On various Ramanujan equations (mock theta functions and taxicab numbers) linked to some sectors of String Theory applied to the Black Hole Physics (black strings): Further new possible mathematical connections IX.

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Abstract

In this research thesis, we have analyzed and deepened further Ramanujan expressions (mock theta functions and taxicab numbers) applied to some sectors of String Theory concerning the Black Hole Physics (black strings). We have therefore described other new possible mathematical connections.

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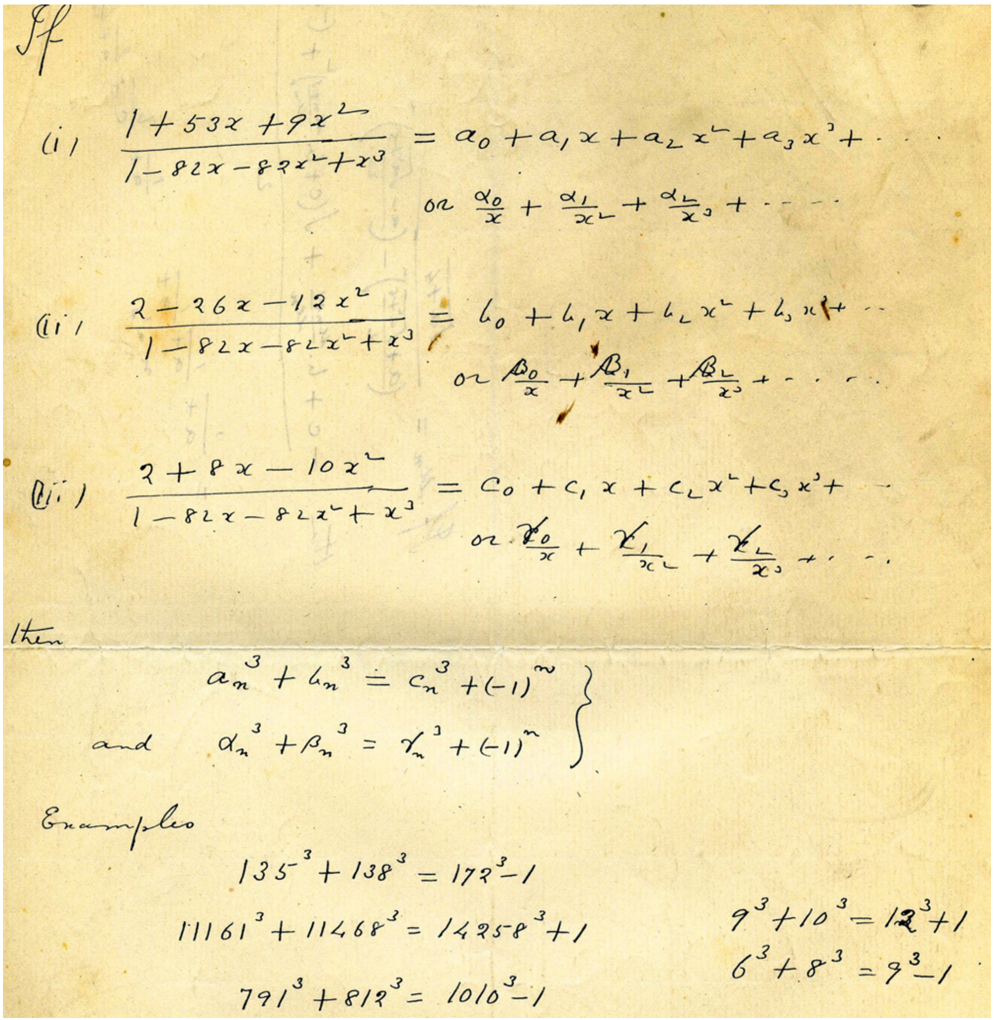
https://www.britannica.com/biography/Srinivasa-Ramanujan



If

(i) $$\frac{1+53x+9x^2}{1-82x-82x^2+x^3} = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \cdots$$
or $$\frac{\alpha_0}{x} + \frac{\alpha_1}{x^2} + \frac{\alpha_2}{x^3} + \cdots$$

(ii) $$\frac{2-26x-12x^2}{1-82x-82x^2+x^3} = b_0 + b_1 x + b_2 x^2 + b_3 x^3 + \cdots$$
or $$\frac{\beta_0}{x} + \frac{\beta_1}{x^2} + \frac{\beta_2}{x^3} + \cdots$$

(iii) $$\frac{2+8x-10x^2}{1-82x-82x^2+x^3} = c_0 + c_1 x + c_2 x^2 + c_3 x^3 + \cdots$$
or $$\frac{\gamma_0}{x} + \frac{\gamma_1}{x^2} + \frac{\gamma_2}{x^3} + \cdots$$

then

$$a_n^3 + b_n^3 = c_n^3 + (-1)^n$$
and $$\alpha_n^3 + \beta_n^3 = \gamma_n^3 + (-1)^n$$

Examples

$$135^3 + 138^3 = 172^3 - 1$$
$$11161^3 + 11468^3 = 14258^3 + 1$$
$$791^3 + 812^3 = 1010^3 - 1$$
$$9^3 + 10^3 = 12^3 + 1$$
$$6^3 + 8^3 = 9^3 - 1$$

https://plus.maths.org/content/ramanujan

Ramanujan's manuscript

The representations of 1729 as the sum of two cubes appear in the bottom right corner. The equation expressing the near counter examples to Fermat's last theorem appears further up: $\alpha^3 + \beta^3 = \gamma^3 + (-1)^n$.

From Wikipedia

The ***taxicab number****, typically denoted Ta(n) or Taxicab(n), also called the nth* ***Hardy–Ramanujan number****, is defined as the smallest integer that can be expressed as a sum of two positive integer cubes in n distinct ways. The most famous taxicab number is* $1729 = Ta(2) = 1^3 + 12^3 = 9^3 + 10^3$.

From:

The Minimal Geometric Deformation Approach Extended - *R. Casadio J. Ovalle Roldao da Rocha* **-** arXiv:1503.02873v2 [gr-qc] 7 Sep 2015

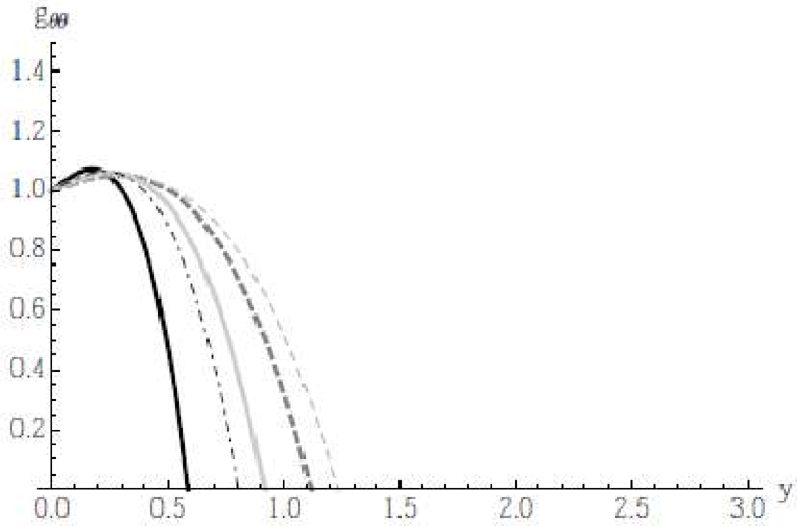


FIG. 1. Squared black string horizon $g_{\theta\theta}(r = 2\,M, y)$ along the extra dimension for $b(\sigma) = 1.9$ (solid black line), $b(\sigma) = 1.0$ (dash-dotted line), $b(\sigma) = 0.5$ (thick gray line), $b(\sigma) = 0.3$ (dashed gray line), $b(\sigma) = 0.1$ (dashed light gray line). Black hole mass $M = 1$ and $\beta \sim 1/\sigma$.

- $0 < r < r_i$
- $r_i < r < r_c$
- $r_c < r < r_e$
- $r > r_e$.

$$e^{-\lambda} = \left(1 - \frac{2\,\mathcal{M}}{3\,r}\right)^{1}\left[\frac{128\,c_2}{r}\left(1 - \frac{\mathcal{M}}{6\,r}\right)^7 + \frac{5}{224}\left(\frac{Q}{12r^2}\right)^4 - \frac{5}{16}\frac{\mathcal{M}}{3r}\left(\frac{Q}{12r^2}\right)^3 + \frac{5}{6}\left(\frac{Q}{12r^2}\right)^3 - \frac{25}{4}\frac{\mathcal{M}}{3r}\left(\frac{Q}{12r^2}\right)^2 + \frac{25}{2}\left(\frac{Q}{12r^2}\right)^2 - \frac{5}{12}\frac{\mathcal{M}}{r}\frac{Q}{r^2} - \frac{10}{12}\frac{Q}{r^2} - \frac{4}{3}\frac{\mathcal{M}}{r} + 1\right], \quad (48)$$

where

$$\mathcal{M} = 3\,M;\; Q = 12\,M^2;\; c_2 \equiv \frac{(1-2M/R)}{(2R-M)^7}\,R^8\,\beta\;. \quad (49)$$

From the Schwarzschild limit in **E**q. (43), we obtain

$$c_2 = -\frac{M}{32}\;. \quad (50)$$

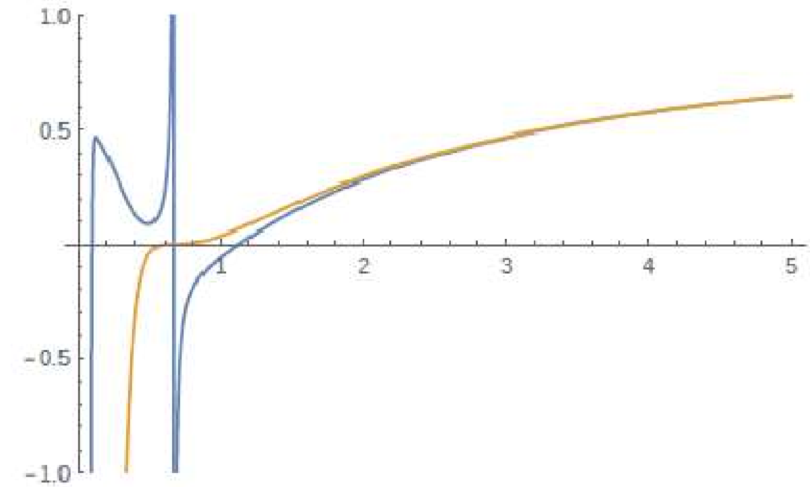


FIG. 3. Behaviour of $g_{tt}(r)$ (red) and $g_{rr}^{-1}(r)$ (blue) for $k=2$. We see two zeros and a singular point for g_{rr}^{-1}, the interior $r_i \simeq 0.095$, the middle $r_c = 2/3$, and the exterior $r_e \simeq 1.124$. It can be seen that the black hole horizon is shifted inside the Schwarzschild radius ($r_s = 2\,\mathcal{M}$) by extra-dimensional effects. The ADM mass is $\mathcal{M} = 1$.

(1-6/(3*0.0864055))^-1*(((((128*1/32*1/0.0864055(1-3/(6*0.0864055))^7+5/224(1/0.0864055^2)^4-15/(48*0.0864055)*(1/0.0864055^2)^3+5/6(1/0.0864055^2)^3))))

$$e^{-\lambda} = \left(1-\frac{2\,\mathcal{M}}{3r}\right)^{-1}\Bigg[\frac{128\,c_2}{r}\left(1-\frac{\mathcal{M}}{6\,r}\right)^7+\frac{5}{224}\left(\frac{Q}{12r^2}\right)^4-\frac{5}{16}\frac{\mathcal{M}}{3r}\left(\frac{Q}{12r^2}\right)^3+\frac{5}{6}\left(\frac{Q}{12r^2}\right)^3$$
$$-\frac{25}{4}\frac{\mathcal{M}}{3r}\left(\frac{Q}{12r^2}\right)^2+\frac{25}{2}\left(\frac{Q}{12r^2}\right)^2-\frac{5}{12}\frac{\mathcal{M}}{r}\frac{Q}{r^2}-\frac{10}{12}\frac{Q}{r^2}-\frac{4}{3}\frac{\mathcal{M}}{r}+1\Bigg]\;, \quad (48)$$

(1-6/(3*0.0864055))^-1*(((((-25/4*1/0.0864055*(1/0.0864055^2)^2+25/2*(1/0.0864055^2)^2-5/12*36/(0.0864055^3)+10/(0.0864055^2)-4/(0.0864055)+1)))))

(((((128*1/32*1/0.0864055(1-3/(6*0.0864055))^7+5/224(1/0.0864055^2)^4-15/(48*0.0864055)*(1/0.0864055^2)^3+5/6(1/0.0864055^2)^3))))

Input interpretation:

$$128\times\frac{1}{32}\times\frac{1}{0.0864055}\left(1-\frac{3}{6\times0.0864055}\right)^7+\frac{5}{224}\left(\frac{1}{0.0864055^2}\right)^4-\frac{15}{48\times0.0864055}\left(\frac{1}{0.0864055^2}\right)^3+\frac{5}{6}\left(\frac{1}{0.0864055^2}\right)^3$$

Result:

$-2.16925170812869269282564675988239597401591120013904 42\ldots\times10^6$

$-2.169251708\ldots*10^6$

(((((-25/4*1/0.0864055*(1/0.0864055^2)^2+25/2*(1/0.0864055^2)^2-5/12*36/(0.0864055^3)+10/(0.0864055^2)-4/(0.0864055)+1)))))

Input interpretation:

$$-\frac{25}{4}\times\frac{1}{0.0864055}\left(\frac{1}{0.0864055^2}\right)^2+\frac{25}{2}\left(\frac{1}{0.0864055^2}\right)^2-\frac{5}{12}\times\frac{36}{0.0864055^3}+\frac{10}{0.0864055^2}-\frac{4}{0.0864055}+1$$

Result:

$-1.09539837109705688980536829715303817650862594217863 03\ldots\times10^6$

$-1.09539837109\ldots*10^6$

-2.1692517081286926928256467598823959740159112001390442 × 10^6

-1.0953983710970568898053682971530381765086259421786303 × 10^6

Input interpretation:

$-2.1692517081286926928256467598823959740159112001390442\times10^6-1.0953983710970568898053682971530381765086259421786303\times10^6$

Result:

$-3.2646500792257495826310150570354341505245371423176744... \times 10^6$

-3.26465007922…*10^6

In conclusion, we obtain

(1-6/(3*0.0864055))^-1* -3.2646500792257495826310150570354341505245371423176744 × 10^6

Input interpretation:

$$-\frac{3.2646500792257495826310150570354341505245371423176744 \times 10^6}{1-\frac{6}{3\times 0.0864055}}$$

Result:

147410.395682335262544924837268645580604014013444608988669 8...

147410.39568233…

Or:

(1-6/(3*0.0864055))^-1*(((((128*1/32*1/0.0864055(1-3/(6*0.0864055))^7+5/224(1/0.0864055^2)^4-15/(48*0.0864055)*(1/0.0864055^2)^3+5/6(1/0.0864055^2)^3))))

Input interpretation:

$$\frac{1}{1-\frac{6}{3\times 0.0864055}}\left(128\times\frac{1}{32}\times\frac{1}{0.0864055}\left(1-\frac{3}{6\times 0.0864055}\right)^7+\frac{5}{224}\left(\frac{1}{0.0864055^2}\right)^4-\frac{15}{48\times 0.0864055}\left(\frac{1}{0.0864055^2}\right)^3+\frac{5}{6}\left(\frac{1}{0.0864055^2}\right)^3\right)$$

Result:

97949.319182676244350590692600244391031031817453287094241 03...

97949.319182676…

(1-6/(3*0.0864055))^-1*(((((-25/4*1/0.0864055*(1/0.0864055^2)^2+25/2*(1/0.0864055^2)^2-5/12*36/(0.0864055^3)+10/(0.0864055^2)-4/(0.0864055)+1)))))

Input interpretation:

$$\frac{1}{1-\frac{6}{3\times 0.0864055}}\left(-\frac{25}{4}\times\frac{1}{0.0864055}\left(\frac{1}{0.0864055^2}\right)^2+\frac{25}{2}\left(\frac{1}{0.0864055^2}\right)^2-\frac{5}{12}\times\frac{36}{0.0864055^3}+\frac{10}{0.0864055^2}-\frac{4}{0.0864055}+1\right)$$

Result:

49461.07649965901819433414466840118957298219599132190471624...

49461.076499659…

The sum of two results is:

Input interpretation:

97949.31918267624435059069260024439103103181745328709424103 + 49461.07649965901819433414466840118957298219599132190471624

Result:

147410.39568233526254492483726864558060401401344460899895 72...

147410.39568233…

2(97949.319182676+49461.076499659)^1/2+8-1/golden ratio

Input interpretation:

$$2\sqrt{97949.319182676+49461.076499659}+8-\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

775.26319558347...

775.26319558347… result practically equal to the rest mass of Charged rho meson 775.4

2(97949.319182676+49461.076499659)^1/2+18+7-golden ratio

Input interpretation:

$$2\sqrt{97949.319182676 + 49461.076499659} + 18 + 7 - \phi$$

ϕ is the golden ratio

Result:

791.26319558347...

791.26319558347… ≈ 791 (Ramanujan taxicab number)

13*ln(97949.319182676+49461.076499659)+18-(1/sqrt2)

Input interpretation:

$$13 \log(97949.319182676 + 49461.076499659) + 18 - \frac{1}{\sqrt{2}}$$

$\log(x)$ is the natural logarithm

Result:

172.005578401293...

172.005578401293… ≈ 172 (Ramanujan taxicab number)

Alternative representations:

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 + 13 \log_e(147410.395682335000) - \frac{1}{\sqrt{2}}$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 + 13 \log(a) \log_a(147410.395682335000) - \frac{1}{\sqrt{2}}$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 - 13 \operatorname{Li}_1(-147409.395682335000) - \frac{1}{\sqrt{2}}$$

Series representations:

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 + 13 \log(147410.395682335000) - \frac{1}{\exp\left(i \pi \left\lfloor \frac{\arg(2-x)}{2 \pi} \right\rfloor\right) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (2-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 + 13 \log(147410.395682335000) - \frac{\left(\frac{1}{z_0}\right)^{-1/2 \lfloor \arg(2-z_0)/(2\pi) \rfloor} z_0^{-1/2-1/2 \lfloor \arg(2-z_0)/(2\pi) \rfloor}}{\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (2-z_0)^k z_0^{-k}}{k!}}$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 + 13 \log(147409.395682335000) - 13 \sum_{k=1}^{\infty} \frac{\left(-6.78382809570011909 \times 10^{-6}\right)^k}{k} - \frac{\left(\frac{1}{z_0}\right)^{-1/2 \lfloor \arg(2-z_0)/(2\pi) \rfloor} z_0^{1/2 (-1-\lfloor \arg(2-z_0)/(2\pi) \rfloor)}}{\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (2-z_0)^k z_0^{-k}}{k!}}$$

Integral representations:

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 + 13 \int_1^{147410.395682335000} \frac{1}{t} \, dt - \frac{1}{\sqrt{2}}$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} = 18 + \frac{13}{2 i \pi} \int_{-i \infty + \gamma}^{i \infty + \gamma} \frac{e^{-11.90096899946257259 s} \, \Gamma(-s)^2 \, \Gamma(1+s)}{\Gamma(1-s)} \, ds - \frac{1}{\sqrt{2}} \quad \text{for } -1 < \gamma < 0$$

13*ln(97949.319182676+49461.076499659)+18-(1/sqrt2)-34

Input interpretation:

$$13 \log(97949.319182676 + 49461.076499659) + 18 - \frac{1}{\sqrt{2}} - 34$$

log(x) is the natural logarithm

Result:

138.005578401293…

138.005578401293… ≈ 138 (Ramanujan taxicab number)

Alternative representations:

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} - 34 = -16 + 13 \log_e(147410.395682335000) - \frac{1}{\sqrt{2}}$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} - 34 = -16 + 13 \log(a) \log_a(147410.395682335000) - \frac{1}{\sqrt{2}}$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} - 34 = -16 - 13 \operatorname{Li}_1(-147409.395682335000) - \frac{1}{\sqrt{2}}$$

Series representations:

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} - 34 = -16 + 13 \log(147410.395682335000) - \frac{1}{\exp\left(i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor\right) \sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (2-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} - 34 = -16 + 13 \log(147410.395682335000) - \frac{\left(\frac{1}{z_0}\right)^{-1/2 \lfloor \arg(2-z_0)/(2\pi) \rfloor} z_0^{-1/2-1/2 \lfloor \arg(2-z_0)/(2\pi) \rfloor}}{\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (2-z_0)^k z_0^{-k}}{k!}}$$

$$13 \log(97949.3191826760000 + 49461.0764996590000) + 18 - \frac{1}{\sqrt{2}} - 34 = -16 + 13 \log(147409.395682335000) - 13 \sum_{k=1}^{\infty} \frac{\left(-6.78382809570011909 \times 10^{-6}\right)^k}{k} - \frac{\left(\frac{1}{z_0}\right)^{-1/2 \lfloor \arg(2-z_0)/(2\pi) \rfloor} z_0^{1/2 (-1-\lfloor \arg(2-z_0)/(2\pi) \rfloor)}}{\sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (2-z_0)^k z_0^{-k}}{k!}}$$

Integral representations:

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34=$$
$$-16+13\int_1^{147410.395682335000}\frac{1}{t}\,dt-\frac{1}{\sqrt{2}}$$

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34=$$
$$-16+\frac{13}{2i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-11.9009689994625 7259 s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds-\frac{1}{\sqrt{2}}\quad\text{for } -1<\gamma<0$$

13*ln(97949.319182676+49461.076499659)+18-(1/sqrt2)-34-3

Input interpretation:

$$13\log(97949.319182676+49461.076499659)+18-\frac{1}{\sqrt{2}}-34-3$$

log(x) is the natural logarithm

Result:

135.005578401293...

135.005578401293… ≈ 135 (Ramanujan taxicab number)

Alternative representations:

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19+13\log_e(147410.395682335000)-\frac{1}{\sqrt{2}}$$

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19+13\log(a)\log_a(147410.395682335000)-\frac{1}{\sqrt{2}}$$

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19-13\,\text{Li}_1(-147409.395682335000)-\frac{1}{\sqrt{2}}$$

Series representations:

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19+13\log(147410.395682335000)-\frac{1}{\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\quad\text{for } (x\in\mathbb{R}\text{ and } x<0)$$

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19+13\log(147410.395682335000)-\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{-1/2-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}$$

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19+13\log(147409.395682335000)-13\sum_{k=1}^{\infty}\frac{\left(-6.78382809570011909\times10^{-6}\right)^k}{k}-\frac{\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{1/2(-1-\lfloor\arg(2-z_0)/(2\pi)\rfloor)}}{\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}}$$

Integral representations:

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19+13\int_1^{147410.395682335000}\frac{1}{t}\,dt-\frac{1}{\sqrt{2}}$$

$$13\log(97949.3191826760000+49461.0764996590000)+18-\frac{1}{\sqrt{2}}-34-3=$$
$$-19+\frac{13}{2i\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-11.9009689994625 7259 s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds-\frac{1}{\sqrt{2}}\quad\text{for } -1<\gamma<0$$

Now, we have that:

Black Strings from Minimal Geometric Deformation in a Variable Tension Brane-World - *R. Casadio, J. Ovalle, Roldao da Rocha* - arXiv:1310.5853v1 [gr-qc] 22 Oct 2013

Finally, when the explicit geometric deformation (21) is considered in the matching condition (26), the function $\beta = \beta(\sigma)$ becomes

$$\beta(\sigma) = R^3 \left(\frac{1 - \frac{3M}{2R}}{1 - \frac{2M}{R}} \right) \left[\left(\frac{\nu'_R}{R} + \frac{1}{R^2} \right) \frac{f^*_R}{8\pi} + p_R \right] , \qquad (27)$$

showing thus that β is always positive and (interior) model-dependent. For instance, we can find $\beta(\sigma)$ by considering the exact interior BW solution found in Ref. [30], where the geometric deformation is given by

$$f^*(r) = \frac{1}{\sigma} \frac{4C(\tau(r))}{49\pi} \left[\frac{240 + 589Cr^2 - 25C^2r^4 - 41C^3r^6 - 3C^4r^8}{3(1+Cr^2)^2} - \frac{80\arctan(\sqrt{C}r)}{\sqrt{C}r} \right] , \qquad (28)$$

with C a constant given by $CR^2 = \frac{\sqrt{57}-7}{2} \equiv \alpha$, and the functions $(\tau(r))^{-1} \equiv (1+Cr^2)^3(1+3Cr^2)$ and $\nu' = \frac{8Cr}{1-Cr^2}$. Now, by using the explicit form of $f(R)$ we get

$$\beta = \frac{\alpha\,\tau(R)}{98\pi^2\sigma} \frac{1 - \frac{3M_0}{2R}}{1 - \frac{2M_0}{R}} [1 + 9\alpha] \left[\frac{240 + 589\alpha - 25\alpha^2 - 41\alpha^3 - 3\alpha^4}{3(1+\alpha)^2} - \frac{80\arctan(\sqrt{\alpha})}{\sqrt{\alpha}} \right] , \qquad (29)$$

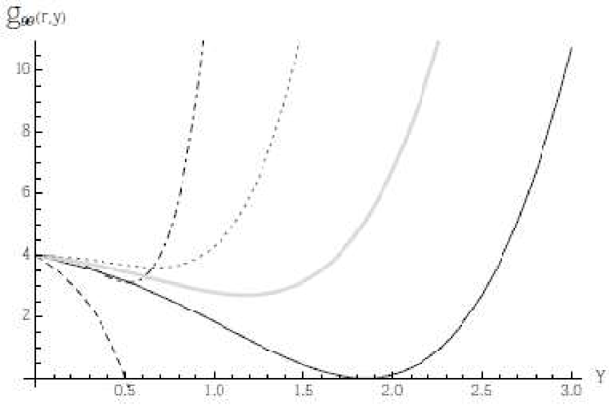


FIG. 1. Metric element $g_{\theta\theta}(r = 2M, y)$ along the extra dimension for $\sigma = 2$ (dashed line), $\sigma = 0.92$ (solid black line), $\sigma = 0.5$ (thick gray line), $\sigma = 0.1$ (dotted line), $\sigma = 0.05$ (dash dotted line). Black hole mass $M = 1$ and constant $C_0 = 1$.

The first result we present is the plot of the area of slices of constant y of the black string horizon $r_H = 2M$ for different constant values of the brane tension σ (see Fig. 1). It is worth noticing that when the brane tension reaches the value $\sigma \approx 0.92$, the black string warped horizon changes profile: for $\sigma \gtrsim 0.92$ the horizon area is always positive, whereas for $\sigma \lesssim 0.92$, there is always a point of coordinate y_c along the extra dimension where the horizon meets the axis of axial symmetry $g_{\theta\theta}(r = r_H, y_c) = 0$. For instance, when $\sigma = 0.05$, one finds $y_c \simeq 0.51$ in Fig. 1.

From:

$$\beta = \frac{\alpha\,\tau(R)}{98\pi^2\sigma}\,\frac{1-\frac{3\,M_0}{2\,R}}{1-\frac{2\,M_0}{R}}\,[1+9\,\alpha]\left[\frac{240+589\,\alpha-25\,\alpha^2-41\,\alpha^3-3\,\alpha^4}{3(1+\alpha)^2}-\frac{80\arctan(\sqrt{\alpha})}{\sqrt{\alpha}}\right]$$

$$\frac{\sqrt{57}-7}{2} \equiv \alpha$$

$$CR^2 = \frac{\sqrt{57}-7}{2} \equiv \alpha$$

((sqrt57-7)/2)

Input:

$\frac{1}{2}\left(\sqrt{57}-7\right)$

Decimal approximation:

0.2749172176353748486183424034730585291110973523116900691 49...

0.2749172….. = α

Alternate forms:

$$\frac{1}{2}\left(\sqrt{57}-7\right)$$

$$\frac{\sqrt{57}}{2}-\frac{7}{2}$$

Minimal polynomial:

$$x^2+7x-2$$

For M = 1.312806e+40 and R = 1.949322e+13 (SMBH87 parameters)

((1-(3*1.312806e+40) / (2*1.949322e+13))) / ((1-(2*1.312806e+40) / (1.949322e+13)))

Input interpretation:

$$\frac{1-\frac{3\times 1.312806\times 10^{40}}{2\times 1.949322\times 10^{13}}}{1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}}$$

Result:

0.74999999999999999999999999981439355853035406602346424 3627...

0.749999…. ≈ 0.75 = 3/4

From:

$$(\tau(r))^{-1}\equiv(1+Cr^2)^3(1+3Cr^2)$$

(1+0.2749172)^3 (1+3*0.2749172)

we obtain, for r = R:

1/(((1+0.2749172)^3 * (1+3*0.2749172)))

Input interpretation:

$$\frac{1}{(1+0.2749172)^3\,(1+3\times 0.2749172)}$$

Result:

0.264454100940729828886573656365912715864007542986810993868...

0.26445410094….. = τ(R)

We have that:

(1+9*0.2749172)*(((240+589*0.2749172-25*0.2749172^2-41*0.2749172^3-3*0.2749172^4)*1/(3(1+0.2749172)^2)-80 atan(sqrt0.2749172)/(sqrt0.2749172)))

Input interpretation:

$$(1+9\times 0.2749172)\left((240+589\times 0.2749172-25\times 0.2749172^2-41\times 0.2749172^3-3\times 0.2749172^4)\times \frac{1}{3(1+0.2749172)^2}-80\times\frac{\tan^{-1}(\sqrt{0.2749172})}{\sqrt{0.2749172}}\right)$$

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

Result:

28.4108...

(result in radians)

28.4108…

Alternative representations:

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3(1+0.274917)^2}-\frac{80\tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right)=$$

$$3.47425\left(\frac{401.926-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3\times 1.27492^2}-\frac{80\cot^{-1}\left(\frac{1}{\sqrt{0.274917}}\right)}{\sqrt{0.274917}}\right)$$

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3(1+0.274917)^2}-\frac{80\tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right)=$$
$$3.47425\left(\frac{401.926-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3\times 1.27492^2}-\frac{80\,\mathrm{sc}^{-1}(\sqrt{0.274917}\mid 0)}{\sqrt{0.274917}}\right)$$

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3(1+0.274917)^2}-\frac{80\tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right)=$$
$$3.47425\left(\frac{401.926-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3\times 1.27492^2}-\frac{80\tan^{-1}(1,\sqrt{0.274917})}{\sqrt{0.274917}}\right)$$

Series representations:

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3(1+0.274917)^2}-\frac{80\tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right)=\left(284.401\left(\sum_{k=0}^{\infty}\frac{(-1)^k(-0.725083)^k\left(-\frac{1}{2}\right)_k}{k!}-0.977282\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{5}\right)^k 2^{1+2k} F_{1+2k}\left(\frac{\sqrt{0.274917}}{1+\sqrt{1+\frac{4\sqrt{0.274917}^2}{5}}}\right)^{1+2k}}{1+2k}\right)\right)\Big/\left(\sum_{k=0}^{\infty}\frac{(-1)^k(-0.725083)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$(1 + 9 \times 0.274917)\left(\frac{240 + 589 \times 0.274917 - 25 \times 0.274917^2 - 41 \times 0.274917^3 - 3 \times 0.274917^4}{3\,(1 + 0.274917)^2} - \frac{80 \tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right) =$$

$$-\left(\left(277.94\left(\tan^{-1}(x) + \pi \left\lfloor \frac{\arg\left(i\left(-x + \sqrt{0.274917}\right)\right)}{2\pi} \right\rfloor - 1.02325 \sum_{k=0}^{\infty} \frac{(-1)^k\,(-0.725083)^k \left(-\frac{1}{2}\right)_k}{k!} + 0.5\, i \sum_{k=1}^{\infty} \frac{\left(-(-i - x)^{-k} + (i - x)^{-k}\right)\left(-x + \sqrt{0.274917}\right)^k}{k}\right)\right) \Big/ \left(\sum_{k=0}^{\infty} \frac{(-1)^k\,(-0.725083)^k \left(-\frac{1}{2}\right)_k}{k!}\right)\right) \text{ for } (i\,x \in \mathbb{R} \text{ and } i\,x < -1)$$

$$(1 + 9 \times 0.274917)\left(\frac{240 + 589 \times 0.274917 - 25 \times 0.274917^2 - 41 \times 0.274917^3 - 3 \times 0.274917^4}{3\,(1 + 0.274917)^2} - \frac{80 \tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right) =$$

$$\left(284.401\left(\exp\left(i\pi \left\lfloor \frac{\arg(0.274917 - x)}{2\pi} \right\rfloor\right)\sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k\,(0.274917 - x)^k\, x^{-k} \left(-\frac{1}{2}\right)_k}{k!} - 0.977282 \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{5}\right)^k 2^{1+2k}\, F_{1+2k} \left(\frac{\sqrt{0.274917}}{1+\sqrt{1+\frac{4\sqrt{0.274917}^{\,2}}{5}}}\right)^{1+2k}}{1 + 2k}\right)\right) \Big/ \left(\exp\left(i\pi \left\lfloor \frac{\arg(0.274917 - x)}{2\pi} \right\rfloor\right)\sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k\,(0.274917 - x)^k\, x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

Integral representations:

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3\,(1+0.274917)^2}-\frac{80\tan^{-1}\left(\sqrt{0.274917}\right)}{\sqrt{0.274917}}\right)=284.401-277.94\int_0^1\frac{1}{1+t^2\,\sqrt{0.274917}^2}\,dt$$

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3\,(1+0.274917)^2}-\frac{80\tan^{-1}\left(\sqrt{0.274917}\right)}{\sqrt{0.274917}}\right)=$$
$$284.401+\frac{69.4851\,i}{\pi^{3/2}}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\left(1+\sqrt{0.274917}^2\right)^{-s}\,ds \text{ for } 0<\gamma<\frac{1}{2}$$

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3\,(1+0.274917)^2}-\frac{80\tan^{-1}\left(\sqrt{0.274917}\right)}{\sqrt{0.274917}}\right)=$$
$$284.401-\frac{69.4851}{i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)\left(\sqrt{0.274917}^2\right)^{-s}}{\Gamma\left(\frac{3}{2}-s\right)}\,ds \text{ for } 0<\gamma<\frac{1}{2}$$

Continued fraction representations:

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3\,(1+0.274917)^2}-\frac{80\tan^{-1}\left(\sqrt{0.274917}\right)}{\sqrt{0.274917}}\right)=$$
$$284.401-\frac{277.94}{1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{k^2\,\sqrt{0.274917}^2}{1+2k}}=284.401-\frac{277.94}{1+\frac{0.274917}{3+\frac{1.09967}{5+\frac{2.47425}{7+\frac{4.39868}{9+\dots}}}}}$$

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3(1+0.274917)^2}-\frac{80\tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right)=$$

$$6.46109+\frac{277.94\sqrt{0.274917}^2}{3+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{\left(1+(-1)^{1+k}+k\right)^2\sqrt{0.274917}^2}{3+2k}}=6.46109+\frac{76.4106}{3+\frac{2.47425}{5+\frac{1.09967}{7+\frac{6.87293}{9+\frac{4.39868}{11+\ldots}}}}}$$

$$(1+9\times 0.274917)\left(\frac{240+589\times 0.274917-25\times 0.274917^2-41\times 0.274917^3-3\times 0.274917^4}{3(1+0.274917)^2}-\frac{80\tan^{-1}(\sqrt{0.274917})}{\sqrt{0.274917}}\right)=$$

$$284.401-\frac{277.94\sqrt{0.274917}}{\left(0.274917+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{0.199338}{0.549834}\right)\left(1+\underset{k=1}{\overset{\infty}{\mathrm{K}}}\frac{k^2\sqrt{0.274917}^2}{1+2k}\right)}=284.401-$$

$$145.731\Bigg/\left(\left(0.274917+\frac{0.199338}{0.549834+\frac{0.199338}{0.549834+\frac{0.199338}{0.549834+\frac{0.199338}{0.549834+\ldots}}}}\right)\left(1+\frac{0.274917}{3+\frac{1.09967}{5+\frac{2.47425}{7+\frac{4.39868}{9+\ldots}}}}\right)\right)$$

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

In conclusion:

(((0.2749172*0.26445410094)/(98Pi^2*0.92))) * 0.7499999 * 28.4108

Input interpretation:

$$\frac{0.2749172\times 0.26445410094}{98\,\pi^2\times 0.92}\times 0.7499999\times 28.4108$$

Result:

0.00174094...

0.00174094…. = β

Alternative representations:

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{1.54916}{90.16\,(180\,°)^2}$$

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{1.54916}{540.96\,\zeta(2)}$$

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{1.54916}{90.16\,(-i\log(-1))^2}$$

Series representations:

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{0.0010739}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{0.00429559}{\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^2}$$

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{0.0171824}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Integral representations:

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{0.00429559}{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}$$

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{0.0010739}{\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2}$$

$$\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92} = \frac{0.00429559}{\left(\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)^2}$$

1+((((((0.2749172*0.26445410094)/(98Pi^2*0.92))) * 0.7499999 * 28.4108)))

Input interpretation:

$$1+\frac{0.2749172\times 0.26445410094}{98\,\pi^2\times 0.92}\times 0.7499999\times 28.4108$$

Result:

1.0017409...

1.0017409… result very near to the following Rogers-Ramanujan continued fraction:

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

Alternative representations:

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\,\pi^2\,0.92}=1+\frac{1.54916}{90.16\,(180\,°)^2}$$

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\,\pi^2\,0.92}=1+\frac{1.54916}{540.96\,\zeta(2)}$$

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\,\pi^2\,0.92}=1+\frac{1.54916}{90.16\,(-i\log(-1))^2}$$

Series representations:

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\,\pi^2\,0.92}=1+\frac{0.0010739}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\,\pi^2\,0.92}=1+\frac{0.00429559}{\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^2}$$

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}=1+\frac{0.0171824}{\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2}$$

Integral representations:

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}=1+\frac{0.00429559}{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^2}$$

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}=1+\frac{0.0010739}{\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^2}$$

$$1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}=1+\frac{0.00429559}{\left(\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)^2}$$

64*log base 0.999130666 (((1/[1+((((((0.2749172*0.26445410094)/(98Pi^2*0.92))) * 0.7499999 * 28.4108)))])))-Pi+1/golden ratio

Input interpretation:

$$64\log_{0.999130666}\left(\frac{1}{1+\frac{0.2749172\times 0.26445410094}{98\pi^2\times 0.92}\times 0.7499999\times 28.4108}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.476…

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

Alternative representation:

$$64 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}}\right)-\pi+\frac{1}{\phi} =$$

$$-\pi+\frac{1}{\phi}+\frac{64\log\left(\frac{1}{1+\frac{1.54916}{90.16\pi^2}}\right)}{\log(0.999131)}$$

Series representations:

$$64 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}}\right)-\pi+\frac{1}{\phi} =$$

$$\frac{1}{\phi}-\pi-\frac{64\sum_{k=1}^{\infty}\frac{(-0.0171824)^k\left(-\frac{1}{0.0171824+\pi^2}\right)^k}{k}}{\log(0.999131)}$$

$$64 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}}\right)-\pi+\frac{1}{\phi} = \frac{1}{\phi}-\pi-$$

$$73587.6\log\left(\frac{1}{1+\frac{0.0171824}{\pi^2}}\right)-64\log\left(\frac{1}{1+\frac{0.0171824}{\pi^2}}\right)\sum_{k=0}^{\infty}(-0.000869334)^k\, G(k)$$

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

64*log base 0.999130666 (((1/[1+((((((0.2749172*0.26445410094)/(98Pi^2*0.92))) * 0.7499999 * 28.4108)))])))+11+1/golden ratio

Input interpretation:

$$64 \log_{0.999130666}\left(\frac{1}{1+\frac{0.2749172\times 0.26445410094}{98\pi^2\times 0.92}\times 0.7499999\times 28.4108}\right)+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.618...

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

Alternative representation:

$$64 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}}\right)+11+\frac{1}{\phi} = 11+\frac{1}{\phi}+\frac{64\log\left(\frac{1}{1+\frac{1.54916}{90.16\pi^2}}\right)}{\log(0.999131)}$$

Series representations:

$$64 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}}\right)+11+\frac{1}{\phi} = 11+\frac{1}{\phi}-\frac{64\sum_{k=1}^{\infty}\frac{(-0.0171824)^k\left(-\frac{1}{0.0171824+\pi^2}\right)^k}{k}}{\log(0.999131)}$$

$$64 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\, 0.92}}\right)+11+\frac{1}{\phi} = 11+\frac{1}{\phi}-73587.6\log\left(\frac{1}{1+\frac{0.0171824}{\pi^2}}\right)-64\log\left(\frac{1}{1+\frac{0.0171824}{\pi^2}}\right)\sum_{k=0}^{\infty}(-0.000869334)^k G(k)$$

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

sqrt(729)*2^5*log base 0.999130666 (((1/[1+((((((0.2749172*0.26445410094)/(98Pi^2*0.92))) * 0.7499999 * 28.4108)))])))

Input interpretation:

$$\sqrt{729}\times 2^5 \log_{0.999130666}\left(\frac{1}{1+\frac{0.2749172\times 0.26445410094}{98\pi^2\times 0.92}\times 0.7499999\times 28.4108}\right)$$

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

Result:

1728.00...

1728

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

Alternative representation:

$$\sqrt{729}\ 2^5 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\ 0.92}}\right) = \frac{\log\left(\frac{1}{1+\frac{1.54916}{90.16\pi^2}}\right) 2^5 \sqrt{729}}{\log(0.999131)}$$

Series representations:

$$\sqrt{729}\ 2^5 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\ 0.92}}\right) = -\frac{32\sqrt{728}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}\ 728^{-k_2}\left(-1+\frac{1}{1+\frac{0.0171824}{\pi^2}}\right)^{k_1}\binom{\frac{1}{2}}{k_2}}{k_1}}{\log(0.999131)}$$

$$\sqrt{729}\ 2^5 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\ 0.92}}\right) = -\frac{32\sqrt{728}\sum_{k_1=1}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\ 728^{-k_2}\left(-1+\frac{1}{1+\frac{0.0171824}{\pi^2}}\right)^{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_2!\,k_1}}{\log(0.999131)}$$

$$\sqrt{729}\ 2^5 \log_{0.999131}\left(\frac{1}{1+\frac{(0.75\times 28.4108)(0.274917\times 0.264454100940000)}{98\pi^2\ 0.92}}\right) =$$

$$32 \exp\left(i\pi\left\lfloor\frac{\arg(729-x)}{2\pi}\right\rfloor\right)\log_{0.999131}\left(\frac{1}{1+\frac{0.0171824}{\pi^2}}\right)$$

$$\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (729-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!} \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

sqrt(x+1)*2^5*log base 0.999130666 (((1/[1+((((((0.2749172*0.26445410094)/(98Pi^2*0.92))) * 0.7499999 * 28.4108)))]))) = 1728

Input interpretation:

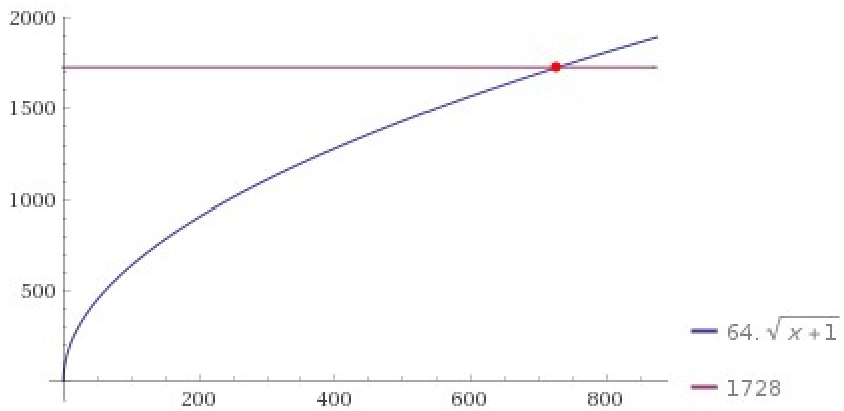
$$\sqrt{x+1}\times 2^5 \log_{0.999130666}\left(\frac{1}{1+\frac{0.2749172\times 0.26445410094}{98\pi^2\times 0.92}\times 0.7499999\times 28.4108}\right) = 1728$$

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

Result:

$$64.\sqrt{x+1} = 1728$$

Plot:



Alternate form assuming x is positive:

$$\sqrt{x+1} = 27.$$

Solution:

$$x \approx 728.$$

728 (Ramanujan taxicab number)

Now, we have:

The phenomenological viability of this model was analysed in Ref. [19]. Further, we shall set $\Lambda_5 = 1 = \kappa_5$ from here on. As the brane tension has the lower bound $\sigma \sim 4.39\times 10^8$ MeV^4 [3, 41, 42], we shall normalize it accordingly in the analysis below.

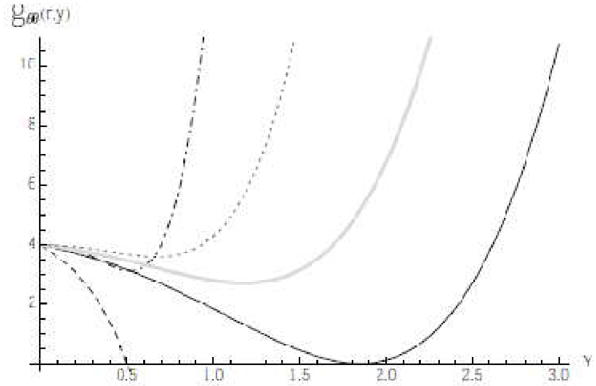


FIG. 1. Metric element $g_{\theta\theta}(r = 2\,M, y)$ along the extra dimension for $\sigma = 2$ (dashed line), $\sigma = 0.92$ (solid black line), $\sigma = 0.5$ (thick gray line), $\sigma = 0.1$ (dotted line), $\sigma = 0.05$ (dash-dotted line). Black hole mass $M = 1$ and constant $C_0 = 1$.

The first result we present is the plot of the area of slices of constant y of the black string horizon $r_H = 2M$ for different constant values of the brane tension σ (see Fig. 1). It is worth noticing that when the brane tension reaches the value $\sigma \approx 0.92$, the black string warped horizon changes profile: for $\sigma \gtrsim 0.92$ the horizon area is always positive, whereas for $\sigma \lesssim 0.92$, there is always a point of coordinate y_c along the extra dimension where the horizon meets the axis of axial symmetry $g_{\theta\theta}(r = r_H, y_c) = 0$. For instance, when $\sigma = 0.05$, one finds $y_c \simeq 0.51$ in Fig. 1.

$$\begin{aligned}
g_{\theta\theta}(t, r, y) = r^2 - \frac{r^2}{3}\,\kappa_5^2\,\sigma\,|y| + \left(\frac{\kappa_5^4\sigma^2}{36} - \frac{\Lambda_5}{6}\right) r^2 y^2 \\
+ \left[\frac{193}{216}\sigma^3\kappa_5^6 + \frac{5}{18}\Lambda_5\kappa_5^2\sigma + \frac{\kappa_5^2\,\beta(\sigma)}{12\,r}\,\frac{\left(1-\frac{M}{r}\right)}{\left(1-\frac{3M}{2r}\right)^2}\right]\frac{r^2|y|^3}{3!} \\
+ \left\{\frac{\Lambda_5}{18}\left(\Lambda_5 - \frac{3\beta(\sigma)}{2\,r}\,\frac{\left(1-\frac{M}{r}\right)}{\left(1-\frac{3M}{2r}\right)^2} - \frac{\sigma^2\kappa_5^4}{6} + \frac{7\,\sigma^4\kappa_5^8}{324}\right)\right. \\
+ \frac{\left(1-\frac{2M}{r}\right)}{\left(1-\frac{3M}{2r}\right)} r^4\,M\,(2\beta + 3M - 2r)\,\left[54M^3 r + 9M^2\left(1 + 4\beta r - 10r^2\right)\right. \\
\left. + 2r^2\left(2 + 7\beta r - 4r^2\right) + 12Mr\left(4r^2 - \beta\right) r - 1\right] + (3M - 2r)^2 \\
\left. - \left(\frac{5\Lambda_5}{6} + \frac{83\sigma^2\kappa_5^4}{216}\right)\frac{\beta(\sigma)}{2\,r}\,\frac{\left(1-\frac{M}{r}\right)}{\left(1-\frac{3M}{2r}\right)^2}\right\}\frac{r^2 y^4}{4!} + \cdots\,, \qquad (32)
\end{aligned}$$

For

$$\Lambda_5 = 1 = \kappa_5$$

0.00174094…. = β   M = 1   r = 2M σ = 0.92 $y = y_c \quad y_c \simeq 2.1$

We obtain:

4-4/3*1*0.92*2.1+(0.92^2/36-1/6)-((((193/216*0.92^3+5/18*0.92+(0.00174094*0.92)/(24)*(1-0.5)/(1-3/4)^2))))*(4*2.1^3)/3!

Input interpretation:

$$4 - \frac{4}{3} \times 1 \times 0.92 \times 2.1 + \left(\frac{0.92^2}{36} - \frac{1}{6}\right) - \left(\frac{193}{216} \times 0.92^3 + \frac{5}{18} \times 0.92 + \frac{0.00174094 \times 0.92}{24} \times \frac{1 - 0.5}{\left(1 - \frac{3}{4}\right)^2}\right) \times \frac{4 \times 2.1^3}{3!}$$

$n!$ is the factorial function

Result:

−4.59594902438062222222222222222222222222222222222222…

Repeating decimal:

$-4.5959490243806\overline{2}$ (period 1)

-4.59594902438062…..

Alternative representations:

$$4 - \frac{4 \times 0.92 \times 2.1}{3} + \left(\frac{0.92^2}{36} - \frac{1}{6}\right) - \frac{\left(\frac{193 \times 0.92^3}{216} + \frac{5 \times 0.92}{18} + \frac{(0.00174094 \times 0.92)(1-0.5)}{24\left(1-\frac{3}{4}\right)^2}\right)(4 \times 2.1^3)}{3!} = 1.424 - \frac{1}{6} + \frac{0.92^2}{36} - \frac{4 \times 2.1^3 \left(\frac{4.6}{18} + \frac{193 \times 0.92^3}{216} + \frac{0.000800832}{24\left(1-\frac{3}{4}\right)^2}\right)}{\Gamma(4)}$$

$$4-\frac{4\times 0.92\times 2.1}{3}+\left(\frac{0.92^2}{36}-\frac{1}{6}\right)-\frac{\left(\frac{193\times 0.92^3}{216}+\frac{5\times 0.92}{18}+\frac{(0.00174094\times 0.92)(1-0.5)}{24\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^3)}{3!}=$$

$$1.424-\frac{1}{6}+\frac{0.92^2}{36}-\frac{4\times 2.1^3\left(\frac{4.6}{18}+\frac{193\times 0.92^3}{216}+\frac{0.000800832}{24\left(1-\frac{3}{4}\right)^2}\right)}{\Gamma(4,\ 0)}$$

$$4-\frac{4\times 0.92\times 2.1}{3}+\left(\frac{0.92^2}{36}-\frac{1}{6}\right)-\frac{\left(\frac{193\times 0.92^3}{216}+\frac{5\times 0.92}{18}+\frac{(0.00174094\times 0.92)(1-0.5)}{24\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^3)}{3!}=$$

$$1.424-\frac{1}{6}+\frac{0.92^2}{36}-\frac{4\times 2.1^3\left(\frac{4.6}{18}+\frac{193\times 0.92^3}{216}+\frac{0.000800832}{24\left(1-\frac{3}{4}\right)^2}\right)}{(1)_3}$$

Series representation:

$$4-\frac{4\times 0.92\times 2.1}{3}+\left(\frac{0.92^2}{36}-\frac{1}{6}\right)-\frac{\left(\frac{193\times 0.92^3}{216}+\frac{5\times 0.92}{18}+\frac{(0.00174094\times 0.92)(1-0.5)}{24\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^3)}{3!}=$$

$$1.28084-\frac{35.2608}{\sum_{k=0}^{\infty}\frac{(3-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}\quad \text{for } ((n_0\notin\mathbb{Z} \text{ or } n_0\geq 0) \text{ and } n_0\to 3)$$

Integral representations:

$$4-\frac{4\times 0.92\times 2.1}{3}+\left(\frac{0.92^2}{36}-\frac{1}{6}\right)-\frac{\left(\frac{193\times 0.92^3}{216}+\frac{5\times 0.92}{18}+\frac{(0.00174094\times 0.92)(1-0.5)}{24\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^3)}{3!}=1.28084-\frac{35.2608}{\int_0^{\infty}e^{-t}\,t^3\,dt}$$

$$4-\frac{4\times 0.92\times 2.1}{3}+\left(\frac{0.92^2}{36}-\frac{1}{6}\right)-\frac{\left(\frac{193\times 0.92^3}{216}+\frac{5\times 0.92}{18}+\frac{(0.00174094\times 0.92)(1-0.5)}{24\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^3)}{3!}=1.28084-\frac{35.2608}{\int_0^{1}\log^3\left(\frac{1}{t}\right)dt}$$

$$4-\frac{4\times 0.92\times 2.1}{3}+\left(\frac{0.92^2}{36}-\frac{1}{6}\right)-\frac{\left(\frac{193\times 0.92^3}{216}+\frac{5\times 0.92}{18}+\frac{(0.00174094\times 0.92)(1-0.5)}{24\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^3)}{3!}=$$

$$1.28084-\frac{35.2608}{\int_1^\infty e^{-t}\,t^3\,dt+\sum_{k=0}^\infty \frac{(-1)^k}{(4+k)k!}}$$

[1/18(((((1-(3*0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2-(0.92^2)/6+7(0.92^4)/324))))+(3-2*2)^2-(5/6+(83*0.92^2)/216)*(0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2)]*(4*2.1^4)/4!

Input interpretation:

$$\left(\frac{1}{18}\left(\left(1-\left(\frac{1}{4}(3\times 0.00174094\times 0.92)\right)\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+7\times\frac{0.92^4}{324}\right)+(3-2\times 2)^2-\left(\frac{5}{6}+\frac{1}{216}(83\times 0.92^2)\right)\times\frac{0.00174094\times 0.92}{4}\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}\right)\right)\times\frac{4\times 2.1^4}{4!}$$

$n!$ is the factorial function

Result:

0.335135725467784799703703703703703703703703703703703703703...

Repeating decimal:

$0.335135725467784799\overline{703}$ (period 3)

0.335135725467784799703

Alternative representations:

$$\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)=\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5)}$$

$$\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)=\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5,0)}$$

$$\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)=\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,(1)_4}$$

Series representation:

$$\frac{1}{4! \times 18}(4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3 - 2 \times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = \frac{8.04326}{\sum_{k=0}^{\infty} \frac{(4-n_0)^k \, \Gamma^{(k)}(1+n_0)}{k!}} \quad \text{for } ((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0) \text{ and } n_0 \to 4)$$

Integral representations:

$$\frac{1}{4! \times 18}(4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3 - 2 \times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = \frac{8.04326}{\int_0^{\infty} e^{-t} \, t^4 \, dt}$$

$$\frac{1}{4! \times 18}(4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3 - 2 \times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = \frac{8.04326}{\int_0^1 \log^4\left(\frac{1}{t}\right) dt}$$

$$\frac{1}{4! \times 18}(4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3 - 2 \times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = \frac{8.04326}{\int_1^{\infty} e^{-t} \, t^4 \, dt + \sum_{k=0}^{\infty} \frac{(-1)^k}{(5+k) k!}}$$

Thence, we obtain:

-4.59594902438062+[1/18(((((1-(3*0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2-(0.92^2)/6+7(0.92^4)/324))))+(3-2*2)^2-(5/6+(83*0.92^2)/216)*(0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2)]*(4*2.1^4)/4!

Input interpretation:

$$-4.59594902438062 + \left(\frac{1}{18}\left(\left(1-\left(\frac{1}{4}(3\times 0.00174094\times 0.92)\right)\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+7\times\frac{0.92^4}{324}\right)+(3-2\times 2)^2-\left(\frac{5}{6}+\frac{1}{216}(83\times 0.92^2)\right)\times\frac{0.00174094\times 0.92}{4}\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}\right)\right)\times\frac{4\times 2.1^4}{4!}$$

$n!$ is the factorial function

Result:

-4.260813298912835200296296296296296296296296296296296296296...

-4.2608132989128352…..

Repeating decimal:

$-4.260813298912835200\overline{296}$ (period 3)

Alternative representations:

$$-4.595949024380620000 + \frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = -4.595949024380620000 + \frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5)}$$

$$-4.595949024380620000+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)=-4.595949024380620000+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5,0)}$$

$$-4.595949024380620000+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)=-4.595949024380620000+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,(1)_4}$$

Series representation:

$$-4.595949024380620000+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)=-4.595949024380620000+\frac{8.04326}{\sum_{k=0}^{\infty}\frac{(4-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}$$

for $((n_0\notin\mathbb{Z}$ or $n_0\geq 0)$ and $n_0\to 4)$

Integral representations:

$$-4.59594902438062000 0+ \frac{1}{4! \times 18} (4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3 - 2 \times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = -4.595949024380620000 + \frac{8.04326}{\int_0^\infty e^{-t} t^4 \, dt}$$

$$-4.595949024380620000 + \frac{1}{4! \times 18} (4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3 - 2 \times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = -4.595949024380620000 + \frac{8.04326}{\int_0^1 \log^4\left(\frac{1}{t}\right) dt}$$

$$-4.595949024380620000 + \frac{1}{4! \times 18} (4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3 - 2 \times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right) = -4.595949024380620000 + \frac{8.04326}{\int_1^\infty e^{-t} t^4 \, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(5+k)k!}}$$

[-4.59594902438062+((((1/18(((((1-(3*0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2-(0.92^2)/6+7(0.92^4)/324))))+(3-2*2)^2-(5/6+(83*0.92^2)/216)*(0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2)))))*(4*2.1^4)/4!]^4

Input interpretation:

$$\left(-4.59594902438062+\left(\frac{1}{18}\left(\left(1-\left(\frac{1}{4}(3\times 0.00174094\times 0.92)\right)\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+7\times\frac{0.92^4}{324}\right)+(3-2\times 2)^2-\left(\frac{5}{6}+\frac{1}{216}(83\times 0.92^2)\right)\times\frac{0.00174094\times 0.92}{4}\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}\right)\right)\times\frac{4\times 2.1^4}{4!}\right)^4$$

$n!$ is the factorial function

Result:

329.58695836599875903168620649542217589963550494919666531 57...

Repeating decimal:

329.58695836599875903168620649542217589963550494919666531 57...

(period 59049)

329.58695836....

[-4.59594902+((((1/18(((((1-(3*0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2-(0.92^2)/6+7(0.92^4)/324))))+(3-2*2)^2-(5/6+(83*0.92^2)/216)*(0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2)))))*(4*2.1^4)/4!]^4+144+21+3

Input interpretation:

$$\left(-4.59594902+\left(\frac{1}{18}\left(\left(1-\left(\frac{1}{4}(3\times 0.00174094\times 0.92)\right)\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+7\times\frac{0.92^4}{324}\right)+(3-2\times 2)^2-\left(\frac{5}{6}+\frac{1}{216}(83\times 0.92^2)\right)\times\frac{0.00174094\times 0.92}{4}\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}\right)\right)\times\frac{4\times 2.1^4}{4!}\right)^4+144+21+3$$

$n!$ is the factorial function

Result:

497.5869570105812666021881454869436116935056470749903309761...

Repeating decimal:

497.5869570105812666021881454869436116935056470749903309761...

(period 59049)

497.58695701… result practically equal to the rest mass of Kaon meson 497.614

Alternative representations:

$$\left(-4.59595 + \frac{1}{4! \times 18} (4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3-2\times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4 + 144 + 21 + 3 = 168 + \left(-4.59595 + \frac{4 \times 2.1^4 \left(2 - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324} - \frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.000800832\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5)}\right)^4$$

$$\left(-4.59595+\frac{1}{4!\times 18}\right.$$

$$(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)\,(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+\right.$$

$$\left.\left.(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+$$

$$144+21+3=168+\left(-4.59595+\right.$$

$$\left.\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5,\,0)}\right)^4$$

$$\left(-4.59595+\frac{1}{4!\times 18}\right.$$

$$(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)\,(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+\right.$$

$$\left.\left.(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+$$

$$144+21+3=168+\left(-4.59595+\right.$$

$$\left.\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,(1)_4}\right)^4$$

Series representation:

$$\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+144+21+3=168+\left(4.59595-\frac{8.04326}{\sum_{k=0}^{\infty}\frac{(4-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}\right)^4$$

for $((n_0 \notin \mathbb{Z} \text{ or } n_0 \geq 0) \text{ and } n_0 \to 4)$

Integral representations:

$$\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+144+21+3=168+\left(4.59595-\frac{8.04326}{\int_0^1 \log^4\left(\frac{1}{t}\right)dt}\right)^4$$

$$\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+144+21+3=168+\left(4.59595-\frac{8.04326}{\int_0^{\infty} e^{-t}\,t^4\,dt}\right)^4$$

$$\left(-4.59595 + \frac{1}{4! \times 18} (4 \times 2.1^4)\left(\left(1 - \frac{(3 \times 0.00174094 \times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + \frac{7 \times 0.92^4}{324}\right) + (3-2\times 2)^2 - \frac{(0.00174094 \times 0.92)\left(\frac{5}{6} + \frac{83 \times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4 +$$

$$144 + 21 + 3 = 168 + \left(4.59595 - \frac{8.04326}{\int_1^\infty e^{-t}\, t^4\, dt + \sum_{k=0}^\infty \frac{(-1)^k}{(5+k)k!}}\right)^4$$

1/3[-4.595949+((((1/18(((((1-(3*0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2-(0.92^2)/6+7(0.92^4)/324))))+(3-2*2)^2-(5/6+(83*0.92^2)/216)*(0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2)))))*(4*2.1^4)/4!]^4+13+2.618034

Input interpretation:

$$\frac{1}{3}\left(-4.595949 + \left(\frac{1}{18}\left(\left(1 - \left(\frac{1}{4}(3 \times 0.00174094 \times 0.92)\right) \times \frac{1-0.5}{\left(1-\frac{3}{4}\right)^2} - \frac{0.92^2}{6} + 7 \times \frac{0.92^4}{324}\right) + (3-2\times 2)^2 - \left(\frac{5}{6} + \frac{1}{216}(83 \times 0.92^2)\right) \times \frac{0.00174094 \times 0.92}{4} \times \frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}\right)\right) \times \frac{4 \times 2.1^4}{4!}\right)^4 + 13 + 2.618034$$

$n!$ is the factorial function

Result:

125.480350940778770446971193036218418163139585246668898 5767...

Repeating decimal:

125.4803509407787704469711930362184181631395852466688985767...

(period 177147)

125.4803509… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

Alternative representations:

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\left(4\times 2.1^4\right)\right)^4+13+2.61803=15.618+\frac{1}{3}\left(-4.59595+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5)}\right)^4$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\left(4\times 2.1^4\right)\right)^4+13+2.61803=15.618+\frac{1}{3}\left(-4.59595+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5,\,0)}\right)^4$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+13+2.61803=15.618+\frac{1}{3}\left(-4.59595+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,(1)_4}\right)^4$$

Series representation:

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+13+2.61803=$$

$$15.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\sum_{k=0}^{\infty}\frac{(4-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}\right)^4$$

for

$((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$ and $n_0 \to 4)$

Integral representations:

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+13+2.61803=15.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\int_0^1 \log^4\left(\frac{1}{t}\right)dt}\right)^4$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+13+2.61803=15.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\int_0^\infty e^{-t}t^4\,dt}\right)^4$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+13+2.61803=$$

$$15.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\int_1^\infty e^{-t}t^4\,dt+\sum_{k=0}^{\infty}\frac{(-1)^k}{(5+k)k!}}\right)^4$$

1/3[-4.595949+((((1/18(((((1-(3*0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2-(0.92^2)/6+7(0.92^4)/324))))+(3-2*2)^2-(5/6+(83*0.92^2)/216)*(0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2)))))*(4*2.1^4)/4!]^4+29+0.618034

Input interpretation:

$$\frac{1}{3}\left(-4.595949+\left(\frac{1}{18}\left(\left(1-\left(\frac{1}{4}(3\times 0.00174094\times 0.92)\right)\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+7\times\frac{0.92^4}{324}\right)+(3-2\times 2)^2-\left(\frac{5}{6}+\frac{1}{216}\left(83\times 0.92^2\right)\right)\times\frac{0.00174094\times 0.92}{4}\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}\right)\right)\times\frac{4\times 2.1^4}{4!}\right)^4+29+0.618034$$

$n!$ is the factorial function

Result:

139.48035094077877044697119303621841816313958524666889857 67...

Repeating decimal:

139.4803509407787704469711930362184181631395852466688985767...

(period 177147)

139.4803509… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternative representations:

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\left(4\times 2.1^4\right)\right)^4+29+0.618034=29.618+\frac{1}{3}\left(-4.59595+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5)}\right)^4$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\left(4\times 2.1^4\right)\right)^4+29+0.618034=29.618+\frac{1}{3}\left(-4.59595+\frac{\left(4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4}{18\,\Gamma(5,\,0)}\right)$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\left(4\times 2.1^4\right)\right)^4+29+0.618034=29.618+\frac{1}{3}\left(-4.59595+\frac{\left(4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4}{18\,(1)_4}\right)$$

Series representation:

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+29+0.618034=$$

$$29.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\sum_{k=0}^{\infty}\frac{(4-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}\right)^4$$

for

$((n_0\notin\mathbb{Z}\text{ or }n_0\geq 0)\text{ and }n_0\to 4)$

Integral representations:

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+29+0.618034=29.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\int_0^1\log^4\left(\frac{1}{t}\right)dt}\right)^4$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)(4\times 2.1^4)\right)^4+29+0.618034=29.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\int_0^{\infty}e^{-t}\,t^4\,dt}\right)^4$$

$$\frac{1}{3}\left(-4.59595+\frac{1}{18\times 4!}\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+\right.\right.$$
$$\left.(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)$$
$$\left.(4\times 2.1^4)\right)^4+29+0.618034=$$

$$29.618+\frac{1}{3}\left(4.59595-\frac{8.04326}{\int_1^\infty e^{-t}\,t^4\,dt+\sum_{k=0}^\infty\frac{(-1)^k}{(5+k)k!}}\right)^4$$

5[[-4.595949+((((1/18(((((1-(3*0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2-(0.92^2)/6+7(0.92^4)/324))))+(3-2*2)^2-(5/6+(83*0.92^2)/216)*(0.00174094*0.92)/4*(1-0.5)/(1-3/4)^2)))))*(4*2.1^4)/4!]^4+16]+1.618034

Input interpretation:

$$5\left(\left(\left(-4.595949+\left(\frac{1}{18}\left(\left(1-\left(\frac{1}{4}(3\times 0.00174094\times 0.92)\right)\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+7\times\frac{0.92^4}{324}\right)+(3-2\times 2)^2-\left(\frac{5}{6}+\frac{1}{216}(83\times 0.92^2)\right)\times\frac{0.00174094\times 0.92}{4}\times\frac{1-0.5}{\left(1-\frac{3}{4}\right)^2}\right)\right)\times\frac{4\times 2.1^4}{4!}\right)^4+16\right)+1.618034$$

$n!$ is the factorial function

Result:

1729.552788111681556704567895543276272447093778700033478651...

Repeating decimal:

1729.552788111681556704567895543276272447093778700033478651...

(period 59049)

1729.552788111...

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

Alternative representations:

$$5\left(\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+16\right)+1.61803=1.61803+5\left(16+\left(-4.59595+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5)}\right)^4\right)$$

$$5\left(\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+16\right)+1.61803=1.61803+5\left(16+\left(-4.59595+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,\Gamma(5,0)}\right)^4\right)$$

$$5\left(\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+16\right)+1.61803=1.61803+5\left(16+\left(-4.59595+\frac{4\times 2.1^4\left(2-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}-\frac{0.0024025}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.000800832\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)}{4\left(1-\frac{3}{4}\right)^2}\right)}{18\,(1)_4}\right)^4\right)$$

Series representation:

$$5\left(\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+16\right)+1.61803=81.618+5\left(4.59595-\frac{8.04326}{\sum_{k=0}^{\infty}\frac{(4-n_0)^k\,\Gamma^{(k)}(1+n_0)}{k!}}\right)^4$$

for

$((n_0 \notin \mathbb{Z}$ or $n_0 \geq 0)$

and

$n_0 \to 4)$

Integral representations:

$$5\left(\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+16\right)+1.61803=81.618+5\left(4.59595-\frac{8.04326}{\int_0^1\log^4\left(\frac{1}{t}\right)dt}\right)^4$$

$$5\left(\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^4)\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}-\frac{0.92^2}{6}+\frac{7\times 0.92^4}{324}\right)+(3-2\times 2)^2-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^2}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^2}\right)\right)^4+16\right)+1.61803=81.618+5\left(4.59595-\frac{8.04326}{\int_0^{\infty}e^{-t}\,t^4\,dt}\right)^4$$

$$5\left(\left(\left(-4.59595+\frac{1}{4!\times 18}(4\times 2.1^{4})\left(\left(\left(1-\frac{(3\times 0.00174094\times 0.92)(1-0.5)}{4\left(1-\frac{3}{4}\right)^{2}}-\frac{0.92^{2}}{6}+\frac{7\times 0.92^{4}}{324}\right)+(3-2\times 2)^{2}-\frac{(0.00174094\times 0.92)\left(\frac{5}{6}+\frac{83\times 0.92^{2}}{216}\right)(1-0.5)}{4\left(1-\frac{3}{4}\right)^{2}}\right)\right)^{4}+16\right)\right)\right)+1.61803=81.618+5\left(4.59595-\frac{8.04326}{\int_{1}^{\infty}e^{-t}\,t^{4}\,dt+\sum_{k=0}^{\infty}\frac{(-1)^{k}}{(5+k)k!}}\right)^{4}$$

Now, we have that:

Let us now find the explicit MGD function $g^{*}(r)$ produced by the Schwarzschild solution

$$e^{\nu_S}=e^{-\lambda_S}=1-\frac{2\,M}{r}\,, \tag{20}$$

where we recall M is a function of the brane tension σ. Using Eq. (20) in Eq. (10), we obtain

$$g^{*}(r)=-\frac{2\,\beta(\sigma)}{r}\,\frac{1-\frac{2M}{r}}{r-\frac{3M}{2}}\,, \tag{21}$$

and the deformed exterior metric components read

$$e^{\nu}=1-\frac{2\,M}{r}\,, \tag{22}$$

$$e^{-\lambda}=\left(1-\frac{2\,M}{r}\right)\left[1-\frac{\beta(\sigma)}{r-\frac{3\,M}{2}}\right]\,, \tag{23}$$

which match the vacuum solution found in Ref. [41] in the particular case when $\beta(\sigma)=-\frac{C_0}{\sigma}$, for C_0 a positive constant. Below we shall show a general expression for the function β, which depends on the interior structure of the self-gravitating system surrounded by the geometry (22).

$$\beta=\beta(\sigma)$$

For β = 0.00174094, M = 1.312806e+40 and R = 1.949322e+13

(SMBH87 parameters)

we obtain:

$$g^*(r) = -\frac{2\,\beta(\sigma)}{r}\,\frac{1-\frac{2M}{r}}{r-\frac{3M}{2}}$$

(-2*0.00174094)/(1.949322e+13)*(1-(2*1.312806e+40)/(1.949322e+13))/(1.949322e+13-(3*1.312806e+40)/2)

Input interpretation:

$$\frac{-2\times 0.00174094}{1.949322\times 10^{13}}\times\frac{1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}}{1.949322\times 10^{13}-\frac{1}{2}(3\times 1.312806\times 10^{40})}$$

Result:

$-1.2217584954260197071826314017692036888147654957318 10\ldots \times 10^{-29}$

$-1.221758495\ldots*10^{-29}$

We note that, from:

Rotating strings confronting PDG mesons

Jacob Sonnenschein and Dorin Weissman - arXiv:1402.5603v1 [hep-ph] 23 Feb 2014

Traj.	N	m	α'	a
π/π_2	$4+3$	$m_{u/d}=0-250$	$0.770-0.801$	$a_0=(-0.34)-0.$ $a_2=(-1.53)-(-1.20)$
a_1	4	$m_{u/d}=0-380$	$0.777-0.862$	$(-0.89)-(-0.20)$
h_1	4	$m_{u/d}=0-265$	$0.827-0.876$	$(-0.85)-(-0.71)$
ω/ω_3	$5+3$	$m_{u/d}=240-345$	$0.937-1.000$	$a_1=(-0.23)-(-0.04)$ $a_3=(-1.54)-(-1.28)$
ϕ	3	$m_s=505-520$	$1.005-1.045$	0.00
Ψ	4	$m_c=1390-1465$	$0.464-0.514$	$(-0.27)-(-0.10)$
Υ	6	$m_b=4730-4740$	$0.417-0.428$	0.00
χ_b	3	$m_b=4820$	0.468	-0.08

Table 3. The results of the meson WKB fits, all in the (n, M^2) plane. The ranges listed are those where χ^2 is within 10% of its optimal value. N is the number of data points in the trajectory.

The Regge slope of Omega meson is in the range 0.937-1.000. From the previous expression, performing the 1024th root, we obtain:

Input interpretation:

$$\sqrt[1024]{-\frac{-2\times 0.00174094}{1.949322\times 10^{13}}\times\frac{1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}}{1.949322\times 10^{13}-\frac{1}{2}(3\times 1.312806\times 10^{40})}}$$

Result:

0.93705403...

0.93705403…

From

$$e^{-\lambda}=\left(1-\frac{2M}{r}\right)\left[1-\frac{\beta(\sigma)}{r-\frac{3M}{2}}\right]$$

we obtain:

((1-(2*1.312806e+40)/1.949322e+13))*(1-((0.00174094))/(1.949322e+13-(3*1.312806e+40)/2))

Input interpretation:

$$\left(1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}\right)\left(1-\frac{0.00174094}{1.949322\times 10^{13}-\frac{1}{2}(3\times 1.312806\times 10^{40})}\right)$$

Result:

$-1.3469360115978786470372775755112177464780063181584844... \times 10^{27}$

$-1.3469360115\ldots*10^{27}$

From the two results, we obtain:

2/([((1-(2*1.312806e+40)/1.949322e+13))*(1-((0.00174094))/(1.949322e+13-(3*1.312806e+40)/2))]*[(-2*0.00174094)/(1.949322e+13)*(1-(2*1.312806e+40)/(1.949322e+13))/(1.949322e+13-(3*1.312806e+40)/2)])+4

Input interpretation:

$$2\Bigg/\left(\left(\left(1-\frac{2\times1.312806\times10^{40}}{1.949322\times10^{13}}\right)\left(1-\frac{0.00174094}{1.949322\times10^{13}-\frac{1}{2}(3\times1.312806\times10^{40})}\right)\right)\left(\frac{-2\times0.00174094}{1.949322\times10^{13}}\times\frac{1-\frac{2\times1.312806\times10^{40}}{1.949322\times10^{13}}}{1.949322\times10^{13}-\frac{1}{2}(3\times1.312806\times10^{40})}\right)\right)+4$$

Result:

125.533964143986478574771899948821649600804640671909001431 3...

125.53396414… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV

2/([((1-(2*1.312806e+40)/1.949322e+13))*(1-((0.00174094))/(1.949322e+13-(3*1.312806e+40)/2))]*[(-2*0.00174094)/(1.949322e+13)*(1-(2*1.312806e+40)/(1.949322e+13))/(1.949322e+13-(3*1.312806e+40)/2)])+18

Input interpretation:

$$2\Bigg/\left(\left(\left(1-\frac{2\times1.312806\times10^{40}}{1.949322\times10^{13}}\right)\left(1-\frac{0.00174094}{1.949322\times10^{13}-\frac{1}{2}(3\times1.312806\times10^{40})}\right)\right)\left(\frac{-2\times0.00174094}{1.949322\times10^{13}}\times\frac{1-\frac{2\times1.312806\times10^{40}}{1.949322\times10^{13}}}{1.949322\times10^{13}-\frac{1}{2}(3\times1.312806\times10^{40})}\right)\right)+18$$

Result:

139.5339641439864785747718999488216496008046406719090014313...

139.53396414… result practically equal to the rest mass of Pion meson 139.57 MeV

2/([((1-(2*1.312806e+40)/1.949322e+13))*(1-((0.001741))/(1.949322e+13-(3*1.312806e+40)/2))]*[(-2*0.001741)/(1.949322e+13)*(1-(2*1.312806e+40)/(1.949322e+13))/(1.949322e+13-(3*1.312806e+40)/2)])+18-3/2

Input interpretation:

$$2/\left(\left(\left(1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}\right)\left(1-\frac{0.001741}{1.949322\times 10^{13}-\frac{1}{2}(3\times 1.312806\times 10^{40})}\right)\right)\left(\frac{-2\times 0.001741}{1.949322\times 10^{13}}\times\frac{1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}}{1.949322\times 10^{13}-\frac{1}{2}(3\times 1.312806\times 10^{40})}\right)\right)+18-\frac{3}{2}$$

Result:

138.029775724774164279128886557668904454925233274387468028...

138.02977572… ≈ 138 (Ramanujan taxicab number)

2/([((1-(2*1.312806e+40)/1.949322e+13))*(1-((0.00174))/(1.949322e+13-(3*1.312806e+40)/2))]*[(-2*0.00174)/(1.949322e+13)*(1-(2*1.312806e+40)/(1.949322e+13))/(1.949322e+13-(3*1.312806e+40)/2)])+18-3/2-3

Input interpretation:

$$2/\left(\left(\left(1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}\right)\left(1-\frac{0.00174}{1.949322\times 10^{13}-\frac{1}{2}(3\times 1.312806\times 10^{40})}\right)\right)\left(\frac{-2\times 0.00174}{1.949322\times 10^{13}}\times\frac{1-\frac{2\times 1.312806\times 10^{40}}{1.949322\times 10^{13}}}{1.949322\times 10^{13}-\frac{1}{2}(3\times 1.312806\times 10^{40})}\right)\right)+18-\frac{3}{2}-3$$

Result:

135.099620423466563224116891664885955494395581272719351014...

135.0996204 ≈ 135 (Ramanujan taxicab number)

2/([((1-(2*1.312806e+40)/1.949322e+13))*(1-((0.00174))/(1.949322e+13-(3*1.312806e+40)/2))]*[(-2*0.00174)/(1.949322e+13)*(1-(2*1.312806e+40)/(1.949322e+13))/(1.949322e+13-(3*1.312806e+40)/2)])+55-4-1/2

Input interpretation:

$$2 / \left(\left(\left(1 - \frac{2 \times 1.312806 \times 10^{40}}{1.949322 \times 10^{13}}\right) \left(1 - \frac{0.00174}{1.949322 \times 10^{13} - \frac{1}{2}(3 \times 1.312806 \times 10^{40})}\right) \right) \left(\frac{-2 \times 0.00174}{1.949322 \times 10^{13}} \times \frac{1 - \frac{2 \times 1.312806 \times 10^{40}}{1.949322 \times 10^{13}}}{1.949322 \times 10^{13} - \frac{1}{2}(3 \times 1.312806 \times 10^{40})} \right) \right) + 55 - 4 - \frac{1}{2}$$

Result:

172.0996204234665632241168916648859555494395581272719351014...

172.099620423… ≈ 172 (Ramanujan taxicab number)

From

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

we obtain:

135.09962042346^3+138.029775724774^3 < 172.09962042346^3-1

Input interpretation:

$$135.09962042346^3 + 138.029775724774^3 < 172.09962042346^3 - 1$$

Result:

True

Difference:

−1694.352976

-1694.352976

-(((135.09962042346^3+138.029775724774^3 - (172.09962042346^3-1)+21+1/golden ratio)))

Input interpretation:

$$-\left(135.09962042346^3 + 138.029775724774^3 - (172.09962042346^3 - 1) + 21 + \frac{1}{\phi}\right)$$

ϕ is the golden ratio

Result:

1672.734942...

1672.734942… result practically equal to the rest mass of Omega baryon 1672.45

Alternative representations:

$$-\left(135.099620423460000^3 + 138.0297757247740000^3 - (172.099620423460000^3 - 1) + 21 + \frac{1}{\phi}\right) = -22 - 135.099620423460000^3 - 138.0297757247740000^3 + 172.099620423460000^3 - \frac{1}{2\sin(54°)}$$

$$-\left(135.099620423460000^3 + 138.0297757247740000^3 - (172.099620423460000^3 - 1) + 21 + \frac{1}{\phi}\right) = -22 - 135.099620423460000^3 - 138.0297757247740000^3 + 172.099620423460000^3 - -\frac{1}{2\cos(216°)}$$

$$-\left(135.099620423460000^3 + 138.0297757247740000^3 - (172.099620423460000^3 - 1) + 21 + \frac{1}{\phi}\right) = -22 - 135.099620423460000^3 - 138.0297757247740000^3 + 172.099620423460000^3 - -\frac{1}{2\sin(666°)}$$

Now, we have that:

$$\frac{1}{k^2}\frac{\mathcal{P}^+}{\sigma} = -\frac{\left(1-\frac{4M}{3r}\right)}{9\left(1-\frac{3M}{2r}\right)^2}\frac{\beta}{r^3}, \qquad \text{and} \qquad \frac{1}{k^2}\frac{\mathcal{U}^+}{\sigma} = \frac{M}{12\left(1-\frac{3M}{2r}\right)^2}\frac{\beta}{r^4}\ .$$

For β = 0.00174094, M = 1.312806e+40 and R = 1.949322e+13

[(((-(1-(4*1.312806e+40)/(3*1.949322e+13))))) / (((9((1-(3*1.312806e+40)/(2*1.949322e+13))^2))))]*(((((0.00174094)/(1.949322e+13)^3))))

Input interpretation:

$$-\frac{1-\frac{4\times 1.312806\times 10^{40}}{3\times 1.949322\times 10^{13}}}{9\left(1-\frac{3\times 1.312806\times 10^{40}}{2\times 1.949322\times 10^{13}}\right)^2}\times\frac{0.00174094}{(1.949322\times 10^{13})^3}$$

Result:

$$2.297892943075526127651276340690303451452026307082877 6\ldots\times 10^{-71}$$

2.297892943…*10^{-71}

(1.312806e+40)/ (((12((1-(3*1.312806e+40)/(2*1.949322e+13))^2))))*(((((0.00174094)/(1.949322e+13)^4))))

Input interpretation:

$$\frac{1.312806\times 10^{40}}{12\left(1-\frac{3\times 1.312806\times 10^{40}}{2\times 1.949322\times 10^{13}}\right)^2}\times\frac{0.00174094}{(1.949322\times 10^{13})^4}$$

Result:

$$1.292564780479983446803842943077745787085067554857349 8\ldots\times 10^{-71}$$

1.29256478…*10^{-71}

From the two results, we obtain:

(2.297892943075 × 10^-71)/(1.292564780479 × 10^-71)

Input interpretation:

$$\frac{2.297892943075 \times 10^{-71}}{1.292564780479 \times 10^{-71}}$$

Result:

1.777777777787233568626181444173389196200245046921425959 42...

1.7777…

1/((((2.297892943075 × 10^-71)/(1.292564780479 × 10^-71))))

Input interpretation:

$$\frac{1}{\frac{2.297892943075 \times 10^{-71}}{1.292564780479 \times 10^{-71}}}$$

Result:

0.5624999999997008128676873868770671645620785400783765362 27...

0.56249999... result very near to the following Ramanujan continued fraction:

$$4\int_0^\infty \frac{tdt}{e^{\sqrt{5}t}\cosh t} = \cfrac{1}{1+\cfrac{1^2}{1+\cfrac{1^2}{1+\cfrac{2^2}{1+\cfrac{2^2}{1+\cfrac{3^2}{1+\cfrac{3^2}{1+\dots}}}}}}} \approx 0.5683000031$$

((((2.297892943075 × 10^-71)/(1.292564780479 × 10^-71))))*938+64-Pi

Input interpretation:

$$\frac{2.297892943075 \times 10^{-71}}{1.292564780479 \times 10^{-71}} \times 938 + 64 - \pi$$

Result:

1728.413962903...

1728.413962903…

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

((((2.297892943075 × 10^-71)/(1.292564780479 × 10^-71))))*89-21-2-1/5

Input interpretation:

$$\frac{2.297892943075\times 10^{-71}}{1.292564780479\times 10^{-71}}\times 89-21-2-\frac{1}{5}$$

Result:

135.02222222306378760773014853143163846182180917600691038...

135.0222… ≈ 135 (Ramanujan taxicab number)

((((2.297892943075 × 10^-71)/(1.292564780479 × 10^-71))))*89-21+4/5

Input interpretation:

$$\frac{2.297892943075\times 10^{-71}}{1.292564780479\times 10^{-71}}\times 89-21+\frac{4}{5}$$

Result:

138.02222222306378760773014853143163846182180917600691038...

138.0222… ≈ 138 (Ramanujan taxicab number)

((((2.297892943075 × 10^-71)/(1.292564780479 × 10^-71))))*89+13+4/5

Input interpretation:

$$\frac{2.297892943075\times 10^{-71}}{1.292564780479\times 10^{-71}}\times 89+13+\frac{4}{5}$$

Result:

172.02222222230637876077301485314316384618218091760069103 88...

172.0222… ≈ 172 (Ramanujan taxicab number)

From

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

we obtain:

135.0222^3 + 138.0222^3 > 172.0222^3-1

Input interpretation:

$$135.0222^3+138.0222^3>172.0222^3-1$$

Result:

True

Difference:

511.97

511.97

Note that:

1+1/((135.0222^3 + 138.0222^3 - (172.0222^3-1)))

Input interpretation:

$$1+\frac{1}{135.0222^3+138.0222^3-(172.0222^3-1)}$$

Result:

1.001953238144901568545685386929765221940474875974872027560...

1.001953238... result very near to the following Rogers-Ramanujan continued fraction:

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

135.0222^3 + 138.0222^3 - (172.0222^3-1) - 13 - golden ratio

Input interpretation:

$$135.0222^3 + 138.0222^3 - (172.0222^3 - 1) - 13 - \phi$$

ϕ is the golden ratio

Result:

497.352...

497.352… result practically equal to the rest mass of Kaon meson 497.614

Alternative representations:

$$135.022^3 + 138.022^3 - (172.022^3 - 1) - 13 - \phi = -12 + 135.022^3 + 138.022^3 - 172.022^3 - 2\sin(54°)$$

$$135.022^3 + 138.022^3 - (172.022^3 - 1) - 13 - \phi = -12 + 2\cos(216°) + 135.022^3 + 138.022^3 - 172.022^3$$

$$135.022^3 + 138.022^3 - (172.022^3 - 1) - 13 - \phi = -12 + 135.022^3 + 138.022^3 - 172.022^3 + 2\sin(666°)$$

Conclusion

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

Note that:

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

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

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

Thence:

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

And

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

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

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

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