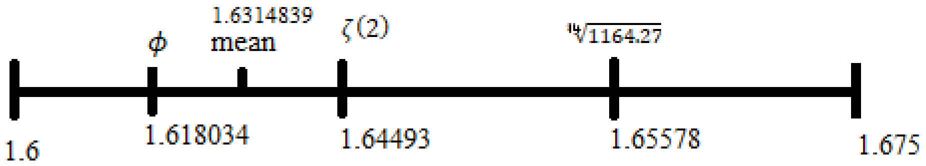
True

$2^{13} = 8192$

$2 \times 8^4 = 8192$

We notice how from the numbers 8 and 2 we get 64, 1024, 4096 and 8192, and that 8 is the fundamental number. In fact $8^2 = 64$, $8^3 = 512$, $8^4 = 4096$. We define it "fundamental number", since 8 is a Fibonacci number, which by rule, divided by the previous one, which is 5, gives 1.6 , a value that tends to the golden ratio, as for all numbers in the Fibonacci sequence

“Golden” Range



Finally we note how $8^2 = 64$, multiplied by 27, to which we add 1, is equal to 1729, the so-called "Hardy-Ramanujan number". Then taking the 15th root of 1729, we obtain a value close to $\zeta(2)$ that 1.6438 ..., which, in turn, is included in the range of what we call "golden numbers"

Furthermore for all the results very near to 1728 or 1729, adding $64 = 8^2$, one obtain values about equal to 1792 or 1793. These are values almost equal to the Planck multipole spectrum frequency 1792.35 and to the hypothetical Gluino mass

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