Further Ramanujan's equations applied to various sectors of Particle Physics and Cosmology: some possible new mathematical connections. IV

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

Abstract

In this research thesis, we have analyzed further Ramanujan formulas and described new possible mathematical connections with some sectors of Particle Physics and Cosmology

[1] M.Nardelli have studied by 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

https://www.freepressjournal.in/health/ramanujan-formula-explains-black-holes

https://www.mobipicker.com/first-picture-black-hole-finally-snapped-sagittarius-captured-glory/

From:

Manuscript Book Of Srinivasa Ramanujan Volume 1

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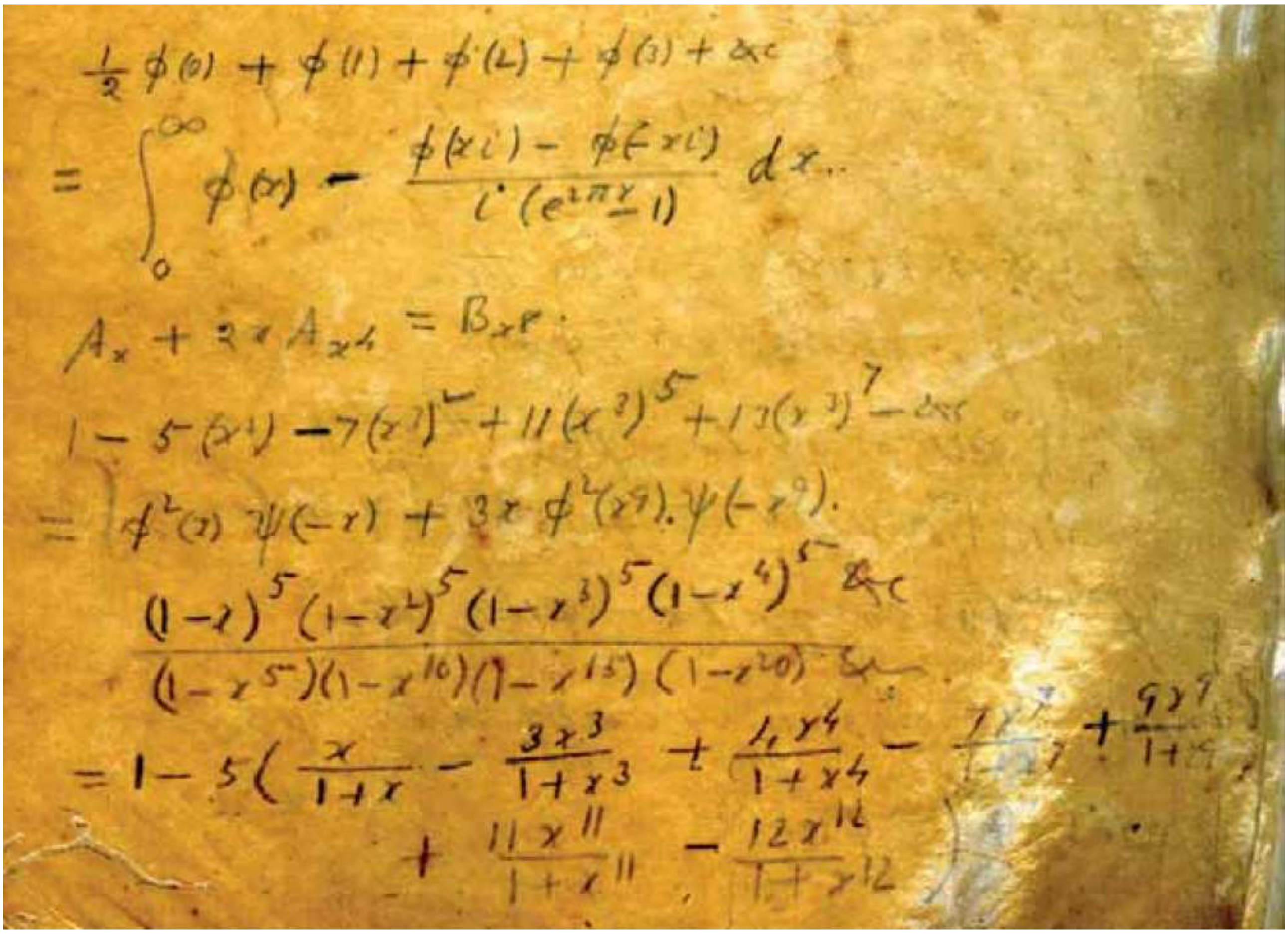

For x = 2, we obtain:

1-5(2/(1+2)-(3*2^3)/(1+2^3)+(4*2^4)/(1+2^4)-(7*2^7)/(1+2^7)+(9*2^9)/(1+2^9)+(11*2^11)/(1+2^11)-(12*2^12)/(1+2^12)

Input:

$$1-5\left(\frac{2}{1+2}-\frac{3\times 2^3}{1+2^3}+\frac{4\times 2^4}{1+2^4}-\frac{7\times 2^7}{1+2^7}+\frac{9\times 2^9}{1+2^9}+\frac{11\times 2^{11}}{1+2^{11}}-\frac{12\times 2^{12}}{1+2^{12}}\right)$$

Exact result:

$$-\frac{5242700117}{403441953}$$

Decimal approximation:

$-12.99493044294280421550507415871050971240960654381920464 28\ldots$

-12.9949304429428…..

7+11*((((1-5(2/(1+2)-(3*2^3)/(1+2^3)+(4*2^4)/(1+2^4)-(7*2^7)/(1+2^7)+(9*2^9)/(1+2^9)+(11*2^11)/(1+2^11)-(12*2^12)/(1+2^12))))))^2

Where 7 and 11 are Lucas numbers

Input:

$$7+11\left(1-5\left(\frac{2}{1+2}-\frac{3\times 2^3}{1+2^3}+\frac{4\times 2^4}{1+2^4}-\frac{7\times 2^7}{1+2^7}+\frac{9\times 2^9}{1+2^9}+\frac{11\times 2^{11}}{1+2^{11}}-\frac{12\times 2^{12}}{1+2^{12}}\right)\right)^2$$

Exact result:

$$\frac{303484307550793130042}{162765409440454209}$$

Decimal approximation:

1864.5503893861383234338596426673998482804644919296581133 80...

1864.550389…. result practically equal to the rest mass of D meson 1864.84

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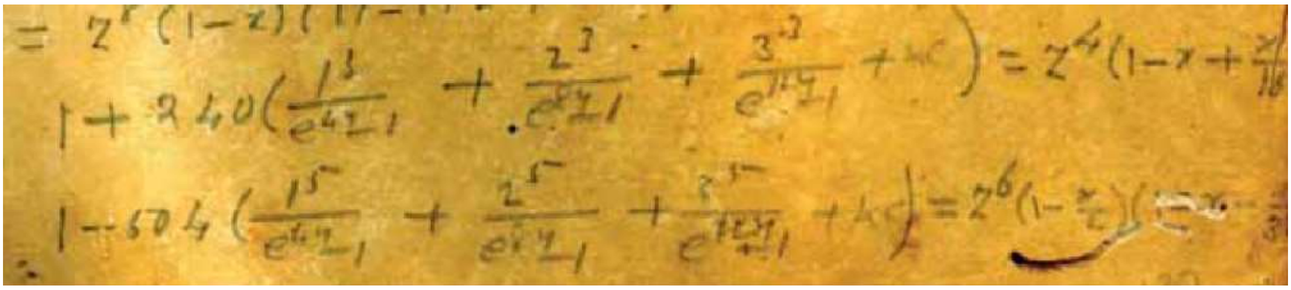

For x = 2, we obtain:

1+240((1/(e^44-1)+2^3/(e^84-1)+3^3/(e^124-1)))

Input:

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)$$

Decimal approximation:

1.0000000000000000186747173787211122738595849432290346765 37...

1.0000000000000000186747173787211122738595849432290346765 37…

Alternate forms:

$$1+\frac{240}{e^{44}-1}+\frac{1920}{e^{84}-1}+\frac{6480}{e^{124}-1}$$

Alternative representation:

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)=$$
$$1+240\left(\frac{1}{\exp^{44}(z)-1}+\frac{2^3}{\exp^{84}(z)-1}+\frac{3^3}{\exp^{124}(z)-1}\right) \text{ for } z=1$$

Series representations:

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)=$$
$$1+\frac{240}{-1+\sum_{k=0}^{\infty}\frac{44^k}{k!}}+\frac{1920}{-1+\sum_{k=0}^{\infty}\frac{84^k}{k!}}+\frac{6480}{-1+\sum_{k=0}^{\infty}\frac{124^k}{k!}}$$

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)=$$
$$1+\frac{240}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{44}}+\frac{1920}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{84}}+\frac{6480}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{124}}$$

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)=$$
$$1+\frac{6480}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{124}}}+\frac{1920}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{84}}}+\frac{240}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{44}}}$$

1-504((1/(e^44-1)+2^5/(e^84-1)+3^5/(e^124-1)))

Input:

$$1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)$$

Decimal approximation:

0.99999999999999999607830935046856602263193934894346668817O2...

0.9999999999999999960783093504685660226319393489434666881702…

Alternate forms:

$$1-\frac{504}{e^{44}-1}-\frac{16\,128}{e^{84}-1}-\frac{122\,472}{e^{124}-1}$$

Alternative representation:

$$1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)=1-504\left(\frac{1}{\exp^{44}(z)-1}+\frac{2^5}{\exp^{84}(z)-1}+\frac{3^5}{\exp^{124}(z)-1}\right)\text{ for }z=1$$

Series representations:

$$1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)=1-\frac{504}{-1+\sum_{k=0}^{\infty}\frac{44^k}{k!}}-\frac{16128}{-1+\sum_{k=0}^{\infty}\frac{84^k}{k!}}-\frac{122472}{-1+\sum_{k=0}^{\infty}\frac{124^k}{k!}}$$

$$1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)=1-\frac{504}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{44}}-\frac{16128}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{84}}-\frac{122472}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{124}}$$

$$1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)=1-\frac{122472}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{124}}}-\frac{16128}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{84}}}-\frac{504}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{44}}}$$

Now, we have:

1+240((1/(e^44-1)+2^3/(e^84-1)+3^3/(e^124-1))) - ((((1-504((1/(e^44-1)+2^5/(e^84-1)+3^5/(e^124-1)))))))

Input:

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)$$

Exact result:

$$240\left(\frac{1}{e^{44}-1}+\frac{8}{e^{84}-1}+\frac{27}{e^{124}-1}\right)+504\left(\frac{1}{e^{44}-1}+\frac{32}{e^{84}-1}+\frac{243}{e^{124}-1}\right)$$

Decimal approximation:

$5.789162387403545204754019145379436779483541741002736 2\ldots\times10^{-17}$

$5.7891623874\ldots*10^{-17}$

Property:

$$240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{32}{-1+e^{84}}+\frac{243}{-1+e^{124}}\right)$$

is a transcendental number

Alternate forms:

$$\frac{744}{e^{44}-1}+\frac{18\,048}{e^{84}-1}+\frac{128\,952}{e^{124}-1}$$

$$24\left(\frac{31}{e^{44}-1}+\frac{752}{e^{84}-1}+\frac{5373}{e^{124}-1}\right)$$

Alternative representation:

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)= 1+240\left(\frac{1}{\exp^{44}(z)-1}+\frac{2^3}{\exp^{84}(z)-1}+\frac{3^3}{\exp^{124}(z)-1}\right)- \left(1-504\left(\frac{1}{\exp^{44}(z)-1}+\frac{2^5}{\exp^{84}(z)-1}+\frac{3^5}{\exp^{124}(z)-1}\right)\right) \text{ for } z=1$$

Series representations:

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)= \frac{744}{-1+\sum_{k=0}^{\infty}\frac{44^k}{k!}}+\frac{18\,048}{-1+\sum_{k=0}^{\infty}\frac{84^k}{k!}}+\frac{128\,952}{-1+\sum_{k=0}^{\infty}\frac{124^k}{k!}}$$

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)= \frac{744}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{44}}+\frac{18\,048}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{84}}+\frac{128\,952}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{124}}$$

$$1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)= \frac{128\,952}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{124}}}+\frac{18\,048}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{84}}}+\frac{744}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{44}}}$$

[1+240((1/(e^44-1)+2^3/(e^84-1)+3^3/(e^124-1)))-((((1-504((1/(e^44-1)+2^5/(e^84-1)+3^5/(e^124-1)))))))]^1/4096

Input:

$$\sqrt[4096]{1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)}$$

Decimal approximation:

0.990913613323507297570412713702190684262962706545067827156...

0.9909136133235….. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Property:

$$\sqrt[4096]{240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{32}{-1+e^{84}}+\frac{243}{-1+e^{124}}\right)}$$

is a transcendental number

Alternate forms:

$$2^{3/4096}\sqrt[4096]{3\left(\frac{31}{e^{44}-1}+\frac{752}{e^{84}-1}+\frac{5373}{e^{124}-1}\right)}$$

$$2^{3/4096} \left(\left(3 \left(6156 + 12312 e^4 + 18468 e^8 + 24624 e^{12} + 30780 e^{16} + 36936 e^{20} + 43092 e^{24} + 49248 e^{28} + 55404 e^{32} + 61560 e^{36} + 67716 e^{40} + 67747 e^{44} + 67778 e^{48} + 67809 e^{52} + 67840 e^{56} + 67871 e^{60} + 67902 e^{64} + 67933 e^{68} + 67964 e^{72} + 67995 e^{76} + 68026 e^{80} + 62653 e^{84} + 57280 e^{88} + 51907 e^{92} + 46534 e^{96} + 41161 e^{100} + 35788 e^{104} + 30415 e^{108} + 25042 e^{112} + 19669 e^{116} + 14296 e^{120} + 8140 e^{124} + 7357 e^{128} + 6574 e^{132} + 5791 e^{136} + 5008 e^{140} + 4225 e^{144} + 3442 e^{148} + 2659 e^{152} + 1876 e^{156} + 1093 e^{160} + 310 e^{164} + 279 e^{168} + 248 e^{172} + 217 e^{176} + 186 e^{180} + 155 e^{184} + 124 e^{188} + 93 e^{192} + 62 e^{196} + 31 e^{200}\right)\right) / \left(-1 - 2 e^4 - 3 e^8 - 4 e^{12} - 5 e^{16} - 6 e^{20} - 7 e^{24} - 8 e^{28} - 9 e^{32} - 10 e^{36} - 11 e^{40} - 11 e^{44} - 11 e^{48} - 11 e^{52} - 11 e^{56} - 11 e^{60} - 11 e^{64} - 11 e^{68} - 11 e^{72} - 11 e^{76} - 11 e^{80} - 10 e^{84} - 9 e^{88} - 8 e^{92} - 7 e^{96} - 6 e^{100} - 5 e^{104} - 4 e^{108} - 3 e^{112} - 2 e^{116} - e^{120} + e^{124} + 2 e^{128} + 3 e^{132} + 4 e^{136} + 5 e^{140} + 6 e^{144} + 7 e^{148} + 8 e^{152} + 9 e^{156} + 10 e^{160} + 11 e^{164} + 11 e^{168} + 11 e^{172} + 11 e^{176} + 11 e^{180} + 11 e^{184} + 11 e^{188} + 11 e^{192} + 11 e^{196} + 11 e^{200} + 11 e^{204} + 10 e^{208} + 9 e^{212} + 8 e^{216} + 7 e^{220} + 6 e^{224} + 5 e^{228} + 4 e^{232} + 3 e^{236} + 2 e^{240} + e^{244}\right)\right) \hat{} (1/4096)$$

All 4096th roots of 240 (1/(e^44 - 1) + 8/(e^84 - 1) + 27/(e^124 - 1)) + 504 (1/(e^44 - 1) + 32/(e^84 - 1) + 243/(e^124 - 1)):

$$\sqrt[4096]{240 \left(\frac{1}{e^{44}-1} + \frac{8}{e^{84}-1} + \frac{27}{e^{124}-1}\right) + 504 \left(\frac{1}{e^{44}-1} + \frac{32}{e^{84}-1} + \frac{243}{e^{124}-1}\right)}\; e^0$$

≈ 0.990914 (real, principal root)

$$\sqrt[4096]{240 \left(\frac{1}{e^{44}-1} + \frac{8}{e^{84}-1} + \frac{27}{e^{124}-1}\right) + 504 \left(\frac{1}{e^{44}-1} + \frac{32}{e^{84}-1} + \frac{243}{e^{124}-1}\right)}\; e^{(i \pi)/2048}$$

$\approx 0.990912 + 0.0015200 i$

$$\sqrt[4096]{240 \left(\frac{1}{e^{44}-1} + \frac{8}{e^{84}-1} + \frac{27}{e^{124}-1}\right) + 504 \left(\frac{1}{e^{44}-1} + \frac{32}{e^{84}-1} + \frac{243}{e^{124}-1}\right)}\; e^{(i \pi)/1024}$$

$\approx 0.990909 + 0.0030401 i$

$$\sqrt[4096]{240 \left(\frac{1}{e^{44}-1} + \frac{8}{e^{84}-1} + \frac{27}{e^{124}-1}\right) + 504 \left(\frac{1}{e^{44}-1} + \frac{32}{e^{84}-1} + \frac{243}{e^{124}-1}\right)}\; e^{(3 i \pi)/2048}$$

$\approx 0.990903 + 0.0045601 i$

$$\sqrt[4096]{240 \left(\frac{1}{e^{44}-1} + \frac{8}{e^{84}-1} + \frac{27}{e^{124}-1}\right) + 504 \left(\frac{1}{e^{44}-1} + \frac{32}{e^{84}-1} + \frac{243}{e^{124}-1}\right)}\; e^{(i \pi)/512}$$

$\approx 0.990895 + 0.006080 i$

Alternative representation:

$$\sqrt[4096]{1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)} = \left(1+240\left(\frac{1}{\exp^{44}(z)-1}+\frac{2^3}{\exp^{84}(z)-1}+\frac{3^3}{\exp^{124}(z)-1}\right)-\left(1-504\left(\frac{1}{\exp^{44}(z)-1}+\frac{2^5}{\exp^{84}(z)-1}+\frac{3^5}{\exp^{124}(z)-1}\right)\right)\right)\hat{}\,(1/4096) \text{ for } z=1$$

Series representations:

$$\sqrt[4096]{1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)} = \left(240\left(\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{44}}+\frac{8}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{84}}+\frac{27}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{124}}\right)+504\left(\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{44}}+\frac{32}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{84}}+\frac{243}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{124}}\right)\right)\hat{}\,(1/4096)$$

$$\sqrt[4096]{1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)} = \left(240\left(\frac{27}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{124}}}+\frac{8}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{84}}}+\frac{1}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{44}}}\right)+504\left(\frac{243}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{124}}}+\frac{32}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{84}}}+\frac{1}{-1+\frac{1}{\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)^{44}}}\right)\right)\hat{}\,(1/4096)$$

$$\sqrt[4096]{1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)} = \left(240\left(\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{44}}+\frac{8}{-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{84}}+\frac{27}{-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{124}}\right)+504\left(\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{44}}+\frac{32}{-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{84}}+\frac{243}{-1+\left(\sum_{k=0}^{\infty}\frac{(-1+k)^2}{k!}\right)^{124}}\right)\right)\hat{}\,(1/4096)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\, ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

And:

2sqrt((((log base 0.9909136133 [1+240((1/(e^44-1)+2^3/(e^84-1)+3^3/(e^124-1)))-((((1-504((1/(e^44-1)+2^5/(e^84-1)+3^5/(e^124-1)))))))]))))-Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.9909136133}\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)}-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.47644...

125.47644…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$2\sqrt{\log_{0.990914}\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)}-\pi+\frac{1}{\phi} = -\pi+\frac{1}{\phi}+2\sqrt{\frac{\log\left(240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{2^5}{-1+e^{84}}+\frac{3^5}{-1+e^{124}}\right)\right)}{\log(0.990914)}}$$

Series representations:

$$2\sqrt{\log_{0.990914}\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{744}{-1+e^{44}}+\frac{18048}{-1+e^{84}}+\frac{128952}{-1+e^{124}}\right)^k}{k}}{\log(0.990914)}}$$

$$2\sqrt{\log_{0.990914}\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{-1+\log_{0.990914}\left(24\left(\frac{31}{-1+e^{44}}+\frac{752}{-1+e^{84}}+\frac{5373}{-1+e^{124}}\right)\right)}\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\log_{0.990914}\left(24\left(\frac{31}{-1+e^{44}}+\frac{752}{-1+e^{84}}+\frac{5373}{-1+e^{124}}\right)\right)\right)^{-k}$$

$$2\sqrt{\log_{0.990914}\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{-1+\log_{0.990914}\left(24\left(\frac{31}{-1+e^{44}}+\frac{752}{-1+e^{84}}+\frac{5373}{-1+e^{124}}\right)\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-1+\log_{0.990914}\left(24\left(\frac{31}{-1+e^{44}}+\frac{752}{-1+e^{84}}+\frac{5373}{-1+e^{124}}\right)\right)\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

In conclusion:

(8/((sqrt(729)*64^6)))*1/[1+240((1/(e^44-1)+2^3/(e^84-1)+3^3/(e^124-1)))-((((1-504((1/(e^44-1)+2^5/(e^84-1)+3^5/(e^124-1)))))))]-987

where 987 is the mass of the scalar meson $f_0(980)$

Mass ~ 987 OLLER 99C RVUE ππ → ππ, K K, ηη

990 ±20 OUR ESTIMATE (http://pdg.lbl.gov/2019/listings/rpp2019-list-f0-980.pdf)

Input:

$$\frac{8}{\sqrt{729}\times 64^6}\times\frac{1}{1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)}-987$$

Exact result:

$$\frac{1}{231928233984\left(240\left(\frac{1}{e^{44}-1}+\frac{8}{e^{84}-1}+\frac{27}{e^{124}-1}\right)+504\left(\frac{1}{e^{44}-1}+\frac{32}{e^{84}-1}+\frac{243}{e^{124}-1}\right)\right)}-987$$

Decimal approximation:

73491.452972133163279451046167316264513905899282254925262 20...

73491.45297213…

Property:

$$-987+\frac{1}{231928233984\left(240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{32}{-1+e^{84}}+\frac{243}{-1+e^{124}}\right)\right)}$$

is a transcendental number

Alternate forms:

$$\frac{1}{5566277615616\left(\frac{31}{e^{44}-1}+\frac{752}{e^{84}-1}+\frac{5373}{e^{124}-1}\right)}-987$$

and also:

golden ratio+1/10^13*1/[1+240((1/(e^44-1)+2^3/(e^84-1)+3^3/(e^124-1)))-((((1-504((1/(e^44-1)+2^5/(e^84-1)+3^5/(e^124-1)))))))]

Input:

$$\phi+\frac{1}{10^{13}}\times\frac{1}{1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)}$$

ϕ is the golden ratio

Decimal approximation:

1728.9836407574739473164644882910569390687206522290815593 97...

1728.9836407….

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

Property:

$$\frac{1}{10\,000\,000\,000\,000\left(240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{32}{-1+e^{84}}+\frac{243}{-1+e^{124}}\right)\right)}+$$

ϕ is a transcendental number

Alternate forms:

$$\phi+\frac{1}{240\,000\,000\,000\,000\left(\frac{31}{e^{44}-1}+\frac{752}{e^{84}-1}+\frac{5373}{e^{124}-1}\right)}$$

Alternative representations:

$$\phi+\frac{1}{\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)10^{13}}=$$
$$-2\cos(216\,°)+\frac{1}{10^{13}\left(240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{2^5}{-1+e^{84}}+\frac{3^5}{-1+e^{124}}\right)\right)}$$

$$\phi+\frac{1}{\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)10^{13}}=$$
$$2\cos\left(\frac{\pi}{5}\right)+\frac{1}{10^{13}\left(240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{2^5}{-1+e^{84}}+\frac{3^5}{-1+e^{124}}\right)\right)}$$

$$\phi+\frac{1}{\left(1+240\left(\frac{1}{e^{44}-1}+\frac{2^3}{e^{84}-1}+\frac{3^3}{e^{124}-1}\right)-\left(1-504\left(\frac{1}{e^{44}-1}+\frac{2^5}{e^{84}-1}+\frac{3^5}{e^{124}-1}\right)\right)\right)10^{13}}=$$
$$\frac{1}{10^{13}\left(240\left(\frac{1}{-1+e^{44}}+\frac{8}{-1+e^{84}}+\frac{27}{-1+e^{124}}\right)+504\left(\frac{1}{-1+e^{44}}+\frac{2^5}{-1+e^{84}}+\frac{3^5}{-1+e^{124}}\right)\right)}+$$
root of $-1-x+x^2$ near $x=1.61803$

We have also the following mathematical connections:

$$\left(\frac{1}{231928233984\left(240\left(\frac{1}{e^{44}-1}+\frac{8}{e^{84}-1}+\frac{27}{e^{124}-1}\right)+504\left(\frac{1}{e^{44}-1}+\frac{32}{e^{84}-1}+\frac{243}{e^{124}-1}\right)\right)}-987\right) = 73491.4529.. \Rightarrow$$

$$\Rightarrow -3927+2\left(\sqrt[13]{\frac{N\exp\left[\int d\hat{\sigma}\left(-\frac{1}{4u^2}\mathbf{P}_i D\mathbf{P}_i\right)\right]|Bp\rangle_{\mathrm{NS}}}{\int [d\mathbf{X}^\mu]\exp\left\{\int d\hat{\sigma}\left(-\frac{1}{4v^2}D\mathbf{X}^\mu D^2\mathbf{X}^\mu\right)\right\}|\mathbf{X}^\mu,\mathbf{X}^i=0\rangle_{\mathrm{NS}}}+}\right) =$$

$$-3927+2\sqrt[13]{2.2983717437\times 10^{59}+2.0823329825883\times 10^{59}}$$

$$= 73490.8437525.... \Rightarrow$$

$$\Rightarrow \left(A(r)\times\frac{1}{B(r)}\left(-\frac{1}{\phi(r)}\right)\times\frac{1}{e^{\Lambda(r)}}\right) \Rightarrow$$

$$\Rightarrow \left(-0.000029211892\times\frac{1}{0.0003644621}\left(-\frac{1}{0.0005946833}\right)\times\frac{1}{0.00183393}\right) =$$

$$= 73491.788325481187105491595720422205480251957265634133987 00...$$

$$= 73491.7883254... \Rightarrow$$

$$\left(\begin{array}{c} I_{21} \ll \int\limits_{-\infty}^{+\infty}\exp\left(-\left(\frac{t}{H}\right)^2\right)\left|\sum_{\lambda\leq P^{1-\varepsilon_2}}\frac{a(\lambda)}{\sqrt{\lambda}}B(\lambda)\lambda^{-i(T+t)}\right|^2 dt \ll \\ \ll H\left\{\left(\frac{4}{\varepsilon_2\log T}\right)^{2r}(\log T)(\log X)^{-2\beta} + \left(\varepsilon_2^{-2r}(\log T)^{-2r}+\varepsilon_2^{-r}h_1^r(\log T)^{-r}\right)T^{-\varepsilon_1}\right\}\end{array}\right)/$$

$$/(26\times 4)^2-24 = \left(\frac{7.9313976505275\times 10^{8}}{(26\times 4)^2-24}\right) = 73493.30662\ldots$$

Mathematical connections with the boundary state corresponding to the NSNS-sector of N Dp-branes in the limit of u → ∞, with the ratio concerning the general asymptotically flat solution of the equations of motion of the p-brane and with the Karatsuba's equation concerning the zeros of a special type of function connected with Dirichlet series.

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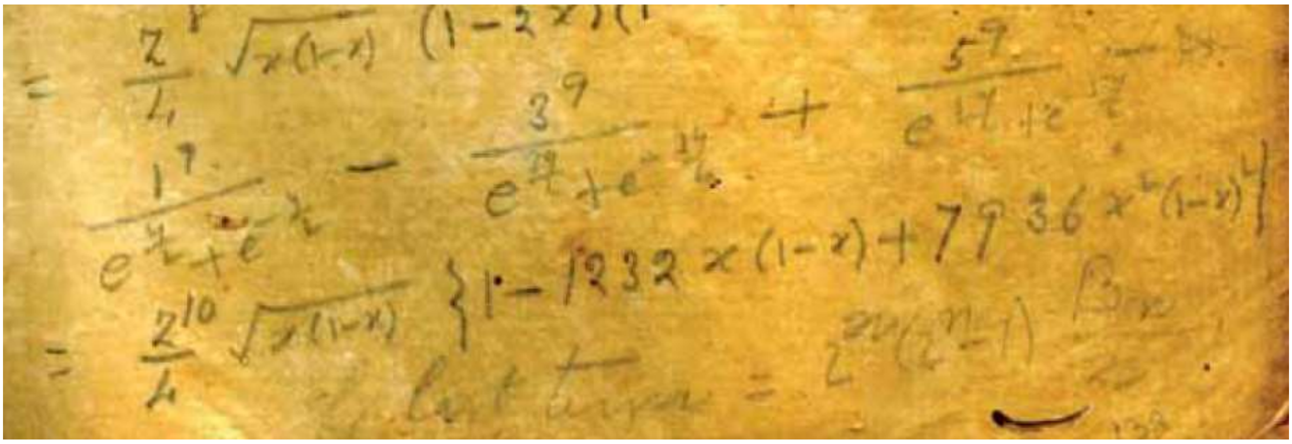

For x = 2 and z = 1, we obtain:

1/4*sqrt(2(1-2)) ((((1-1232*2(1-2)+7936*2^2(1-2)^2)))

Input:

$$\frac{1}{4}\sqrt{2(1-2)}\,\left(1-1232\times 2(1-2)+7936\times 2^2(1-2)^2\right)$$

Result:

$$\frac{34209\,i}{2\sqrt{2}}$$

Decimal approximation:

12094.70793880530213111424239162239039244747629619250415882... i

Polar coordinates:

$r \approx 12094.7$ (radius), $\theta = 90°$ (angle)

12094.7

From which:

2Pi(((1/4*sqrt(2(1-2)) ((((1-1232*2(1-2)+7936*2^2(1-2)^2)))))))-2517.9i +18i

Where 2517.9 is the rest mass of charmed Sigma baryon and 18 is a Lucas number

Input interpretation:

$$2\pi\left(\frac{1}{4}\sqrt{2(1-2)}\left(1-1232\times 2(1-2)+7936\times 2^2(1-2)^2\right)\right)+i\times(-2517.9)+18\,i$$

i is the imaginary unit

Result:

73493.4... i

Polar coordinates:

$r = 73493.4$ (radius), $\theta = 90°$ (angle)

73493.4

We have the following mathematical connections:

$$\left(2\pi\left(\frac{1}{4}\sqrt{2(1-2)}\left(1-1232\times 2(1-2)+7936\times 2^2(1-2)^2\right)\right)+i\times(-2517.9)+18\,i\right) = 73493.4 \Rightarrow$$

$$\Rightarrow -3927+2\left(\sqrt[13]{\begin{array}{c} N\exp\left[\int d\hat{\sigma}\left(-\frac{1}{4u^2}\mathbf{P}_i D\mathbf{P}_i\right)\right]|Bp\rangle_{\mathrm{NS}} + \\ \int[d\mathbf{X}^\mu]\exp\left\{\int d\hat{\sigma}\left(-\frac{1}{4v^2}D\mathbf{X}^\mu D^2\mathbf{X}^\mu\right)\right\}|\mathbf{X}^\mu,\mathbf{X}^i=0\rangle_{\mathrm{NS}}\end{array}}\right) =$$

$$-3927+2\sqrt[13]{2.2983717437\times 10^{59}+2.0823329825883\times 10^{59}}$$

$$= 73490.8437525.... \Rightarrow$$

$$\Rightarrow\left(A(r)\times\frac{1}{B(r)}\left(-\frac{1}{\phi(r)}\right)\times\frac{1}{e^{\Lambda(r)}}\right)\Rightarrow$$

$$\Rightarrow\left(-0.000029211892\times\frac{1}{0.0003644621}\left(-\frac{1}{0.0005946833}\right)\times\frac{1}{0.00183393}\right) =$$

$$= 73491.788325481187105491595720422205480251957265634133987 00...$$

$$= 73491.7883254... \Rightarrow$$

$$\left(\begin{array}{c} I_{21} \ll \int_{-\infty}^{+\infty} \exp\left(-\left(\frac{t}{H}\right)^2\right) \left| \sum_{\lambda \leq P^{1-\varepsilon_2}} \frac{a(\lambda)}{\sqrt{\lambda}} B(\lambda) \lambda^{-i(T+t)} \right|^2 dt \ll \\ \ll H \left\{ \left(\frac{4}{\varepsilon_2 \log T} \right)^{2r} (\log T)(\log X)^{-2\beta} + (\varepsilon_2^{-2r} (\log T)^{-2r} + \varepsilon_2^{-r} h_1^r (\log T)^{-r}) T^{-\varepsilon_1} \right\} \end{array} \right) /$$

$$/(26 \times 4)^2 - 24 = \left(\frac{7.9313976505275 \times 10^8}{(26 \times 4)^2 - 24} \right) = 73493.30662\ldots$$

Mathematical connections with the boundary state corresponding to the NSNS-sector of N Dp-branes in the limit of u → ∞, with the ratio concerning the general asymptotically flat solution of the equations of motion of the p-brane and with the Karatsuba's equation concerning the zeros of a special type of function connected with Dirichlet series.

Series representations:

$$\frac{1}{4}(2\pi)\left(\sqrt{2(1-2)}\left(1 - 1232 \times 2(1-2) + 7936 \times 2^2 (1-2)^2\right)\right) - i\,2517.9 + 18\,i = -2499.9\,i + 17104.5\,\pi\sqrt{-3}\sum_{k=0}^{\infty}(-3)^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{1}{4}(2\pi)\left(\sqrt{2(1-2)}\left(1 - 1232 \times 2(1-2) + 7936 \times 2^2 (1-2)^2\right)\right) - i\,2517.9 + 18\,i = -2499.9\,i + 17104.5\,\pi\sqrt{-3}\sum_{k=0}^{\infty}\frac{3^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{1}{4}(2\pi)\left(\sqrt{2(1-2)}\left(1 - 1232 \times 2(1-2) + 7936 \times 2^2 (1-2)^2\right)\right) - i\,2517.9 + 18\,i = -2499.9\,i + \frac{8552.25\,\pi\sum_{j=0}^{\infty}\mathrm{Res}_{s=-\frac{1}{2}+j}(-3)^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

And we have also:

(golden ratio)i+1/7(((1/4*sqrt(2(1-2)) ((((1-1232*2(1-2)+7936*2^2(1-2)^2)))))))

Where 7 is a Lucas number

Input:

$$\phi i+\frac{1}{7}\left(\frac{1}{4}\sqrt{2(1-2)}\left(1-1232\times 2(1-2)+7936\times 2^2(1-2)^2\right)\right)$$

ϕ is the golden ratio

i is the imaginary unit

Result:

$$i\phi+\frac{4887 i}{2\sqrt{2}}$$

Decimal approximation:

1729.433453818078770721667785637564265610216922921592071265... i

1729.4334538…i

Polar coordinates:

$r \approx 1729.43$ (radius), $\theta = 90°$ (angle)

1729.43

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

Alternate forms:

$$\frac{1}{4} i\left(2+2\sqrt{5}+4887\sqrt{2}\right)$$

$$\frac{1}{4} i\left(4\phi+4887\sqrt{2}\right)$$

$$\frac{i(2\sqrt{2}\phi+4887)}{2\sqrt{2}}$$

Minimal polynomial:

$$4096 x^8+48911935488 x^6+219028548929138048 x^4+435916988159174541467808 x^2+325340282449154359113161898961$$

Series representations:

$$\phi i + \frac{\sqrt{2(1-2)}\left(1-1232\times 2(1-2)+7936\times 2^2(1-2)^2\right)}{4\times 7} = \phi i + \frac{4887}{4}\sqrt{-3}\sum_{k=0}^{\infty}(-3)^{-k}\binom{\frac{1}{2}}{k}$$

$$\phi i + \frac{\sqrt{2(1-2)}\left(1-1232\times 2(1-2)+7936\times 2^2(1-2)^2\right)}{4\times 7} = \phi i + \frac{4887}{4}\sqrt{-3}\sum_{k=0}^{\infty}\frac{3^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$\phi i + \frac{\sqrt{2(1-2)}\left(1-1232\times 2(1-2)+7936\times 2^2(1-2)^2\right)}{4\times 7} = \phi i + \frac{4887\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}+j}(-3)^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{8\sqrt{\pi}}$$

We have also:

(golden ratio)i+1/7(((1/4*sqrt(2(1-2)) ((((1-x*2(1-2)+7936*2^2(1-2)^2))))))) = 1729.433453818i

Input interpretation:

$$\phi i + \frac{1}{7}\left(\frac{1}{4}\sqrt{2(1-2)}\left(1-x\times 2(1-2)+7936\times 2^2(1-2)^2\right)\right) = 1729.433453818\, i$$

ϕ is the golden ratio

i is the imaginary unit

Result:

$$\frac{i(2x+31745)}{14\sqrt{2}} + i\phi = 1729.433453818\, i$$

Alternate forms:

$$\frac{i x}{7\sqrt{2}} = 0.\times 10^{-27} + 124.450793489\, i$$

$$\frac{i x}{7\sqrt{2}} - \left(0.\times 10^{-26} + 124.450793489\, i\right) = 0$$

$$\frac{1}{28}\, i\left(\sqrt{2}\,(2x+31745) + 28\phi\right) = 1729.433453818\, i$$

Expanded form:

$$\frac{i x}{7\sqrt{2}} + \frac{i\sqrt{5}}{2} + \frac{4535\, i}{2\sqrt{2}} + \frac{i}{2} = 1729.433453818\, i$$

Alternate form assuming x is real:

$$i\left(\frac{x}{7\sqrt{2}}+\frac{\sqrt{5}}{2}+\frac{4535}{2\sqrt{2}}+\frac{1}{2}\right)=1729.433453818\,i$$

Solution:

$x \approx 1232.0000000$

1232

Or:

ix / ((7sqrt(2))) = 0.×10^-26 + 124.450793489 i

Input interpretation:

$$\frac{i\,x}{7\sqrt{2}}=0\times10^{-26}+124.450793489\,i$$

i is the imaginary unit

Result:

$$\frac{i\,x}{7\sqrt{2}}=124.451\,i$$

Alternate form:

$$\frac{i\,x}{7\sqrt{2}}-124.451\,i=0$$

Real solution:

$x \approx 1232.$

1232 result equal to the rest mass of Delta baryon 1232

From which:

i1232 / ((7sqrt(2))) = 0.×10^-26 + x i

Input interpretation:

$$i\times\frac{1232}{7\sqrt{2}}=0\times10^{-26}+x\,i$$

i is the imaginary unit

Result:

$88 i \sqrt{2} = 0 + i x$

Alternate forms:

$i x = 124.451 i$

$124.451 i - i x = 0$

$88 i \sqrt{2} = i x$

Real solution:

$x \approx 124.451$

124.451

124.451 + 1/golden ratio

Input interpretation:

$124.451 + \frac{1}{\phi}$

ϕ is the golden ratio

Result:

125.069...

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

Alternative representations:

$$124.451 + \frac{1}{\phi} = 124.451 + \frac{1}{2 \sin(54 °)}$$

$$124.451 + \frac{1}{\phi} = 124.451 + -\frac{1}{2 \cos(216 °)}$$

$$124.451 + \frac{1}{\phi} = 124.451 + -\frac{1}{2 \sin(666 °)}$$

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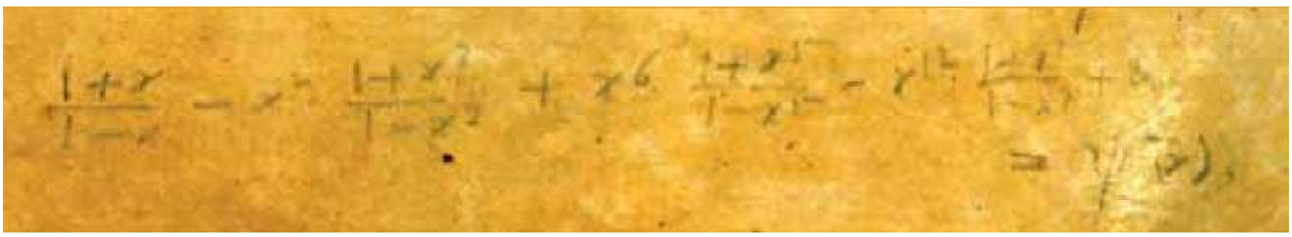


For x = 2, we obtain:

(1+2)/(1-2) – 2^2 (1+2^3)/(1-2^2) + 2^6(1+2^5)/(1-2^5) – 2^12(1+2^7)/(1-2^7)

Input:

$$\frac{1+2}{1-2} - 2^2 \times \frac{1+2^3}{1-2^2} + 2^6 \times \frac{1+2^5}{1-2^5} - 2^{12} \times \frac{1+2^7}{1-2^7}$$

Exact result:

$$\frac{16147113}{3937}$$

Decimal approximation:

4101.374904749809499618999237998475996951993903987807975615...

4101.3749047....

From which:

1/3 ((((1+2)/(1-2) – 2^2 (1+2^3)/(1-2^2) + 2^6(1+2^5)/(1-2^5) – 2^12(1+2^7)/(1-2^7)))) + 18

Where 18 is a Lucas number:

Input:

$$\frac{1}{3}\left(\frac{1+2}{1-2} - 2^2 \times \frac{1+2^3}{1-2^2} + 2^6 \times \frac{1+2^5}{1-2^5} - 2^{12} \times \frac{1+2^7}{1-2^7}\right) + 18$$

Exact result:

$$\frac{5453237}{3937}$$

Decimal approximation:

1385.124968249936499872999745999491998983997967995935991871...

1385.124968249... result very near to the rest mass of Sigma baryon 1383.7

We have also:

1/((((1+2)/(1-2) – 2^2 (1+2^3)/(1-2^2) + 2^6(1+2^5)/(1-2^5) – 2^12(1+2^7)/(1-2^7))))^1/4096

Input:

$$\frac{1}{\sqrt[4096]{\frac{1+2}{1-2}-2^2\times\frac{1+2^3}{1-2^2}+2^6\times\frac{1+2^5}{1-2^5}-2^{12}\times\frac{1+2^7}{1-2^7}}}$$

Result:

$$\sqrt[4096]{\frac{3937}{16\,147\,113}}$$

Decimal approximation:

0.997971036345387497972446818795673207004582954744978818283...

0.997971036345…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate form:

$$\frac{\sqrt[4096]{3937}\ 16\,147\,113^{4095/4096}}{16\,147\,113}$$

2 log base 0.997971036345 ((((1/(((((1+2)/(1-2) – 2^2 (1+2^3)/(1-2^2) + 2^6(1+2^5)/(1-2^5) – 2^12(1+2^7)/(1-2^7))))))))^1/2 - Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.997971036345}\left(\frac{1}{\frac{1+2}{1-2}-2^2\times\frac{1+2^3}{1-2^2}+2^6\times\frac{1+2^5}{1-2^5}-2^{12}\times\frac{1+2^7}{1-2^7}}\right)}-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4764413...

125.4764413…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$2\sqrt{\log_{0.9979710363450000}\left(\frac{1}{\frac{1+2}{1-2}-\frac{2^2(1+2^3)}{1-2^2}+\frac{2^6(1+2^5)}{1-2^5}-\frac{2^{12}(1+2^7)}{1-2^7}}\right)}-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+2\sqrt{\frac{\log\left(\frac{1}{-3-\frac{36}{3}+\frac{(1+2^5)2^6}{1-2^5}-\frac{(1+2^7)2^{12}}{1-2^7}}\right)}{\log(0.9979710363450000)}}$$

Series representations:

$$2\sqrt{\log_{0.9979710363450000}\left(\frac{1}{\frac{1+2}{1-2}-\frac{2^2(1+2^3)}{1-2^2}+\frac{2^6(1+2^5)}{1-2^5}-\frac{2^{12}(1+2^7)}{1-2^7}}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{16143176}{16147113}\right)^k}{k}}{\log(0.9979710363450000)}}$$

$$2\sqrt{\log_{0.9979710363450000}\left(\frac{1}{\frac{1+2}{1-2}-\frac{2^2(1+2^3)}{1-2^2}+\frac{2^6(1+2^5)}{1-2^5}-\frac{2^{12}(1+2^7)}{1-2^7}}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{\left(-1.0000000000000\log\left(\frac{3937}{16147113}\right)\left(492.3624510033+\sum_{k=0}^{\infty}(-0.0020289636550000)^k\,G(k)\right)\right)}$$

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

$$2\sqrt{\log_{0.9979710363450000}\left(\frac{1}{\frac{1+2}{1-2}-\frac{2^2(1+2^3)}{1-2^2}+\frac{2^6(1+2^5)}{1-2^5}-\frac{2^{12}(1+2^7)}{1-2^7}}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{\left(-1.0000000000000\log\left(\frac{3937}{16147113}\right)\left(492.3624510033+\sum_{k=0}^{\infty}(-0.0020289636550000)^k G(k)\right)\right)}$$

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

1/4 log base 0.997971036345 ((((1/((((1+2)/(1-2) – 2^2 (1+2^3)/(1-2^2) + 2^6(1+2^5)/(1-2^5) – 2^12(1+2^7)/(1-2^7)))))))^1/2 + 1/golden ratio

Input interpretation:

$$\frac{1}{4}\sqrt{\log_{0.997971036345}\left(\frac{1}{\frac{1+2}{1-2}-2^2\times\frac{1+2^3}{1-2^2}+2^6\times\frac{1+2^5}{1-2^5}-2^{12}\times\frac{1+2^7}{1-2^7}}\right)}+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.61803399...

16.61803399…. result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{4}\sqrt{\log_{0.9979710363450000}\left(\frac{1}{\frac{1+2}{1-2}-\frac{2^2(1+2^3)}{1-2^2}+\frac{2^6(1+2^5)}{1-2^5}-\frac{2^{12}(1+2^7)}{1-2^7}}\right)}+\frac{1}{\phi}=$$

$$\frac{1}{\phi}+\frac{1}{4}\sqrt{\frac{\log\left(\frac{1}{-3-\frac{36}{3}+\frac{(1+2^5)2^6}{1-2^5}-\frac{(1+2^7)2^{12}}{1-2^7}}\right)}{\log(0.9979710363450000)}}$$

Series representations:

$$\frac{1}{4}\sqrt{\log_{0.9979710363450000}\left(\frac{1}{\frac{1+2}{1-2}-\frac{2^2(1+2^3)}{1-2^2}+\frac{2^6(1+2^5)}{1-2^5}-\frac{2^{12}(1+2^7)}{1-2^7}}\right)}+\frac{1}{\phi}=\frac{1}{\phi}+\frac{1}{4}\sqrt{-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{16143176}{16147113}\right)^k}{k}}{\log(0.9979710363450000)}}$$

$$\frac{1}{4}\sqrt{\log_{0.9979710363450000}\left(\frac{1}{\frac{1+2}{1-2}-\frac{2^2(1+2^3)}{1-2^2}+\frac{2^6(1+2^5)}{1-2^5}-\frac{2^{12}(1+2^7)}{1-2^7}}\right)}+\frac{1}{\phi}=\frac{1}{\phi}+\frac{1}{4}\sqrt{\left(-1.0000000000000\log\left(\frac{3937}{16147113}\right)\left(492.3624510033+\sum_{k=0}^{\infty}(-0.0020289636550000)^k\,G(k)\right)\right)}$$

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

For x = 0.5, we obtain:

(1+0.5)/(1-0.5) – 0.5^2 (1+0.5^3)/(1-0.5^2) + 0.5^6(1+0.5^5)/(1-0.5^5) – 0.5^12(1+0.5^7)/(1-0.5^7)

Input:

$$\frac{1+0.5}{1-0.5}-0.5^2\times\frac{1+0.5^3}{1-0.5^2}+0.5^6\times\frac{1+0.5^5}{1-0.5^5}-0.5^{12}\times\frac{1+0.5^7}{1-0.5^7}$$

Result:

2.641385079156877063754127508255016510033020066040132080264...

2.641385079…. result very near to the value of golden ratio square and to the M of black hole for $\ell = 4$ and $\omega = 0.75793$ (see Tables in Appendix)

And:

7*((((1+0.5)/(1-0.5) – 0.5^2 (1+0.5^3)/(1-0.5^2) + 0.5^6(1+0.5^5)/(1-0.5^5) – 0.5^12(1+0.5^7)/(1-0.5^7)))) - golden ratio

Input:

$$7\left(\frac{1+0.5}{1-0.5}-0.5^2\times\frac{1+0.5^3}{1-0.5^2}+0.5^6\times\frac{1+0.5^5}{1-0.5^5}-0.5^{12}\times\frac{1+0.5^7}{1-0.5^7}\right)-\phi$$

ϕ is the golden ratio

Result:

16.8717...

16.8717…. result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representations:

$$7\left(\frac{1+0.5}{1-0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{0.5^6(1+0.5^5)}{1-0.5^5}-\frac{0.5^{12}(1+0.5^7)}{1-0.5^7}\right)-\phi = 7\left(\frac{1.5}{0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{(1+0.5^5)\,0.5^6}{1-0.5^5}-\frac{(1+0.5^7)\,0.5^{12}}{1-0.5^7}\right)-2\sin(54\,°)$$

$$7\left(\frac{1+0.5}{1-0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{0.5^6(1+0.5^5)}{1-0.5^5}-\frac{0.5^{12}(1+0.5^7)}{1-0.5^7}\right)-\phi = 2\cos(216\,°)+7\left(\frac{1.5}{0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{(1+0.5^5)\,0.5^6}{1-0.5^5}-\frac{(1+0.5^7)\,0.5^{12}}{1-0.5^7}\right)$$

$$7\left(\frac{1+0.5}{1-0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{0.5^6(1+0.5^5)}{1-0.5^5}-\frac{0.5^{12}(1+0.5^7)}{1-0.5^7}\right)-\phi = 7\left(\frac{1.5}{0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{(1+0.5^5)\,0.5^6}{1-0.5^5}-\frac{(1+0.5^7)\,0.5^{12}}{1-0.5^7}\right)+2\sin(666\,°)$$

We have also that:

((((((1+0.5)/(1-0.5) – 0.5^2 (1+0.5^3)/(1-0.5^2) + 0.5^6(1+0.5^5)/(1-0.5^5) – 0.5^12(1+0.5^7)/(1-0.5^7))))))^1/2 - 7/10^3

Where 7 is a Lucas number

Input:

$$\sqrt{\frac{1+0.5}{1-0.5}-0.5^2\times\frac{1+0.5^3}{1-0.5^2}+0.5^6\times\frac{1+0.5^5}{1-0.5^5}-0.5^{12}\times\frac{1+0.5^7}{1-0.5^7}}-\frac{7}{10^3}$$

Result:

1.61823385368287140653346154191695526028306293890573246996 9...

1.61823385368287..... result that is a very good approximation to the value of the golden ratio 1,618033988749...

And:

1/((((((1+0.5)/(1-0.5) – 0.5^2 (1+0.5^3)/(1-0.5^2) + 0.5^6(1+0.5^5)/(1-0.5^5) – 0.5^12(1+0.5^7)/(1-0.5^7))))))^1/256

Input:

$$\frac{1}{\sqrt[256]{\frac{1+0.5}{1-0.5} - 0.5^2 \times \frac{1+0.5^3}{1-0.5^2} + 0.5^6 \times \frac{1+0.5^5}{1-0.5^5} - 0.5^{12} \times \frac{1+0.5^7}{1-0.5^7}}}$$

Result:

0.99621303...

0.99621303.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

1/2*log base 0.99621303 ((((1/((((((1+0.5)/(1-0.5) – 0.5^2 (1+0.5^3)/(1-0.5^2) + 0.5^6(1+0.5^5)/(1-0.5^5) – 0.5^12(1+0.5^7)/(1-0.5^7)))))))))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2} \log_{0.99621303}\left(\frac{1}{\frac{1+0.5}{1-0.5} - 0.5^2 \times \frac{1+0.5^3}{1-0.5^2} + 0.5^6 \times \frac{1+0.5^5}{1-0.5^5} - 0.5^{12} \times \frac{1+0.5^7}{1-0.5^7}}\right) - \pi + \frac{1}{\phi}$$

$\log_b(x)$ 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

Alternative representation:

$$\frac{1}{2}\log_{0.996213}\left(\frac{1}{\frac{1+0.5}{1-0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{0.5^6(1+0.5^5)}{1-0.5^5}-\frac{0.5^{12}(1+0.5^7)}{1-0.5^7}}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{1}{\frac{1.5}{0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{(1+0.5^5)0.5^6}{1-0.5^5}-\frac{(1+0.5^7)0.5^{12}}{1-0.5^7}}\right)}{2\log(0.996213)}$$

Series representations:

$$\frac{1}{2}\log_{0.996213}\left(\frac{1}{\frac{1+0.5}{1-0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{0.5^6(1+0.5^5)}{1-0.5^5}-\frac{0.5^{12}(1+0.5^7)}{1-0.5^7}}\right)-\pi+\frac{1}{\phi}=$$

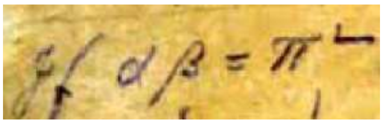
$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.621411)^k}{k}}{2\log(0.996213)}$$

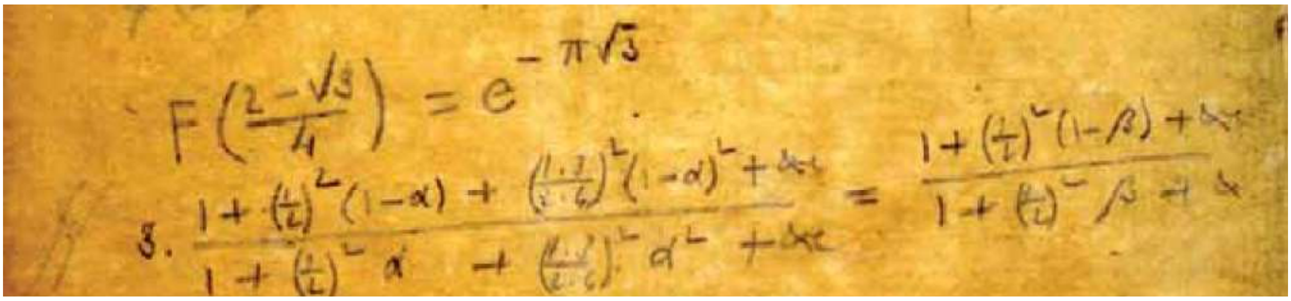
$$\frac{1}{2}\log_{0.996213}\left(\frac{1}{\frac{1+0.5}{1-0.5}-\frac{0.5^2(1+0.5^3)}{1-0.5^2}+\frac{0.5^6(1+0.5^5)}{1-0.5^5}-\frac{0.5^{12}(1+0.5^7)}{1-0.5^7}}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-131.782\log(0.378589)-\frac{1}{2}\log(0.378589)\sum_{k=0}^{\infty}(-0.00378697)^k G(k)$$

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

For $\alpha\beta = \pi^2$; $\alpha = \pi$; $\beta = \pi$, from page 269, we obtain:





We have:

(A)

e^(-Pi*sqrt(3)) sqrt(golden ratio) * (144-3^2)   (((((1+1/4(1-Pi)))+((1*3)/(2*4))^2((1-Pi)^2))))/(((((1+1/4(Pi)))+((1*3)/(2*4))^2(Pi)^2)))

Input:

$$e^{-\pi\sqrt{3}}\left(\sqrt{\phi}\,(144-3^2)\right)\times\frac{\left(1+\frac{1}{4}(1-\pi)\right)+\left(\frac{1\times3}{2\times4}\right)^2(1-\pi)^2}{\left(1+\frac{1}{4}\pi\right)+\left(\frac{1\times3}{2\times4}\right)^2\pi^2}$$

ϕ is the golden ratio

Exact result:

$$\frac{135\,e^{-\sqrt{3}\,\pi}\left(1+\frac{1-\pi}{4}+\frac{9}{64}(1-\pi)^2\right)\sqrt{\phi}}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}$$

Decimal approximation:

0.2601952041899515751863543664277209699568951836961251617 09...

0.260195204189….

Alternate forms:

$$\frac{135\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\,e^{-\sqrt{3}\,\pi}\,(89+\pi(9\pi-34))}{64+\pi(16+9\pi)}$$

$$\frac{135\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\ e^{-\sqrt{3}\,\pi}\left(89-34\,\pi+9\,\pi^2\right)}{64+16\,\pi+9\,\pi^2}$$

$$\frac{12015\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\ e^{-\sqrt{3}\,\pi}}{64+16\,\pi+9\,\pi^2}-\frac{2295\sqrt{2\left(1+\sqrt{5}\right)}\ e^{-\sqrt{3}\,\pi}\,\pi}{64+16\,\pi+9\,\pi^2}+\frac{1215\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\ e^{-\sqrt{3}\,\pi}\,\pi^2}{64+16\,\pi+9\,\pi^2}$$

Series representations:

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\left(144-3^2\right)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}=$$
$$\frac{1}{64+16\,\pi+9\,\pi^2}\,135\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\left(89-34\,\pi+9\,\pi^2\right)$$
$$\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\quad\text{for not }\left(\left(z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0\right)\right)$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\left(144-3^2\right)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}=\frac{1}{64+16\,\pi+9\,\pi^2}\,135$$
$$\exp\left(-\pi\exp\left(i\,\pi\left\lfloor\frac{\arg(3-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\left(89-34\,\pi+9\,\pi^2\right)$$
$$\exp\left(i\,\pi\left\lfloor\frac{\arg(\phi-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\left(144-3^2\right)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}=\frac{1}{64+16\,\pi+9\,\pi^2}\,135$$
$$\exp\left(-\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(3-z_0)/(2\,\pi)\rfloor}z_0^{1/2+1/2\lfloor\arg(3-z_0)/(2\,\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)$$
$$\left(89-34\,\pi+9\,\pi^2\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\,\pi)\rfloor}$$
$$z_0^{1/2+1/2\lfloor\arg(\phi-z_0)/(2\,\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}$$

Applying the formula for the calculation of a(n) regarding the coefficients of the "5th order" mock theta function $\psi_1(q)$, that for n = 105, provises a(n) = 171

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

that is:

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

We obtain:

e^(-Pi*sqrt(3)) sqrt(golden ratio) * exp(Pi*sqrt(105/15)) / (2*5^(1/4)*sqrt(105)) (((((1+1/4(1-Pi)))+((1*3)/(2*4))^2((1-Pi)^2))))/(((((1+1/4(Pi)))+((1*3)/(2*4))^2(Pi)^2)))

Input:

$$e^{-\pi \sqrt{3}} \left(\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{105}{15}}\right)}{2 \sqrt[4]{5} \sqrt{105}}\right) \times \frac{\left(1 + \frac{1}{4}(1-\pi)\right) + \left(\frac{1\times 3}{2\times 4}\right)^2 (1-\pi)^2}{\left(1 + \frac{1}{4}\pi\right) + \left(\frac{1\times 3}{2\times 4}\right)^2 \pi^2}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{7}\pi - \sqrt{3}\pi} \left(1 + \frac{1-\pi}{4} + \frac{9}{64}(1-\pi)^2\right) \sqrt{\frac{\phi}{21}}}{2 \times 5^{3/4} \left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right)}$$

Decimal approximation:

0.2560937029211075963104640213814172707154544353672924676 52...

0.25609370292….

Alternate forms:

$$\frac{\sqrt{\frac{1}{42}\left(1+\sqrt{5}\right)}\, e^{\left(\sqrt{7}-\sqrt{3}\right)\pi} (89 + \pi(9\pi - 34))}{2 \times 5^{3/4} (64 + \pi(16 + 9\pi))}$$

$$\frac{\sqrt{\frac{1}{42}\left(1+\sqrt{5}\right)}\, e^{\left(\sqrt{7}-\sqrt{3}\right)\pi} (89 - 34\pi + 9\pi^2)}{2 \times 5^{3/4} (64 + 16\pi + 9\pi^2)}$$

$$\frac{89\sqrt{\frac{1}{42}\left(1+\sqrt{5}\right)}\ e^{\sqrt{7}\,\pi-\sqrt{3}\,\pi}}{128\times 5^{3/4}\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)} - \frac{17\sqrt{\frac{1}{42}\left(1+\sqrt{5}\right)}\ e^{\sqrt{7}\,\pi-\sqrt{3}\,\pi}\,\pi}{64\times 5^{3/4}\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)} + \frac{3\sqrt{\frac{3}{14}\left(1+\sqrt{5}\right)}\ e^{\sqrt{7}\,\pi-\sqrt{3}\,\pi}\,\pi^2}{128\times 5^{3/4}\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)}$$

Alternative representations:

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{105}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\ \sqrt{105}\right)} = \frac{\exp\left(\pi\sqrt{\frac{105}{15}}\right)\left(1+\frac{2}{-1+\coth\left(-\frac{\pi\sqrt{3}}{2}\right)}\right)\left(1+\frac{1-\pi}{4}+(1-\pi)^2\left(\frac{3}{8}\right)^2\right)\sqrt{\phi}}{\left(1+\frac{\pi}{4}+\pi^2\left(\frac{3}{8}\right)^2\right)\left(2\sqrt[4]{5}\ \sqrt{105}\right)}$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{105}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\ \sqrt{105}\right)} = \frac{\left(z^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{105}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\ \sqrt{105}\right)} \quad \text{for } z = e$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{105}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\ \sqrt{105}\right)} = \frac{\left(w^{a}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{105}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\ \sqrt{105}\right)} \quad \text{for } a+\frac{\sqrt{3}\,\pi}{\log(w)} = 0$$

Series representations:

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105}\right)} =$$

$$\left((89-34\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(7-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(7-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(\phi-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}\left(-\pi\sqrt{3}\right)^{k_2}}{k_1!\,k_2!}\right)\Big/$$
$$\left(2\sqrt[4]{5}\,(64+16\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(105-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(105-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105}\right)} =$$

$$\left((89-34\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(7-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(7-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\left.\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_2}(\phi-x)^{k_2}x^{-k_2}I_{k_1}\left(-\pi\sqrt{3}\right)\left(-\frac{1}{2}\right)_{k_2}}{k_2!}\right)\Big/$$
$$\left(2\sqrt[4]{5}\,(64+16\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(105-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(105-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\exp\left(\pi\sqrt{\frac{105}{15}}\right)\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\sqrt{105}\right)} =$$

$$\left((89-34\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(7-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(7-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(\phi-x)^{k_2}x^{-k_2}I_{k_1}(\pi\sqrt{3})\left(-\frac{1}{2}\right)_{k_2}}{k_2!}\right) \Big/ \left(2\sqrt[4]{5}(64+16\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(105-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(105-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

Now, we have, for n = 105.4568:

(B)

e^(-Pi*sqrt(3)) sqrt(golden ratio) * exp(Pi*sqrt(105.4568/15)) / (2*5^(1/4)*sqrt(105.4568)) (((((1+1/4(1-Pi)))+((1*3)/(2*4))^2((1-Pi)^2))))/(((((1+1/4(Pi)))+((1*3)/(2*4))^2(Pi)^2)))

Input interpretation:

$$e^{-\pi\sqrt{3}}\left(\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{105.4568}{15}}\right)}{2\sqrt[4]{5}\sqrt{105.4568}}\right)\times\frac{\left(1+\frac{1}{4}(1-\pi)\right)+\left(\frac{1\times 3}{2\times 4}\right)^2(1-\pi)^2}{\left(1+\frac{1}{4}\pi\right)+\left(\frac{1\times 3}{2\times 4}\right)^2\pi^2}$$

ϕ is the golden ratio

Result:

0.26019557639442353661788489163802131197972275599036733990...

0.2601955763944…..

Alternative representations:

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)}=$$

$$\frac{\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)\left(1+\frac{2}{-1+\coth\left(-\frac{\pi\sqrt{3}}{2}\right)}\right)\left(1+\frac{1-\pi}{4}+(1-\pi)^2\left(\frac{3}{8}\right)^2\right)\sqrt{\phi}}{\left(1+\frac{\pi}{4}+\pi^2\left(\frac{3}{8}\right)^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)}$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)}=$$

$$\frac{\left(z^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)}\quad\text{for } z=e$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)}=$$

$$\frac{\left(w^{a}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)}\quad\text{for } a+\frac{\sqrt{3}\,\pi}{\log(w)}=0$$

Series representations:

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)} = \left((89-34\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(7.03045-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(7.03045-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1}(\phi-x)^{k_1}x^{-k_1}\left(-\frac{1}{2}\right)_{k_1}\left(-\pi\sqrt{3}\right)^{k_2}}{k_1!\,k_2!}\right)\Bigg/\left(2\sqrt[4]{5}\,(64+16\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(105.457-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(105.457-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\,\sqrt{105.457}\right)} = \left((89-34\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(7.03045-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(7.03045-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_2}(\phi-x)^{k_2}x^{-k_2}I_{k_1}\left(-\pi\sqrt{3}\right)\left(-\frac{1}{2}\right)_{k_2}}{k_2!}\right)\Bigg/\left(2\sqrt[4]{5}\,(64+16\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(105.457-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(105.457-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\left(e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\exp\left(\pi\sqrt{\frac{105.457}{15}}\right)\right)}{\left(\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2\right)\left(2\sqrt[4]{5}\sqrt{105.457}\right)} =$$

$$\left((89-34\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(7.03045-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(7.03045-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(\phi-x)^{k_2}x^{-k_2}I_{k_1}(\pi\sqrt{3})\left(-\frac{1}{2}\right)_{k_2}}{k_2!}\right) / \left(2\sqrt[4]{5}(64+16\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(105.457-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(105.457-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

We note that 0.25609370292…. is a value very near to the one just obtained 0.2601955763944….. and to that obtained previously 0.260195204189….

Now, we have:

((1+1/4(1-Pi)))/(1+1/4*Pi)

Input:

$$\frac{1+\frac{1}{4}(1-\pi)}{1+\frac{1}{4}\pi}$$

Decimal approximation:

0.260223095401004095798576907344144886451828252715199207151...

0.2602230954…. result very near to 0.2601952 and 0.26019557

Property:

$\frac{1+\frac{1-\pi}{4}}{1+\frac{\pi}{4}}$ is a transcendental number

Alternate forms:

$$\frac{5-\pi}{4+\pi}$$

$$\frac{9}{4+\pi}-1$$

$$-\frac{\pi-5}{4+\pi}$$

Alternative representations:

$$\frac{1+\frac{1-\pi}{4}}{1+\frac{\pi}{4}}=\frac{1+\frac{1}{4}(1-180\,°)}{1+\frac{180\,°}{4}}$$

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

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

Series representations:

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

$$\frac{1+\frac{1-\pi}{4}}{1+\frac{\pi}{4}}=\frac{5+\sum_{k=0}^{\infty}\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}}{4+\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}}$$

$$\frac{1+\frac{1-\pi}{4}}{1+\frac{\pi}{4}}=-\frac{-5+\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}{4+\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}$$

Integral representations:

$$\frac{1+\frac{1-\pi}{4}}{1+\frac{\pi}{4}}=-\frac{-5+2\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt}{2\left(2+\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt\right)}$$

$$\frac{1+\frac{1-\pi}{4}}{1+\frac{\pi}{4}} = -\frac{-5+2\int_0^\infty \frac{1}{1+t^2}\,dt}{2\left(2+\int_0^\infty \frac{1}{1+t^2}\,dt\right)}$$

$$\frac{1+\frac{1-\pi}{4}}{1+\frac{\pi}{4}} = -\frac{-5+4\int_0^1 \sqrt{1-t^2}\,dt}{4\left(1+\int_0^1 \sqrt{1-t^2}\,dt\right)}$$

Thence, we have:

$$\left(e^{-\pi\sqrt{3}} \left(\sqrt{\phi} \times \frac{\exp\left(\pi\sqrt{\frac{105.4568}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{105.4568}} \right) \times \frac{\left(1+\frac{1}{4}(1-\pi)\right)+\left(\frac{1\times 3}{2\times 4}\right)^2 (1-\pi)^2}{\left(1+\frac{1}{4}\pi\right)+\left(\frac{1\times 3}{2\times 4}\right)^2 \pi^2} \right) \cong \left(\frac{1+\frac{1}{4}(1-\pi)}{1+\frac{1}{4}\pi} \right) \Rightarrow$$

$\Rightarrow 0.2601955763944\ldots. \cong 0.2602230954\ldots.$

Now, from (**A**),we obtain:

[e^(-Pi*sqrt(3)) sqrt(golden ratio) * (144-3^2) * (((((1+1/4(1-Pi)))+((1*3)/(2*4))^2((1-Pi)^2)))))/(((((1+1/4(Pi))+((1*3)/(2*4))^2(Pi)^2)))]^1/256

Input:

$$\sqrt[256]{e^{-\pi\sqrt{3}}\sqrt{\phi}\,(144-3^2)\times\frac{\left(1+\frac{1}{4}(1-\pi)\right)+\left(\frac{1\times 3}{2\times 4}\right)^2 (1-\pi)^2}{\left(1+\frac{1}{4}\pi\right)+\left(\frac{1\times 3}{2\times 4}\right)^2 \pi^2}}$$

ϕ is the golden ratio

Exact result:

$$3^{3/256}\, e^{-\left(\sqrt{3}\,\pi\right)/256}\, \sqrt[256]{\frac{5\left(1+\frac{1-\pi}{4}+\frac{9}{64}(1-\pi)^2\right)}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}}\, \sqrt[512]{\phi}$$

Decimal approximation:

0.9947547299406620547549005146985820107139869621872767373O3...

0.9947547299406…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate forms:

$$3^{3/256}\, \sqrt[512]{\frac{1}{2}\left(1+\sqrt{5}\right)}\, e^{-\left(\sqrt{3}\,\pi\right)/256}\, \sqrt[256]{\frac{5\,(89+\pi\,(9\,\pi-34))}{64+\pi\,(16+9\,\pi)}}$$

$$3^{3/256}\, \sqrt[512]{\frac{1}{2}\left(1+\sqrt{5}\right)}\, e^{-\left(\sqrt{3}\,\pi\right)/256}\, \sqrt[256]{\frac{5\left(89-34\,\pi+9\,\pi^2\right)}{64+16\,\pi+9\,\pi^2}}$$

All 256th roots of (135 e^(-sqrt(3) π) (1 + (1 - π)/4 + 9/64 (1 - π)^2) sqrt(ϕ))/(1 + π/4 + (9 π^2)/64):

$$3^{3/256}\, e^{-\left(\sqrt{3}\,\pi\right)/256}\, \sqrt[256]{\frac{5\left(1+\frac{1-\pi}{4}+\frac{9}{64}(1-\pi)^2\right)}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}}\, e^{0}\, \sqrt[512]{\phi} \approx 0.99475 \quad \text{(real, principal root)}$$

$$3^{3/256}\, e^{-\left(\sqrt{3}\,\pi\right)/256}\, \sqrt[256]{\frac{5\left(1+\frac{1-\pi}{4}+\frac{9}{64}(1-\pi)^2\right)}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}}\, e^{(i\,\pi)/128}\, \sqrt[512]{\phi} \approx 0.99446+0.024413\, i$$

$$3^{3/256}\, e^{-\left(\sqrt{3}\,\pi\right)/256} \sqrt[256]{\frac{5\left(1+\frac{1-\pi}{4}+\frac{9}{64}\,(1-\pi)^2\right)}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}}\; e^{(i\pi)/64}\, \sqrt[512]{\phi} \approx 0.99356 + 0.04881\, i$$

$$3^{3/256}\, e^{-\left(\sqrt{3}\,\pi\right)/256} \sqrt[256]{\frac{5\left(1+\frac{1-\pi}{4}+\frac{9}{64}\,(1-\pi)^2\right)}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}}\; e^{(3 i\pi)/128}\, \sqrt[512]{\phi} \approx 0.99206 + 0.07318\, i$$

$$3^{3/256}\, e^{-\left(\sqrt{3}\,\pi\right)/256} \sqrt[256]{\frac{5\left(1+\frac{1-\pi}{4}+\frac{9}{64}\,(1-\pi)^2\right)}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}}\; e^{(i\pi)/32}\, \sqrt[512]{\phi} \approx 0.98996 + 0.09750\, i$$

Series representations:

$$\sqrt[256]{\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2 (1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2 \pi^2}} =$$

$$3^{3/256}\, \sqrt[256]{5}\, \left(\frac{1}{64+16\pi+9\pi^2}\, \exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k \left(-\frac{1}{2}\right)_k (3-z_0)^k z_0^{-k}}{k!}\right)\right.$$
$$\left.(89-34\pi+9\pi^2)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (\phi-z_0)^k z_0^{-k}}{k!}\right)\char`^(1/256)$$

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

$$\sqrt[256]{\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2 (1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2 \pi^2}} = 3^{3/256}\, \sqrt[256]{5}$$

$$\left(\frac{1}{64+16\pi+9\pi^2}\, \exp\left(-\pi \exp\left(i\pi\left\lfloor\frac{\arg(3-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (3-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$
$$\left.(89-34\pi+9\pi^2)\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\char`^$$

$(1/256)$ for $(x \in \mathbb{R}$ and $x < 0)$

$$\sqrt[256]{\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}} =$$

$$3^{3/256}\sqrt[256]{5}\left(\frac{1}{64+16\pi+9\pi^2}\exp\left(-\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(3-z_0)/(2\pi)\rfloor}\right.\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\left(89-34\pi+9\pi^2\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}$$
$$\left. z_0^{1/2+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\hat{}\,(1/256)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\text{Re}(a) \text{ and } |\arg(z)|<\pi)$$

1/2((((log base 0.99475472994 [e^(-Pi*sqrt(3)) sqrt(golden ratio) * (144-3^2) * (((((1+1/4(1-Pi)))+((1*3)/(2*4))^2((1-Pi)^2))))/(((((1+1/4(Pi)))+((1*3)/(2*4))^2(Pi)^2)))])))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.99475472994}\left(e^{-\pi\sqrt{3}}\sqrt{\phi}\,(144-3^2)\times\frac{\left(1+\frac{1}{4}(1-\pi)\right)+\left(\frac{1\times 3}{2\times 4}\right)^2(1-\pi)^2}{\left(1+\frac{1}{4}\pi\right)+\left(\frac{1\times 3}{2\times 4}\right)^2\pi^2}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.476441...

125.476441…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$\frac{1}{2}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{135\,e^{-\pi\sqrt{3}}\left(1+\frac{1-\pi}{4}+(1-\pi)^2\left(\frac{3}{8}\right)^2\right)\sqrt{\phi}}{1+\frac{\pi}{4}+\pi^2\left(\frac{3}{8}\right)^2}\right)}{2\log(0.994754729940000)}$$

Series representations:

$$\frac{1}{2}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{135\,e^{-\pi\sqrt{3}}\left(89-34\pi+9\pi^2\right)\sqrt{\phi}}{64+16\pi+9\pi^2}\right)^k}{k}}{2\log(0.994754729940000)}$$

$$\frac{1}{2}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{135\,e^{-\pi\sqrt{3}}\left(1+\frac{1-\pi}{4}+\frac{9}{64}(1-\pi)^2\right)\sqrt{\phi}}{1+\frac{\pi}{4}+\frac{9\pi^2}{64}}\right)^k}{k}}{2\log(0.994754729940000)}$$

$$\frac{1}{2}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1.000000000000}{\phi}-1.000000000000\,\pi+\log\left(\frac{135\,e^{-\pi\sqrt{3}}\left(89-34\pi+9\pi^2\right)\sqrt{\phi}}{64+16\pi+9\pi^2}\right)\left(-95.0739765123-0.5000000000000\sum_{k=0}^{\infty}(-0.005245270060000)^k\,G(k)\right)$$

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

And:

1/16((((log base 0.99475472994 [e^(-Pi*sqrt(3)) sqrt(golden ratio) * (144-3^2) * (((((1+1/4(1-Pi)))+((1*3)/(2*4))^2((1-Pi)^2))))/(((((1+1/4(Pi)))+((1*3)/(2*4))^2(Pi)^2)))])))))+1/golden ratio

Input interpretation:

$$\frac{1}{16}\log_{0.99475472994}\left(e^{-\pi\sqrt{3}}\sqrt{\phi}\,(144-3^2)\times\frac{\left(1+\frac{1}{4}(1-\pi)\right)+\left(\frac{1\times 3}{2\times 4}\right)^2(1-\pi)^2}{\left(1+\frac{1}{4}\pi\right)+\left(\frac{1\times 3}{2\times 4}\right)^2\pi^2}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.6180340...

16.6180340…. result very near to the mass of the hypothetical light particle, the boson $m_X = 16.84$ MeV

Alternative representation:

$$\frac{1}{16}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(\frac{135\,e^{-\pi\sqrt{3}}\left(1+\frac{1-\pi}{4}+(1-\pi)^2\left(\frac{3}{8}\right)^2\right)\sqrt{\phi}}{1+\frac{\pi}{4}+\pi^2\left(\frac{3}{8}\right)^2}\right)}{16\log(0.994754729940000)}$$

Series representations:

$$\frac{1}{16}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{135\,e^{-\pi\sqrt{3}}(89-34\pi+9\pi^2)\sqrt{\phi}}{64+16\pi+9\pi^2}\right)^k}{k}}{16\log(0.994754729940000)}$$

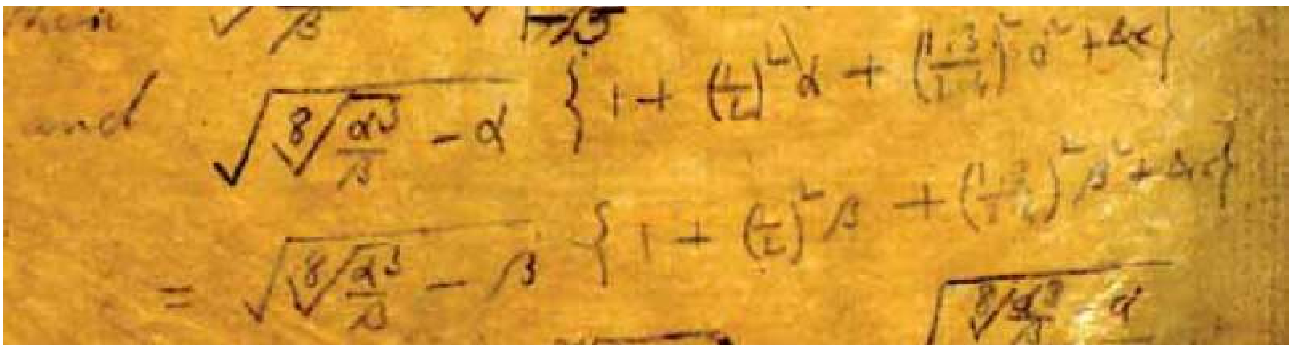
$$\frac{1}{16}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)+\frac{1}{\phi} = \frac{1.000000000000}{\phi}+\log\left(\frac{135\,e^{-\pi\sqrt{3}}\,(89-34\pi+9\pi^2)\sqrt{\phi}}{64+16\pi+9\pi^2}\right)\left(-11.88424706403-0.0625000000000\sum_{k=0}^{\infty}(-0.005245270060000)^k\,G(k)\right)$$

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

$$\frac{1}{16}\log_{0.994754729940000}\left(\frac{e^{-\pi\sqrt{3}}\left(\left(1+\frac{1-\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2(1-\pi)^2\right)\sqrt{\phi}\,(144-3^2)}{\left(1+\frac{\pi}{4}\right)+\left(\frac{3}{2\times 4}\right)^2\pi^2}\right)+\frac{1}{\phi} = \frac{1.000000000000}{\phi}+\log\left(\frac{135\,e^{-\pi\sqrt{3}}\,(89-34\pi+9\pi^2)\sqrt{\phi}}{64+16\pi+9\pi^2}\right)\left(-11.88424706403-0.0625000000000\sum_{k=0}^{\infty}(-0.005245270060000)^k\,G(k)\right)$$

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

Now, we have that:



sqrt((((Pi^3/Pi)^1/8 – Pi))) ((1+1/4*Pi+(3/8)^2*Pi^2))

Input:

$$\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}} - \pi \left(1 + \frac{1}{4}\pi + \left(\frac{3}{8}\right)^2 \pi^2\right)}$$

Exact result:

$$i \sqrt{\pi - \sqrt[4]{\pi} \left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right)}$$

Decimal approximation:

4.2695571220476940261350524846020246475206980453351089391 87... i

4.269557122…

Polar coordinates:

$r \approx 4.26956$ (radius), $\theta = 90°$ (angle)

Alternate forms:

$$i \sqrt{\pi - \sqrt[4]{\pi} \left(1 + \frac{1}{64}\pi(16 + 9\pi)\right)}$$

$$\frac{1}{64} i \sqrt{\pi^{3/4} - 1}\ \sqrt[8]{\pi}\ (64 + 16\pi + 9\pi^2)$$

$$i \sqrt{\pi^{3/4} - 1}\ \sqrt[8]{\pi} \left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right)$$

Series representations:

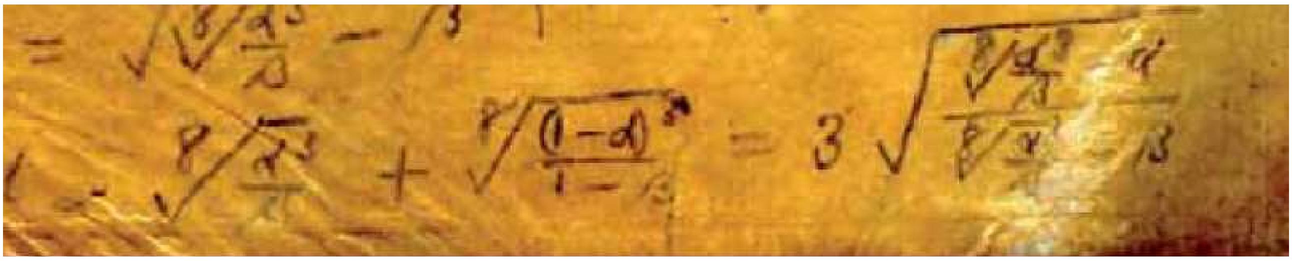
$$\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}} - \pi \left(1 + \frac{\pi}{4} + \left(\frac{3}{8}\right)^2 \pi^2\right)} = \left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right) \sqrt{-1 - \pi + \sqrt[8]{\pi^2}} \sum_{k=0}^{\infty} \left(-1 - \pi + \sqrt[8]{\pi^2}\right)^{-k} \binom{\frac{1}{2}}{k}$$

$$\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}} - \pi \left(1 + \frac{\pi}{4} + \left(\frac{3}{8}\right)^2 \pi^2\right)} = \left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right) \sqrt{-1 - \pi + \sqrt[8]{\pi^2}} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-1 - \pi + \sqrt[8]{\pi^2}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}$$

$$\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)=$$

$$\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^k z_0^{-k}}{k!}$$

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



3sqrt((((((Pi^3/Pi)^1/8 – Pi)))/(((Pi^3/Pi)^1/8 – Pi)))

Input:

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}$$

Exact result:

3

3

Multiplying the two results, we obtain:

3sqrt((((((Pi^3/Pi)^1/8 – Pi)))/(((Pi^3/Pi)^1/8 – Pi)))) * sqrt((((Pi^3/Pi)^1/8 – Pi))) ((1+1/4*Pi+(3/8)^2*Pi^2))

Input:

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{1}{4}\pi+\left(\frac{3}{8}\right)^2\pi^2\right)$$

Exact result:

$$3\,i\sqrt{\pi-\sqrt[4]{\pi}}\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)$$

Decimal approximation:

12.808671366143082078405157453806073942562094136005326817 56... i

12.808671366143…. result that is very near to the value of black hole entropy 12.5664

Polar coordinates:

$r \approx 12.8087$ (radius), $\theta = 90°$ (angle)

Alternate forms:

$$3\,i\sqrt{\pi-\sqrt[4]{\pi}}\left(1+\frac{1}{64}\pi(16+9\pi)\right)$$

$$\frac{3}{64}\,i\sqrt{\pi^{3/4}-1}\,\sqrt[8]{\pi}\,(64+16\pi+9\pi^2)$$

$$3\,i\sqrt{\pi^{3/4}-1}\,\sqrt[8]{\pi}\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)$$

Series representations:

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)=\frac{3}{64}\left(64+16\pi+9\pi^2\right)\sqrt{z_0}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}$$

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

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)=$$

$$\frac{3}{64}\left(64+16\pi+9\pi^2\right)\exp\left(i\pi\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}$$

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

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)=$$

$$\frac{3}{64}\left(64+16\pi+9\pi^2\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}$$

3sqrt((((((Pi^3/Pi)^1/8 – Pi)))/(((Pi^3/Pi)^1/8 – Pi)))) * sqrt((((Pi^3/Pi)^1/8 – Pi))) ((1+1/4*Pi+(3/8)^2*Pi^2)) + 4i

Where 4 is a Lucas number

Input:

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{1}{4}\pi+\left(\frac{3}{8}\right)^2\pi^2\right)+4i$$

i is the imaginary unit

Exact result:

$$4i+3i\sqrt{\pi-\sqrt[4]{\pi}}\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)$$

Decimal approximation:

16.80867136614308207840515745380607394256209413600532681756... *i*

Polar coordinates:

$r \approx 16.8087$ (radius), $\theta = 90°$ (angle)

16.8087 result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternate forms:

$$4i+3i\sqrt{\pi-\sqrt[4]{\pi}}\left(1+\frac{1}{64}\pi(16+9\pi)\right)$$

$$4i+3i\sqrt{\pi^{3/4}-1}\,\sqrt[8]{\pi}\left(1+\frac{\pi}{4}+\frac{9\pi^2}{64}\right)$$

$$i\left(4+3\sqrt{\pi-\sqrt[4]{\pi}}+\frac{3}{4}\pi\sqrt{\pi-\sqrt[4]{\pi}}+\frac{27}{64}\pi^2\sqrt{\pi-\sqrt[4]{\pi}}\right)$$

Expanded form:

$$4i+3i\sqrt{\pi-\sqrt[4]{\pi}}+\frac{3}{4}i\pi\sqrt{\pi-\sqrt[4]{\pi}}+\frac{27}{64}i\pi^2\sqrt{\pi-\sqrt[4]{\pi}}$$

Series representations:

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)+4i=\frac{1}{64}\left(256i+192\sqrt{z_0}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}+48\,\pi\sqrt{z_0}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}+27\,\pi^2\sqrt{z_0}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)$$

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

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)+4i=$$

$$\frac{1}{64}\left(256\,i+192\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2\right.$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}+$$

$$48\,\pi\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}+$$

$$27\,\pi^2\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2$$

$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\right)$$

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

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)+4i=$$

$$\frac{1}{64}\left(256i+192\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}\right.$$
$$z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}+$$
$$48\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$
$$z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}+$$
$$27\pi^2\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$
$$z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)$$

3sqrt((((((Pi^3/Pi)^1/8 – Pi)))/(((Pi^3/Pi)^1/8 – Pi)))) * sqrt((((Pi^3/Pi)^1/8 – Pi))) ((1+1/4*Pi+(3/8)^2*Pi^2)) - ((21+3)/10^2)i

Where 21 and 3 are Fibonacci numbers

Input:

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{1}{4}\pi+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{21+3}{10^2}i$$

i is the imaginary unit

Exact result:

$$-\frac{6 i}{25} + 3 i \sqrt{\pi - \sqrt[4]{\pi}} \left(1 + \frac{\pi}{4} + \frac{9 \pi^2}{64}\right)$$

Decimal approximation:

12.568671366143082078405157453806073942562094136005326817 56... i

Polar coordinates:

$r \approx 12.5687$ (radius), $\theta = 90°$ (angle)

12.5687 result practically equal to the black hole entropy 12.5664

Alternate forms:

$$-\frac{6 i}{25} + 3 i \sqrt{\pi^{3/4} - 1} \sqrt[8]{\pi} \left(1 + \frac{\pi}{4} + \frac{9 \pi^2}{64}\right)$$

$$\frac{3}{25} i \left(25 \sqrt{\pi^{3/4} - 1} \sqrt[8]{\pi} \left(1 + \frac{\pi}{4} + \frac{9 \pi^2}{64}\right) - 2\right)$$

$$i \left(-\frac{6}{25} + 3 \sqrt{\pi - \sqrt[4]{\pi}} + \frac{3}{4} \pi \sqrt{\pi - \sqrt[4]{\pi}} + \frac{27}{64} \pi^2 \sqrt{\pi - \sqrt[4]{\pi}}\right)$$

Expanded form:

$$-\frac{6 i}{25} + 3 i \sqrt{\pi - \sqrt[4]{\pi}} + \frac{3}{4} i \pi \sqrt{\pi - \sqrt[4]{\pi}} + \frac{27}{64} i \pi^2 \sqrt{\pi - \sqrt[4]{\pi}}$$

Series representations:

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{i\,(21+3)}{10^2}=$$

$$-\frac{1}{1600}\,3\left(128\,i-1600\sqrt{z_0}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}-\right.$$

$$400\,\pi\sqrt{z_0}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}-$$

$$\left.225\,\pi^2\sqrt{z_0}^2\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)$$

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

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{i(21+3)}{10^2}=$$

$$-\frac{1}{1600}3\left(128\,i-1600\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2\right.$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}-$$

$$400\,\pi\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}-$$

$$225\,\pi^2\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2$$

$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\right)$$

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

$$3\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{i(21+3)}{10^2}=$$

$$-\frac{1}{1600}3\left(128i-1600\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor} z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!k_2!}-\right.$$

$$400\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor} z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!k_2!}-$$

$$\left.225\pi^2\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor} z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!k_2!}\right)$$

13* 3sqrt((((((Pi^3/Pi)^1/8 – Pi)))/(((Pi^3/Pi)^1/8 – Pi)))) * sqrt((((Pi^3/Pi)^1/8 – Pi))) ((1+1/4*Pi+(3/8)^2*Pi^2)) - ((21+3)/10^2)i-(47-7)i-(1/golden ratio)i

Input:

$$13\times3\left(\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\right)\left(1+\frac{1}{4}\pi+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{21+3}{10^2}i-(47-7)i-\frac{1}{\phi}i$$

i is the imaginary unit

ϕ is the golden ratio

Exact result:

$$-\frac{i}{\phi} + -\frac{1006\, i}{25} + 39\, i \sqrt{\pi - \sqrt[4]{\pi}} \left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right)$$

Decimal approximation:

125.65469377111017217106246006511332313558691458826348576 61... i

Polar coordinates:

$r \approx 125.655$ (radius), $\theta = 90°$ (angle)

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

Alternate forms:

$$-\frac{i}{\phi} + -\frac{1006\, i}{25} + 39\, i \sqrt{\pi^{3/4} - 1}\, \sqrt[8]{\pi} \left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right)$$

$$-\frac{i\left(\left(1006 - 975\sqrt{\pi^{3/4} - 1}\, \sqrt[8]{\pi}\left(1 + \frac{\pi}{4} + \frac{9\pi^2}{64}\right)\right)\phi + 25\right)}{25\,\phi}$$

$$i\left(-\frac{1006}{25} - \frac{2}{1+\sqrt{5}} + 39\sqrt{\pi - \sqrt[4]{\pi}} + \frac{39}{4}\pi\sqrt{\pi - \sqrt[4]{\pi}} + \frac{351}{64}\pi^2\sqrt{\pi - \sqrt[4]{\pi}}\right)$$

Expanded form:

$$-\frac{1006\, i}{25} - \frac{2\, i}{1+\sqrt{5}} + 39\, i\sqrt{\pi - \sqrt[4]{\pi}} + \frac{39}{4}\, i\, \pi\sqrt{\pi - \sqrt[4]{\pi}} + \frac{351}{64}\, i\, \pi^2\sqrt{\pi - \sqrt[4]{\pi}}$$

Series representations:

$$13\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\;3\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{i\,(21+3)}{10^2}-i\,(47-7)-\frac{i}{\phi}=$$

$$-\frac{1}{1600\,\phi}\left(1600\,i+64\,384\,\phi\,i-62\,400\,\phi\,\sqrt{z_0}^{\,2}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}-\right.$$

$$15\,600\,\phi\,\pi\,\sqrt{z_0}^{\,2}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}-$$

$$\left.8775\,\phi\,\pi^2\,\sqrt{z_0}^{\,2}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)$$

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

$$13\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\;3\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{i(21+3)}{10^2}-i(47-7)-\frac{i}{\phi}=$$

$$-\frac{1}{1600\phi}\Bigg(1600\,i+64\,384\,\phi\,i-$$

$$62\,400\,\phi\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}-$$

$$15\,600\,\phi\,\pi\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}-$$

$$8775\,\phi\,\pi^2\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg(1-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\,\mathcal{A}\left\lfloor\frac{\arg\left(-\pi+\sqrt[8]{\pi^2}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}^2$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(1-x)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-x\right)^{k_2}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}}{k_1!\,k_2!}\Bigg)$$

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

$$13\sqrt{\frac{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}}\sqrt{\sqrt[8]{\frac{\pi^3}{\pi}}-\pi}\;3\left(1+\frac{\pi}{4}+\left(\frac{3}{8}\right)^2\pi^2\right)-\frac{i\,(21+3)}{10^2}-i\,(47-7)-\frac{i}{\phi}=$$

$$-\frac{1}{1600\,\phi}\left(1600\,i+64\,384\,\phi\,i-62\,400\,\phi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}\right.$$

$$z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}-$$

$$15\,600\,\phi\,\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$

$$z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$

$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}-$$

$$8775\,\phi\,\pi^2\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$

$$z_0^{1+1/2\lfloor\arg(1-z_0)/(2\pi)\rfloor+1/2\left\lfloor\arg\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)/(2\pi)\right\rfloor}$$

$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(1-z_0)^{k_1}\left(-\pi+\sqrt[8]{\pi^2}-z_0\right)^{k_2}z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)$$

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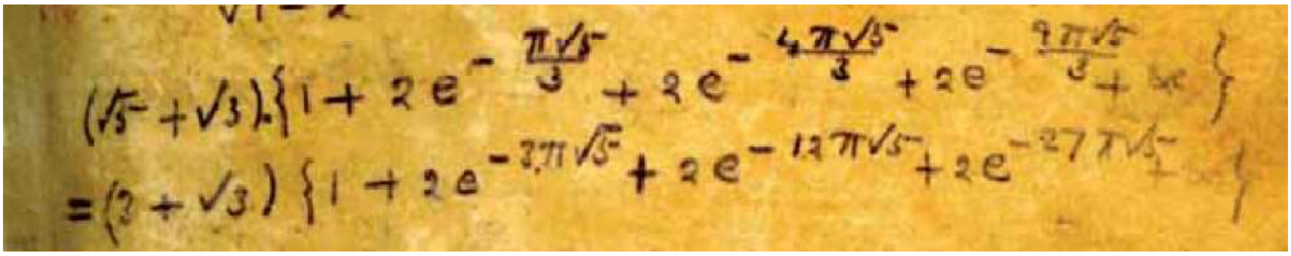

$$(\sqrt{5}+\sqrt{3})\left\{1+2e^{-\frac{\pi\sqrt{5}}{3}}+2e^{-\frac{4\pi\sqrt{5}}{3}}+2e^{-\frac{9\pi\sqrt{5}}{3}}+\&c\right\}$$
$$=(3+\sqrt{3})\left\{1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}+\&c\right\}$$

(3+sqrt(3)) (((1+2e^(-3Pi*sqrt(5))+2e^(-12Pi*sqrt(5))+2e^(-27Pi*sqrt(5)))

Input:

$$\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)$$

Decimal approximation:

4.732050814230262870207675512355022722225091098146403433958...

4.73205081423…

Alternate forms:

$$\left(3+\sqrt{3}\right)e^{-27\sqrt{5}\,\pi}\left(2+2e^{15\sqrt{5}\,\pi}+2e^{24\sqrt{5}\,\pi}+e^{27\sqrt{5}\,\pi}\right)$$

$$3+\sqrt{3}+6e^{-27\sqrt{5}\,\pi}+2\sqrt{3}\,e^{-27\sqrt{5}\,\pi}+6e^{-12\sqrt{5}\,\pi}+2\sqrt{3}\,e^{-12\sqrt{5}\,\pi}+6e^{-3\sqrt{5}\,\pi}+2\sqrt{3}\,e^{-3\sqrt{5}\,\pi}$$

$$e^{-27\sqrt{5}\,\pi}\left(2+2e^{15\sqrt{5}\,\pi}+2e^{24\sqrt{5}\,\pi}+e^{27\sqrt{5}\,\pi}\right)\sqrt{3}+3e^{-27\sqrt{5}\,\pi}\left(2+2e^{15\sqrt{5}\,\pi}+2e^{24\sqrt{5}\,\pi}+e^{27\sqrt{5}\,\pi}\right)$$

Series representations:

$$\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)=e^{-27\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\left(2+2e^{15\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+2e^{24\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+e^{27\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\right)\left(3+\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)=\exp\left(-27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(2+2\exp\left(15\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+2\exp\left(24\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+\exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\left(3+\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right) = \exp\left(-27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right) \left(2+2\exp\left(15\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)+ 2\exp\left(24\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)+ \exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)\right) \left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (3-z_0)^k z_0^{-k}}{k!}\right) \text{ for not } ((z_0\in\mathbb{R} \text{ and } -\infty < z_0 \le 0))$$

4* (3+sqrt(3)) (((1+2e^(-3Pi*sqrt(5))+2e^(-12Pi*sqrt(5))+2e^(-27Pi*sqrt(5)))))-Pi +1/golden ratio

Input:

$$4\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)-\pi+\frac{1}{\phi}$$

ϕ is the golden ratio

Decimal approximation:

16.404644592081153090572645500506226122423504173016270776 99...

16.404644592…. result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternate forms:

$$\frac{1}{\phi}+4\left(3+\sqrt{3}\right)\left(1+2e^{-27\sqrt{5}\pi}\left(1+e^{15\sqrt{5}\pi}+e^{24\sqrt{5}\pi}\right)\right)-\pi$$

$$\frac{1}{\phi}\left(8\left(3+\sqrt{3}\right)e^{-27\sqrt{5}\pi}\phi+8\left(3+\sqrt{3}\right)e^{-12\sqrt{5}\pi}\phi+8\left(3+\sqrt{3}\right)e^{-3\sqrt{5}\pi}\phi-\left(\pi-4\left(3+\sqrt{3}\right)\right)\phi+1\right)$$

$$12+4\sqrt{3}+\frac{2}{1+\sqrt{5}}+24e^{-27\sqrt{5}\pi}+8\sqrt{3}\,e^{-27\sqrt{5}\pi}+24e^{-12\sqrt{5}\pi}+8\sqrt{3}\,e^{-12\sqrt{5}\pi}+24e^{-3\sqrt{5}\pi}+8\sqrt{3}\,e^{-3\sqrt{5}\pi}-\pi$$

Series representations:

$$4\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{1}{\phi}e^{-27\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\left(-e^{27\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}-24\phi-24e^{15\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\phi-24e^{24\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\phi-12e^{27\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\phi+e^{27\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\phi\pi-8\phi\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-8e^{15\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\phi\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-8e^{24\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\phi\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}-4e^{27\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\phi\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$4\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)-\pi+\frac{1}{\phi}=$$
$$-\frac{1}{\phi}\exp\left(-27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(-\exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)-24\phi-24\exp\left(15\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\phi-24\exp\left(24\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\phi-12\exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\phi+\exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\phi\pi-8\phi\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-8\exp\left(15\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\phi\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-8\exp\left(24\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\phi\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-4\exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\phi\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$
\begin{aligned}
&4\left(3+\sqrt{3}\right)\left(1+2\,e^{-3\pi\sqrt{5}}+2\,e^{-12\pi\sqrt{5}}+2\,e^{-27\pi\sqrt{5}}\right)-\pi+\frac{1}{\phi}= \\
&-\frac{1}{\phi}\exp\left(-27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right) \\
&\left(-\exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)-24\,\phi-\right. \\
&\quad 24\exp\left(15\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\phi- \\
&\quad 24\exp\left(24\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\phi- \\
&\quad 12\exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\phi+ \\
&\quad \exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\phi\,\pi- \\
&\quad 8\,\phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}- \\
&\quad 8\exp\left(15\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right) \\
&\quad\quad \phi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}- \\
&\quad 8\exp\left(24\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\phi \\
&\quad\quad \sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}- \\
&\quad 4\exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\phi\sqrt{z_0} \\
&\quad\quad \left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right) \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))
\end{aligned}
$$

1/((((3+sqrt(3)) (((1+2e^(-3Pi*sqrt(5))+2e^(-12Pi*sqrt(5))+2e^(-27Pi*sqrt(5)))))))))^1/256

Input:

$$\frac{1}{\sqrt[256]{(3+\sqrt{3})\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)}}$$

Decimal approximation:

0.9939466819920470492208804340227807149338462465995797315 15...

0.993946681992…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **$0.989117352243 = \phi$**

Alternate forms:

$$\frac{1}{\sqrt[256]{(3+\sqrt{3})\left(1+2e^{-27\sqrt{5}\,\pi}\left(1+e^{15\sqrt{5}\,\pi}+e^{24\sqrt{5}\,\pi}\right)\right)}}$$

$$\frac{e^{(27\sqrt{5}\,\pi)/256}}{\sqrt[256]{(3+\sqrt{3})\left(2+2e^{15\sqrt{5}\,\pi}+2e^{24\sqrt{5}\,\pi}+e^{27\sqrt{5}\,\pi}\right)}}$$

Series representations:

$$\frac{1}{\sqrt[256]{\left(3+\sqrt{3}\right)\left(1+2\,e^{-3\pi\sqrt{5}}+2\,e^{-12\pi\sqrt{5}}+2\,e^{-27\pi\sqrt{5}}\right)}} = \left(e^{27\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}} \left(e^{-27\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}} \left(2+2\,e^{15\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+2\,e^{24\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+ e^{27\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\right)\left(3+\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)\right)^{255/256}\right) \Big/ \left(\left(2+2\,e^{15\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+2\,e^{24\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+e^{27\pi\sqrt{4}\,\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}\right)\left(3+\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{1}{\sqrt[256]{\left(3+\sqrt{3}\right)\left(1+2\,e^{-3\pi\sqrt{5}}+2\,e^{-12\pi\sqrt{5}}+2\,e^{-27\pi\sqrt{5}}\right)}} = \left(\exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right) \left(\exp\left(-27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\left(2+2\exp\left(15\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+ 2\exp\left(24\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+\exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \left(3+\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)^{255/256}\right) \Big/ \left(\left(2+2\exp\left(15\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+2\exp\left(24\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+ \exp\left(27\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\left(3+\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{1}{\sqrt[256]{\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)}} =$$

$$\left(\exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right.$$
$$\left(\exp\left(-27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right.$$
$$\left(2+2\exp\left(15\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)+\right.$$
$$2\exp\left(24\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)+$$
$$\left.\left.\exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\right)$$
$$\left.\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\right)^{255/256}\right)\Big/$$
$$\left(\left(\left(2+2\exp\left(15\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)+\right.\right.\right.$$
$$2\exp\left(24\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)+$$
$$\left.\left.\exp\left(27\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\right)\right)$$
$$\left.\left.\left(3+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(3-z_0)^k z_0^{-k}}{k!}\right)\right)\right)$$

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

1/2 log base 0.993946681992 (((1/((((3+sqrt(3)) (((1+2e^(-3Pi*sqrt(5))+2e^(-12Pi*sqrt(5))+2e^(-27Pi*sqrt(5))))))))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{2}\log_{0.993946681992}\left(\frac{1}{\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4764413...

125.4764413…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$\frac{1}{2}\log_{0.9939466819920000}\left(\frac{1}{\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$-\pi+\frac{1}{\phi}+\frac{\log\left(\frac{1}{\left(1+2e^{-27\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-3\pi\sqrt{5}}\right)\left(3+\sqrt{3}\right)}\right)}{2\log(0.9939466819920000)}$$

Series representations:

$$\frac{1}{2}\log_{0.9939466819920000}\left(\frac{1}{\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{\left(1+2e^{-27\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-3\pi\sqrt{5}}\right)\left(3+\sqrt{3}\right)}\right)^k}{k}}{2\log(0.9939466819920000)}$$

$$\frac{1}{2}\log_{0.9939466819920000}\left(\frac{1}{\left(3+\sqrt{3}\right)\left(1+2e^{-3\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-27\pi\sqrt{5}}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1.0000000000000}{\phi}-1.0000000000000\,\pi+\log\left(\frac{1}{\left(1+2e^{-27\pi\sqrt{5}}+2e^{-12\pi\sqrt{5}}+2e^{-3\pi\sqrt{5}}\right)\left(3+\sqrt{3}\right)}\right)\left(-82.34932806094-0.50000000000000\sum_{k=0}^{\infty}(-0.0060533180080000)^k\,G(k)\right)$$

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

$$\frac{1}{2}\log_{0.9939466819920000}\left(\frac{1}{(3+\sqrt{3})\left(1+2\,e^{-3\pi\sqrt{5}}+2\,e^{-12\pi\sqrt{5}}+2\,e^{-27\pi\sqrt{5}}\right)}\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1.0000000000000}{\phi}-1.0000000000000\,\pi+\log\left(\frac{1}{\left(1+2\,e^{-27\pi\sqrt{5}}+2\,e^{-12\pi\sqrt{5}}+2\,e^{-3\pi\sqrt{5}}\right)(3+\sqrt{3})}\right)$$

$$\left(-82.34932806094-0.50000000000000\sum_{k=0}^{\infty}(-0.0060533180080000)^k\,G(k)\right)$$

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

Now, we have:

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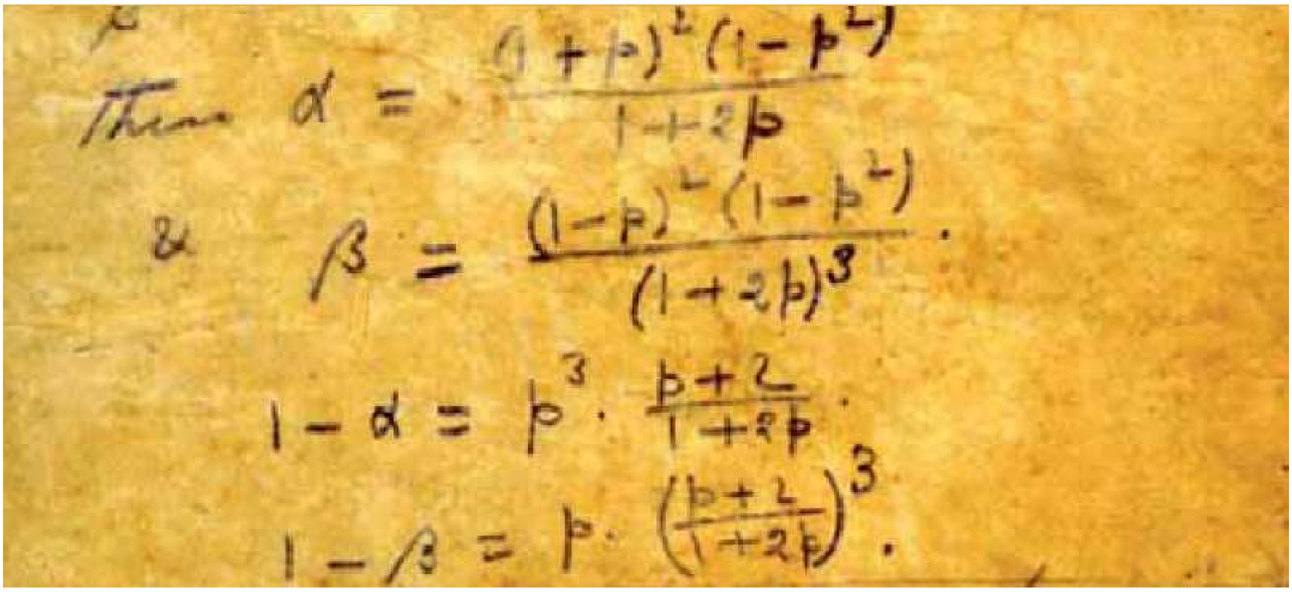


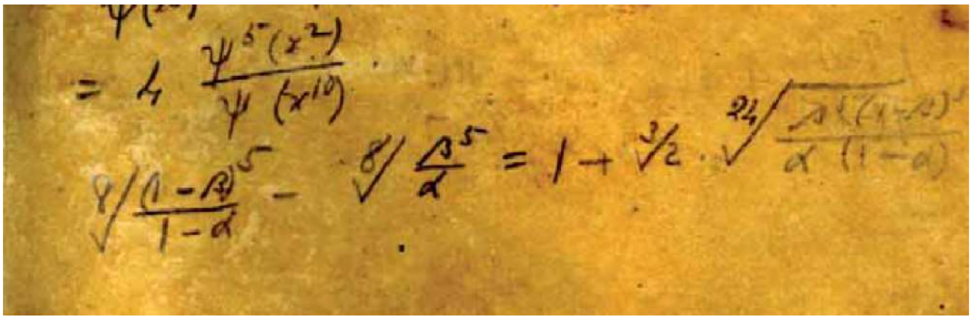
$$\text{Then }\alpha=\frac{(1+p)^2(1-p^2)}{1+2p}$$
$$\&\quad\beta=\frac{(1-p)^2(1-p^2)}{(1+2p)^3}.$$
$$1-\alpha=p^3\cdot\frac{p+2}{1+2p}.$$
$$1-\beta=p\cdot\left(\frac{p+2}{1+2p}\right)^3.$$

For p = 2, we obtain:

(1+2)^2(1-2^2)/(1+2*2) = α = -5.4 ;   (1-2)^2(1-2^2)/(1+2*2)^3 = β = -0.024;

2^3((2+2)/(1+2*2)) = 1 – α = 6.4 ;   2(((2+2)/(1+2*2)))^3 = 1 – β = 1.024 ;

Page 272-273



For:

$\alpha = -5.4$; $\beta = -0.024$;

$1 - \alpha = 6.4$; $1 - \beta = 1.024$;

(((1.024^5)/6.4))^1/8 – (((-0.024^5)/(-5.4)))^1/8

Input:

$$\sqrt[8]{\frac{1.024^5}{6.4}} - \sqrt[8]{\frac{-0.024^5}{-5.4}}$$

Result:

0.726038...

0.726038...

1+(2)^1/3 * (((-0.024^5(1.024)^5))/(-5.4(6.4)))^1/24

Input:

$$1 + \sqrt[3]{2}\ \sqrt[24]{\frac{-0.024^5 \times 1.024^5}{-5.4 \times 6.4}}$$

Result:

1.502257...

1.502257...

((((((1.024^5)/6.4))^1/8 – (((-0.024^5)/(-5.4)))^1/8)))x = 1+(2)^1/3 * (((-0.024^5(1.024)^5))/(-5.4(6.4)))^1/24

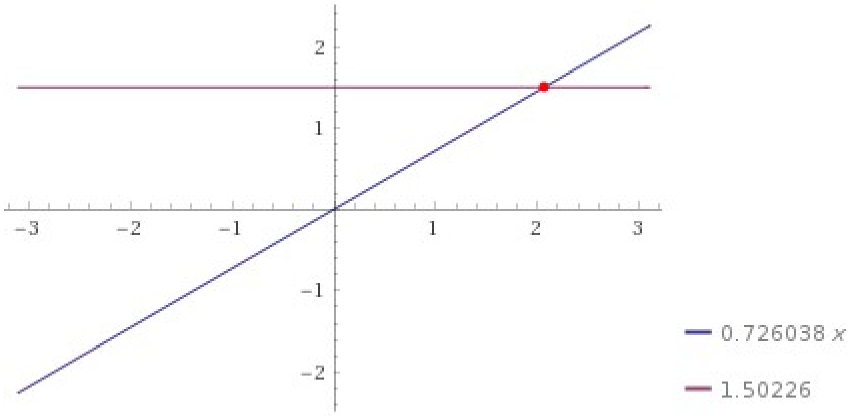
Input:

$$\left(\sqrt[8]{\frac{1.024^5}{6.4}} - \sqrt[8]{\frac{-0.024^5}{-5.4}}\right) x = 1 + \sqrt[3]{2}\ \sqrt[24]{\frac{-0.024^5 \times 1.024^5}{-5.4 \times 6.4}}$$

Result:

$0.726038\, x = 1.50226$

Plot:



Alternate form:

$0.726038\, x - 1.50226 = 0$

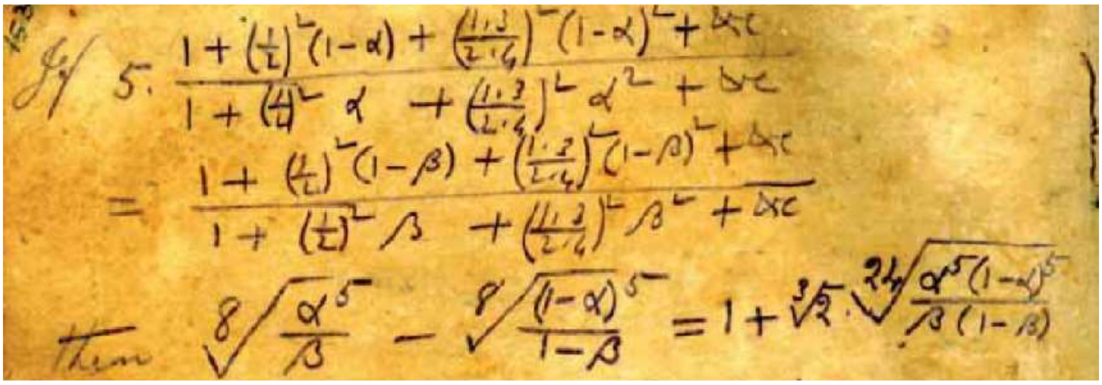
Alternate form assuming x is real:

$0.726038\, x + 0 = 1.50226$

Solution:

$x \approx 2.06912$

2.06912



For:

α = -5.4 ;   β = -0.024;

1 – α = 6.4 ;   1 – β = 1.024 ;

(((-5.4^5)/-0.024))^1/8 – (((6.4^5)/(1.024)))^1/8

Input:

$$\sqrt[8]{\frac{-5.4^5}{-0.024}} - \sqrt[8]{\frac{6.4^5}{1.024}}$$

Result:

1.39211...

1.39211...

1+(2)^1/3 * ((((-5.4^5(6.4)^5)/(-0.024(1.024))))^1/24

Input:

$$1 + \sqrt[3]{2}\,\sqrt[24]{\frac{-5.4^5 \times 6.4^5}{-0.024 \times 1.024}}$$

Result:

4.07568...

4.07568...

((((((-5.4^5)/-0.024))^1/8 – (((6.4^5)/(1.024)))^1/8)))x = 1+(2)^1/3 * ((((-5.4^5(6.4)^5)/(-0.024(1.024))))^1/24

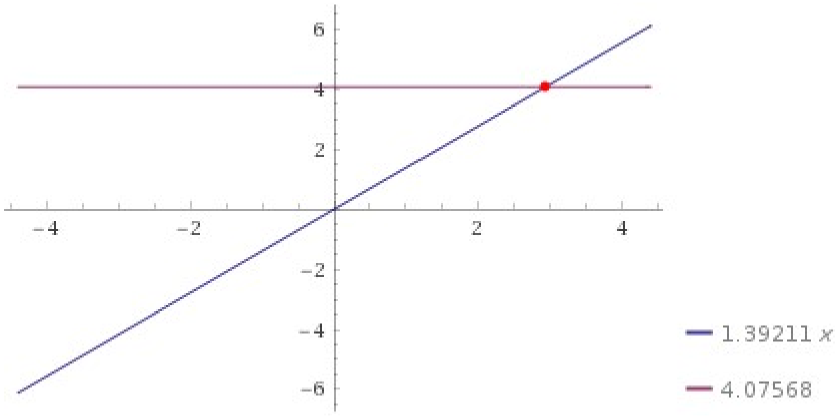
Input:

$$\left(\sqrt[8]{\frac{-5.4^5}{-0.024}} - \sqrt[8]{\frac{6.4^5}{1.024}}\right) x = 1 + \sqrt[3]{2}\ \sqrt[24]{\frac{-5.4^5 \times 6.4^5}{-0.024 \times 1.024}}$$

Result:

$1.39211\, x = 4.07568$

Plot:



Alternate form:

$1.39211\, x - 4.07568 = 0$

Alternate form assuming x is real:

$1.39211\, x + 0 = 4.07568$

Solution:

$x \approx 2.9277$

2.9277

The difference between the two results is:

Input interpretation:

$2.9277 - 2.06912$

Result:

0.85858

0.85858

While the sum:

Input interpretation:

$2.9277 + 2.06912$

Result:

4.99682

4.99682 ≈ 5

In conclusion, we obtain:

(((1/(2.06912) + 1/(2.9277))))^1/64

Input interpretation:

$$\sqrt[64]{\frac{1}{2.06912} + \frac{1}{2.9277}}$$

Result:

0.9969961...

0.9969961... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

2 log base 0.9969961 (((1/(2.06912) + 1/(2.9277))))-Pi+1/golden ratio

Input interpretation:

$$2\log_{0.9969961}\left(\frac{1}{2.06912} + \frac{1}{2.9277}\right) - \pi + \frac{1}{\phi}$$

$\log_b(x)$ 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

Alternative representation:

$$2 \log_{0.996996}\left(\frac{1}{2.06912} + \frac{1}{2.9277}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{2 \log\left(\frac{1}{2.06912} + \frac{1}{2.9277}\right)}{\log(0.996996)}$$

Series representations:

$$2 \log_{0.996996}\left(\frac{1}{2.06912} + \frac{1}{2.9277}\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{2 \sum_{k=1}^{\infty} \frac{(-1)^k (-0.175138)^k}{k}}{\log(0.996996)}$$

$$2 \log_{0.996996}\left(\frac{1}{2.06912} + \frac{1}{2.9277}\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - 664.801 \log(0.824862) - 2 \log(0.824862) \sum_{k=0}^{\infty} (-0.0030039)^k G(k)$$

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

1/4 log base 0.9969961 (((1/(2.06912) + 1/(2.9277))))+1/golden ratio

Input interpretation:

$$\frac{1}{4} \log_{0.9969961}\left(\frac{1}{2.06912} + \frac{1}{2.9277}\right) + \frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.6180...

16.6180…. result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{4}\log_{0.996996}\left(\frac{1}{2.06912}+\frac{1}{2.9277}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(\frac{1}{2.06912}+\frac{1}{2.9277}\right)}{4\log(0.996996)}$$

Series representations:

$$\frac{1}{4}\log_{0.996996}\left(\frac{1}{2.06912}+\frac{1}{2.9277}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k(-0.175138)^k}{k}}{4\log(0.996996)}$$

$$\frac{1}{4}\log_{0.996996}\left(\frac{1}{2.06912}+\frac{1}{2.9277}\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-83.1001\log(0.824862)-\frac{1}{4}\log(0.824862)\sum_{k=0}^{\infty}(-0.0030039)^k G(k)$$
$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}G(-j+k)}{1+j}\right)$$

And:

(2.9277 / 2.06912)

Input interpretation:

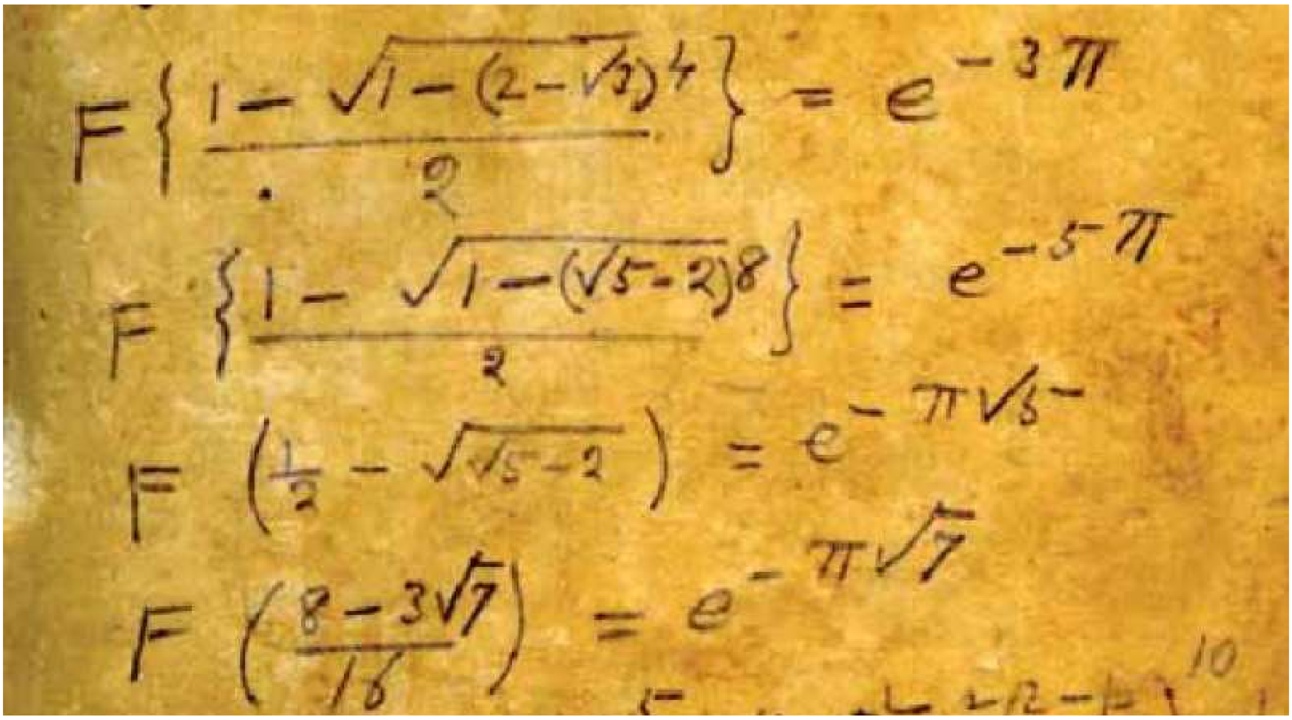
$$\frac{2.9277}{2.06912}$$

Result:

1.414949350448499845344880915558304979894834519022579647386...

1.41494935.... ≈ $\sqrt{2}$ = 1.414213562373...

Now, we have that (page 274):



e^(-3Pi)+e^(-5Pi)+e^(-Pi*sqrt(5))+e^(-Pi*sqrt(7))

Input:

$$e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}$$

Exact result:

$$e^{-5\pi}+e^{-3\pi}+e^{-\sqrt{5}\,\pi}+e^{-\sqrt{7}\,\pi}$$

Decimal approximation:

0.001215966189501663516799037097937027839462647628489373696...

0.00121596618….

Alternate forms:

$$e^{-\sqrt{7}\,\pi}+e^{-5\pi-\sqrt{5}\,\pi}\left(e^{5\pi}+e^{\sqrt{5}\,\pi}+e^{2\pi+\sqrt{5}\,\pi}\right)$$

$$e^{-5\pi-\sqrt{5}\,\pi-\sqrt{7}\,\pi}\left(e^{5\pi+\sqrt{5}\,\pi}+e^{5\pi+\sqrt{7}\,\pi}+e^{\sqrt{5}\,\pi+\sqrt{7}\,\pi}+e^{2\pi+\sqrt{5}\,\pi+\sqrt{7}\,\pi}\right)$$

((e^(-3Pi)+e^(-5Pi)+e^(-Pi*sqrt(5))+e^(-Pi*sqrt(7))))^1/1024

Input:

$$\sqrt[1024]{e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}}$$

Exact result:

$$\sqrt[1024]{e^{-5\pi}+e^{-3\pi}+e^{-\sqrt{5}\,\pi}+e^{-\sqrt{7}\,\pi}}$$

Decimal approximation:

0.9934665377541489562687546839696737941598857258769486372600...

0.9934665377…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate form:

$$e^{-(5\pi)/1024-\left(\sqrt{5}\,\pi\right)/1024-\left(\sqrt{7}\,\pi\right)/1024}\sqrt[1024]{e^{5\pi+\sqrt{5}\,\pi}+e^{5\pi+\sqrt{7}\,\pi}+e^{\sqrt{5}\,\pi+\sqrt{7}\,\pi}+e^{2\pi+\sqrt{5}\,\pi+\sqrt{7}\,\pi}}$$

All 1024th roots of e^(-5 π) + e^(-3 π) + e^(-sqrt(5) π) + e^(-sqrt(7) π):

$$\sqrt[1024]{e^{-5\pi}+e^{-3\pi}+e^{-\sqrt{5}\,\pi}+e^{-\sqrt{7}\,\pi}}\;e^{0}\approx 0.993467 \text{ (real, principal root)}$$

$$\sqrt[1024]{e^{-5\pi}+e^{-3\pi}+e^{-\sqrt{5}\,\pi}+e^{-\sqrt{7}\,\pi}}\;e^{(i\pi)/512}\approx 0.993448+0.006096\,i$$

$$\sqrt[1024]{e^{-5\pi}+e^{-3\pi}+e^{-\sqrt{5}\,\pi}+e^{-\sqrt{7}\,\pi}}\;e^{(i\pi)/256}\approx 0.993392+0.012191\,i$$

$$\sqrt[1024]{e^{-5\pi}+e^{-3\pi}+e^{-\sqrt{5}\,\pi}+e^{-\sqrt{7}\,\pi}}\;e^{(3i\pi)/512}\approx 0.993298+0.018286\,i$$

$$\sqrt[1024]{e^{-5\pi}+e^{-3\pi}+e^{-\sqrt{5}\,\pi}+e^{-\sqrt{7}\,\pi}}\;e^{(i\pi)/128}\approx 0.993167+0.024381\,i$$

Series representations:

$$\sqrt[1024]{e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}} = \sqrt[1024]{e^{-5\pi}+e^{-3\pi}+e^{-\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+e^{-\pi\sqrt{6}\sum_{k=0}^{\infty}6^{-k}\binom{1/2}{k}}}$$

$$\sqrt[1024]{e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}} = \sqrt[1024]{e^{-5\pi}+e^{-3\pi}+\exp\left(-\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+\exp\left(-\pi\sqrt{6}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{6}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}$$

$$\sqrt[1024]{e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}} = \left(e^{-5\pi}+e^{-3\pi}+\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)+\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(7-z_0)^k z_0^{-k}}{k!}\right)\right)^{\wedge}(1/1024)$$

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

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\text{Re}(a) \text{ and } |\arg(z)|<\pi)$$

1/8 log base 0.9934665377541 ((e^(-3Pi)+e^(-5Pi)+e^(-Pi*sqrt(5))+e^(-Pi*sqrt(7))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{8}\log_{0.9934665377541}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.47644133...

125.47644133…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$\frac{1}{8}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)-\pi+\frac{1}{\phi}=-\pi+\frac{1}{\phi}+\frac{\log\left(e^{-5\pi}+e^{-3\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)}{8\log(0.99346653775410000)}$$

Series representations:

$$\frac{1}{8}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+e^{-5\pi}+e^{-3\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)^k}{k}}{8\log(0.99346653775410000)}$$

$$\frac{1}{8}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)-\pi+\frac{1}{\phi}=-\frac{1}{8\phi}\left(-8+8\phi\pi-\phi\log_{0.99346653775410000}\left(e^{-5\pi}+e^{-3\pi}+e^{-\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+e^{-\pi\sqrt{6}\sum_{k=0}^{\infty}6^{-k}\binom{1/2}{k}}\right)\right)$$

$$\frac{1}{8}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)-\pi+\frac{1}{\phi}=-\frac{1}{8\phi}\left(-8+8\phi\pi-\phi\log_{0.99346653775410000}\left(e^{-5\pi}+e^{-3\pi}+\exp\left(-\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+\exp\left(-\pi\sqrt{6}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{6}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)$$

1/64 log base 0.9934665377541 ((e^(-3Pi)+e^(-5Pi)+e^(-Pi*sqrt(5))+e^(-Pi*sqrt(7))))+1/golden ratio

Input interpretation:

$$\frac{1}{64}\log_{0.9934665377541}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.618033989...

16.618033989.... result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{64}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(e^{-5\pi}+e^{-3\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)}{64\log(0.99346653775410000)}$$

Series representations:

$$\frac{1}{64}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+e^{-5\pi}+e^{-3\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)^k}{k}}{64\log(0.99346653775410000)}$$

$$\frac{1}{64}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)+\frac{1}{\phi}=\frac{64+\phi\log_{0.99346653775410000}\left(e^{-5\pi}+e^{-3\pi}+e^{-\pi\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}}+e^{-\pi\sqrt{6}\sum_{k=0}^{\infty}6^{-k}\binom{1/2}{k}}\right)}{64\phi}$$

$$\frac{1}{64}\log_{0.99346653775410000}\left(e^{-3\pi}+e^{-5\pi}+e^{-\pi\sqrt{5}}+e^{-\pi\sqrt{7}}\right)+\frac{1}{\phi}=\frac{1}{64\phi}\left(64+\phi\log_{0.99346653775410000}\left(e^{-5\pi}+e^{-3\pi}+\exp\left(-\pi\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)+\exp\left(-\pi\sqrt{6}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{6}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\right)$$

x((8-3*sqrt(7))/16) = e^(-Pi*sqrt(7))

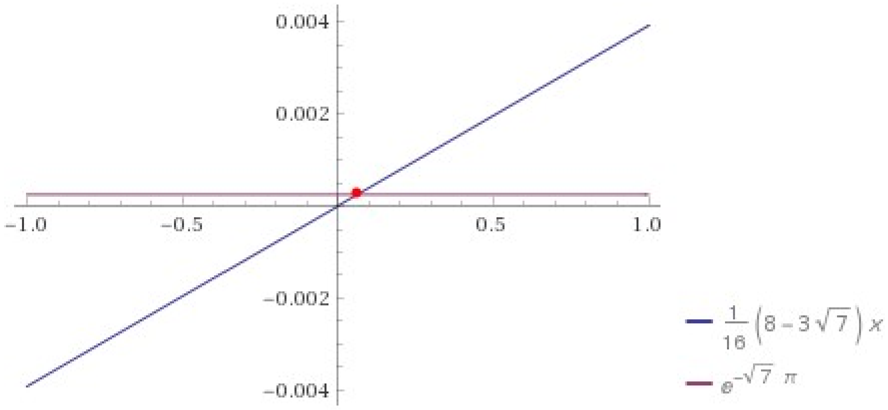
Input:

$$x\left(\frac{1}{16}\left(8-3\sqrt{7}\right)\right)=e^{-\pi\sqrt{7}}$$

Exact result:

$$\frac{1}{16}\left(8-3\sqrt{7}\right)x=e^{-\sqrt{7}\,\pi}$$

Plot:



Alternate form:

$$-\frac{1}{16}\left(3\sqrt{7}-8\right)x=e^{-\sqrt{7}\,\pi}$$

Expanded form:

$$\frac{x}{2}-\frac{3\sqrt{7}\,x}{16}=e^{-\sqrt{7}\,\pi}$$

Solution:

$x\approx 0.062623$

0.062623 = F

Indeed:

0.062623((8-3*sqrt(7))/16)

Input:

$0.062623\left(\frac{1}{16}\left(8-3\sqrt{7}\right)\right)$

Result:

0.000245584183850401897065746873721611442639957345842697941...

0.00024558418385…

e^(-Pi*sqrt(7))

Input:

$e^{-\pi\sqrt{7}}$

Exact result:

$e^{-\sqrt{7}\,\pi}$

Decimal approximation:

0.000245583663139323435662929065429087054468894030388669274...

0.0002455836631…

Property:

$e^{-\sqrt{7}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{7}} = e^{-\pi\sqrt{6}\sum_{k=0}^{\infty} 6^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{7}} = \exp\left(-\pi\sqrt{6}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{6}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{7}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 6^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,d\,s}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

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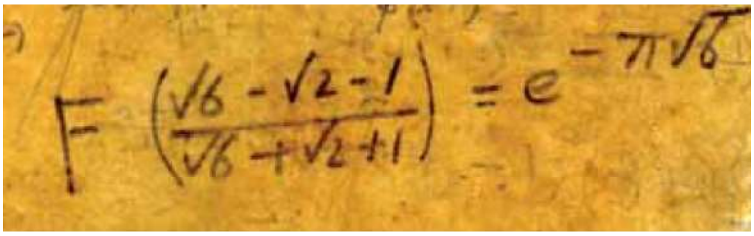
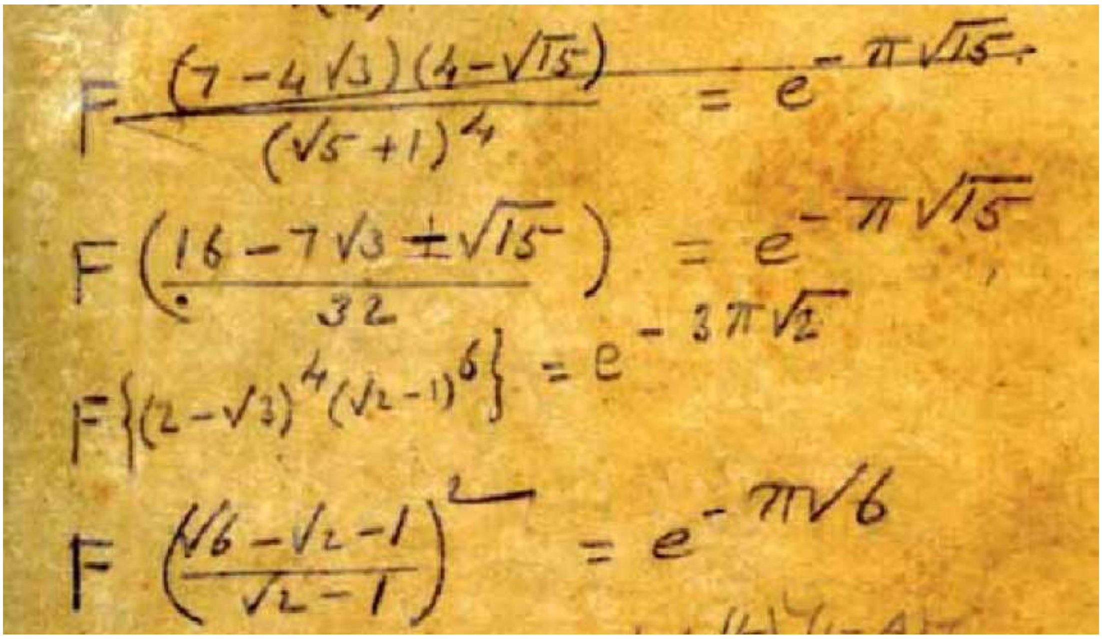




e^(-Pi*sqrt6)+e^(-Pi*sqrt15)+e^(-3Pi*sqrt2)+e^(-Pi*sqrt6)

Input:

$$e^{-\pi\sqrt{6}} + e^{-\pi\sqrt{15}} + e^{-3\pi\sqrt{2}} + e^{-\pi\sqrt{6}}$$

Exact result:

$$e^{-3\sqrt{2}\,\pi} + 2\,e^{-\sqrt{6}\,\pi} + e^{-\sqrt{15}\,\pi}$$

Decimal approximation:

0.000916746572106060171859025819203818748817255351605254768...

0.0009167465721…

Alternate forms:

$$e^{-\sqrt{15}\,\pi} + e^{-3\sqrt{2}\,\pi-\sqrt{6}\,\pi}\left(2\,e^{3\sqrt{2}\,\pi} + e^{\sqrt{6}\,\pi}\right)$$

$$e^{-3\sqrt{2}\,\pi-\sqrt{6}\,\pi-\sqrt{15}\,\pi}\left(e^{3\sqrt{2}\,\pi+\sqrt{6}\,\pi} + 2\,e^{3\sqrt{2}\,\pi+\sqrt{15}\,\pi} + e^{\sqrt{6}\,\pi+\sqrt{15}\,\pi}\right)$$

((e^(-Pi*sqrt6)+e^(-Pi*sqrt15)+e^(-3Pi*sqrt2)+e^(-Pi*sqrt6)))^1/1024

Input:

$$\sqrt[1024]{e^{-\pi\sqrt{6}} + e^{-\pi\sqrt{15}} + e^{-3\pi\sqrt{2}} + e^{-\pi\sqrt{6}}}$$

Exact result:

$$\sqrt[1024]{e^{-3\sqrt{2}\,\pi} + 2\,e^{-\sqrt{6}\,\pi} + e^{-\sqrt{15}\,\pi}}$$

Decimal approximation:

0.9931925347976544185212063511716488615627565879346257 21759...

0.99319253479…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

All 1024th roots of e^(-3 sqrt(2) π) + 2 e^(-sqrt(6) π) + e^(-sqrt(15) π):

$$\sqrt[1024]{e^{-3\sqrt{2}\,\pi} + 2\,e^{-\sqrt{6}\,\pi} + e^{-\sqrt{15}\,\pi}}\; e^{0} \approx 0.993193$$ (real, principal root)

$$\sqrt[1024]{e^{-3\sqrt{2}\,\pi} + 2\,e^{-\sqrt{6}\,\pi} + e^{-\sqrt{15}\,\pi}}\; e^{(i\pi)/512} \approx 0.993174 + 0.006094\,i$$

$$\sqrt[1024]{e^{-3\sqrt{2}\,\pi}+2\,e^{-\sqrt{6}\,\pi}+e^{-\sqrt{15}\,\pi}}\;\; e^{(i\,\pi)/256} \approx 0.993118+0.012188\,i$$

$$\sqrt[1024]{e^{-3\sqrt{2}\,\pi}+2\,e^{-\sqrt{6}\,\pi}+e^{-\sqrt{15}\,\pi}}\;\; e^{(3\,i\,\pi)/512} \approx 0.993024+0.018281\,i$$

$$\sqrt[1024]{e^{-3\sqrt{2}\,\pi}+2\,e^{-\sqrt{6}\,\pi}+e^{-\sqrt{15}\,\pi}}\;\; e^{(i\,\pi)/128} \approx 0.992893+0.024374\,i$$

Series representations:

$$\sqrt[1024]{e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}} = \left(\exp\left(-3\,\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)+ 2\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(6-z_0)^k z_0^{-k}}{k!}\right)+ \exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(15-z_0)^k z_0^{-k}}{k!}\right)\right)\hat{}\,(1/1024)$$

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

$$\sqrt[1024]{e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}} = \left(\exp\left(-3\,\pi\exp\left(i\,\pi\left\lfloor\frac{\arg(2-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+ 2\exp\left(-\pi\exp\left(i\,\pi\left\lfloor\frac{\arg(6-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(6-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+ \exp\left(-\pi\exp\left(i\,\pi\left\lfloor\frac{\arg(15-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(15-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\hat{}\,(1/1024)$$

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

$$\sqrt[1024]{e^{-\pi\sqrt{6}} + e^{-\pi\sqrt{15}} + e^{-3\pi\sqrt{2}} + e^{-\pi\sqrt{6}}} =$$

$$\left(\exp\left(-3\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right) + 2\exp\left(-\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(6-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(6-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(6-z_0)^k z_0^{-k}}{k!}\right) + \exp\left(-\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(15-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(15-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(15-z_0)^k z_0^{-k}}{k!}\right)\right)\text{^}(1/1024)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\pi i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

1/8*log base 0.993192534797 ((((e^(-Pi*sqrt6)+e^(-Pi*sqrt15)+e^(-3Pi*sqrt2)+e^(-Pi*sqrt6)))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{8}\log_{0.993192534797}\left(e^{-\pi\sqrt{6}} + e^{-\pi\sqrt{15}} + e^{-3\pi\sqrt{2}} + e^{-\pi\sqrt{6}}\right) - \pi + \frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4764413...

125.4764413…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$\frac{1}{8}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}} + e^{-\pi\sqrt{15}} + e^{-3\pi\sqrt{2}} + e^{-\pi\sqrt{6}}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{\log\left(e^{-3\pi\sqrt{2}} + 2e^{-\pi\sqrt{6}} + e^{-\pi\sqrt{15}}\right)}{8\log(0.9931925347970000)}$$

Series representations:

$$\frac{1}{8}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+e^{-3\pi\sqrt{2}}+2e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)^k}{k}}{8\log(0.9931925347970000)}$$

$$\frac{1}{8}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1.0000000000000}{\phi}-1.0000000000000\,\pi-$$
$$18.299694483919\log\left(e^{-3\pi\sqrt{2}}+2e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)-0.12500000000000$$
$$\log\left(e^{-3\pi\sqrt{2}}+2e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)\sum_{k=0}^{\infty}(-0.0068074652030000)^k\,G(k)$$
$$\text{for}\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

$$\frac{1}{8}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1.0000000000000}{\phi}-1.0000000000000\,\pi-$$
$$18.299694483919\log\left(e^{-3\pi\sqrt{2}}+2e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)-0.12500000000000$$
$$\log\left(e^{-3\pi\sqrt{2}}+2e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)\sum_{k=0}^{\infty}(-0.0068074652030000)^k\,G(k)$$
$$\text{for}\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2(1+k)(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

1/64*log base 0.993192534797 ((((e^(-Pi*sqrt6)+e^(-Pi*sqrt15)+e^(-3Pi*sqrt2)+e^(-Pi*sqrt6)))))+1/golden ratio

Input interpretation:

$$\frac{1}{64}\log_{0.993192534797}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.61803399...

16.61803399…. result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{64}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}+\frac{\log\left(e^{-3\pi\sqrt{2}}+2\,e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)}{64\log(0.9931925347970000)}$$

Series representations:

$$\frac{1}{64}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+e^{-3\pi\sqrt{2}}+2\,e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)^k}{k}}{64\log(0.9931925347970000)}$$

$$\frac{1}{64}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)+\frac{1}{\phi}=$$

$$\frac{1.0000000000000}{\phi}-2.2874618104899\log\left(e^{-3\pi\sqrt{2}}+2\,e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)-$$

$$0.015625000000000\log\left(e^{-3\pi\sqrt{2}}+2\,e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)$$

$$\sum_{k=0}^{\infty}(-0.0068074652030000)^k\,G(k)$$

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

$$\frac{1}{64}\log_{0.9931925347970000}\left(e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}+e^{-3\pi\sqrt{2}}+e^{-\pi\sqrt{6}}\right)+\frac{1}{\phi}=$$

$$\frac{1.0000000000000}{\phi}-2.2874618104899\log\left(e^{-3\pi\sqrt{2}}+2\,e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)-$$

$$0.015625000000000\log\left(e^{-3\pi\sqrt{2}}+2\,e^{-\pi\sqrt{6}}+e^{-\pi\sqrt{15}}\right)$$

$$\sum_{k=0}^{\infty}(-0.0068074652030000)^k\,G(k)$$

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

x((sqrt6-sqrt2-1)/(sqrt2-1))^2 = e^(-Pi*sqrt6)

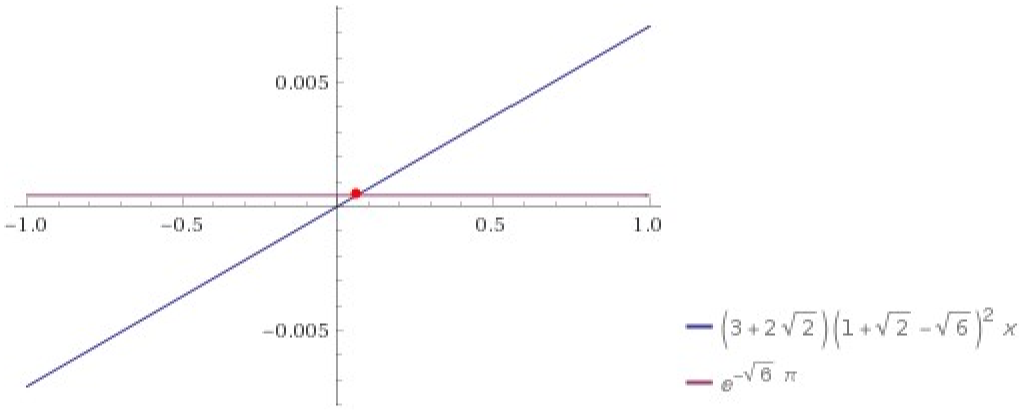
Input:

$$x\left(\frac{\sqrt{6}-\sqrt{2}-1}{\sqrt{2}-1}\right)^2 = e^{-\pi\sqrt{6}}$$

Exact result:

$$\frac{\left(-1-\sqrt{2}+\sqrt{6}\right)^2 x}{(\sqrt{2}-1)^2} = e^{-\sqrt{6}\,\pi}$$

Plot:



Alternate forms:

$$\left(3+2\sqrt{2}\right)\left(1+\sqrt{2}-\sqrt{6}\right)^2 x = e^{-\sqrt{6}\,\pi}$$

$$\left(35-20\sqrt{3}-2\sqrt{6\left(97-56\sqrt{3}\right)}\right)x = e^{-\sqrt{6}\,\pi}$$

$$\frac{\left(-9-2\sqrt{2}+4\sqrt{3}+2\sqrt{6}\right)x}{2\sqrt{2}-3} = e^{-\sqrt{6}\,\pi}$$

Expanded form:

$$-\frac{2\sqrt{6}\,x}{(\sqrt{2}-1)^2} - \frac{4\sqrt{3}\,x}{(\sqrt{2}-1)^2} + \frac{2\sqrt{2}\,x}{(\sqrt{2}-1)^2} + \frac{9\,x}{(\sqrt{2}-1)^2} = e^{-\sqrt{6}\,\pi}$$

Solution:

$x \approx 0.0627277392084520$

0.0627277392084520 = F

0.0627277392084520((sqrt6-sqrt2-1)/(sqrt2-1))^2 = e^(-Pi*sqrt6)

Input interpretation:

$$0.0627277392084520\left(\frac{\sqrt{6}-\sqrt{2}-1}{\sqrt{2}-1}\right)^2 = e^{-\pi\sqrt{6}}$$

Result:

True

e^(-Pi*sqrt6)

Input:

$$e^{-\pi\sqrt{6}}$$

Exact result:

$$e^{-\sqrt{6}\,\pi}$$

Decimal approximation:

0.000454960943585536823013982231914376108393947267506330392...

0.00045496094…

Property:

$e^{-\sqrt{6}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{6}} = e^{-\pi\sqrt{5}\sum_{k=0}^{\infty} 5^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{6}} = \exp\left(-\pi\sqrt{5}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{5}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{6}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 5^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

3(0.00024558418385 / 0.00045496094)

Input interpretation:

$$3 \times \frac{0.00024558418385}{0.00045496094}$$

Result:

1.619375394182190673335605469779449638028266778242545393017...

1.61937539418.... result that is a very good approximation to the value of the golden ratio 1,618033988749...

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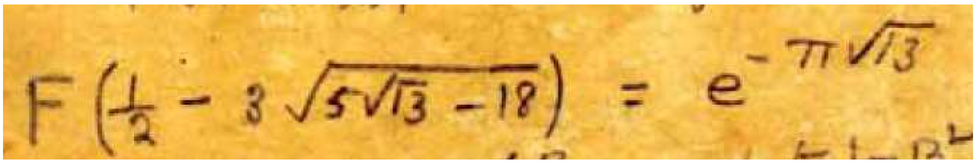


x(1/2-3(5sqrt13-18)^1/2) = e^(-Pi*sqrt13)

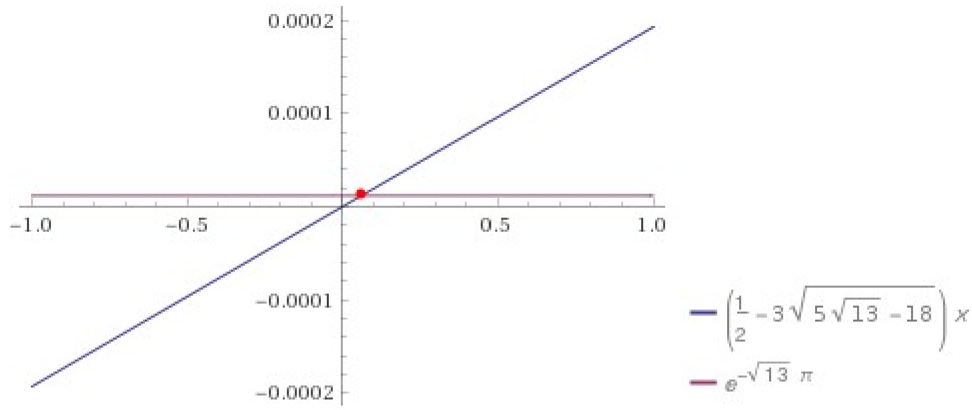
Input:

$$x\left(\frac{1}{2} - 3\sqrt{5\sqrt{13} - 18}\right) = e^{-\pi\sqrt{13}}$$

Exact result:

$$\left(\frac{1}{2} - 3\sqrt{5\sqrt{13} - 18}\right)x = e^{-\sqrt{13}\,\pi}$$

Plot:



Alternate forms:

$$\left(\frac{1}{2}-\frac{3}{\sqrt{18+5\sqrt{13}}}\right)x=e^{-\sqrt{13}\,\pi}$$

$$-\frac{1}{2}\left(6\sqrt{5\sqrt{13}-18}-1\right)x=e^{-\sqrt{13}\,\pi}$$

$$-\frac{x}{2\left(-649-180\sqrt{13}\right)\left(1+\sqrt{1+\frac{1}{-649-180\sqrt{13}}}\right)}=e^{-\sqrt{13}\,\pi}$$

Expanded form:

$$\frac{x}{2}-3\sqrt{5\sqrt{13}-18}\;x=e^{-\sqrt{13}\,\pi}$$

Alternate form assuming x>0:

$$\frac{1}{2}\left(x-6\sqrt{5\sqrt{13}-18}\;x\right)=e^{-\sqrt{13}\,\pi}$$

Solution:

$x \approx 0.0625060207996390$

0.062506027996390 = F

0.062506027996390(1/2-3(5sqrt13-18)^1/2)

Input interpretation:

$$0.062506027996390\left(\frac{1}{2}-3\sqrt{5\sqrt{13}-18}\right)$$

Result:

0.000012041238186004...

0.000012041238186004…

e^(-Pi*sqrt13)

Input:

$e^{-\pi\sqrt{13}}$

Exact result:

$e^{-\sqrt{13}\,\pi}$

Decimal approximation:

0.000012041236799613530073893771115792272103075615185247065...

0.00001204123679…

Property:

$e^{-\sqrt{13}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{13}} = e^{-\pi\sqrt{12}\sum_{k=0}^{\infty} 12^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{13}} = \exp\left(-\pi\sqrt{12}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{12}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{13}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 12^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0<\gamma<-\operatorname{Re}(a) \text{ and } |\arg(z)|<\pi)$$

((e^(-Pi*sqrt13)))^1/1024

Input:

$$\sqrt[1024]{e^{-\pi \sqrt{13}}}$$

Exact result:

$$e^{-(\sqrt{13}\ \pi)/1024}$$

Decimal approximation:

0.988999262786647933098562862985062371932293271706796583157...

0.9889992627…. result very near to the dilaton value **0.989117352243 = ϕ**

Property:

$e^{-(\sqrt{13}\ \pi)/1024}$ is a transcendental number

All 1024th roots of e^(-sqrt(13) π):

$e^{-(\sqrt{13}\ \pi)/1024}\ e^{0} \approx 0.988999$ (real, principal root)

$e^{-(\sqrt{13}\ \pi)/1024}\ e^{(i\pi)/512} \approx 0.988981 + 0.006068\, i$

$e^{-(\sqrt{13}\ \pi)/1024}\ e^{(i\pi)/256} \approx 0.988925 + 0.012137\, i$

$e^{-(\sqrt{13}\ \pi)/1024}\ e^{(3 i\pi)/512} \approx 0.988832 + 0.018204\, i$

$e^{-(\sqrt{13}\ \pi)/1024}\ e^{(i\pi)/128} \approx 0.988701 + 0.024271\, i$

Series representations:

$$\sqrt[1024]{e^{-\pi \sqrt{13}}} = \sqrt[1024]{e^{-\pi \sqrt{12} \sum_{k=0}^{\infty} 12^{-k} \binom{1/2}{k}}}$$

$$\sqrt[1024]{e^{-\pi \sqrt{13}}} = \sqrt[1024]{\exp\left(-\pi \sqrt{12} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{12}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)}$$

$$\sqrt[1024]{e^{-\pi \sqrt{13}}} = \sqrt[1024]{\exp\left(-\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 12^{-s}\, \Gamma\left(-\frac{1}{2} - s\right) \Gamma(s)}{2 \sqrt{\pi}}\right)}$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\Gamma(s)\,\Gamma(-a-s)}{z^s}\,ds}{(2\,\pi\,i)\,\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

1/8*log base 0.988999262786((((e^(-Pi*sqrt13)))))-Pi+1/golden ratio

Input interpretation:

$$\frac{1}{8}\log_{0.988999262786}\left(e^{-\pi\sqrt{13}}\right) - \pi + \frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4764413...

125.4764413…. result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representation:

$$\frac{1}{8}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right) - \pi + \frac{1}{\phi} = -\pi + \frac{1}{\phi} + \frac{\log\left(e^{-\pi\sqrt{13}}\right)}{8\log(0.9889992627860000)}$$

Series representations:

$$\frac{1}{8}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + \frac{1}{8}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{12}\sum_{k=0}^{\infty} 12^{-k}\binom{1/2}{k}}\right)$$

$$\frac{1}{8}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right) - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi - \frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+e^{-\pi\sqrt{13}}\right)^k}{k}}{8\log(0.9889992627860000)}$$

$$\frac{1}{8}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right)-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+\frac{1}{8}\log_{0.9889992627860000}\left(\exp\left(-\pi\sqrt{12}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{12}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

1/64*log base 0.988999262786((((e^(-Pi*sqrt13)))))+1/golden ratio

Input interpretation:

$$\frac{1}{64}\log_{0.988999262786}\left(e^{-\pi\sqrt{13}}\right)+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.61803399...

16.61803399…. result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

Alternative representation:

$$\frac{1}{64}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right)+\frac{1}{\phi}=\frac{1}{\phi}+\frac{\log\left(e^{-\pi\sqrt{13}}\right)}{64\log(0.9889992627860000)}$$

Series representations:

$$\frac{1}{64}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right)+\frac{1}{\phi}=$$
$$\frac{1}{\phi}+\frac{1}{64}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{12}\sum_{k=0}^{\infty}12^{-k}\binom{1/2}{k}}\right)$$

$$\frac{1}{64}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right)+\frac{1}{\phi}=\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+e^{-\pi\sqrt{13}}\right)^k}{k}}{64\log(0.9889992627860000)}$$

$$\frac{1}{64}\log_{0.9889992627860000}\left(e^{-\pi\sqrt{13}}\right)+\frac{1}{\phi}=$$

$$\frac{1}{\phi}+\frac{1}{64}\log_{0.9889992627860000}\left(\exp\left(-\pi\sqrt{12}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{12}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

1/((e^(-Pi*sqrt13)))-2*4096-(1024+256+64+16+4) =

= 1/((e^(-Pi*sqrt13)))-2*4096-(64*2^4+64*2^2+64+2^4+2^2)

Input:

$$\frac{1}{e^{-\pi\sqrt{13}}}-2\times4096-\left(64\times2^4+64\times2^2+64+2^4+2^2\right)$$

Exact result:

$$e^{\sqrt{13}\,\pi}-9556$$

Decimal approximation:

73491.947369666838051322861479741894087422377619883737203 27...

73491.94736…

Property:

$-9556+e^{\sqrt{13}\,\pi}$ is a transcendental number

Series representations:

$$\frac{1}{e^{-\pi\sqrt{13}}}-2\times4096-\left(64\times2^4+64\times2^2+64+2^4+2^2\right)=-9556+e^{\pi\sqrt{12}\sum_{k=0}^{\infty}12^{-k}\binom{1/2}{k}}$$

$$\frac{1}{e^{-\pi\sqrt{13}}}-2\times4096-\left(64\times2^4+64\times2^2+64+2^4+2^2\right)=-9556+e^{\pi\sqrt{12}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{12}\right)^k\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{1}{e^{-\pi\sqrt{13}}} - 2\times 4096 - (64\times 2^4 + 64\times 2^2 + 64 + 2^4 + 2^2) =$$

$$-9556 + \exp\left(\frac{\pi \sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 12^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

We have the following mathematical connections:

$$\left(e^{\sqrt{13}\,\pi} - 9556\right) = 73491.94736 \Rightarrow$$

$$\Rightarrow -3927 + 2\left(\sqrt[13]{\begin{array}{c} N\exp\left[\int d\hat{\sigma}\left(-\frac{1}{4u^2}\mathbf{P}_i D\mathbf{P}_i\right)\right]|Bp\rangle_{\rm NS} + \\ \int[d\mathbf{X}^\mu]\exp\left\{\int d\hat{\sigma}\left(-\frac{1}{4v^2}D\mathbf{X}^\mu D^2\mathbf{X}^\mu\right)\right\}|\mathbf{X}^\mu,\mathbf{X}^i=0\rangle_{\rm NS}\end{array}}\right) =$$

$$-3927 + 2\sqrt[13]{2.2983717437\times 10^{59} + 2.0823329825883\times 10^{59}}$$

$$= 73490.8437525\ldots \Rightarrow$$

$$\Rightarrow \left(A(r)\times\frac{1}{B(r)}\left(-\frac{1}{\phi(r)}\right)\times\frac{1}{e^{\Lambda(r)}}\right) \Rightarrow$$

$$\Rightarrow \left(-0.000029211892\times\frac{1}{0.0003644621}\left(-\frac{1}{0.0005946833}\right)\times\frac{1}{0.00183393}\right) =$$

$$= 73491.78832548118710549159572042220548025195726563413398700\ldots$$

$$= 73491.7883254\ldots \Rightarrow$$

$$\left(\begin{array}{c} I_{21} \ll \int_{-\infty}^{+\infty}\exp\left(-\left(\frac{t}{H}\right)^2\right)\left|\sum_{\lambda\leq P^{1-\varepsilon_2}}\frac{a(\lambda)}{\sqrt{\lambda}}B(\lambda)\lambda^{-i(T+t)}\right|^2 dt \ll \\ \ll H\left\{\left(\frac{4}{\varepsilon_2\log T}\right)^{2r}(\log T)(\log X)^{-2\beta} + (\varepsilon_2^{-2r}(\log T)^{-2r} + \varepsilon_2^{-r}h_1^r(\log T)^{-r})\,T^{-\varepsilon_1}\right\}\end{array}\right)/$$

$$/(26 \times 4)^2 - 24 = \left(\frac{7.9313976505275 \times 10^8}{(26 \times 4)^2 - 24} \right) = 73493.30662\ldots$$

Mathematical connections with the boundary state corresponding to the NSNS-sector of N Dp-branes in the limit of u → ∞, with the ratio concerning the general asymptotically flat solution of the equations of motion of the p-brane and with the Karatsuba's equation concerning the zeros of a special type of function connected with Dirichlet series.

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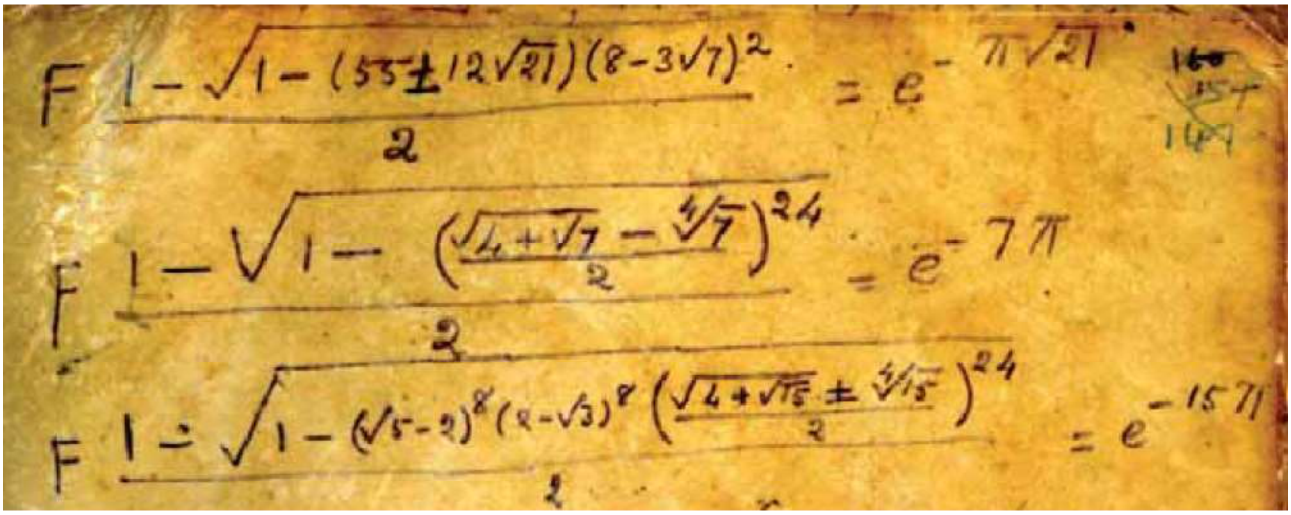


(((1-sqrt(1-(55+12sqrt21)(8-3sqrt7)^2)))/2

Input:

$$\frac{1}{2}\left(1 - \sqrt{1 - \left(55 + 12\sqrt{21}\right)\left(8 - 3\sqrt{7}\right)^2}\right)$$

Decimal approximation:

0.1235168610906205580721680819885517418664424202726739424 33...

0.12351686109….

Alternate forms:

$$\frac{1}{2}\left(1-\sqrt{-6984+4032\sqrt{3}+2640\sqrt{7}-1524\sqrt{21}}\right)$$

$$\frac{1}{2}-\frac{1}{2}\sqrt{1+\left(48\sqrt{7}-127\right)\left(55+12\sqrt{21}\right)}$$

$$\frac{1}{2}\left(1-\sqrt{1+\left(48\sqrt{7}-127\right)\left(55+12\sqrt{21}\right)}\right)$$

Minimal polynomial:

$$256x^8-1024x^7+1789696x^6-5365504x^5+6590560x^4-4239808x^3+1337584x^2-111760x+1$$

e^-(Pi*sqrt21)

Input:

$$e^{-\left(\pi\sqrt{21}\right)}$$

Exact result:

$$e^{-\sqrt{21}\,\pi}$$

Decimal approximation:

- More digits

$$5.5929647492579811238029275293883981102204059755319116\ldots\times10^{-7}$$

5.59296474925…*10^{-7}

Property:

$e^{-\sqrt{21}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{21}}=e^{-\pi\sqrt{20}\sum_{k=0}^{\infty}20^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{21}}=\exp\left(-\pi\sqrt{20}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{20}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{21}}=\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}20^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Integral representation:

$$(1+z)^a = \frac{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(s)\Gamma(-a-s)}{z^s}\, ds}{(2\pi i)\Gamma(-a)} \quad \text{for } (0 < \gamma < -\text{Re}(a) \text{ and } |\arg(z)| < \pi)$$

And:

(((1-sqrt(1-(55-12sqrt21)(8-3sqrt7)^2))))/2

Input:

$$\frac{1}{2}\left(1-\sqrt{1-\left(55-12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)$$

Decimal approximation:

$$8.948703558929939139384371760164301192213344499490577 2\ldots \times 10^{-6}$$

8.9487035589…*10^{-6}

Alternate forms:

$$\frac{1}{2}\left(1-\sqrt{-6984-4032\sqrt{3}+2640\sqrt{7}+1524\sqrt{21}}\right)$$

$$\frac{1}{2}-\frac{1}{2}\sqrt{1+\left(48\sqrt{7}-127\right)\left(55-12\sqrt{21}\right)}$$

$$\frac{1}{2}-\sqrt{3\left(-582-336\sqrt{3}+220\sqrt{7}+127\sqrt{21}\right)}$$

Minimal polynomial:

$$256x^8-1024x^7+1789696x^6-5365504x^5+ 6590560x^4-4239808x^3+1337584x^2-111760x+1$$

((((((1-sqrt(1-(55+12sqrt21)(8-3sqrt7)^2))))/2))) - ((e^-(Pi*sqrt21)))

Input:

$$\frac{1}{2}\left(1-\sqrt{1-\left(55+12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\left(\pi\sqrt{21}\right)}$$

Exact result:

$$\frac{1}{2}\left(1-\sqrt{1-\left(8-3\sqrt{7}\right)^2\left(55+12\sqrt{21}\right)}\right)-e^{-\sqrt{21}\,\pi}$$

Decimal approximation:

0.123516301794145632274055701695798803026631398232076389242...

0.123516301794….

Property:

$\frac{1}{2}\left(1-\sqrt{1-\left(8-3\sqrt{7}\right)^2\left(55+12\sqrt{21}\right)}\right)-e^{-\sqrt{21}\,\pi}$ is a transcendental number

Alternate forms:

$$\frac{1}{2}-\frac{1}{2}\sqrt{1+\left(48\sqrt{7}-127\right)\left(55+12\sqrt{21}\right)}-e^{-\sqrt{21}\,\pi}$$

$$\left(\text{root of } x^8+6984x^6-450x^4-648x^2+81 \text{ near } x=-0.376483\right)+\frac{1}{2}-e^{-\sqrt{21}\,\pi}$$

$$\frac{1}{2}-\sqrt{3\left(-582-127\sqrt{21}+4\sqrt{7}\left(55+12\sqrt{21}\right)\right)}-e^{-\sqrt{21}\,\pi}$$

Series representations:

$$\frac{1}{2}\left(1-\sqrt{1-\left(55+12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\pi\sqrt{21}}=\frac{1}{2}-e^{-\pi\sqrt{21}}-\frac{1}{2}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\left(8-3\sqrt{7}\right)^2\left(55+12\sqrt{21}\right)\right)^k}{k!}$$

$$\frac{1}{2}\left(1-\sqrt{1-\left(55+12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\pi\sqrt{21}}=\frac{1}{2}-e^{-\pi\sqrt{21}}+\frac{\sum_{j=0}^{\infty}\text{Res}_{s=-j}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(-\left(8-3\sqrt{7}\right)^2\left(55+12\sqrt{21}\right)\right)^{-s}}{4\sqrt{\pi}}$$

$$\frac{1}{2}\left(1-\sqrt{1-\left(55+12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\pi\sqrt{21}} =$$

$$-\frac{1}{2}\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (21-z_0)^k z_0^{-k}}{k!}\right)$$
$$\left(2-\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (21-z_0)^k z_0^{-k}}{k!}\right)+\right.$$
$$\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (21-z_0)^k z_0^{-k}}{k!}\right)\sqrt{z_0}$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k \left(1-(8-3\sqrt{7})^2(55+12\sqrt{21})-z_0\right)^k z_0^{-k}}{k!}\right)$$

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

And:

(((1-sqrt(1-(55-12sqrt21)(8-3sqrt7)^2))))/2 - e^-(Pi*sqrt21)

Input:

$$\frac{1}{2}\left(1-\sqrt{1-\left(55-12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\left(\pi\sqrt{21}\right)}$$

Exact result:

$$\frac{1}{2}\left(1-\sqrt{1-\left(8-3\sqrt{7}\right)^2\left(55-12\sqrt{21}\right)}\right)-e^{-\sqrt{21}\,\pi}$$

Decimal approximation:

$8.3894070840041410270040790072254613811913039019373860\ldots \times 10^{-6}$

8.389407084…*10^-6

Property:

$\frac{1}{2}\left(1-\sqrt{1-\left(8-3\sqrt{7}\right)^2\left(55-12\sqrt{21}\right)}\right)-e^{-\sqrt{21}\,\pi}$ is a transcendental number

Alternate forms:

$$\frac{1}{2}-\frac{1}{2}\sqrt{1+\left(48\sqrt{7}-127\right)\left(55-12\sqrt{21}\right)}-e^{-\sqrt{21}\,\pi}$$

$$\boxed{\text{root of } x^8+6984x^6-450x^4-648x^2+81 \text{ near } x=-0.499991}+\frac{1}{2}-e^{-\sqrt{21}\,\pi}$$

$$\frac{1}{2}-\sqrt{3\left(-582+127\sqrt{21}-4\sqrt{7}\left(12\sqrt{21}-55\right)\right)}-e^{-\sqrt{21}\,\pi}$$

Series representations:

$$\frac{1}{2}\left(1-\sqrt{1-\left(55-12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\pi\sqrt{21}}=$$
$$\frac{1}{2}-e^{-\pi\sqrt{21}}-\frac{1}{2}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\left(8-3\sqrt{7}\right)^2\left(-55+12\sqrt{21}\right)\right)^k}{k!}$$

$$\frac{1}{2}\left(1-\sqrt{1-\left(55-12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\pi\sqrt{21}}=$$
$$\frac{1}{2}-e^{-\pi\sqrt{21}}+\frac{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-j}\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\left(\left(8-3\sqrt{7}\right)^2\left(-55+12\sqrt{21}\right)\right)^{-s}}{4\sqrt{\pi}}$$

$$\frac{1}{2}\left(1-\sqrt{1-\left(55-12\sqrt{21}\right)\left(8-3\sqrt{7}\right)^2}\right)-e^{-\pi\sqrt{21}}=$$
$$-\frac{1}{2}\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(21-z_0)^k z_0^{-k}}{k!}\right)$$
$$\left(2-\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(21-z_0)^k z_0^{-k}}{k!}\right)+\right.$$
$$\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(21-z_0)^k z_0^{-k}}{k!}\right)\sqrt{z_0}$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\left(8-3\sqrt{7}\right)^2\left(-55+12\sqrt{21}\right)-z_0\right)^k z_0^{-k}}{k!}\right)$$

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

(((((1-sqrt(1-((((((1/2(4+sqrt7)^1/2-(7)^1/4)))))^24)))/2))))

Input:

$$\frac{1}{2}\left(1-\sqrt{1-\left(\frac{1}{2}\sqrt{4+\sqrt{7}}-\sqrt[4]{7}\right)^{24}}\right)$$

Result:

$$\frac{1}{2}\left(1-\sqrt{1-\left(\frac{\sqrt{4+\sqrt{7}}}{2}-\sqrt[4]{7}\right)^{24}}\right)$$

Decimal approximation:

$1.2019072669313651881992200962962756428559712573771606\ldots \times 10^{-12}$

1.2019072669316….*10^{-12}

Alternate forms:

$$\frac{1}{33554432}\left(16777216-\sqrt{\left(-10014980505762681298354176+4353760920154693970165760\sqrt{2}\sqrt[4]{7}-3785327058140861483188224\sqrt{7}+1645545612871320408686592\sqrt{2}\,7^{3/4}\right)}\right)$$

$$\frac{1}{2}-\frac{1}{2}\sqrt{1-\left(\frac{\sqrt{4+\sqrt{7}}}{2}-\sqrt[4]{7}\right)^{24}}$$

$$\frac{1}{2}-\frac{1}{8192}\left(\sqrt{\left(3\left(-198979785159482187-75207691553053488\sqrt{7}+47452306548387136\sqrt[4]{7}\sqrt{4+\sqrt{7}}+17935801262877872\times 7^{3/4}\sqrt{4+\sqrt{7}}\right)\right)}\right)$$

Minimal polynomial:

$20\,282\,409\,603\,651\,670\,423\,947\,251\,286\,016\,x^8 -$
$81\,129\,638\,414\,606\,681\,695\,789\,005\,144\,064\,x^7 +$
$721\,655\,399\,723\,986\,356\,237\,574\,382\,852\,548\,851\,662\,848\,x^6 -$
$2\,164\,966\,198\,888\,005\,334\,261\,599\,762\,622\,385\,036\,984\,320\,x^5 -$
$68\,607\,004\,714\,521\,648\,749\,925\,799\,447\,988\,643\,469\,583\,187\,968\,x^4 +$
$137\,217\,617\,706\,041\,349\,524\,163\,884\,521\,119\,679\,160\,388\,681\,728\,x^3 +$
$11\,232\,462\,484\,133\,253\,461\,216\,673\,137\,045\,649\,832\,317\,234\,794\,463\,232\,x^2 -$
$11\,232\,531\,093\,302\,934\,181\,692\,581\,168\,295\,742\,572\,311\,247\,660\,777\,472\,x +$
$13\,500\,460\,747\,057\,082\,764\,996\,435\,506\,735\,298\,654\,081$

(((((1-sqrt(1-((((((1/2(4+sqrt7)^1/2-(7)^1/4)))))^24)))/2)))) - e^(-7*Pi)

Input:

$$\frac{1}{2}\left(1-\sqrt{1-\left(\frac{1}{2}\sqrt{4+\sqrt{7}}-\sqrt[4]{7}\right)^{24}}\right)-e^{-7\pi}$$

Exact result:

$$\frac{1}{2}\left(1-\sqrt{1-\left(\frac{\sqrt{4+\sqrt{7}}}{2}-\sqrt[4]{7}\right)^{24}}\right)-e^{-7\pi}$$

Decimal approximation:

$-2.8022493848162390692091842080487822187415672940827 17\ldots \times 10^{-10}$

-2.802249384816239….*10^{-10}

Property:

$$\frac{1}{2}\left(1-\sqrt{1-\left(-\sqrt[4]{7}+\frac{\sqrt{4+\sqrt{7}}}{2}\right)^{24}}\right)-e^{-7\pi} \text{ is a transcendental number}$$

Alternate forms:

$$\frac{1}{8192}\left(4096-\sqrt{\left(3\left(-198\,979\,785\,159\,482\,187-75\,207\,691\,553\,053\,488\sqrt{7}+47\,452\,306\,548\,387\,136\sqrt[4]{7}\sqrt{4+\sqrt{7}}+17\,935\,801\,262\,877\,872\times 7^{3/4}\sqrt{4+\sqrt{7}}\right)\right)}\right)-e^{-7\pi}$$

$$
-\frac{1}{8192} e^{-7\pi}\left(8192-4096 e^{7\pi}+\sqrt{\left(3\left(-198\,979\,785\,159\,482\,187-75\,207\,691\,553\,053\,488\sqrt{7}+47\,452\,306\,548\,387\,136\sqrt[4]{7}\sqrt{4+\sqrt{7}}+17\,935\,801\,262\,877\,872\times 7^{3/4}\sqrt{4+\sqrt{7}}\right)\right)}\, e^{7\pi}\right)
$$

$$
\left(596\,939\,355\,495\,223\,777+225\,623\,074\,659\,160\,464\sqrt{7}-33\,554\,432\sqrt{\left(\frac{2\,783\,894\,518\,885\,061\,585\,088\,079\,999\,558\,785}{4\,398\,046\,511\,104}+\frac{263\,053\,306\,208\,034\,479\,089\,207\,959\,768\,009\sqrt{7}}{1\,099\,511\,627\,776}\right)}\right)\Bigg/\left(33\,554\,432\left(1+\frac{1}{4096}\left(\sqrt{\left(-596\,939\,355\,478\,446\,561-225\,623\,074\,659\,160\,464\sqrt{7}+33\,554\,432\sqrt{\left(\frac{2\,783\,894\,518\,885\,061\,585\,088\,079\,999\,558\,785}{4\,398\,046\,511\,104}+\frac{263\,053\,306\,208\,034\,479\,089\,207\,959\,768\,009\sqrt{7}}{1\,099\,511\,627\,776}\right)}\right)}\right)\right)\right)-e^{-7\pi}
$$

Series representations:

$$
\frac{1}{2}\left(1-\sqrt{1-\left(\frac{\sqrt{4+\sqrt{7}}}{2}-\sqrt[4]{7}\right)^{24}}\right)-e^{-7\pi}=\frac{1}{2}-e^{-7\pi}-\frac{1}{2}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\left(-\sqrt[4]{7}+\frac{\sqrt{4+\sqrt{7}}}{2}\right)^{24}\right)^k}{k!}
$$

$$
\frac{1}{2}\left(1-\sqrt{1-\left(\frac{\sqrt{4+\sqrt{7}}}{2}-\sqrt[4]{7}\right)^{24}}\right)-e^{-7\pi}=\frac{1}{2}-e^{-7\pi}-\frac{1}{2}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\left(-\sqrt[4]{7}+\frac{\sqrt{4+\sqrt{7}}}{2}\right)^{24}-z_0\right)^k z_0^{-k}}{k!}
$$

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

$$\frac{1}{2}\left(1-\sqrt{1-\left(\frac{\sqrt{4+\sqrt{7}}}{2}-\sqrt[4]{7}\right)^{24}}\right)-e^{-7\pi}=$$

$$\frac{1}{2}-e^{-7\pi}-\frac{1}{2}\exp\left(i\pi\left\lfloor\frac{\arg\left(1-x-\left(-\sqrt[4]{7}+\frac{\sqrt{4+\sqrt{7}}}{2}\right)^{24}\right)}{2\pi}\right\rfloor\right)\sqrt{x}$$

$$\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(1-x-\left(-\sqrt[4]{7}+\frac{\sqrt{4+\sqrt{7}}}{2}\right)^{24}\right)^k}{k!} \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

(((((1-sqrt(1-(sqrt5-2)^8(2-sqrt3)^8((((((1/2(4+sqrt15)^1/2+(15)^1/4)))))^24)))/2))))

Input:

$$\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{5}-2\right)^8\left(2-\sqrt{3}\right)^8\left(\frac{1}{2}\sqrt{4+\sqrt{15}}+\sqrt[4]{15}\right)^{24}}\right)$$

Exact result:

$$\frac{1}{2}\left(1-\sqrt{1-\left(2-\sqrt{3}\right)^8\left(\sqrt{5}-2\right)^8\left(\sqrt[4]{15}+\frac{\sqrt{4+\sqrt{15}}}{2}\right)^{24}}\right)$$

Decimal approximation:

0.5 −
17.224411414206379806353442812586938056556322099994926086... i

Polar coordinates:

$r \approx 17.2317$ (radius), $\theta \approx -88.3373°$ (angle)

17.2317

(((((1-sqrt(1-(sqrt5-2)^8(2-sqrt3)^8((((((1/2(4+sqrt15)^1/2+(15)^1/4)))))^24)))/2)))) - e^(-15*Pi)

Input:

$$\frac{1}{2}\left(1-\sqrt{1-\left(\sqrt{5}-2\right)^8\left(2-\sqrt{3}\right)^8\left(\frac{1}{2}\sqrt{4+\sqrt{15}}+\sqrt[4]{15}\right)^{24}}\right)-e^{-15\pi}$$

Exact result:

$$\frac{1}{2}\left(1-\sqrt{1-\left(2-\sqrt{3}\right)^8\left(\sqrt{5}-2\right)^8\left(\sqrt[4]{15}+\frac{\sqrt{4+\sqrt{15}}}{2}\right)^{24}}\right)-e^{-15\pi}$$

Decimal approximation:

0.499999999999999999999657741145587875913220379955969126057... − 17.224411414206379806353442812586938056556322099994926086... i

Property:

$$\frac{1}{2}\left(1-\sqrt{1-\left(2-\sqrt{3}\right)^8\left(-2+\sqrt{5}\right)^8\left(\sqrt[4]{15}+\frac{\sqrt{4+\sqrt{15}}}{2}\right)^{24}}\right)-e^{-15\pi}$$

is a transcendental number

Polar coordinates:

$r \approx 17.2317$ (radius), $\theta \approx -88.3373°$ (angle)

17.2317

From the following three results, we obtain:

-2.802249384816239….*10^{-10} 0.123516301794…. 17.2317

-2.802249384816239*10^-10 + 0.123516301794 + 17.2317

Input interpretation:

$-2.802249384816239\times 10^{-10}+0.123516301794+17.2317$

Result:

17.3552163015137750615183761

17.35521630....

-2.802249384816239*10^-10 * 0.123516301794 * 17.2317

Input interpretation:

$-2.802249384816239\times 10^{-10}\times 0.123516301794\times 17.2317$

Result:

$-5.9642959826713601073002898138822\times 10^{-10}$

-5.964295982...*10^{-10}

We note that :

-1/ (-2.802249384816239*10^-10 * 0.123516301794 * 17.2317)

Input interpretation:

$$\frac{-1}{-2.802249384816239 \times 10^{-10} \times 0.123516301794 \times 17.2317}$$

Result:

$1.676643820000542727106407348316112919029030218452972 13... \times 10^9$

$1.67664382....*10^9$

and:

e^(-2.802249384816239*10^-10 + 0.123516301794 + 17.2317)

Input interpretation:

$$e^{-2.802249384816239 \times 10^{-10} + 0.123516301794 + 17.2317}$$

Result:

$3.44568... \times 10^7$

$3.44568...*10^7$

from which:

(((((e^(-2.802249384816239*10^-10 + 0.123516301794 + 17.2317))))))^1/2 – 34

Input interpretation:

$$\sqrt{e^{-2.802249384816239 \times 10^{-10} + 0.123516301794 + 17.2317}} - 34$$

Result:

5835.989656686068288572536410469790141366435194000311551104...

5835.989656.... result practically equal to the rest mass of bottom Sigma baryon 5835.1

And:

1/(((((e^(-2.802249384816239*10^-10 + 0.123516301794 + 17.2317))))))^1/4096

Input interpretation:

$$\frac{1}{\sqrt[4096]{e^{-2.802249384816239\times 10^{-10}+0.123516301794+17.2317}}}$$

Result:

0.99577185...

0.99577185.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

2sqrt((((log base 0.99577185 (((1/(((((e^(-2.802249384816239*10^-10 + 0.123516301794 + 17.2317)))))))))))))-Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.99577185}\left(\frac{1}{e^{-2.802249384816239\times 10^{-10}+0.123516301794+17.2317}}\right)}-\pi+\frac{1}{\phi}$$

$\log_b(x)$ 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

1/4 sqrt((((log base 0.99577185 (((1/(((((e^(-2.802249384816239*10^-10 + 0.123516301794 + 17.2317)))))))))))))+1/golden ratio

Input interpretation:

$$\frac{1}{4}\sqrt{\log_{0.99577185}\left(\frac{1}{e^{-2.802249384816239\times 10^{-10}+0.123516301794+17.2317}}\right)}+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

16.6180...

16.6180.... result very near to the mass of the hypothetical light particle, the boson m_X = 16.84 MeV

From:

Dynamical evolutions of ℓ-boson stars in spherical symmetry
Miguel Alcubierre, Juan Barranco, Argelia Bernal, Juan Carlos Degollado, Alberto Diez-Tejedor, Miguel Megevand, Dario Nunez, and Olivier Sarbach - arXiv:1906.08959v2 [gr-qc] 9 Oct 2019

From the tables one can see some interesting facts. First, for all types of (small) perturbations with $0 < \varphi_0 < \varphi_0^M$, and all values of ℓ, the configurations are stable as expected. In the region $\varphi_0^M < \varphi_0 < \varphi_0^U$, the configurations are unstable and either collapse to a black hole or migrate to the stable branch. But collapse to a black hole is far more common, and we find that only type I perturbations with $\epsilon < 0$, or type II perturbations with $\epsilon > 0$ can migrate to the stable branch. Moreover, for type II perturbations with $\epsilon > 0$, migration to the stable branch only happens for very small values of ϵ, and increasing slightly the perturbation amplitude again results in collapse to a black hole. The transition between migration and collapse for these type of perturbations seems to be related not so much with the sign of the binding energy U, which in these region is always negative, but rather with the value of $dU/d\epsilon$ (that is, if U is decreasing or increasing with ϵ), but this still needs more studying. Finally, in the region $\varphi_0 > \varphi_0^U$ the configurations are also unstable and either collapse to a black hole of explode to infinity. Again, collapse is far more common and only type I perturbations with $\epsilon < 0$, or type II perturbations with $\epsilon > 0$ (and very small) explode to infinity.

Interestingly, for type 0 perturbations in the unstable branch $\varphi_0 > \varphi_0^M$, we always find collapse to a black hole except for one particular case with $\ell = 3$ for which the configuration migrates to the stable branch. Of course, these perturbations are only through numerical truncation error which we can not control.

We have the following partial **Tables**, where we show only some values: a) those that are connected to the Rogers-Ramanujan continued fraction 0.9568666373, to the spectral index n_s , to the mesonic Regge slope (see Appendix), to the inflaton value at the end of the inflation 0.9402 and b) those that are connected to the values near to the golden ratio conjugate, near to the golden ratio and to the square of it.

The expression for the total mass of ℓ-boson star is:

$$M := \int_0^\infty r^2 \psi^6 B^{3/2} \left[4\pi \rho_E + \frac{1}{4} \left(K_{ij} K^{ij} - K^2 \right) \right] \times \left[1 + r \left(\frac{\partial_r B}{2B} + 2 \frac{\partial_r \psi}{\psi} \right) \right] dr \, ,$$

From:

A FRAMEWORK OF ROGERS–RAMANUJAN IDENTITIES AND THEIR ARITHMETIC PROPERTIES - *MICHAEL J. GRIFFIN, KEN ONO, AND S. OLE WARNAAR*
https://arxiv.org/abs/1401.7718v4

The Rogers–Ramanujan (RR) identities [69]

$$G(q) := \sum_{n=0}^{\infty} \frac{q^{n^2}}{(1-q)\cdots(1-q^n)} = \prod_{n=0}^{\infty} \frac{1}{(1-q^{5n+1})(1-q^{5n+4})} \tag{1.1}$$

and

$$H(q) := \sum_{n=0}^{\infty} \frac{q^{n^2+n}}{(1-q)\cdots(1-q^n)} = \prod_{n=0}^{\infty} \frac{1}{(1-q^{5n+2})(1-q^{5n+3})} \tag{1.2}$$

play many roles in mathematics and physics. They are essentially modular functions, and their ratio $H(q)/G(q)$ is the famous Rogers–Ramanujan q-continued fraction

$$\frac{H(q)}{G(q)} = \cfrac{1}{1+\cfrac{q}{1+\cfrac{q^2}{1+\cfrac{q^3}{\ddots}}}}. \tag{1.3}$$

The *golden ratio* ϕ satisfies $H(1)/G(1) = 1/\phi = (-1+\sqrt{5})/2$. Ramanujan computed further values such as[1]

$$e^{-\frac{2\pi}{5}} \cdot \frac{H(e^{-2\pi})}{G(e^{-2\pi})} = \sqrt{\frac{5+\sqrt{5}}{2}} - \frac{\sqrt{5}+1}{2}. \tag{1.4}$$

The minimal polynomial of this value is

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

which shows that it is an algebraic integral unit. All of Ramanujan's evaluations are such units.

We have that, from (1.4):

((5+sqrt(5))/2)^1/2 – (((sqrt(5)-1)/2))

Input:

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

Result:

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

Decimal approximation:

1.2840790438404122960282918323931261690910880884457375827 59...

1.28407904384...

Alternate forms:

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

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

Minimal polynomial:

$$x^4-2x^3-6x^2+12x-4$$

From which, we have that:

((5+sqrt(5))/2)^1/2 – x = 1.284079043840412296

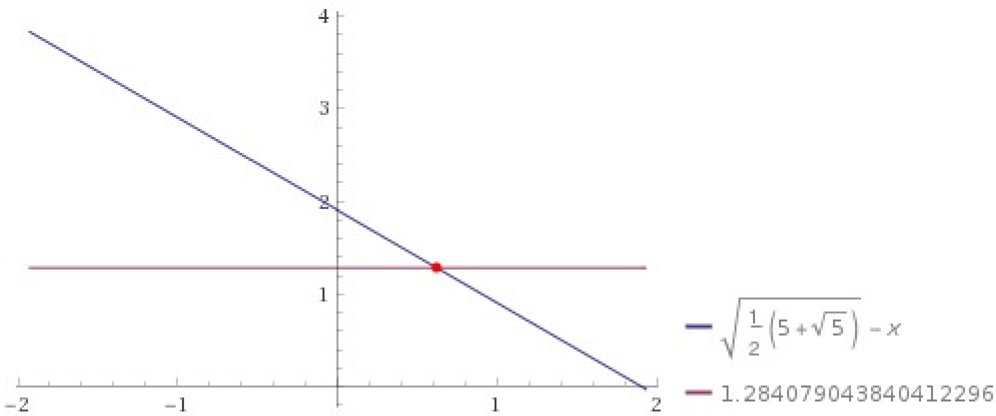
Input interpretation:

$$\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}-x=1.284079043840412296$$

Result:

$$\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}-x=1.284079043840412296$$

Plot:



Alternate forms:

$$0.618033988749894848-x=0$$

$$\frac{1}{2}\left(\sqrt{2\left(5+\sqrt{5}\right)}-2x\right)=1.284079043840412296$$

Solution:

$$x\approx 0.618033988749894848$$

0.61803398….. result very near to the value of the total mass of ℓ-boson star 0.6193 and equal to the conjugate of the value of the golden ratio

ℓ	a_0	ω	Perturbation	M	N_B	U	$\epsilon/\varphi_R^{\max}$	s	r_0	End result
0	0.4	0.80866	Type III	0.6193	0.6305	−0.0112	+0.01	+1	20.0	black hole
0	0.4	0.80866	Type III	0.6193	0.6166	+0.0027	+0.01	−1	20.0	black hole

Thence, we have the following mathematical connection, between the total mass of ℓ-boson star and the Rogers-Ramanujan q-continued fraction:

$$e^{-\frac{2\pi}{5}} \cdot \frac{H(e^{-2\pi})}{G(e^{-2\pi})} = \sqrt{\frac{5+\sqrt{5}}{2}} - \frac{\sqrt{5}+1}{2}.$$

$$M = \left(\begin{array}{l} \int_0^\infty r^2 \psi^6 B^{3/2} \left[4\pi \rho_E + \frac{1}{4} \left(K_{ij} K^{ij} - K^2 \right) \right] \\ \times \left[1 + r \left(\frac{\partial_r B}{2B} + 2 \frac{\partial_r \psi}{\psi} \right) \right] dr \,, \end{array} \right) \cong \left(\frac{1}{2} \left(\sqrt{2\left(5+\sqrt{5}\right)} - 2x \right) = 1.284079043840412296 \right) \Rightarrow$$

$0.6193 \cong 0.61803398…..$

And:

-Pi+((5+sqrt(5))/2)^1/2 – (((sqrt(5)-1)/2))

Input:

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

Result:

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

Decimal approximation:

-1.857513609749380942434351550886376715106081310929368238 21...

-1.8575136…

Property:

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

Alternate forms:

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

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

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

Series representations:

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

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

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

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

thence:

3	0.02	0.72405	Type I	1.8558	1.8170	+0.0388	+0.01	0	4.0	black hole

$$M = \left(\begin{array}{l} \int_0^\infty r^2 \psi^6 B^{3/2} \left[4\pi \rho_E + \frac{1}{4}(K_{ij}K^{ij} - K^2)\right] \\ \times \left[1 + r\left(\frac{\partial_r B}{2B} + 2\frac{\partial_r \psi}{\psi}\right)\right] dr \,, \end{array} \right) \cong -\left(\frac{1}{2}\left(1-\sqrt{5}\right)+\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}-\pi\right) \Rightarrow$$

1.8558 ≈ 1.8575136

Then:

((5+sqrt(5))/2)^1/2 – (((sqrt(5)-1)/2)) + 7/18

where 7 and 18 are Lucas numbers

Input:

$$\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)} - \frac{1}{2}\left(\sqrt{5}-1\right) + \frac{7}{18}$$

Result:

$$\frac{7}{18} + \frac{1}{2}\left(1-\sqrt{5}\right) + \sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}$$

Decimal approximation:

1.672967932729301184917180721282015057979976977334626471648...

1.6729679327….result practically equal to the proton mass

Alternate forms:

$$\frac{1}{18}\left(9\sqrt{2\left(5+\sqrt{5}\right)} - 9\sqrt{5} + 16\right)$$

$$\frac{8}{9} - \frac{\sqrt{5}}{2} + \sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}$$

$$\frac{1}{18}\left(16 - 9\sqrt{5}\right) + \sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}$$

Minimal polynomial:

$104976x^4 - 373248x^3 - 289656x^2 + 1629648x - 990299$

And:

|2|0.005|0.88354| Type I |1.6229|1.6749|−0.0520| −0.01 | 0 | 8.0 |

$$M = \left(\int_0^\infty r^2 \psi^6 B^{3/2} \left[4\pi\rho_E + \frac{1}{4}\left(K_{ij}K^{ij} - K^2\right)\right] \times \left[1 + r\left(\frac{\partial_r B}{2B} + 2\frac{\partial_r \psi}{\psi}\right)\right] dr \, , \right) \cong \left(\frac{7}{18} + \frac{1}{2}\left(1 - \sqrt{5}\right) + \sqrt{\frac{1}{2}\left(5 + \sqrt{5}\right)} \right) \Rightarrow$$

$$\left(1.6229 | 1.6749 | -0.0520 \right) \cong 1.6729679327\ldots$$

From:

Dynamical evolutions of ℓ-boson stars in spherical symmetry

Miguel Alcubierre, Juan Barranco, Argelia Bernal, Juan Carlos Degollado, Alberto Diez-Tejedor, Miguel Megevand, Darıo Nunez, and Olivier Sarbach

arXiv:1906.08959v2 [gr-qc] 9 Oct 2019

ℓ	a_0	ω	Perturbation	M	N_B	U	$\epsilon/\varphi_R^{\max}$	s	r_0	End result
0	0.2	0.88401	Type 0	0.6209	0.6391	−0.0182	–	–	–	stable
0	0.2	0.88401	Type I	0.6211	0.6394	−0.0183	+0.005	0	0.0	stable
0	0.2	0.88401	Type I	0.6207	0.6389	−0.0182	−0.005	0	0.0	stable
0	0.2	0.88401	Type II	0.6209	0.6391	−0.0182	+0.005	−1	0.0	stable
0	0.2	0.88401	Type II	0.6209	0.6391	−0.0182	−0.005	−1	0.0	stable
0	0.2	0.88401	Type III	0.6238	0.6412	−0.0174	+0.01	+1	20.0	stable
0	0.2	0.88401	Type III	0.6237	0.6372	−0.0135	+0.01	−1	20.0	stable
0	0.4	0.80866	Type 0	0.6088	0.6235	−0.0147	–	–	–	black hole
0	0.4	0.80866	Type I	0.6096	0.6246	−0.0150	+0.005	0	0.0	black hole
0	0.4	0.80866	Type I	0.6079	0.6225	−0.0146	−0.005	0	0.0	migration to stable branch
0	0.4	0.80866	Type II	0.6087	0.6235	−0.0148	+0.005	−1	0.0	migration to stable branch
0	0.4	0.80866	Type II	0.6088	0.6236	−0.0148	−0.005	−1	0.0	black hole
0	0.4	0.80866	Type III	0.6193	0.6305	−0.0112	+0.01	+1	20.0	black hole
0	0.4	0.80866	Type III	0.6193	0.6166	+0.0027	+0.01	−1	20.0	black hole

ℓ	a_0	ω	Perturbation	M	N_B	U	$\epsilon/\varphi_R^{\max}$	s	r_0	End result
1	0.4	0.74471	Type 0	0.9674	0.9476	+0.0198	–	–	–	black hole
1	0.4	0.74471	Type I	0.9743	0.9568	+0.0175	+0.01	0	1.7	black hole
1	0.4	0.74471	Type I	0.9606	0.9385	+0.0221	−0.01	0	1.7	explosion to infinity
1	0.4	0.74471	Type II	0.9673	0.9473	+0.0200	+0.01	−1	1.7	explosion to infinity
1	0.4	0.74471	Type II	0.9677	0.9478	+0.0199	−0.01	−1	1.7	black hole
1	0.4	0.74471	Type III	0.9714	0.9502	+0.0212	+0.01	+1	20.0	black hole
1	0.4	0.74471	Type III	0.9714	0.9450	+0.0264	+0.01	−1	20.0	black hole

ℓ	a_0	ω	Perturbation	M	N_B	U	$\epsilon/\varphi_R^{\max}$	s	r_0	End result
2	0.005	0.88354	Type 0	1.6268	1.6793	−0.0525	–	–	–	stable
2	0.005	0.88354	Type I	1.6307	1.6837	−0.0530	+0.01	0	8.0	stable
2	0.005	0.88354	Type I	1.6229	1.6749	−0.0520	−0.01	0	8.0	stable
2	0.005	0.88354	(A) Type II	1.6268	1.6792	−0.0524	+0.01	−1	8.0	stable
2	0.005	0.88354	Type II	1.6268	1.6793	−0.0525	−0.01	−1	8.0	stable
2	0.005	0.88354	Type III	1.6273	1.6797	−0.0524	+0.01	+1	30.0	stable
2	0.005	0.88354	Type III	1.6273	1.6789	−0.0516	+0.01	−1	30.0	stable
2	0.05	0.76114	Type 0	1.6035	1.6388	−0.0353	–	–	–	black hole
2	0.05	0.76114	Type I	1.6121	1.6502	−0.0381	+0.01	0	4.0	black hole
2	0.05	0.76114	(B) Type I	1.5949	1.6276	−0.0327	−0.01	0	4.0	migration to stable branch
2	0.05	0.76114	Type II	1.6035	1.6388	−0.0353	+0.005	−1	4.0	migration to stable branch
2	0.05	0.76114	Type II	1.6035	1.6387	−0.0352	+0.01	−1	4.0	black hole
2	0.05	0.76114	Type II	1.6036	1.6389	−0.0353	−0.01	−1	4.0	black hole
2	0.05	0.76114	Type III	1.6062	1.6407	−0.0345	+0.01	+1	30.0	black hole
2	0.05	0.76114	Type III	1.6062	1.6370	−0.0308	+0.01	−1	30.0	black hole

ℓ	a_0	ω	Perturbation	M	N_B	U	$\epsilon/\varphi_R^{\max}$	s	r_0	End result
4	0.0005	0.75793	Type 0	2.6419	2.7181	−0.0762	–	–	–	black hole
4	0.0005	0.75793	Type I	2.6539	2.7339	−0.0800	+0.01	0	7.5	black hole
4	0.0005	0.75793	Type I	2.6299	2.7024	−0.0725	−0.01	0	7.5	migration to stable branch
4	0.0005	0.75793	Type II	2.6419	2.7181	−0.0762	+0.005	−1	7.5	migration to stable branch
4	0.0005	0.75793	Type II	2.6419	2.7180	−0.0761	+0.01	−1	7.5	black hole
4	0.0005	0.75793	Type II	2.6420	2.7181	−0.0761	−0.01	−1	7.5	black hole
4	0.0005	0.75793	Type III	2.6430	2.7190	−0.0760	+0.01	+1	30.0	black hole
4	0.0005	0.75793	Type III	2.6430	2.7173	−0.0743	+0.01	−1	30.0	black hole

We note that:

From:

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

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

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

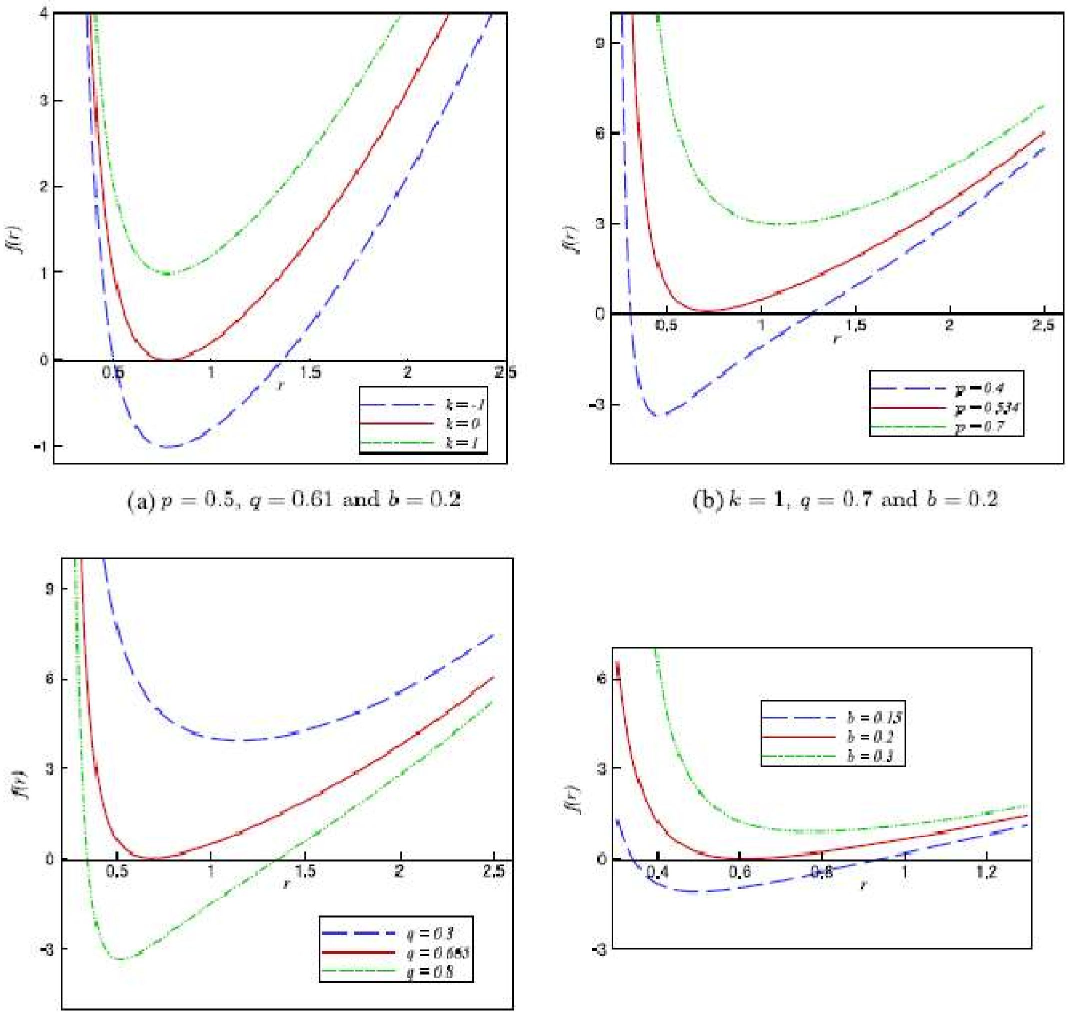
ω	6	$m_{u/d} = 0 - 60$	$0.910 - 0.918$
ω/ω_3	$5+3$	$m_{u/d} = 255 - 390$	$0.988 - 1.18$
ω/ω_3	$5+3$	$m_{u/d} = 240 - 345$	$0.937 - 1.000$

From:

PHYSICAL REVIEW D 99, 024028 (2019)

Topological dyonic dilaton black holes in AdS spaces
S. Hajkhalili and A. Sheykhi

We have that:



(a) $p = 0.5$, $q = 0.61$ and $b = 0.2$

(b) $k = 1$, $q = 0.7$ and $b = 0.2$

(c) $k = 1$, $p = 0.5$ and $b = 0.2$

(d) $k = 1$, $p = 0.4$ and $q = 0.56$

FIG. 1. The behavior of the metric function $f(r)$ versus r.

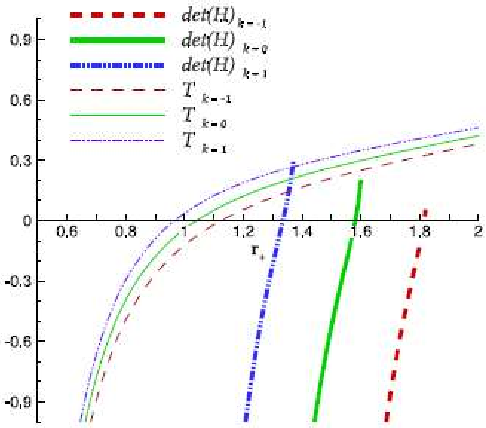
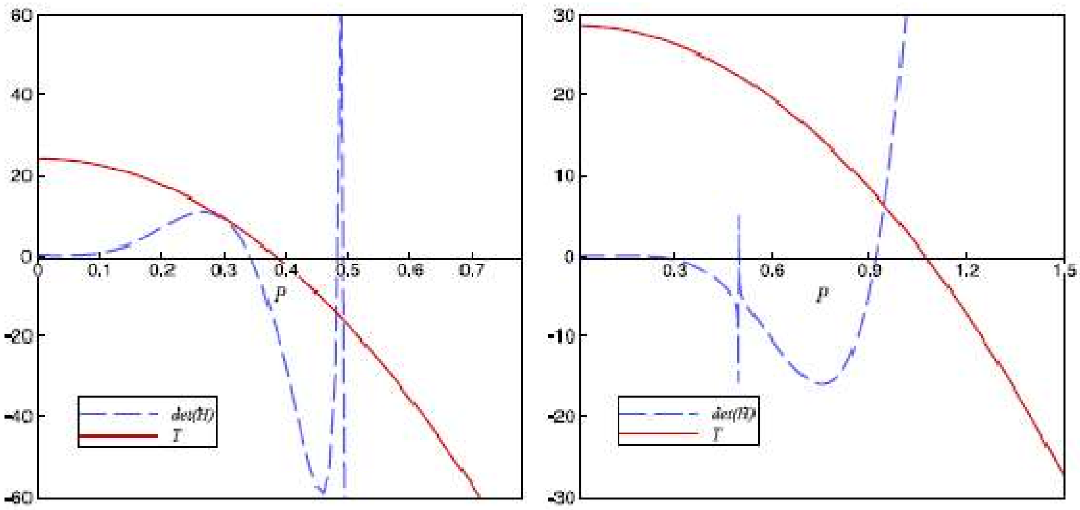
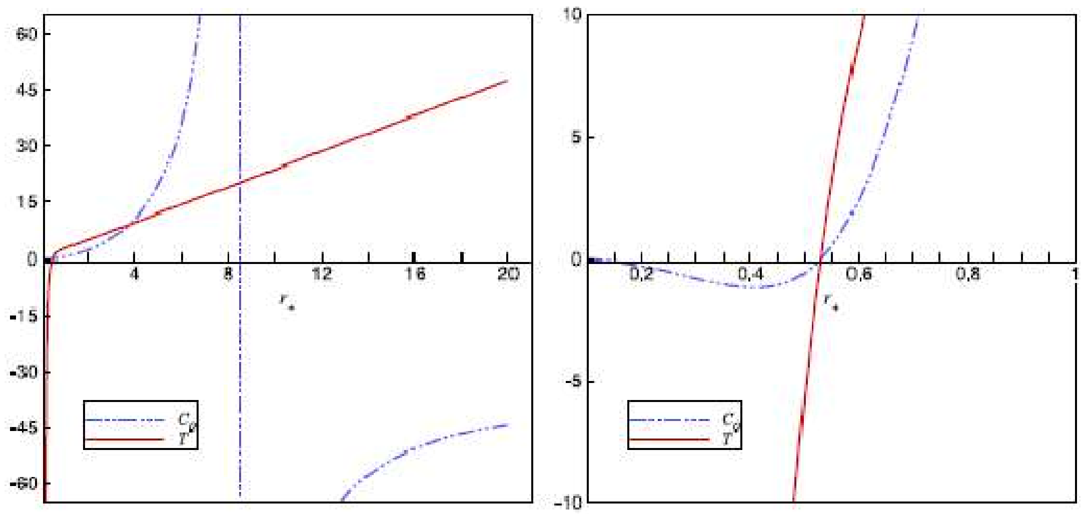


FIG. 2. $b = 0.2$, $P = 1$ and $Q = 0.6$.



(a) $r_+ = 0.6$ (b) $r_+ = 1$

FIG. 3. $b = 0.2$, $k = 1$ and $Q = 0.5$.



(a) $Q = 0.2$ (b) $Q = 6$

FIG. 4. $b = 0.1$, $k = 1$ and $P = 0.4$

charge ($p = 0$), it reduces to the temperature of charged AdS dilaton black hole [6] for $\alpha = 1$. The entropy of the dilaton black hole typically obeys the area law of the entropy which is a quarter of the event horizon area [23]. For our solution the entropy per unit area ω_2 is obtained as

$$S = \frac{r_+^2}{4}\left(1 - \frac{b}{r_+}\right), \tag{29}$$

The above expression is exactly the entropy of charged AdS dilaton black hole [6]. Using Brown and York formalism we calculate the mass of the asymptotically AdS dyonic dilaton black hole [6]. We find the mass per unit area ω_2 of the horizon as

$$M = \frac{q^2 - p^2}{4b\pi}. \tag{30}$$

In the absence of magnetic charge ($p = 0$), it recovers the mass of the AdS dilaton black hole [6], while in the absence of dilaton field ($b = 0$), it reduces to the mass of topological dyonic AdS black holes. One may use the Gauss's law to calculate the total electric and magnetic charge of the black hole. According to the Gauss theorem, the electric charge of the black hole per unit area ω_2 is

$$Q = \frac{1}{4\pi}\int_{r\to\infty} \sqrt{-g}F_{tr}d^2x = \frac{q}{4\pi}. \tag{31}$$

Similarly, we can obtain the total magnetic charge of the dyonic black hole per unit area ω_2 as

$$P = \frac{p}{4\pi}. \qquad (32)$$

Also, one can obtain U_Q and U_P which are, respectively, the electric and magnetic potential by using the free energy, which is given as [22]

$$W = \frac{I_{\text{onshell}}}{\beta} \qquad (33)$$

where I_{onshell} is the on shell action and β is the inverse of temperature. Multiplying both sides of Eq. (4) by $g^{\mu\nu}$, we arrive at

$$\mathcal{R} = 2\partial^{\mu}\phi\partial_{\mu}\phi + 2V(\Phi). \qquad (34)$$

Substituting Eq. (34) in Eq. (2), we find

$$\begin{aligned} I_{\text{onshell}} &= \frac{1}{16\pi}\int d^4x\sqrt{-g}(V(\Phi) - e^{-2\Phi}F^2) \\ &= -\frac{1}{16\pi}\int d^4x\left[\frac{2\sin(\theta)}{r^2(r-b)^2}\left(\frac{-r^2\Lambda}{6}(r^2(b-r)^2(6r^2 \right.\right. \\ &\quad \left.\left. + b^2 - 6br)) + r^2(P^2 - Q^2) + Q^2(2br - b^2)\right)\right] \end{aligned} \qquad (35)$$

We have that:

0.6^2/4(1-0.2/0.6) = S

Input:

$$\frac{0.6^2}{4}\left(1 - \frac{0.2}{0.6}\right)$$

Result:

0.06

0.5 = x/(4Pi) = q

Input:

$$0.5 = \frac{x}{4\pi}$$

Solution:

$x \approx 6.28319$

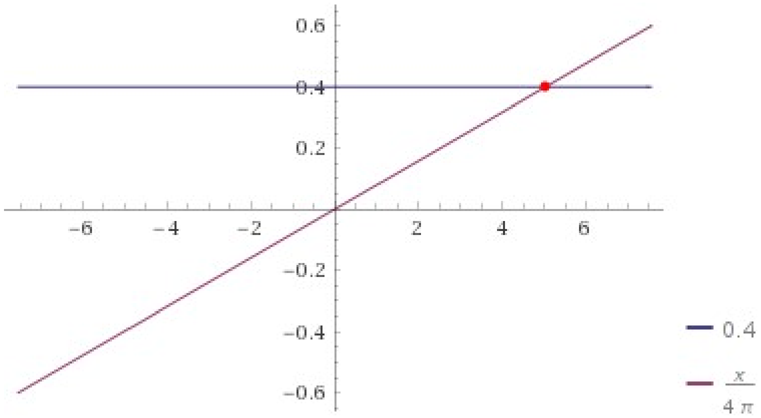
6.28319 = 2π = q

0.4 = x/(4Pi)

Input:

$$0.4 = \frac{x}{4\pi}$$

Plot:



Alternate form:

$$0.4 - \frac{x}{4\pi} = 0$$

Solution:

$x \approx 5.02655$

5.02655 = p

From:

$$M = \frac{q^2 - p^2}{4b\pi}.$$

For b = 0.2, q = 0.61 and p = 0.5

((((0.61)^2-(0.5)^2))) / (4*0.2*Pi)

Input:

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2\,\pi}$$

Result:

0.0485820...

0.0485820

Alternative representations:

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{-0.5^2 + 0.61^2}{144 °}$$

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = -\frac{-0.5^2 + 0.61^2}{0.8 i \log(-1)}$$

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{-0.5^2 + 0.61^2}{0.8 \cos^{-1}(-1)}$$

Series representations:

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{0.0381562}{\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}}$$

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{0.0763125}{-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}}$$

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{0.152625}{\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{0.0763125}{\int_0^{\infty} \frac{1}{1+t^2} \, dt}$$

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{0.0381562}{\int_0^1 \sqrt{1-t^2} \, dt}$$

$$\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi} = \frac{0.0763125}{\int_0^{\infty} \frac{\sin(t)}{t} \, dt}$$

Or, with the previous data:

For b = 0.2 q = 2π and p = 5.02655, we obtain:

(((2Pi)^2-(5.02655)^2)) / (4*0.2*Pi)

Input interpretation:

$$\frac{(2\pi)^2 - 5.02655^2}{4\times 0.2\pi}$$

Result:

5.65486...

5.65486…. = M

Alternative representations:

$$\frac{(2\pi)^2 - 5.02655^2}{4\times 0.2\pi} = \frac{-5.02655^2 + (360\,°)^2}{144\,°}$$

$$\frac{(2\pi)^2 - 5.02655^2}{4\times 0.2\pi} = -\frac{-5.02655^2 + (-2\,i\log(-1))^2}{0.8\,i\log(-1)}$$

$$\frac{(2\pi)^2 - 5.02655^2}{4\times 0.2\pi} = \frac{-5.02655^2 + (2\cos^{-1}(-1))^2}{0.8\cos^{-1}(-1)}$$

Series representations:

$$\frac{(2\pi)^2 - 5.02655^2}{4\times 0.2\pi} = \frac{20\left(-0.628319 + \sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)\left(0.628319 + \sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$\frac{(2\pi)^2 - 5.02655^2}{4\times 0.2\pi} = \frac{10\left(-1.57914 + \sqrt{3}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k}{1+2k}\right)^2\right)}{\sqrt{3}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k}{1+2k}}$$

$$\frac{(2\pi)^2 - 5.02655^2}{4 \times 0.2\pi} = \frac{10\left(-2.25664 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)\left(0.256638 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)}{-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}}$$

Integral representations:

$$\frac{(2\pi)^2 - 5.02655^2}{4 \times 0.2\pi} = \frac{10\left(-1.25664 + \int_0^{\infty} \frac{1}{1+t^2}\,dt\right)\left(1.25664 + \int_0^{\infty} \frac{1}{1+t^2}\,dt\right)}{\int_0^{\infty} \frac{1}{1+t^2}\,dt}$$

$$\frac{(2\pi)^2 - 5.02655^2}{4 \times 0.2\pi} = \frac{10\left(-1.25664 + \int_0^{\infty} \frac{\sin(t)}{t}\,dt\right)\left(1.25664 + \int_0^{\infty} \frac{\sin(t)}{t}\,dt\right)}{\int_0^{\infty} \frac{\sin(t)}{t}\,dt}$$

$$\frac{(2\pi)^2 - 5.02655^2}{4 \times 0.2\pi} = \frac{20\left(-0.628319 + \int_0^{1} \sqrt{1-t^2}\,dt\right)\left(0.628319 + \int_0^{1} \sqrt{1-t^2}\,dt\right)}{\int_0^{1} \sqrt{1-t^2}\,dt}$$

From the previous result:

0.0485820...

0.0485820 , inserting this value of mass 0.048582000 in the Hawking radiation calculator, we obtain:

Mass = 0.048582000

Radius = 7.213706e-29

Temperature = 2.526045e+24

From the Ramanujan-Nardelli mock formula, we obtain:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(0.048582000)* sqrt[[-((((2.526045e+24 * 4*Pi*(7.213706e-29)^3-(7.213706e-29)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{\left(1/\left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{0.048582000}\sqrt{-\frac{2.526045\times 10^{24}\times 4\pi(7.213706\times 10^{-29})^3-(7.213706\times 10^{-29})^2}{6.67\times 10^{-11}}}\right)\right)}$$

Result:

1.618249204105811708562737345616323567639330926742470400721...

1.6182492…

And:

1/sqrt[[[[1/((((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(0.048582000)* sqrt[[-((((2.526045e+24 * 4*Pi*(7.213706e-29)^3-(7.213706e-29)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\frac{1}{\sqrt{\frac{1}{\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\times\frac{1}{0.048582000}\sqrt{-\frac{2.526045\times 10^{24}\times 4\pi(7.213706\times 10^{-29})^3-(7.213706\times 10^{-29})^2}{6.67\times 10^{-11}}}}}}$$

Result:

0.617951794731495177543773746966283208021036225409526143541...

0.61795179…

Now, we have:

It is important to note that the dialton field does not affect the electric potential, while it changes the magnetic potential. In the absence of the dilaton field ($b = 0$), magnetic potential is the same as that in [19,22]. In the thermodynamics consideration, the satisfaction of the first law of thermodynamics implies the correctness of conserved and thermodynamic quantities. In order to check this, we obtain the mass M per unit area ω_2 as a function of extensive quantities S, Q and P. We find

$$M(S,Q,P)=\frac{4\pi}{b}(Q^2-P^2). \qquad (38)$$

For Q = 0.6 P = 1 and b = 0.2, we obtain:

(4pi/0.2) (0.6^2-1)

Input:

$$\frac{4\pi}{0.2}\left(0.6^2-1\right)$$

Result:

$-40.2124\ldots$

-40.2124…. = M

Alternative representations:

$$\frac{\left(0.6^2-1\right)(4\pi)}{0.2}=\frac{720\,°\left(-1+0.6^2\right)}{0.2}$$

$$\frac{\left(0.6^2-1\right)(4\pi)}{0.2}=-\frac{4\,i\log(-1)\left(-1+0.6^2\right)}{0.2}$$

$$\frac{\left(0.6^2-1\right)(4\pi)}{0.2}=\frac{4\cos^{-1}(-1)\left(-1+0.6^2\right)}{0.2}$$

Series representations:

$$\frac{\left(0.6^2-1\right)(4\pi)}{0.2}=-51.2\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\frac{\left(0.6^2-1\right)(4\pi)}{0.2}=25.6-25.6\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$\frac{\left(0.6^2-1\right)(4\pi)}{0.2}=-12.8\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$\frac{\left(0.6^2-1\right)(4\pi)}{0.2}=-25.6\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

$$\frac{(0.6^2-1)(4\pi)}{0.2} = -51.2 \int_0^1 \sqrt{1-t^2}\, dt$$

$$\frac{(0.6^2-1)(4\pi)}{0.2} = -25.6 \int_0^\infty \frac{\sin(t)}{t}\, dt$$

From the ratio of two masses, we obtain:

-((4pi/0.2) (0.6^2-1))/0.048582000

Input interpretation:

$$-\frac{\left(4\times\frac{\pi}{0.2}\right)(0.6^2-1)}{0.048582000}$$

Result:

827.722...

827.722…

Alternative representations:

- More

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = -\frac{720^\circ(-1+0.6^2)}{0.048582\times 0.2}$$

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = \frac{4\,i\log(-1)(-1+0.6^2)}{0.048582\times 0.2}$$

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = -\frac{4\cos^{-1}(-1)(-1+0.6^2)}{0.048582\times 0.2}$$

Series representations:

- More

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = 1053.89 \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}$$

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = -526.944 + 526.944 \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}$$

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = 263.472 \sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

- More

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = 526.944 \int_0^{\infty} \frac{1}{1+t^2}\, dt$$

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = 1053.89 \int_0^{1} \sqrt{1-t^2}\, dt$$

$$-\frac{(4\pi)(0.6^2-1)}{0.048582\times 0.2} = 526.944 \int_0^{\infty} \frac{\sin(t)}{t}\, dt$$

From the ratio between the charge and the two masses ratio, we obtain:

1/((((0.6*1 /(((-((4pi/0.2) (0.6^2-1))*1/0.048582000)))))))

Input interpretation:

$$\frac{1}{0.6\left(-\frac{1}{\left(\left(4\times\frac{\pi}{0.2}\right)(0.6^2-1)\right)\times\frac{1}{0.048582000}}\right)}$$

Result:

1379.54...

1379.54... result very near to the rest mass of Sigma baryon 1382.8

Alternative representations:

- More

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = \frac{1}{-\frac{0.6}{\frac{720^\circ(-1+0.6^2)}{0.048582\times 0.2}}}$$

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = \frac{1}{\frac{0.6}{\frac{4\,i\log(-1)(-1+0.6^2)}{0.048582\times 0.2}}}$$

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = \frac{1}{-\frac{0.6}{\frac{4\cos^{-1}(-1)(-1+0.6^2)}{0.048582\times 0.2}}}$$

Series representations:

- More

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = 1756.48\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = -878.24 + 878.24\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = 439.12\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

- More

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = 878.24\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = 1756.48\int_0^{1}\sqrt{1-t^2}\,dt$$

$$\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2\times 0.048582}}} = 878.24\int_0^{\infty}\frac{\sin(t)}{t}\,dt$$

From the ratio between the charge 0.6 and the mass 0.048582000, we obtain:

((((0.6/(((((((0.61)^2-(0.5)^2))) *1/ (4*0.2*Pi)))))

Input:

$$\frac{0.6}{(0.61^2 - 0.5^2) \times \frac{1}{4 \times 0.2 \pi}}$$

Result:

12.3502...

12.3502….

This result is very near to the values of black hole entropies 12.1904 – 12.5664

Alternative representations:

$$\frac{0.6}{\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi}} = \frac{0.6}{\frac{-0.5^2 + 0.61^2}{144 °}}$$

$$\frac{0.6}{\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi}} = \frac{0.6}{-\frac{-0.5^2 + 0.61^2}{0.8 \, i \log(-1)}}$$

$$\frac{0.6}{\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi}} = \frac{0.6}{\frac{-0.5^2 + 0.61^2}{0.8 \cos^{-1}(-1)}}$$

Series representations:

$$\frac{0.6}{\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi}} = 15.7248 \sum_{k=0}^{\infty} \frac{(-1)^k}{1 + 2k}$$

$$\frac{0.6}{\frac{0.61^2 - 0.5^2}{4 \times 0.2 \pi}} = -7.86241 + 7.86241 \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}$$

$$\frac{0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} = 3.9312 \sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$\frac{0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} = 7.86241 \int_0^{\infty} \frac{1}{1+t^2}\,dt$$

$$\frac{0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} = 15.7248 \int_0^{1} \sqrt{1-t^2}\,dt$$

$$\frac{0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} = 7.86241 \int_0^{\infty} \frac{\sin(t)}{t}\,dt$$

And:

((((0.6/(((((((0.61)^2-(0.5)^2))) *1/ (4*0.2*Pi))))))))*Pi^2+(sqrt5+5)/2

Input:

$$\frac{0.6}{(0.61^2-0.5^2)\times\frac{1}{4\times 0.2\pi}}\,\pi^2 + \frac{1}{2}\left(\sqrt{5}+5\right)$$

Result:

125.510...

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

Series representations:

$$\frac{\pi^2\,0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} + \frac{1}{2}\left(\sqrt{5}+5\right) = \frac{5}{2} + 3.9312\,\pi^3 + \frac{1}{2}\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{\pi^2\,0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} + \frac{1}{2}\left(\sqrt{5}+5\right) = \frac{5}{2} + 3.9312\,\pi^3 + \frac{1}{2}\sqrt{4}\sum_{k=0}^{\infty} \frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$\frac{\pi^2\, 0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} + \frac{1}{2}\left(\sqrt{5}+5\right) = \frac{5}{2} + 3.9312\,\pi^3 + \frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{4\sqrt{\pi}}$$

And:

1/(((((((0.6/(((((((0.61)^2-(0.5)^2))) *1/ (4*0.2*Pi))))))))*Pi^2+(sqrt5+5)/2)))^1/4096

Input:

$$\frac{1}{\sqrt[4096]{\frac{0.6}{\left(0.61^2-0.5^2\right)\times\frac{1}{4\times 0.2\pi}}\,\pi^2 + \frac{1}{2}\left(\sqrt{5}+5\right)}}$$

Result:

0.998820914...

0.998820914… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Series representations:

$$\frac{1}{\sqrt[4096]{\frac{\pi^2\, 0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} + \frac{1}{2}\left(\sqrt{5}+5\right)}} = \frac{1}{\sqrt[4096]{\frac{5}{2} + 3.9312\,\pi^3 + \frac{1}{2}\sqrt{4}\sum_{k=0}^{\infty} 4^{-k}\binom{\frac{1}{2}}{k}}}$$

$$\frac{1}{\sqrt[4096]{\frac{\pi^2\, 0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\pi}} + \frac{1}{2}\left(\sqrt{5}+5\right)}} = \frac{1}{\sqrt[4096]{3.9312\,\pi^3 + \frac{1}{2}\left(5+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}}$$

$$\frac{1}{\sqrt[4096]{\frac{\pi^2\, 0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\,\pi}} + \frac{1}{2}\left(\sqrt{5}+5\right)}} = \frac{1}{\sqrt[4096]{\frac{5}{2} + 3.9312\,\pi^3 + \frac{\sum_{j=0}^{\infty} \operatorname{Res}_{s=-\frac{1}{2}+j} 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{4\sqrt{\pi}}}}$$

And also:

2sqrt[log base 0.998820914 (((1/(((((((0.6/(((((((0.61)^2-(0.5)^2))) *1/(4*0.2*Pi))))))))*Pi^2+(sqrt5+5)/2))))))]-Pi+1/golden ratio

Input interpretation:

$$2\sqrt{\log_{0.998820914}\left(\frac{1}{\frac{0.6}{\left(0.61^2-0.5^2\right)\times\frac{1}{4\times 0.2\,\pi}}\,\pi^2 + \frac{1}{2}\left(\sqrt{5}+5\right)}\right)} - \pi + \frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.4764408908421047891164700624825712042669834839705258087...

125.47644089… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Series representations:

$$2\sqrt{\log_{0.998821}\left(\frac{1}{\frac{\pi^2\, 0.6}{\frac{0.61^2-0.5^2}{4\times 0.2\,\pi}} + \frac{1}{2}\left(\sqrt{5}+5\right)}\right)} - \pi + \frac{1}{\phi} = \frac{1}{\phi} - \pi + 2\sqrt{-\frac{\sum_{k=1}^{\infty} \frac{(-1)^k \left(-1+\frac{2}{5+7.86241\,\pi^3+\sqrt{5}}\right)^k}{k}}{\log(0.998821)}}$$

$$2\sqrt{\log_{0.998821}\left(\frac{1}{\frac{\pi^2\,0.6}{\frac{0.61^2-0.5^2}{4\times0.2\,\pi}}+\frac{1}{2}\left(\sqrt{5}+5\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{-1+\log_{0.998821}\left(\frac{2}{5+7.86241\,\pi^3+\sqrt{5}}\right)}$$
$$\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-1+\log_{0.998821}\left(\frac{2}{5+7.86241\,\pi^3+\sqrt{5}}\right)\right)^{-k}$$

$$2\sqrt{\log_{0.998821}\left(\frac{1}{\frac{\pi^2\,0.6}{\frac{0.61^2-0.5^2}{4\times0.2\,\pi}}+\frac{1}{2}\left(\sqrt{5}+5\right)}\right)}-\pi+\frac{1}{\phi}=$$

$$\frac{1}{\phi}-\pi+2\sqrt{-\log\left(\frac{2}{5+7.86241\,\pi^3+\sqrt{5}}\right)\left(847.615+\sum_{k=0}^{\infty}(-0.00117909)^k\,G(k)\right)}$$

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

For Q = 0.6 and M = -40.2124, we obtain:

2[((((1/((((0.6*1 /(((-((4pi/0.2) (0.6^2-1))))))))))) - Pi]-golden ratio^2

Input:

$$2\left(\frac{1}{0.6\left(-\frac{1}{\left(4\times\frac{\pi}{0.2}\right)\left(0.6^2-1\right)}\right)}-\pi\right)-\phi^2$$

ϕ is the golden ratio

Result:

125.14006725723503018260957741900081250629791306144854052 41...

125.140067257… result very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0

Alternative representations:

$$2\left(\frac{1}{-\frac{\frac{0.6}{(4\pi)(0.6^2-1)}}{0.2}}-\pi\right)-\phi^2=-(-2\cos(216°))^2+2\left(-\pi+\frac{1}{-\frac{\frac{0.6}{4\pi(-1+0.6^2)}}{0.2}}\right)$$

$$2\left(\frac{1}{-\frac{\frac{0.6}{(4\pi)(0.6^2-1)}}{0.2}}-\pi\right)-\phi^2=-(-2\cos(216°))^2+2\left(-180°+\frac{1}{-\frac{\frac{0.6}{720°(-1+0.6^2)}}{0.2}}\right)$$

$$2\left(\frac{1}{-\frac{\frac{0.6}{(4\pi)(0.6^2-1)}}{0.2}}-\pi\right)-\phi^2=-\left(2\cos\left(\frac{\pi}{5}\right)\right)^2+2\left(-\pi+\frac{1}{-\frac{\frac{0.6}{4\pi(-1+0.6^2)}}{0.2}}\right)$$

Series representations:

$$2\left(\frac{1}{-\frac{\frac{0.6}{(4\pi)(0.6^2-1)}}{0.2}}-\pi\right)-\phi^2=-\phi^2+162.667\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$2\left(\frac{1}{-\frac{\frac{0.6}{(4\pi)(0.6^2-1)}}{0.2}}-\pi\right)-\phi^2=-81.3333-\phi^2+81.3333\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$2\left(\frac{1}{-\frac{\frac{0.6}{(4\pi)(0.6^2-1)}}{0.2}}-\pi\right)-\phi^2=-\phi^2+40.6667\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$2\left(\frac{1}{-\frac{\frac{0.6}{(4\pi)(0.6^2-1)}}{0.2}}-\pi\right)-\phi^2=-\phi^2+81.3333\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

$$2\left(\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2}}}-\pi\right)-\phi^2=-\phi^2+162.667\int_0^1\sqrt{1-t^2}\,dt$$

$$2\left(\frac{1}{-\frac{0.6}{\frac{(4\pi)(0.6^2-1)}{0.2}}}-\pi\right)-\phi^2=-\phi^2+81.3333\int_0^\infty\frac{\sin(t)}{t}\,dt$$

Acknowledgments

I would like to thank Prof. **George E. Andrews** Evan Pugh Professor of Mathematics at Pennsylvania State University for his great availability and kindness towards me

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