On the Ramanujan's Fundamental Formula for obtain a highly precise Golden Ratio: mathematical connections with Black Holes Entropies and Like-Particle Solutions

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Abstract

In the present research thesis, we have obtained various and interesting new mathematical connections concerning the fundamental Ramanujan's formula to obtain a highly precise golden ratio, some sectors of Particle Physics and Black Holes entropies.

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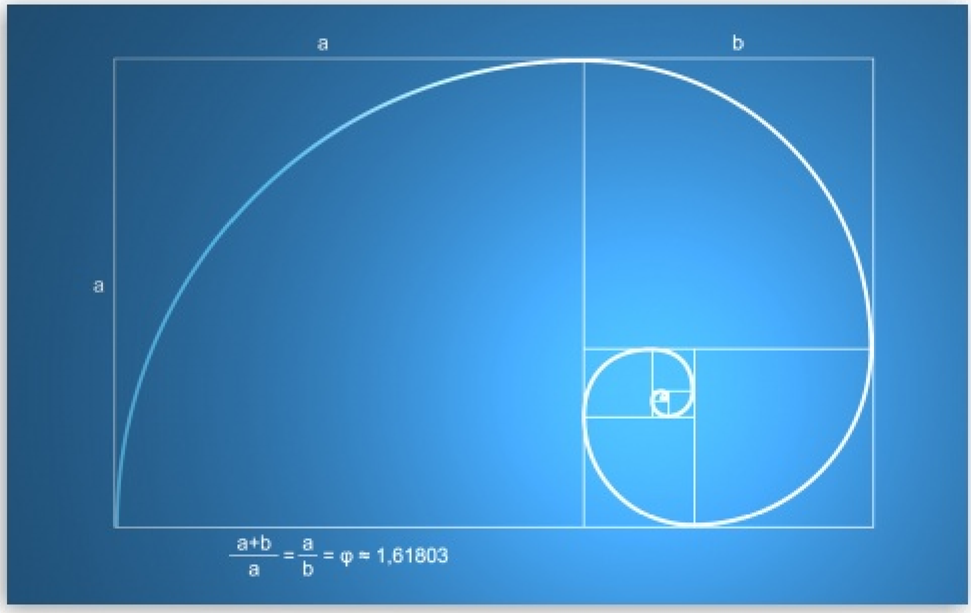
http://discovermagazine.com/2015/jan-feb/15-a-beautiful-find

$$\frac{1+\sqrt{5}}{2}$$

$$\frac{1}{(\sqrt{\phi\sqrt{5}})e^{2\pi/5}} = 1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \cfrac{e^{-6\pi}}{1 + \cfrac{e^{-8\pi}}{1 + \cfrac{e^{-10\pi}}{1 + \ldots}}}}}$$

https://twitter.com/pickover/status/1167248857958420480

https://www.sharanagati.org/the-golden-section-of-bhagavad-gita/

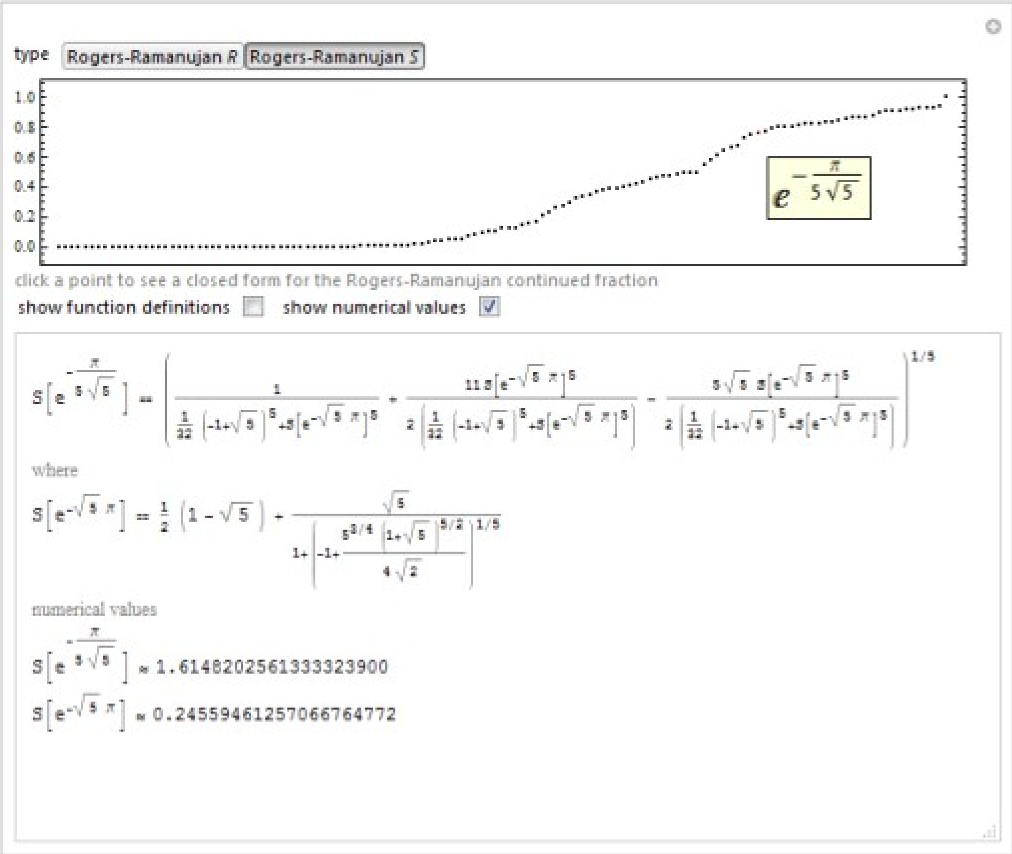


http://wallpaperswide.com/snail_shell_spiral-wallpapers.html

Ramanujan and Phi

From:

https://blog.wolfram.com/2013/05/01/after-100-years-ramanujan-gap-filled/



This is the Ramanujan fundamental formula for obtain a beautiful and highly precise golden ratio:

$$\sqrt[5]{\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^{5}+5e^{\left(-\sqrt{5}\pi\right)^{5}}}-\frac{11\times 5e^{\left(-\sqrt{5}\pi\right)^{5}}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^{5}+5e^{\left(-\sqrt{5}\pi\right)^{5}}\right)}-\frac{5\sqrt{5}\times 5e^{\left(-\sqrt{5}\pi\right)^{5}}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^{5}+5e^{\left(-\sqrt{5}\pi\right)^{5}}\right)}\right)}$$

1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))

Input:

$$\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^{5}+5\,e^{\left(-\sqrt{5}\,\pi\right)^{5}}}$$

Open code

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Exact result:

$$\frac{1}{\frac{1}{32}(\sqrt{5}-1)^5+5e^{-25\sqrt{5}\pi^5}}$$

Decimal approximation:

- More digits
11.090169943749474241022934171828190588601545899028814310 67...
Open code

11.090169943749474241022934171828190588601545899028814310 67

(11*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))

Input:

$$\frac{11\times5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}$$

Open code

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Exact result:

$$\frac{55\,e^{-25\sqrt{5}\pi^5}}{2\left(\frac{1}{32}(\sqrt{5}-1)^5+5e^{-25\sqrt{5}\pi^5}\right)}$$

Decimal approximation:

- More digits
9.9929022507071872307053630412945712274243697626525 5... $\times 10^{-7428}$
Open code

9.9929022507071872307053630412945712274243697626525 5 × 10^-7428

(5sqrt(5)*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))

Input:

$$\frac{5\sqrt{5}\times5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}$$

Open code

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Exact result:

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

Decimal approximation:

- More digits
1.0156731238678143887477757629564691789882352909878 4... $\times 10^{-7427}$
Open code

1.0156731238678143887477757629564691789882352909878 4 × 10^-7427

Input interpretation:

$$\left(1\Big/\left(\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{9.992902250707187230705363041294571227424369762652 55}{10^{7428}}-\frac{1.0156731238678143887477757629564691789882352909878 4}{10^{7427}}\right)\right)^{\wedge}(1/5)$$

Open code

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Result:

- More digits

1.618033988749894848204586834365638117720309179805762862135...

Or:

((((1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))-(-1.6382898797095665677239458827012056245798314722584 × 10^-7429)))^1/5

Input interpretation:

$$\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)--\frac{1.6382898797095665677239458827012056245798314722584}{10^{7429}}}}$$

Open code

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Result:

- More digits

1.618033988749894848204586834365638117720309179805762862135...

The result, thence, is:

1.6180339887498948482045868343656381177203091798057628

This is a wonderful golden ratio, fundamental constant of various fields of mathematics and physics

Continued fraction:

- Linear form

$$1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$\phi \approx 1.61803398874989484820458683436563811772030917980576286213 5$

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$\Phi + 1 \approx 1.618033988749894848204586834365638117720309179805762862135$

$\frac{1}{\Phi} \approx 1.618033988749894848204586834365638117720309179805762862135$

Now, we take the three results and calculate the following interesting expressions:

(1.0156731238678143887477757629564691789882352909 8784 × 10^-7427) / (9.992902250707187230705363041294571227424369762652 55 × 10^-7428)

Input interpretation:

$$\frac{\frac{1.01567312386781438874777576295646917898823529098784}{10^{7427}}}{\frac{9.99290225070718723070536304129457122742436976265255}{10^{7428}}}$$

Open code

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Result:

- More digits

1.016394535227177134731442576696034652473008345277961510888...

The result is:

1.016394535227177134731442576696034652473008345277961510888

Rational approximation:

$$\frac{84\,753\,381\,552\,557\,490\,451\,770\,790\,712}{83\,386\,301\,888\,777\,894\,022\,056\,258\,371} = 1 + \frac{1\,367\,079\,663\,779\,596\,429\,714\,532\,341}{83\,386\,301\,888\,777\,894\,022\,056\,258\,371}$$

Open code

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Continued fraction:

- Linear form

$$1 + \cfrac{1}{60 + \cfrac{1}{1+\cfrac{1}{244+\cfrac{1}{1+\cfrac{1}{60+\cfrac{1}{2+\cfrac{1}{60+\cfrac{1}{1+\cfrac{1}{244+\cfrac{1}{1+\cfrac{1}{60+\cfrac{1}{2+\cfrac{1}{60+\cfrac{1}{1+\cfrac{1}{244+\cfrac{1}{1+\cfrac{1}{60+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$\frac{5\sqrt{5}}{11} \approx 1.01639453522717713473144257669603465247300834527796 62383$

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$\frac{5}{11}(2\,\Phi + 1) \approx 1.01639453522717713473144257669603465247300834527796 62383$

$\frac{10}{11\,\Phi} - \frac{5}{11} \approx 1.01639453522717713473144257669603465247300834527796 62383$

- Φ is the golden ratio conjugate

[(1.0156731238678143887477757629564691789882352909878 4 × 10^-7427) / (9.992902250707187230705363041294571227424369762652 55 × 10^-7428)]^31

Input interpretation:

$$\left(\frac{\frac{1.01567312386781438874777576295646917898823529098784}{10^{7427}}}{\frac{9.99290225070718723070536304129457122742436976265255}{10^{7428}}}\right)^{31}$$

Open code

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Result:

- More digits

1.65551058435888319870999744615974161694617506524991910430 1...

The result is:

1.655510584358883198709997446159741616946175065249919104301

Rational approximation:

$$\frac{69\,673\,893\,686\,116\,680\,947\,888\,837\,251}{42\,086\,045\,443\,858\,489\,000\,117\,795\,970} = 1 + \frac{27\,587\,848\,242\,258\,191\,947\,771\,041\,281}{42\,086\,045\,443\,858\,489\,000\,117\,795\,970}$$

Open code

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Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{24+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{11+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$$\frac{2\,729\,646\,287\,\pi}{5\,179\,934\,700} \approx 1.655510584358883198752922$$

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$$\text{root of } 555x^4 - 633x^3 + 80x^2 + 6070x - 11565 \text{ near } x = 1.65551 \approx 1.655510584358883198707808 4$$

$$\frac{1}{11}\sqrt{\frac{1}{2}(-7728 + 2352e + 40\pi + 2701\log(2))} \approx 1.65551058435888831990329$$

We note that 1,65551058... is very near to the fourteenth root of following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164{,}2696$

$$\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3 = 1164{,}269601267364$$

Indeed:

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

11.09016994374947424102293417182819058860154589902881431067 + (1.01567312386781438874777576295646917898823529098784 × 10^-7427) / (9.99290225070718723070536304129457122742436976265255 × 10^-7428)

Input interpretation:

$$11.09016994374947424102293417182819058860154589902881431067+\frac{\frac{1.01567312386781438874777576295646917898823529098784}{10^{7427}}}{\frac{9.99290225070718723070536304129457122742436976265255}{10^{7428}}}$$

Open code

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Result:

- More digits

12.10656447897665137575437674852422524107455424430677582155...

The result is: 12.10656447897665137575437674852422524107455424430677582155 and is very near to the black hole entropy value 12.1904 (that is equal to the ln of 196883)

Rational approximation:

$$\frac{308989299311928902774738082929}{25522459311103200467827553378} = 12+\frac{2719787578690497160807442393}{25522459311103200467827553378}$$

Open code

Continued fraction:

- Linear form

$$12+\cfrac{1}{9+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1597+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Possible closed forms:

- More

$$\frac{1}{22}\left(121+65\sqrt{5}\right)\approx$$
12.10656447897665137575437674852422524107455424430678054 8

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$$\frac{1}{11}(65\,\Phi+93)\approx$$
12.106564478976651375754376748524225241074554244306780548

$$\frac{37-9\,\Phi}{11\,(2\,\Phi-1)}\approx 12.106564478976651375754376748524225241074554244306780548$$

- Φ is the golden ratio conjugate

((11.09016994374947424102293417182819058860154589902881431067+(1.01567312386781438874777576295646917898823529098784 × 10^-7427)/(9.99290225070718723070536304129457122742436976265255 × 10^-7428))^3

Input interpretation:

$$\left(11.09016994374947424102293417182819058860154589902881431067+\frac{\frac{1.01567312386781438874777576295646917898823529098784}{10^{7427}}}{\frac{9.99290225070718723070536304129457122742436976265255}{10^{7428}}}\right)^3$$

Open code

Result:

- More digits
$1774.44588063734136092989813788843761049879670347864970055\ldots$

The result is:
1774.4458806373413609298981378884376104987967034786497005555

Rational approximation:

$$\frac{2497836262005287330445683785493}{1407671143573068730650200572} = 1774 + \frac{627653306663402272227970765}{1407671143573068730650200572}$$

Open code

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Continued fraction:

- Linear form

$$1774+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{10+\cfrac{1}{2+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

From:

1774.4458806373413609298981378884376104987967034786497005555 – 48 =

= 1726.4458806373413609298981378884376104987967034786497005554

Result that is very near to the range of the mass of $f_0(1710)$ candidate glueball.

[exp(11.0901699437494742241+(1.015673123867814388747 × 10^-7427)/(9.9929022507071872307 × 10^-7428))]^1/8

Input interpretation:

$$\sqrt[8]{\exp\left(11.0901699437494742241+\frac{\frac{1.015673123867814388747}{10^{7427}}}{\frac{9.9929022507071872307}{10^{7428}}}\right)}$$

Open code

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Result:

- More digits

4.5417870587209305302...

This value 4,541787... is practically equal to the value of mass of the dark atom ≈ 5 GeV = 4.5 * 10^{17}

and

[exp(11.090169943749474241+(1.015673123867814388747 × 10^-7427)/(9.9929022507071872307 × 10^-7428))]^1/8 * 0.92434086

Input interpretation:

$$\sqrt[8]{\exp\left(11.090169943749474241+\frac{\frac{1.015673123867814388747}{10^{7427}}}{\frac{9.9929022507071872307}{10^{7428}}}\right)}\times 0.92434086$$

Open code

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Result:

- More digits

4.1981594...

Continued fraction:

- Linear form

$$4+\cfrac{1}{5+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{8+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

The result is: 4.19815935579... and is a very near to the range of the mass of hypothetical dark matter particles.

(((((([exp(11.090169943749474241+(1.015673123867814388747 × 10^-7427)/(9.9929022507071872307 × 10^-7428))]^1/8 * (1.0061571663-0.081816+0.0814135-0.07609064)))))^1/3

Input interpretation:

$$\left(\sqrt[8]{\exp\left(11.090169943749474241+\frac{\frac{1.015673123867814388747}{10^{7427}}}{\frac{9.9929022507071872307}{10^{7428}}}\right)}\,(1.0061571663-0.081816+0.0814135-0.07609064)\right)^{\wedge}(1/3)$$

Open code

Result:

- More digits
  1.616283718780967119038391999282118987049390234042755292944...

The result is: 1.6162837187809671190383919992821189870493902340427552

Continued fraction:

- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{28+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{42+\cfrac{1}{2+\cfrac{1}{22+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

From:

1.6162837187809671190383919992821189870493902340427552 * 3 =

= 4.8488511563429013571151759978463569611481707021282656

and

1.61628371878096711903839199928211898704939023404 27552 * 2.5849 =

= 4.17793178467692190600233947894434936962396881597711791648 where 2.5849 is a Hausdorff dimension.

The results 4,8488 and 4,1779 are very near to the values of the first of upper bound dark photon energy range (4.95 * 10^{16} – 5.4 * 10^{16}) and of the range of the mass of hypothetical dark matter particles.

Note that:

1/[(5sqrt(5)*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))]

Input:

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

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Exact result:

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

Decimal approximation:

- More digits

9.845687323022498522853504497386406211369747193708929... × 10^{7426}

Alternate forms:

- More

$$\frac{10-11\, e^{25\sqrt{5}\,\pi^5}+5\sqrt{5}\, e^{25\sqrt{5}\,\pi^5}}{25\sqrt{5}}$$

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$$\frac{1}{125}\left(10-11\, e^{25\sqrt{5}\,\pi^5}\right)\sqrt{5}+\frac{1}{5}\, e^{25\sqrt{5}\,\pi^5}$$

$$\frac{e^{25\sqrt{5}\,\pi^5}\left(\left(\sqrt{5}-1\right)^5+160\, e^{-25\sqrt{5}\,\pi^5}\right)}{400\sqrt{5}}$$

ln ((((((1/[(5sqrt(5)*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))]))))))

Input:

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

Open code

- $\log(x)$ is the natural logarithm

Exact result:

$$\log\left(\frac{2\, e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{32}\left(\sqrt{5}-1\right)^5+5\, e^{-25\sqrt{5}\,\pi^5}\right)}{25\sqrt{5}}\right)$$

Decimal approximation:

- More digits

17101.28393409786327530804780300529221259899171561940725254...

Open code

Alternate forms:

- More

$$\log\left(10-11\, e^{25\sqrt{5}\,\pi^5}+5\sqrt{5}\; e^{25\sqrt{5}\,\pi^5}\right)-\frac{5\log(5)}{2}$$

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$$\frac{1}{2}\left(2\log\left(10-11\, e^{25\sqrt{5}\,\pi^5}+5\sqrt{5}\; e^{25\sqrt{5}\,\pi^5}\right)-5\log(5)\right)$$

$$\log\left(\frac{2\, e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{2}\left(5\sqrt{5}-11\right)+5\, e^{-25\sqrt{5}\,\pi^5}\right)}{25\sqrt{5}}\right)$$

and:

1/Pi^2 * ln ((((((1/[(5sqrt(5)*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))]))))))

Input:

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

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\frac{\log\left(\frac{2 e^{25\sqrt{5}\pi^5}\left(\frac{1}{32}\left(\sqrt{5}-1\right)^5+5 e^{-25\sqrt{5}\pi^5}\right)}{25\sqrt{5}}\right)}{\pi^2}$$

Decimal approximation:

- More digits

1732.722330006490155883907217809676768207629974194791390849...

1732.7223...

Continued fraction:

- Linear form

$$1732+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{28+\cfrac{1}{41+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{9+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\log\left(\frac{\frac{1}{5\sqrt{5}\,5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5 e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}\right)}{\pi^2}=$$

$$\frac{\log\left(-1+\frac{2}{5\sqrt{5}}+\left(\frac{1}{5}-\frac{11}{25\sqrt{5}}\right)e^{25\sqrt{5}\pi^5}\right)}{\pi^2}-\frac{\sum_{k=1}^{\infty}\frac{125^k\left(\frac{1}{125-10\sqrt{5}+\left(-25+11\sqrt{5}\right)e^{25\sqrt{5}\pi^5}}\right)^k}{k}}{\pi^2}$$

Open code

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$$\frac{\log\left(\frac{1}{\frac{5\sqrt{5}\,5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = \frac{\log\left(-1+\frac{2\,e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{-25\sqrt{5}\,\pi^5}\right)}{25\sqrt{5}}\right)}{\pi^2} - \frac{\sum_{k=1}^{\infty}\frac{125^k\left(\frac{1}{125-10\sqrt{5}+\left(-25+11\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}}\right)^k}{k}}{\pi^2}$$

$$\frac{\log\left(\frac{1}{\frac{5\sqrt{5}\,5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = \frac{2\,i\left\lfloor\frac{\arg\left(\frac{2\,e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{-25\sqrt{5}\,\pi^5}\right)}{25\sqrt{5}}-x\right)}{2\,\pi}\right\rfloor}{\pi} + \frac{\log(x)}{\pi^2} - \frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{2}{5\sqrt{5}}+\left(\frac{1}{5}-\frac{11}{25\sqrt{5}}\right)e^{25\sqrt{5}\,\pi^5}-x\right)^k x^{-k}}{k}}{\pi^2} \quad \text{for } x<0$$

Integral representations:

$$\frac{\log\left(\frac{1}{\frac{5\sqrt{5}\,5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = \frac{1}{\pi^2}\int_1^{\frac{10+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}}{25\sqrt{5}}}\frac{1}{t}\,dt$$

Open code

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$$\frac{\log\left(\frac{1}{\frac{5\sqrt{5}\,5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = -\frac{i}{2\pi^3}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(-1+\frac{2\,e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{-25\sqrt{5}\,\pi^5}\right)}{25\sqrt{5}}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \text{ for } -1<\gamma<0$$

We have that:

1/[(11*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))]

Input:

$$\frac{1}{\frac{11\times 5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}$$

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Exact result:

$$\frac{2}{55}\,e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{32}\left(\sqrt{5}-1\right)^5+5\,e^{-25\sqrt{5}\,\pi^5}\right)$$

Decimal approximation:

- More digits

$$1.000710279067556221617981291357761768984865098218399\ldots\times 10^{7427}$$

Alternate forms:

- More

$$\frac{1}{55}\left(10-11\,e^{25\sqrt{5}\,\pi^5}+5\sqrt{5}\,e^{25\sqrt{5}\,\pi^5}\right)$$

Open code

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$$\frac{2}{11}-\frac{1}{5}\,e^{25\sqrt{5}\,\pi^5}+\frac{1}{11}\sqrt{5}\,e^{25\sqrt{5}\,\pi^5}$$

Open code

$$\frac{1}{880}\,e^{25\sqrt{5}\,\pi^5}\left(\left(\sqrt{5}-1\right)^5+160\,e^{-25\sqrt{5}\,\pi^5}\right)$$

ln ((((1/[(11*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))])))))

Input:

$$\log\left(\frac{1}{\frac{11\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\log\left(\frac{2}{55}\, e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{32}\left(\sqrt{5}-1\right)^5+5\, e^{-25\sqrt{5}\,\pi^5}\right)\right)$$

Decimal approximation:

- More digits

17101.300195693716055325886998427166364758458410796872611944...

Alternate forms:

- More

$$\log\left(\frac{1}{55}\left(10-11\, e^{25\sqrt{5}\,\pi^5}+5\sqrt{5}\, e^{25\sqrt{5}\,\pi^5}\right)\right)$$

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$$\log\left(\frac{2}{55}\, e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{2}\left(5\sqrt{5}-11\right)+5\, e^{-25\sqrt{5}\,\pi^5}\right)\right)$$

Open code

$$25\sqrt{5}\,\pi^5-\log\left(\frac{55}{2}\right)+\log\left(\frac{1}{32}\left(\sqrt{5}-1\right)^5+5\, e^{-25\sqrt{5}\,\pi^5}\right)$$

and:

1/Pi^2 * ln ((((1/[(11*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))])))))

Input:

$$\frac{1}{\pi^2}\log\left(\frac{1}{\frac{11\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)$$

Open code

- $\log(x)$ is the natural logarithm

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Exact result:

$$\frac{\log\left(\frac{2}{55} e^{25\sqrt{5}\pi^5}\left(\frac{1}{32}(\sqrt{5}-1)^5+5 e^{-25\sqrt{5}\pi^5}\right)\right)}{\pi^2}$$

Decimal approximation:

- More digits

1732.723977650629872886393641942839475932747804889887454392...

Alternate forms:

- More

$$\frac{\log\left(\frac{1}{55}\left(10-11 e^{25\sqrt{5}\pi^5}+5\sqrt{5} e^{25\sqrt{5}\pi^5}\right)\right)}{\pi^2}$$

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$$\frac{\log\left(\frac{2}{55} e^{25\sqrt{5}\pi^5}\left(\frac{1}{2}(5\sqrt{5}-11)+5 e^{-25\sqrt{5}\pi^5}\right)\right)}{\pi^2}$$

Open code

$$\frac{25\sqrt{5}\pi^5-\log\left(\frac{55}{2}\right)+\log\left(\frac{1}{32}(\sqrt{5}-1)^5+5 e^{-25\sqrt{5}\pi^5}\right)}{\pi^2}$$

Open code

Continued fraction:

- Linear form

$$1732+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{18+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{28+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{2+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{\log\left(\frac{1}{\frac{11\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = \frac{\log\left(\frac{1}{55}\left(-45+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}\right)\right)}{\pi^2} - \frac{\sum_{k=1}^{\infty}\frac{\left(-\frac{55}{-45+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}}\right)^k}{k}}{\pi^2}$$

Open code

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$$\frac{\log\left(\frac{1}{\frac{11\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = \frac{\log\left(-1+\frac{2}{55}\, e^{25\sqrt{5}\,\pi^5}\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{-25\sqrt{5}\,\pi^5}\right)\right)}{\pi^2} - \frac{\sum_{k=1}^{\infty}\frac{\left(-\frac{55}{-45+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}}\right)^k}{k}}{\pi^2}$$

Open code

$$\frac{\log\left(\frac{1}{\frac{11\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = \frac{2\, i\left\lfloor\frac{\arg\left(10+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}-55\,x\right)}{2\,\pi}\right\rfloor}{\pi} + \frac{\log(x)}{\pi^2} - \frac{\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{55}\right)^k\left(10+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}-55\,x\right)^k x^{-k}}{k}}{\pi^2} \quad \text{for } x<0$$

Integral representations:

$$\frac{\log\left(\frac{1}{\frac{11\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} = \frac{1}{\pi^2}\int_1^{\frac{1}{55}\left(10+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}\right)} \frac{1}{t}\,dt$$

Open code

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$$\frac{\log\left(\frac{1}{\frac{11\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}\right)}{\pi^2} =$$

$$-\frac{i}{2\pi^3}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\left(\frac{55}{-45+\left(-11+5\sqrt{5}\right)e^{25\sqrt{5}\,\pi^5}}\right)^s \Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds \quad \text{for } -1<\gamma<0$$

The two results 1732,72233 and 1732,72397 are very similar and are very near to the range of the mass of $f_0(1710)$ candidate glueball.

Now, we have that:

27*3 + 10^3 * sqrt((exp((((((1 / (((((1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))))))^1/(1164*2-32)))))))

Input:

$$27\times 3+10^3\sqrt{\exp\left(\frac{1}{\sqrt[1164\times 2-32]{\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}}}\right)}$$

Open code

Exact result:

$$81+1000\, e^{\frac{1}{2}\sqrt[2296]{\frac{1}{32}\left(\sqrt{5}-1\right)^5+5\, e^{-25\sqrt{5}\,\pi^5}}}$$

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Decimal approximation:

- More digits

1728.858072736919434280617815816864915168670165258188187538...

Alternate forms:

- More

$$81 + 1000\, e^{\frac{1}{2}\sqrt[2296]{-\frac{11}{2}+\frac{5\sqrt{5}}{2}+5\, e^{-25\sqrt{5}\,\pi^5}}}$$

Open code

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$$1000 \exp\left(\frac{1}{2}\sqrt[2296]{\frac{1}{2}\left(5\sqrt{5}-11\right)+5\, e^{-25\sqrt{5}\,\pi^5}}\right)+81$$

Open code

$$81 + 1000\, e^{\frac{\sqrt[2296]{\left(\sqrt{5}-1\right)^5+160\, e^{-25\sqrt{5}\,\pi^5}}}{2\times 2^{5/2296}}}$$

Continued fraction:

- Linear form

$$1728+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{9+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}$$

We have that:

1 / ((((((((((((11*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5))))))))^1/(2*1164-32))))))))

Input:

$$\frac{1}{\sqrt[2\times1164-32]{\frac{11\times5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}}$$

Open code

Exact result:

$$e^{(25\sqrt{5}\,\pi^5)/2296}\sqrt[2296]{\frac{2}{55}\left(\frac{1}{32}\left(\sqrt{5}-1\right)^5+5\,e^{-25\sqrt{5}\,\pi^5}\right)}$$

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Decimal approximation:

- More digits

1716.944401114722818821471990021882723351969991809758315223...

Alternate forms:

- More

$$\sqrt[2296]{\frac{1}{55}\left(10+\left(5\sqrt{5}-11\right)e^{25\sqrt{5}\,\pi^5}\right)}$$

Open code

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$$\frac{1}{\sqrt[2296]{\frac{55}{10-11\,e^{25\sqrt{5}\,\pi^5}+5\sqrt{5}\,e^{25\sqrt{5}\,\pi^5}}}}$$

Open code

$$e^{(25\sqrt{5}\,\pi^5)/2296}\sqrt[2296]{\frac{2}{55}\left(\frac{1}{2}\left(5\sqrt{5}-11\right)+5\,e^{-25\sqrt{5}\,\pi^5}\right)}$$

Continued fraction:

- Linear form

$$1716+\cfrac{1}{1+\cfrac{1}{16+\cfrac{1}{1+\cfrac{1}{70+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{23+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{\sqrt[2\times 1164-32]{\frac{11\left(5 e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5 e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}} = \frac{\sqrt[2296]{\frac{2}{55}}}{\sqrt[2296]{\frac{\exp\left(-\frac{\pi^5\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^5}{32\sqrt{\pi}^5}\right)}{5\exp\left(-\frac{\pi^5\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^5}{32\sqrt{\pi}^5}\right)+\frac{1}{32}\left(-1+\frac{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)^5}}}$$

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$$\frac{1}{\sqrt[2\times 1164-32]{\frac{11\left(5 e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5 e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}} = \frac{\sqrt[2296]{\frac{2}{55}}}{\sqrt[2296]{\frac{\exp\left(-\pi^5\sqrt{z_0}^5\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)^5\right)}{5\exp\left(-\pi^5\sqrt{z_0}^5\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)^5\right)+\frac{1}{32}\left(-1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (5-z_0)^k z_0^{-k}}{k!}\right)^5}}}$$

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

$$\frac{1}{\sqrt[2\times 1164-32]{\dfrac{11\left(5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}} =$$

$$\left(\sqrt[2296]{\frac{2}{55}}\right) \Big/ \left(\left(\exp\left(-\pi^5 \exp^5\left(i\,\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^5\left(\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\right) \Big/ \right.$$
$$\left(5\exp\left(-\pi^5 \exp^5\left(i\,\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^5\left(\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)+\right.$$
$$\left.\left.\frac{1}{32}\left(-1+\exp\left(i\,\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k (5-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\right)\hat{}$$
$$\left.(1/2296)\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

We have that:

1/ (((((((((((((5sqrt(5)*5*(e^((-sqrt(5)*Pi))^5))) / (((2*(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5))))))))^1/(2*1164-32)))))))))

Input:

$$\frac{1}{\sqrt[2\times 1164-32]{\dfrac{5\sqrt{5}\times 5\, e^{\left(-\sqrt{5}\,\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\, e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}}$$

Open code

Exact result:

$$\frac{e^{\left(25\sqrt{5}\,\pi^5\right)/2296}\sqrt[2296]{2\left(\frac{1}{32}\left(\sqrt{5}-1\right)^5+5\,e^{-25\sqrt{5}\,\pi^5}\right)}}{5^{5/4592}}$$

Decimal approximation:

- More digits

1716.932240767562897713904103115924197988364844525361104020...

Alternate forms:

$$\frac{\sqrt[2296]{10-11\,e^{25\sqrt{5}\,\pi^5}+5\sqrt{5}\,e^{25\sqrt{5}\,\pi^5}}}{5^{5/4592}}$$

Open code

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$$\frac{e^{(25\sqrt{5}\,\pi^5)/2296}\sqrt[2296]{(\sqrt{5}-1)^5+160\,e^{-25\sqrt{5}\,\pi^5}}}{\sqrt[574]{2}\;5^{5/4592}}$$

Continued fraction:

- Linear form

$$1716+\cfrac{1}{1+\cfrac{1}{13+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{7+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{46+\cfrac{1}{2+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

- More

$$\frac{1}{\sqrt[2\times 1164-32]{\frac{5\left(\sqrt{5}\;5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}}=$$

$$\left(\sqrt[2296]{2}\right)\Big/\left(\sqrt[1148]{5}\left(\left(\exp\left(-\pi^5\left(\frac{1}{z_0}\right)^{5/2\,\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{5/2\,(1+\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^5\right)\right)\left(\frac{1}{z_0}\right)^{1/2\,\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2\,(1+\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)\Big/$$

$$\left(5\exp\left(-\pi^5\left(\frac{1}{z_0}\right)^{5/2\,\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{5/2\,(1+\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^5\right)+\frac{1}{32}\left(-1+\left(\frac{1}{z_0}\right)^{1/2\,\lfloor\arg(5-z_0)/(2\pi)\rfloor} z_0^{1/2\,(1+\lfloor\arg(5-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5-z_0)^k z_0^{-k}}{k!}\right)^5\right)\Bigg)\wedge(1/2296)\Bigg)$$

$$\frac{1}{\sqrt[2\times 1164-32]{\frac{5\left(\sqrt{5}\;5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}}=$$

$$1\Big/\left(\sqrt[574]{2}\;\sqrt[1148]{5}\left(\left(\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(160-e^{\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}+5\,e^{\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}-10\,e^{\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}\sqrt{4}^2\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^2+10\,e^{\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}\sqrt{4}^3\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^3-5\,e^{\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}\sqrt{4}^4\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^4+e^{\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\right)\wedge(1/2296)\right)$$

$$\frac{1}{\sqrt[2\times 1164-32]{\frac{5\left(\sqrt{5}\,5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)}}} =$$

$$1\Bigg/\left(\sqrt[574]{2}\ \sqrt[1148]{5}\left(\left(\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(160-\exp\left(\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)+\right.\right.\right.$$
$$5\exp\left(\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}-$$
$$10\exp\left(\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\sqrt{4}^2\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^2+$$
$$10\exp\left(\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\sqrt{4}^3\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^3-$$
$$5\exp\left(\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\sqrt{4}^4\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^4+$$
$$\exp\left(\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\sqrt{4}^5$$
$$\left.\left.\left.\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\right)\right)\text{^}(1/2296)\right)$$

We have that:

((((1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))))^(1.08185+1.087534+1.006157-0.07609064)

Input interpretation:

$$\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}\right)^{1.08185+1.087534+1.006157-0.07609064}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1732.74...

And

((((1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))))^((29.7668^(1/3))

where 29.7668 is a value of the Black Hole entropy (see Table)

Input interpretation:

$$\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}\right)^{\sqrt[3]{29.7668}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1731.534151150132597646379570111950361166250299421249406794...

Series representations:

- More

$$\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}\right)^{\sqrt[3]{29.7668}} = \left(\frac{1}{5\,e^{-\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}+\frac{1}{32}\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^5}\right)^{3.09916}$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}\right)^{\sqrt[3]{29.7668}} = \left(\frac{1}{5\exp\left(-\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)+\frac{1}{32}\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5}\right)^{3.09916}$$

Open code

$$\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}}\right)^{\sqrt[3]{29.7668}} =$$

$$\left(1\middle/\left(5\exp\left(-\frac{\pi^5\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^5}{32\sqrt{\pi}^5}\right)+\right.\right.$$
$$\left.\left.\frac{1}{32}\left(-1+\frac{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)^5\right)\right)^{3.09916}$$

Integral representation:

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

All the results: 1728,858 1716,944 1716,932 1732,74 and 1731,53 are very near to the range of the mass of $f_0(1710)$ candidate glueball.

Note that:

Input interpretation:

$$\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{1.6382898797095665677239458827012056245798314722584}{10^{7429}}}}^{\,3}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

4.2360679774997896964091736687312762354406183596115257242708...

The result is a very near to the range of the mass of hypothetical dark matter particles.

We have that:

Input interpretation:

$$\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{1.6382898797095665677239458827012056245798314722584}{10^{7429}}}}^{\,\pi} \times 10^{17}$$

Open code

Enlarge Data Customize A Plaintext Interactive

- Result:
  More digits
  $4.5347571611551792889915884948567915637887680293971326\ldots \times 10^{17}$

Or

(1.6180339887498948482045868343656381177203091798057628621354)^Pi * 10^17

Input interpretation:
$1.6180339887498948482045868343656381177203091798057628621354^{\pi} \times 10^{17}$
Open code

Enlarge Data Customize A Plaintext Interactive

- Result:
  More digits
  $4.5347571611551792889915884948567915637887680293971326\ldots \times 10^{17}$

This value is very near to the value of mass of the dark atom ≈ 5 GeV = 4.5 * 10^{17}

We have also that:

((((((((((1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5))-(-1.6382898797095665677239458827012056245798314722584 × 10^-7429)))^1/5))))))^PI * 1.08753454 * 10^16

Input interpretation:

$$\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)--\frac{1.6382898797095665677239458827012056245798314722584}{10^{7429}}}}^{\,\pi} \times 1.08753454\times 10^{16}$$

Open code

Enlarge Data Customize A Plaintext Interactive

- Result:
  More digits
  $4.93170504\ldots \times 10^{16}$

Or:

(1.6180339887498948482045868343656381177203091798057628621354)^Pi * 1.08753454 * 10^16

Input interpretation:
$1.6180339887498948482045868343656381177203091798057628621354^{\pi} \times 1.08753454 \times 10^{16}$
Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

$4.93170504\ldots \times 10^{16}$

This result is very near to the first value of upper bound dark photon energy range ($4.95 * 10^{16} – 5.4 * 10^{16}$)

We have that:

Input interpretation:

$$\left(\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{1.63828987970956656772394588270120562457983147225 84}{10^{7429}}}}\right)^{16}-\left(2^9-2^5\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1726.99954689614621517792720551888482218994516046828794 4927...

Continued fraction:

- Linear form

$$1726+\cfrac{1}{1+\cfrac{1}{2205+\cfrac{1}{1+\cfrac{1}{2205+\cfrac{1}{1+\cfrac{1}{2205+\cfrac{1}{1+\cfrac{1}{2205+\cfrac{1}{1+\cfrac{1}{2205+\cfrac{1}{1+\cfrac{1}{2205+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}$$

This result is very near to the range of the mass of $f_0(1710)$ candidate glueball.

We have that:

Input interpretation:

$$\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)--\frac{1.6382898797095665677239458827012056245798314722584}{10^{7429}}}}^{13}+\left(12^2+8^2\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

729.00191937872549963166873240719368142883203889474274687 75...

This value is very near to the Ramanujan expression $6^3 + 8^3 = 9^3 - 1 = 728$

Among Ramanujan's formulas, there is a beautiful relationship that links, through a wonderful continuous fraction, two fundamental numbers: Φ, the golden section and the famous π:

$$\sqrt{\Phi+2}-\Phi=\cfrac{e^{\frac{-2\pi}{5}}}{1+\cfrac{e^{\frac{-2\pi}{5}}}{1+\cfrac{e^{\frac{-2\pi}{5}}}{1+\ldots}}}=0,2840\ldots$$

(https://www.matematicamente.it/storia/Ramanujan-genio-matematico.pdf)

Now let's analyze this expression and see if we can get new and interesting mathematical connections with some sectors of particle physics and black holes

(((sqrt((sqrt(5)+1)/2+2))) - ((sqrt(5)+1)/2))

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

Result:

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

Decimal approximation:

0.2840790438404122960282918323931261690910880884457375827 59...

Alternate forms:

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

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

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

Minimal polynomial:

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

Continued fraction:

$$\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{25+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{10+\cfrac{1}{24+\cfrac{1}{6+\cfrac{1}{133+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}$$

-5/2 ln [(((sqrt((sqrt(5)+1)/2+2))) - ((sqrt(5)+1)/2))]

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

- $\log(x)$ is the natural logarithm

Exact result:

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

Decimal approximation:

3.146256890409912031962983108617580961172288121414743463855...

3.146256890409912031962983108617580961172288121414743463855

Property:

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

Continued fraction:

$$3+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{96+\cfrac{1}{1+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

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

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

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

Integral representation:

$$\frac{1}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)(-5)=-\frac{5}{2}\int_1^{\frac{1}{2}\left(-1-\sqrt{5}+\sqrt{2\left(5+\sqrt{5}\right)}\right)}\frac{1}{t}\,dt$$

We note that:

1/1.7712 * (((-5/2 ln [(((sqrt((sqrt(5)+1)/2+2))) - ((sqrt(5)+1)/2))])))^7

Where 1,7712 is a Hausdorff dimension

Input interpretation:

$$\frac{1}{1.7712}\left(-\frac{5}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^7$$

Open code

- $\log(x)$ is the natural logarithm

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Result:

- More digits

1723.03...

Series representations:

- More

$$\frac{\left(-\frac{5}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^7}{1.7712} = 344.598\left(\sum_{k=1}^{\infty}\frac{(-1)^k\left(-\frac{3}{2}-\frac{\sqrt{5}}{2}+\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}\right)^k}{k}\right)^7$$

Open code

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$$\frac{\left(-\frac{5}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^7}{1.7712} = -344.598\log^7\left(-\frac{1}{2}+\sum_{k=0}^{\infty}\binom{\frac{1}{2}}{k}\left(-2^{-1-2k}\sqrt{4}+2^k\left(3+\sqrt{5}\right)^{-k}\sqrt{\frac{1}{2}\left(3+\sqrt{5}\right)}\right)\right)$$

Open code

$$\frac{\left(-\frac{5}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^7}{1.7712} = -344.598\left(2 i \pi \left\lfloor\frac{\arg\left(-\frac{1}{2}-x-\frac{\sqrt{5}}{2}+\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}\right)}{2\pi}\right\rfloor + \log(x) - \sum_{k=1}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}-x-\frac{\sqrt{5}}{2}+\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}\right)^k}{k}\right)^7 \quad \text{for } x < 0$$

Integral representation:

$$\frac{\left(-\frac{5}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^7}{1.7712} = -344.598\left(\int_1^{-\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{\frac{1}{2}\left(5+\sqrt{5}\right)}}\frac{1}{t}\,dt\right)^7$$

(((((1/1.7712 * (((-5/2 ln [(((sqrt((sqrt(5)+1)/2+2))) - ((sqrt(5)+1)/2))])))^7)))))^1/3

Input interpretation:

$$\sqrt[3]{\frac{1}{1.7712}\left(-\frac{5}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^7}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

11.9885...

This result is very near to the two values of black hole entropies 11,8458 and 12,1904

We have that:

((((((((1/1.7712 * (((-5/2 ln [(((sqrt((sqrt(5)+1)/2+2))) - ((sqrt(5)+1)/2))])))^7))))))))^1/15

Input interpretation:

$$\sqrt[15]{\frac{1}{1.7712}\left(-\frac{5}{2}\log\left(\sqrt{\frac{1}{2}\left(\sqrt{5}+1\right)+2}-\frac{1}{2}\left(\sqrt{5}+1\right)\right)\right)^7}$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- Fewer digits
- More digits

1.643435927508493987136581463417090709645425557040873758714...

1.6434359275....... ≈ $\zeta(2)$

Now:

exp(-2Pi/5)

$$\exp\left(-2\times\frac{\pi}{5}\right)$$

Exact result:

$e^{-(2\pi)/5}$

Decimal approximation:

0.284609543336029280115568598422534831907047843012062136097...

Property:

$e^{-(2\pi)/5}$ is a transcendental number

Note that:

(((e^(-2Pi/5)))/((1+(((e^(-2Pi/5)))/((1+(((e^(-2Pi/5)))/((1+(((e^(-2Pi/5)))/((1+(((e^(-2Pi/5)))

$$\frac{e^{-2\times\pi/5}}{1+\frac{e^{-2\times\pi/5}}{1+\frac{e^{-2\times\pi/5}}{1+\frac{e^{-2\times\pi/5}}{1+e^{-2\times\pi/5}}}}}$$

Exact result:

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+e^{-(2\pi)/5}}}}}$$

Decimal approximation:

0.231234066267623019735059502654595755412999544181351871272...

Property:

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+e^{-(2\pi)/5}}}}}$$ is a transcendental number

Alternate forms:

$$\frac{3+2\cosh\left(\frac{2\pi}{5}\right)}{3+4\,e^{(2\pi)/5}+e^{(4\pi)/5}}$$

$$\frac{3+e^{-(2\pi)/5}+e^{(2\pi)/5}}{3+4\,e^{(2\pi)/5}+e^{(4\pi)/5}}$$

$$\frac{1}{3}\,e^{-(2\pi)/5}+\frac{1}{2\left(1+e^{(2\pi)/5}\right)}+\frac{1}{6\left(3+e^{(2\pi)/5}\right)}$$

Continued fraction:

$$\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{12+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{21+\cfrac{1}{1+\cfrac{1}{253+\cfrac{1}{1+\cfrac{1}{180+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

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

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{1+e^{-(2\pi)/5}}}}} = \frac{e^{-8/5\sum_{k=0}^{\infty}e^{i k\pi}/(1+2k)}\left(1+3\,e^{8/5\sum_{k=0}^{\infty}e^{i k\pi}/(1+2k)}+e^{16/5\sum_{k=0}^{\infty}e^{i k\pi}/(1+2k)}\right)}{\left(1+e^{8/5\sum_{k=0}^{\infty}e^{i k\pi}/(1+2k)}\right)\left(3+e^{8/5\sum_{k=0}^{\infty}e^{i k\pi}/(1+2k)}\right)}$$

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

Integral representations:

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

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

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

And

(((e^(-2Pi/5)))/((1+(((e^(-2Pi/5)))/((142+(((e^(-2Pi/5)))/((143+(((e^(-2Pi/5)))))/((144+(((e^(-2Pi/5)))

$$\frac{e^{-2\times\pi/5}}{1+\frac{e^{-2\times\pi/5}}{142+\frac{e^{-2\times\pi/5}}{143+\frac{e^{-2\times\pi/5}}{144+e^{-2\times\pi/5}}}}}$$

Exact result:

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}$$

Decimal approximation:

0.284040251552571646790195087181918299434906557227779317801...

Property:

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}$$ is a transcendental number

Alternate forms:

$$\frac{e^{-(2\pi)/5}}{1+\frac{1}{\frac{1}{143}+142\,e^{(2\pi)/5}-\frac{1}{20\,592\left(1+143\,e^{(2\pi)/5}\right)}}}$$

$$\frac{1}{145}\,e^{-(2\pi)/5}+\frac{20\,592\left(143+20\,448\,e^{(2\pi)/5}\right)}{145\left(145+41\,184\,e^{(2\pi)/5}+2\,924\,064\,e^{(4\pi)/5}\right)}$$

$$\frac{e^{-(2\pi)/5}\left(1+20\,592\,e^{(2\pi)/5}+2\,924\,064\,e^{(4\pi)/5}\right)}{145+41\,184\,e^{(2\pi)/5}+2\,924\,064\,e^{(4\pi)/5}}$$

Continued fraction:

$$\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{11+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{14+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{35+\cfrac{1}{2+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}} = \frac{e^{-8/5\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\left(1+20\,592\,e^{8/5\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+2\,924\,064\,e^{16/5\sum_{k=0}^{\infty}(-1)^k/(1+2k)}\right)}{145+41\,184\,e^{8/5\sum_{k=0}^{\infty}(-1)^k/(1+2k)}+2\,924\,064\,e^{16/5\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}} = \frac{\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{-(2\pi)/5}\left(1+20\,592\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{(2\pi)/5}+2\,924\,064\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{(4\pi)/5}\right)}{145+41\,184\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{(2\pi)/5}+2\,924\,064\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{(4\pi)/5}}$$

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}} = \frac{\left(1+20\,592\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{(2\pi)/5}+2\,924\,064\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{(4\pi)/5}\right)\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{-(2\pi)/5}}{145+41\,184\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{(2\pi)/5}+2\,924\,064\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{(4\pi)/5}}$$

Integral representations:

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}} = \frac{e^{-4/5\int_0^{\infty}1/(1+t^2)\,dt}\left(1+20\,592\,e^{4/5\int_0^{\infty}1/(1+t^2)\,dt}+2\,924\,064\,e^{8/5\int_0^{\infty}1/(1+t^2)\,dt}\right)}{145+41\,184\,e^{4/5\int_0^{\infty}1/(1+t^2)\,dt}+2\,924\,064\,e^{8/5\int_0^{\infty}1/(1+t^2)\,dt}}$$

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}} =$$

$$\frac{e^{-4/5\int_0^\infty \sin(t)/t\,dt}\left(1+20592\,e^{4/5\int_0^\infty \sin(t)/t\,dt}+2924064\,e^{8/5\int_0^\infty \sin(t)/t\,dt}\right)}{145+41184\,e^{4/5\int_0^\infty \sin(t)/t\,dt}+2924064\,e^{8/5\int_0^\infty \sin(t)/t\,dt}}$$

$$\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}} =$$

$$\frac{e^{-8/5\int_0^1 \sqrt{1-t^2}\,dt}\left(1+20592\,e^{8/5\int_0^1 \sqrt{1-t^2}\,dt}+2924064\,e^{16/5\int_0^1 \sqrt{1-t^2}\,dt}\right)}{145+41184\,e^{8/5\int_0^1 \sqrt{1-t^2}\,dt}+2924064\,e^{16/5\int_0^1 \sqrt{1-t^2}\,dt}}$$

Now:

-5/2 * ln [(((e^(-2Pi/5)))/((1+(((e^(-2Pi/5)))/((142+(((e^(-2Pi/5)))/((143+(((e^(-2Pi/5))))/((144+(((e^(-2Pi/5)))]

$$-\frac{5}{2}\log\left(\frac{e^{-2\times\pi/5}}{1+\frac{e^{-2\times\pi/5}}{142+\frac{e^{-2\times\pi/5}}{143+\frac{e^{-2\times\pi/5}}{144+e^{-2\times\pi/5}}}}}\right)$$

- $\log(x)$ is the natural logarithm

Exact result:

$$-\frac{5}{2}\log\left(\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}\right)$$

Decimal approximation:

3.14659830011220091674719211843240079348108369933026073 7149...

3.14659830011220091674719211843240079348108369933026073 7149

Continued fraction:

$$3+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{18+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{267542+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{7+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$\frac{1}{2}\log\left(\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}\right)(-5) =$$

$$\frac{5}{2}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{e^{-(2\pi)/5}}{1+\frac{144\left(1+143\,e^{(2\pi)/5}\right)}{1+20\,592\,e^{(2\pi)/5}+2\,924\,064\,e^{(4\pi)/5}}}\right)^k}{k}$$

$$\frac{1}{2}\log\left(\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}\right)(-5) = \frac{5}{2}\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}\right)^k}{k}$$

$$\frac{1}{2}\log\left(\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}\right)(-5) = -5\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor - \frac{5\log(z_0)}{2} + \frac{5}{2}\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{e^{-(2\pi)/5}}{1+\frac{144\left(1+143\,e^{(2\pi)/5}\right)}{1+20\,592\,e^{(2\pi)/5}+2\,924\,064\,e^{(4\pi)/5}}}-z_0\right)^k z_0^{-k}}{k}$$

Integral representation:

$$\frac{1}{2}\log\left(\frac{e^{-(2\pi)/5}}{1+\frac{e^{-(2\pi)/5}}{142+\frac{e^{-(2\pi)/5}}{143+\frac{e^{-(2\pi)/5}}{144+e^{-(2\pi)/5}}}}}\right)(-5) = -\frac{5}{2}\int_1^{\frac{e^{-(2\pi)/5}}{1+\frac{144\left(1+143\,e^{(2\pi)/5}\right)}{1+20\,592\,e^{(2\pi)/5}+2\,924\,064\,e^{(4\pi)/5}}}}\frac{1}{t}\,dt$$

1/1.7712 * (3.146598300112200916747192118432400793481083699330260737149)^7

Where 1,7712 is a Hausdorff dimension

Input interpretation:

$$\frac{1}{1.7712}\times 3.146598300112200916747192118432400793481083699330260737149^7$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

1724.334519417215011072155751426792246560495211390772263712...

(((((1/1.7712 * (3.146598300112200916747192118432400793481083699330260737149)^7)))))^1/3

Input interpretation:

$$\left(\frac{1}{1.7712}\times 3.146598300112200916747192118432400793481083699330260737149^7\right)^{\wedge}(1/3)$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits

11.9915...

This result is very near to the two values of black hole entropies 11,8458 and 12,1904

We have also that:

(((((1/1.7712 * (3.1465983001122009167471921)^7)))))^1/15

Input interpretation:

$$\sqrt[15]{\frac{1}{1.7712}\times 3.1465983001122009167471921^7}$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- Fewer digits
- More digits

1.643519147692272025085077393491643800794801127145485544947...

1.64351914769...... ≈ ζ(2)

We note that, from the above expression, we obtain the following results, that are very good approximation to π :

3.146256890409912031962983108617580961172288121414743463855 ≈

≈ 3.146598300112200916747192118432400793481083699330260737149

This is a Ramanujan approximation to π:

(https://www.matematicamente.it/storia/Ramanujan-genio-matematico.pdf)

$$\pi \cong \frac{-2}{\sqrt{210}} \log\left[\frac{(\sqrt{2}-1)^4(2-\sqrt{3})(\sqrt{7}-\sqrt{6})^4(8-3\sqrt{7})(\sqrt{10}-3)^4(\sqrt{15}-\sqrt{14})(4-\sqrt{15})^4(6-\sqrt{35})}{4}\right]$$

We have that:

(((-2/((sqrt(210)))

$$-\frac{2}{\sqrt{210}}$$

Result:

$$-\sqrt{\frac{2}{105}}$$

Decimal approximation:

$$-0.138013111868470843559225372925426397363239360711990219 89\ldots$$

-0.13801311186847084355922537292542639736323936071199021989

[ln(1/4*((sqrt(2)-1))^3.94 ((2-sqrt(3)) ((7-sqrt(6))^3.94 ((8-3sqrt(7)) ((sqrt(10)-3))^3.94 ((sqrt(15)-sqrt(14)) ((4-sqrt(15))^3.94 ((6-sqrt(35))]

$$\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)^{3.94}\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)^{3.94}\right.\right.\right.$$
$$\left.\left.\left.\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)^{3.94}\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)^{3.94}\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)$$

- $\log(x)$ is the natural logarithm

Result:

$$-22.7771\ldots$$

-22.7771...

-0.1380131118 * [ln(1/4*((sqrt(2)-1))^3.94 ((2-sqrt(3)) ((7-sqrt(6))^3.94 ((8-3sqrt(7)) ((sqrt(10)-3))^3.94 ((sqrt(15)-sqrt(14)) ((4-sqrt(15))^3.94 ((6-sqrt(35))]

$$-0.1380131118 \log\left(\frac{1}{4}\left(\sqrt{2}-1\right)^{3.94}\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)^{3.94}\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)^{3.94}\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)^{3.94}\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)$$

- $\log(x)$ is the natural logarithm

Result:

3.14353335464603279933890798165334023607270842887666489398 2...

3.14353335464603279933890798165334023607270842887666 48

Series representations:

$$\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)^{3.94}\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)^{3.94}\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)^{3.94}\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)^{3.94}\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)(-1)\,0.138013 = 0.138013\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1-\frac{1}{4}\left(-1+\sqrt{2}\right)^{3.94}\left(-2+\sqrt{3}\right)\left(7-\sqrt{6}\right)^{3.94}\left(-8+3\sqrt{7}\right)\left(-3+\sqrt{10}\right)^{3.94}\left(4-\sqrt{15}\right)^{3.94}\left(-\sqrt{14}+\sqrt{15}\right)\left(-6+\sqrt{35}\right)\right)^k$$

$$\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)^{3.94}\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)^{3.94}\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)^{3.94}\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)^{3.94}\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)(-1)\,0.138013 = 0.138013\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)^{3.94}\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)^{3.94}\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)^{3.94}\left(4-\sqrt{15}\right)^{3.94}\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k$$

$$\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)^{3.94}\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)^{3.94}\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)^{3.94}\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)^{3.94}\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)(-1)\,0.138013 = -0.276026\,i\,\pi\left\lfloor\frac{1}{2\pi}\arg\left(-x+\frac{1}{4}\left(-1+\sqrt{2}\right)^{3.94}\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)^{3.94}\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)^{3.94}\left(4-\sqrt{15}\right)^{3.94}\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right\rfloor - 0.138013\log(x)+0.138013\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k x^{-k}\left(-x+\frac{1}{4}\left(-1+\sqrt{2}\right)^{3.94}\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)^{3.94}\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)^{3.94}\left(4-\sqrt{15}\right)^{3.94}\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k \quad \text{for } x<0$$

Integral representation:

$$\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)^{3.94}\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)^{3.94}\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)^{3.94}\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)^{3.94}\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)(-1)\,0.138013 = -0.138013\int_1^{-\frac{1}{4}\left(-1+\sqrt{2}\right)^{3.94}\left(-2+\sqrt{3}\right)\left(7-\sqrt{6}\right)^{3.94}\left(-8+3\sqrt{7}\right)\left(-3+\sqrt{10}\right)^{3.94}\left(4-\sqrt{15}\right)^{3.94}\left(-\sqrt{14}+\sqrt{15}\right)\left(-6+\sqrt{35}\right)}\frac{1}{t}\,dt$$

1/1.7712 * (3.1435333546460327993389079816533402360727084288766648)^7

Input interpretation:

$$\frac{1}{1.7712}\times 3.1435333546460327993389079816533402360727084288766648^7$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1712.611698175792834398526977124345116854997211081796928611...

1712.61169817579…

((((1/1.7712 * (3.1435333546460327993389079816533402360727084288766648)^7))))^1/3

Input interpretation:

$$\sqrt[3]{\frac{1}{1.7712} \times 3.14353335464603279933890798165334023607270842887666487^{7}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

11.9643...

This result is very near to the two values of black hole entropies 11,8458 and 12,1904

With 4 as exponent, we obtain the original Ramanujan approximation to Pi:

-0.1380131118 * ln [1/4*(((((sqrt(2)-1))^4 ((2-sqrt(3)) ((7-sqrt(6))^4 ((8-3sqrt(7)) ((sqrt(10)-3))^4 ((sqrt(15)-sqrt(14)) ((4-sqrt(15))^4 ((6-sqrt(35))]

$$-0.1380131118 \log\left(\frac{1}{4}\left(\left(\sqrt{2}-1\right)^4\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)^4\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)^4\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)^4\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)$$

- $\log(x)$ is the natural logarithm

Result:

3.170429496808134399061223668881523703860885705131826135241...

3.1704294968081343990612236688815237038608857051318261

((((1/1.8617 * (3.1704294968081343990612236688815237038608857051318261)^7))))

Where 1,8617 is a Hausdorff dimension

Input interpretation:

$$\frac{1}{1.8617} \times 3.1704294968081343990612236688815237038608857051318261^{7}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1729.485799950796752328700245893329149548729229367577364614...

1729.48579995....

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

((((1/1.8617 * (3.1704294968081343990612236688815237038608857051318261)^7))))^1/3

Input interpretation:

$$\sqrt[3]{\frac{1}{1.8617} \times 3.1704294968081343990612236688815237038608857051318261^7}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

12.0034...

This result is very near to the value of black hole entropy 12,1904

2 * ((((1/1.8617 * (3.1704294968081343990612236688815237038608857051318261)^7))))^1/3

Input interpretation:

$$2\sqrt[3]{\frac{1}{1.8617} \times 3.1704294968081343990612236688815237038608857051318261^7}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

24.0069...

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

A new approximation to Pi can be obtained also multiplying the above Ramanujan expression (without exponents) by the Hausdorff dimension 1,7227:

1.7227 * -2/(sqrt(210)) * ln [1/4*(((((sqrt(2)-1)) ((2-sqrt(3)) ((7-sqrt(6)) ((8-3sqrt(7)) ((sqrt(10)-3)) ((sqrt(15)-sqrt(14)) ((4-sqrt(15)) ((6-sqrt(35))]

$$1.7227\left(-\frac{2}{\sqrt{210}}\right)\log\left(\frac{1}{4}\left(\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)$$

- $\log(x)$ is the natural logarithm

Result:

3.144999690579044036176475089121164161207446575918317499717...

Series representations:

$$\frac{1}{\sqrt{210}}\left(1.7227\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)(-2)\right) = \left(3.4454\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Bigg/\left(\sqrt{209}\sum_{k=0}^{\infty}209^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{1}{\sqrt{210}}\left(1.7227\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)(-2) = \left(3.4454\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Big/\left(\sqrt{209}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{209}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{1}{\sqrt{210}}\left(1.7227\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)(-2) = \left(3.4454\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Big/\left(\exp\left(i\pi\left\lfloor\frac{\arg(210-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(210-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

Integral representation:

$$\frac{1}{\sqrt{210}}\left(1.7227\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)(-2) = -\frac{3.4454}{\sqrt{210}}\int_1^{-\frac{1}{4}\left(-1+\sqrt{2}\right)\left(-2+\sqrt{3}\right)\left(-7+\sqrt{6}\right)\left(-8+3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(-4+\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(-6+\sqrt{35}\right)}\frac{1}{t}\,dt$$

1/1.7712 * (3.1449996905790440361764750891211641612074465759183174)^7

Input interpretation:

$$\frac{1}{1.7712}\times 3.1449996905790440361764750891211641612074465759183174^7$$

Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
1718.211596506515216555784793643310055691013226699210595777...
1718.2115965...

This result is very near to the mass of candidate glueball $f_0(1710)$ meson.

((((1/1.7712 * (3.1449996905790440361764750891211641612074465759183174)^7))))^1/3

Input interpretation:
$$\sqrt[3]{\frac{1}{1.7712} \times 3.1449996905790440361764750891211641612074465759183174^7}$$
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
11.9773...

This result is very near to the two values of black hole entropies 11,8458 and 12,1904

We note that, from the three results that we have obtained, we have the following interesting expression:

(((((1712.61169817579+1729.48579995+1718.2115965)/3))))^1/15

Input interpretation:
$$\sqrt[15]{\frac{1}{3}(1712.61169817579 + 1729.48579995 + 1718.2115965)}$$
Open code

Enlarge Data Customize A Plaintext Interactive
Result:
- More digits
1.643249961400...
1.643249961400000495779........ ≈ ζ(2)

Now, we can to obtain a similar result, thence a good approximation to π, also multiplying the above expression by the value in GeV of $f_0(1710)$ scalar meson (candidate glueball). Indeed:

1.723 * -2/(sqrt(210)) * ln [1/4*(((((sqrt(2)-1)) ((2-sqrt(3)) ((7-sqrt(6)) ((8-3sqrt(7)) ((sqrt(10)-3)) ((sqrt(15)-sqrt(14)) ((4-sqrt(15)) ((6-sqrt(35))]

$$1.723\left(-\frac{2}{\sqrt{210}}\right)\log\left(\frac{1}{4}\left(\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)$$

- $\log(x)$ is the natural logarithm

Result:

3.145547377295926669955341370265145324061316799388901754230...

3.1455473772959266699553413702651453240613167993889017

Continued fraction:

$$3+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{21+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{\ldots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$\frac{1}{\sqrt{210}}\left(1.723\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)(-2) =$$

$$\left(3.446\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)/\left(\sqrt{209}\sum_{k=0}^{\infty}209^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{1}{\sqrt{210}}\left(1.723\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)(-2) =$$

$$\left(3.446\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)/\left(\sqrt{209}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{209}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{1}{\sqrt{210}}\left(1.723\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)(-2) =$$

$$\left(3.446\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)/\left(\exp\left(i\pi\left\lfloor\frac{\arg(210-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(210-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

Integral representation:

$$\frac{1}{\sqrt{210}}$$

$$\left(1.723 \log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)(-2) = -\frac{3.446}{\sqrt{210}}$$

$$\int_1^{-\frac{1}{4}\left(-1+\sqrt{2}\right)\left(-2+\sqrt{3}\right)\left(-7+\sqrt{6}\right)\left(-8+3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(-4+\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(-6+\sqrt{35}\right)} \frac{1}{t}\,dt$$

We note that, multiplying by 2:

2 * 1.723 * -2/(sqrt(210)) * ln [1/4*(((((sqrt(2)-1)) ((2-sqrt(3)) ((7-sqrt(6)) ((8-3sqrt(7)) ((sqrt(10)-3)) ((sqrt(15)-sqrt(14)) ((4-sqrt(15)) ((6-sqrt(35))]

$$2\times 1.723\left(-\frac{2}{\sqrt{210}}\right)\log\left(\frac{1}{4}\left(\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)\right)$$

- $\log(x)$ is the natural logarithm

Result:

6.29109...

6.2910947545918533399106827405302906481226335987778035 ≈ 2π

Continued fraction:

$$6+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{10+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{\dots}}}}}}}}}}}}}}}}}}}}}}$$

Series representations:

$$\frac{1}{\sqrt{210}} 2\,(-2)\,1.723 \log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right) = \left(6.892\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Big/\left(\sqrt{209}\sum_{k=0}^{\infty}209^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{1}{\sqrt{210}} 2\,(-2)\,1.723 \log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right) = \left(6.892\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Big/\left(\sqrt{209}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{209}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{1}{\sqrt{210}} 2\,(-2)\,1.723 \log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right) =$$

$$\left(6.892 \sum_{k=1}^{\infty} \frac{1}{k}(-1)^k \left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right) \Big/$$

$$\left(\exp\left(i\pi \left\lfloor \frac{\arg(210-x)}{2\pi} \right\rfloor\right)\sqrt{x} \sum_{k=0}^{\infty} \frac{(-1)^k (210-x)^k x^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

Integral representation:

$$\frac{1}{\sqrt{210}} 2\,(-2)\,1.723 \log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right) =$$

$$-\frac{6.892}{\sqrt{210}} \int_1^{-\frac{1}{4}\left(-1+\sqrt{2}\right)\left(-2+\sqrt{3}\right)\left(-7+\sqrt{6}\right)\left(-8+3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(-4+\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(-6+\sqrt{35}\right)} \frac{1}{t}\, dt$$

The result 6.291094754… is a very good approximation to the length of a circle with radius equal to 1: 2π.

This is a further confirmation of the dual nature of the particles (wave-particle), in this case represented by small closed-loop curves. In the present case, the glueball - the Particle Made of Pure Force-, is a particle composed only of gluons which are bosons, therefore, energy particles, which can be described as closed strings.

We have also that:

2*(6.291094754591853339910682740530290648122633598778035)

Input interpretation:

$2 \times 6.291094754591853339910682740530290648122633598778035$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

12.582189509183706679821365481060581296245267197555607

Open code

This result 12,5821 is very near to the value of black hole entropy 12,5664

Furthermorer:

(((((2*(6.291094754591853)))^1/5

Input interpretation:

$$\sqrt[5]{2 \times 6.291094754591853}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

1.6594006062528121...

1.6594006062528121 is very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164,2696$ i.e. 1,65578...

We have also:

(1.4649+0.6309) * 1.723 * -2/(sqrt(210)) * ln [1/4*(((((sqrt(2)-1)) ((2-sqrt(3)) ((7-sqrt(6)) ((8-3sqrt(7)) ((sqrt(10)-3)) ((sqrt(15)-sqrt(14)) ((4-sqrt(15)) ((6-sqrt(35))]

Input interpretation:

$$(1.4649 + 0.6309) \times 1.723 \left(-\frac{2}{\sqrt{210}}\right) \log\left(\frac{1}{4}\left(\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)\right)$$

Open code

- $\log(x)$ is the natural logarithm

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

6.59244...

Series representations:

- More

$$\frac{1}{\sqrt{210}}(1.4649+0.6309)(-2)\,1.723\,\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)=$$

$$\left(7.22213\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Big/\left(\sqrt{209}\sum_{k=0}^{\infty}209^{-k}\binom{\frac{1}{2}}{k}\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{\sqrt{210}}(1.4649+0.6309)(-2)\,1.723\,\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)=$$

$$\left(7.22213\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Big/\left(\sqrt{209}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{209}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

Open code

$$\frac{1}{\sqrt{210}}(1.4649+0.6309)(-2)\,1.723\,\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right)=$$

$$\left(7.22213\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(-1+\frac{1}{4}\left(-1+\sqrt{2}\right)\left(2-\sqrt{3}\right)\left(7-\sqrt{6}\right)\left(8-3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(4-\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)^k\right)\Big/\left(\exp\left(i\pi\left\lfloor\frac{\arg(210-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(210-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

Integral representation:

$$\frac{1}{\sqrt{210}}\,(1.4649+0.6309)\,(-2)\,1.723$$

$$\log\left(\frac{1}{4}\left(\sqrt{2}-1\right)\left(\left(2-\sqrt{3}\right)\left(\left(7-\sqrt{6}\right)\left(\left(8-3\sqrt{7}\right)\left(\sqrt{10}-3\right)\left(\left(\sqrt{15}-\sqrt{14}\right)\left(\left(4-\sqrt{15}\right)\left(6-\sqrt{35}\right)\right)\right)\right)\right)\right)\right) = -\frac{7.22213}{\sqrt{210}}$$

$$\int_1^{-\frac{1}{4}\left(-1+\sqrt{2}\right)\left(-2+\sqrt{3}\right)\left(-7+\sqrt{6}\right)\left(-8+3\sqrt{7}\right)\left(-3+\sqrt{10}\right)\left(-4+\sqrt{15}\right)\left(-\sqrt{14}+\sqrt{15}\right)\left(-6+\sqrt{35}\right)} \frac{1}{t}\,dt$$

This result 6,59244 is a very good approximation to the value of reduced Planck's constant 6,5821 * 10^{-16} eV * s

We have that:

(((sqrt(5)+5))/2)))*
6.592438193336803114892404443801691570167707748159 2602

Input interpretation:

$$\left(\frac{1}{2}\left(\sqrt{5}+5\right)\right)\times 6.5924381933368031148924044438016915701677077481592602$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  23.851665452225504239235410886090825336655367196541473...

This result 23,8516 is very near to the value of black hole entropy 23,9078

(1.8617 * 2) * 6.5924381933368031148924044438016915701677077481592602

Where 1,8617 is a Hausdorff dimension

Input interpretation:

$$(1.8617\times 2)\times 6.5924381933368031148924044438016915701677077481592602$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits
  24.546284369070252717990378706051218392362443029496189428 68...

This result 24,5462 is very near to the value of black hole entropy 24,4233

And:

(1.8272* 2) * 6.5924381933368031148924044438016915701677077481592602

Where 1,8272 is a Hausdorff dimension

Input interpretation:

$(1.8272\times 2)\times 6.59243819333680311489240444380169157016770774815926 02$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  $24.091406133730013303062802799428901674020871194873200474 88\ldots$

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

We note that:

((((6.5924381933368031148924044438016915701677077481592602))))^1/4

Input interpretation:

$\sqrt[4]{6.5924381933368031148924044438016915701677077481592602}$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

- More digits

  $1.6023652452918726935321429868440130930050658734506845 8\ldots$

1.602365245291872693..... result that is a golden number and is very near to the elementary charge

We note that with the last two results, we obtain:

(1.6594006062528121+1.602365245291872693)/2.015

With regard the fractal dimension of the Rössler attractor is slightly above 2. For a=0.1, b=0.1 and c=14 it has been estimated between 2.01 and 2.02. thence 2.015 is a very good value.

Input interpretation:

$$\frac{1.6594006062528121+1.602365245291872693}{2.015}$$

Open code

Result:

- More digits
  1.618742358086692204962779156327543424317617866004962779156...
  Open code
  1.618742358086692204962779156327543424317617866004962779156

Continued fraction:
- Linear form

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{6+\cfrac{1}{1+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{37+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{10+\cfrac{1}{4+\cfrac{1}{1+\cfrac{1}{\cdots}}}}}}}}}}}}}}}}}}}}}}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Possible closed forms:
- More

$$\frac{7}{6}\,\pi\,\operatorname{sech}^2\left(\frac{4474282}{4628671}\right) \approx 1.6187423580866922061642$$

$$\frac{-55995+25645\,\pi-73\,\pi^2}{4690\,\pi} \approx 1.618742358086692204886885$$

$$\frac{-428\,\pi\,\pi!+1227-304\,\pi+961\,\pi^2}{18\,\pi} \approx 1.6187423580866922026812$$

$$\frac{1198262411\,\pi}{2325541411} \approx 1.6187423580866922050745$$

$$\frac{851}{13085\,C_{PTP}}+\frac{9064}{13085} \approx 1.61874235808669217609$$

$$\text{root of } 2750\,x^3-53841\,x^2+31358\,x+78656 \text{ near } x=1.61874 \approx 1.618742358086692204956408$$

$$\text{root of } 435\,x^5-213\,x^4-335\,x^3-620\,x^2-158\,x-71 \text{ near } x=1.61874 \approx 1.618742358086692204941618$$

$$\frac{1}{\boxed{\text{root of } 78656x^3 + 31358x^2 - 53841x + 2750 \text{ near } x = 0.617764}} \approx$$
1.61874235808669220495640 8

$$\pi\ \boxed{\text{root of } 1025x^5 + 876x^4 - 681x^3 + 882x^2 - 97x - 190 \text{ near } x = 0.515262} \approx$$
1.61874235808669220496631750

$$\frac{1}{\boxed{\text{root of } 71x^5 + 158x^4 + 620x^3 + 335x^2 + 213x - 435 \text{ near } x = 0.617764}} \approx$$
1.61874235808669220494161 8

$$\frac{-296 + 622\pi - 167\pi^2}{2(-13 - 441\pi + 142\pi^2)} \approx 1.61874235808669219697$$

$$\boxed{\text{root of } 3690x^4 - 4563x^3 - 6831x^2 + 9277x - 3099 \text{ near } x = 1.61874} \approx$$
1.61874235808669220496613096

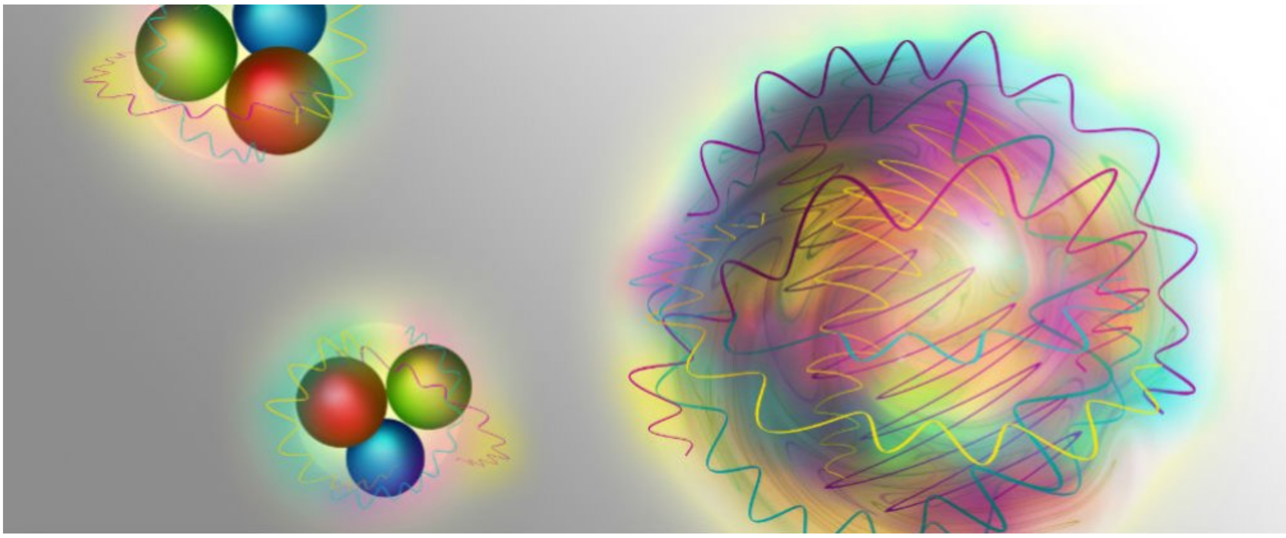
$$\pi\ \boxed{\text{root of } 8717x^4 - 123x^3 + 1333x^2 + 1637x - 1795 \text{ near } x = 0.515262} \approx$$
1.61874235808669220494949 8

$$-\frac{4229}{749} + \frac{5809}{963e} + \frac{4171e}{2247} \approx 1.6187423580866922048808 8$$

$$\frac{1}{\boxed{\text{root of } 3099x^4 - 9277x^3 + 6831x^2 + 4563x - 3690 \text{ near } x = 0.617764}} \approx$$
1.61874235808669220496613096

This result 1.61874235808669220496…. is a good approximation to the value of the golden ratio.

http://sciencevibe.com/2015/10/14/new-discovery-particle-made-of-pure-force/



“GLUEBALL” – The Particle Made of Pure Force

Appendix A

This is the Ramanujan fundamental formula for obtain a beautiful and highly precise golden ratio:

$$\sqrt[5]{\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5e^{\left(-\sqrt{5}\pi\right)^5}}-\frac{11\times 5e^{\left(-\sqrt{5}\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5e^{\left(-\sqrt{5}\pi\right)^5}\right)}-\frac{5\sqrt{5}\times 5e^{\left(-\sqrt{5}\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5e^{\left(-\sqrt{5}\pi\right)^5}\right)}\right)}$$

(11.09016994374947424102293417182819058860154589902881431067 +

- 9.99290225070718723070536304129457122742436976265255 × 10^-7428 +

- 1.01567312386781438874777576295646917898823529098784 × 10^-7427)^1/5 =

Input interpretation:

$$\left(11.09016994374947424102293417182819058860154589902881431067+-\frac{9.99290225070718723070536304129457122742436976265255}{10^{7428}}+-\frac{1.01567312386781438874777576295646917898823529098784}{10^{7427}}\right)^{\wedge}(1/5)$$

= 1.6180339887498948482045868343656381177203091798057628

1,61803398………………………

Possible closed forms:

- Less

$\phi \approx 1.618033988749894848204586834365638117720309179805762862135$

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$\Phi + 1 \approx 1.618033988749894848204586834365638117720309179805762862135$

$\frac{1}{\Phi} \approx 1.618033988749894848204586834365638117720309179805762862135$

$\frac{151\,837\,964\,\pi}{294\,810\,267} \approx 1.61803398874989484850313$

$\frac{11(-70 + 23\pi + 40\pi^2)}{-185 - 659\pi + 502\pi^2} \approx 1.61803398874989484854941$

π root of $11\,208\,x^3 + 103\,781\,x^2 - 49\,442\,x - 3596$ near $x = 0.515036$ $\approx$ $1.6180339887498948482068128$

π root of $4704\,x^4 + 358\,x^3 - 4422\,x^2 - 3386\,x + 2537$ near $x = 0.515036$ $\approx$ $1.61803398874989484818899$

$\frac{1}{42}\left(-1 + 34e - 56e^2 + 7\sqrt{1+e} - 5\sqrt{1+e^2} + 50\pi + 22\pi^2 - 24\sqrt{1+\pi} + 20\sqrt{1+\pi^2}\right) \approx 1.6180339887498948482008510$

$\frac{-487 - 906e + 711e^2}{283 - 56e + 175e^2} \approx 1.61803398874989484835044$

$\frac{-13 + \sqrt{2} - 3e + 2\pi - \pi^2 - \log(2) - \log(3)}{7\sqrt{2} + 7\sqrt{3} - e - \pi - 3\pi^2 - 3\log(2)} \approx 1.61803398874989484867509$

$\frac{7\,778\,742\,049}{4\,807\,526\,976} \approx 1.6180339887498948482223936$

- ϕ is the golden ratio
- Φ is the golden ratio conjugate

Developing this formula, we obtain the extended value of golden ratio as the following image:

1.61803398874989484820458683436563811772030917980576286213544862270
5260462818902449707207204189391137484754088075386891752126633862223
5369317931800607667263544333890865959395829056383226613199282902678
8067520876689250171169620703222104321626954862629631361443814975870
1220340805887954454749246185695364864449241044320771344947049565846
7885098743394422125448770664780915884607499887124007652170575179788
3416625624940758906970400028121042762177111777805315317141011704666
5991466979873176135600670874807101317952368942752194843530567830022
8785699782977834784587822891109762500302696156170025046433824377648
6102838312683303724292675263116533924731671112115881863851331620384
0052221657912866752946549068113171599343235973494985090409476213222
9810172610705961164562990981629055520852479035240602017279974717534
2777592778625619432082750513121815628551222480939471234145170223735
8057727861600868838295230459264787801788992199027077690389532196819
8615143780314997411069260886742962267575605231727775203536139362107
6738937645560606059216589466759551900400555908950229530942312482355
2122124154440064703405657347976639723949499465845788730396230903750
3399385621024236902513868041457799569812244574717803417312645322041
6397232134044449487302315417676893752103068737880344170093954409627
9558986787232095124268935573097045095956844017555198819218020640529
0551893494759260073485228210108819464454422231889131929468962200230
1443770269923007803085261180754519288770502109684249362713592518760
7778846658361502389134933331223105339232136243192637289106705033992
8226526355620902979864247275977256550861548754357482647181414512700
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3147985719113978153978074761507722117508269458639320456520989698555
6781410696837288405874610337810544439094368358358138113116899385557
6975484149144534150912954070050194775486163075422641729394680367319
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8809287570345050780814545881990633612982798141174533927312080928972
7922213298064294687824274874017450554067787570832373109759151177629
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9956564736007295999839128810319742631251797141432012311279551894778
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7578076560503677313097519122397388722468258057159744574048429878073
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1425454055429273458837116020994794572082378043687189448056357159090
3968866527212318646304335724281379838482131 $e^0 \approx 1.6180$ (real, principal root)

From:

Exact Renormalization Group Equations. An Introductory Review.

C. Bagnuls*and C. Bervillier† C. E. Saclay, F91191 Gif-sur-Yvette Cedex, France
February 1, 2008

For $d = 3$ and $k = 1$, the first order of the derivative expansion yields (after a long but straightforward computation) the following two coupled equations for U and Z [22]:

$$\begin{aligned}
\dot{U} &= -\frac{1-\eta/4}{\sqrt{Z}\sqrt{U''+2\sqrt{Z}}} + 3U - \frac{1}{2}(1+\eta)\varphi U' \\
\dot{Z} &- -\frac{1}{2}(1+\eta)\varphi Z' - \eta Z + \left(1-\frac{\eta}{4}\right)\left\{\frac{1}{48}\frac{24ZZ''-19(Z')^2}{Z^{3/2}(U''+2\sqrt{Z})^{3/2}}\right. \\
&\left. \frac{1}{48}\frac{58U'''Z'\sqrt{Z}+57(Z')^2+(Z''')^2Z}{Z(U''+2\sqrt{Z})^{5/2}} + \frac{5}{12}\frac{(U''')^2Z+2U'''Z'\sqrt{Z}+(Z')^2}{\sqrt{Z}(U''+2\sqrt{Z})^{7/2}}\right\}
\end{aligned} \tag{87}$$

As expected, the search for a non trivial fixed point solution for these equations (a solution which is nonsingular up to $\varphi - \infty$) produces a unique solution with an unambiguously defined η [22]:

$$\eta - 0.05393 \tag{88}$$

The linearization about this fixed point yields the eigenvalues:

$$\begin{aligned}
\nu &= 0.6181 && (89)\\
\omega &= 0.8975 && (90)
\end{aligned}$$

and also a zero eigenvalue $\lambda = 0$ [22] which corresponds to the redundant operator $\mathcal{O}_1$ [eq. (24)] responsible for the moving along the line of equivalent fixed points. This is, of course, an expected confirmation of the preservation of the reparametrization invariance.

and from:

Polchinski equation, reparameterization invariance and the derivative expansion

Jordi Comellas - Departament d'Estructura i Constituents de la Materia - Facultat de Fisica, Universitat de Barcelona - Diagonal, 647, 08028 Barcelona, Spain

	LPA	Polchinski	eff. action	best known
η	0	0.042	0.054	0.035(3)
ν	0.650	0.622	0.618	0.631(2)
ω	0.656	0.754	0.897	0.80(4)

Table 1: The critical exponents η, ν and ω for (1) the LPA of Polchinski equation; (2) derivative expansion at second order of Polchinski equation; (3) derivative expansion at second order of the effective action RG equation [1]; (4) combination of best known estimates taken from Ref. [1].

The partition function is then

$$Z = \int \mathcal{D}\phi \, e^{-S^{*}-j_\alpha \mathcal{O}_\alpha}, \tag{52}$$

and we define the thermodynamic densities

$$M_\alpha \equiv \frac{1}{V}\frac{\partial}{\partial j_\alpha} \ln Z, \tag{53}$$

with V the volume of the system (needed in order M_α to be an intensive quantity and, thus, defined in the thermodynamic limit).

From Wikipedia:

In mathematics, in particular in linear algebra, an eigenvector of a function between vector spaces is a non-zero vector whose image is the vector itself multiplied by a number (real or complex) called **eigenvalue**. If the function is linear, the eigenvectors having in common the same eigenvalue, together with the null vector, form a vector space, called autospace. The notion of eigenvector is generalized by the concept of root vector or generalized eigenvector.

Eigenvectors and eigenvalues are defined and used in mathematics and physics in the context of more complex and abstract vector spaces than the three-dimensional one of classical physics. These spaces can have dimensions greater than 3 or even infinite (an example is given by the Hilbert space). Also the possible positions of a vibrating string form a space of this type: a vibration of the string is then interpreted as a transformation of this space and its eigenvectors (more precisely, its eigenfunctions) are stationary waves.

We note that the values of ν, 0.6181 or 0.618, are practically equals to the reciprocal of the golden ratio:

From Wikipedia:

$$\varphi = \frac{1+\sqrt{5}}{2} = 1.61803\,39887\ldots$$

The conjugate root to the minimal polynomial $x^2 - x - 1$ is

$$-\frac{1}{\varphi} = 1 - \varphi = \frac{1-\sqrt{5}}{2} = -0.61803\,39887\ldots.$$

The absolute value of this quantity (≈ 0.618) corresponds to the length ratio taken in reverse order (shorter segment length over longer segment length, *b/a*), and is sometimes referred to as the *golden ratio conjugate*. It is denoted here by the capital Phi (Φ)

$$\Phi = \frac{1}{\varphi} = \varphi^{-1} = 0.61803\,39887\ldots.$$

Alternatively, **Φ** can be expressed as

$$\Phi = \varphi - 1 = 1.61803\,39887\ldots - 1 = 0.61803\,39887\ldots.$$

This illustrates the unique property of the golden ratio among positive numbers, that

$$\frac{1}{\varphi} = \varphi - 1,$$

or its inverse:

$$\frac{1}{\Phi} = \Phi + 1.$$

This means 0.61803...:1 = 1:1.61803....

Thence, we can to obtain the following mathematical connection between the value of the eigenvalue ν = 0.618... and the fundamental Ramanujan's formula:

$$\sqrt[5]{\left(\frac{1}{\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5e^{\left(-\sqrt{5}\pi\right)^5}}-\frac{11\times 5e^{\left(-\sqrt{5}\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5e^{\left(-\sqrt{5}\pi\right)^5}\right)}-\frac{5\sqrt{5}\times 5e^{\left(-\sqrt{5}\pi\right)^5}}{2\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5e^{\left(-\sqrt{5}\pi\right)^5}\right)}\right)}$$

(a)

Input interpretation:

$$\left(1\Big/\left(\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{9.99290225070718723070536304129457122742436976265255}{10^{7428}}-\frac{1.01567312386781438874777576295646917898823529098784}{10^{7427}}\right)\right)\hat{}\,(1/5)$$

Open code

(b)

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Result:

- More digits

1.6180339887498948482045868343656381177203091798057628621354...

Or:

((((1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))-(-1.6382898797095665677239458827012056245798314722584 × 10^-7429)))^1/5

Input interpretation:

$$\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)--\frac{1.6382898797095665677239458827012056245798314722584}{10^{7429}}}}$$

Open code

(c)

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Result:

- More digits

1.6180339887498948482045868343656381177203091798057628621354...

The result, thence, is:

1.618033988749894848204586834365638117720309179805762

Indeed, we obtain from (c):

1/ ((((1/(((1/32(-1+sqrt(5))^5+5*(e^((-sqrt(5)*Pi))^5)))-(-1.6382898797095665677239458827012056245798314722584 × 10^-7429)))^1/5

Input interpretation:

$$\frac{1}{\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{1.6382898797095665677239458827012056245798314722584}{10^{7429}}}}}$$

Open code

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Result:

- More digits

0.61803398874989484820458683436563811772030917980576286213 5...

0.61803398...

Series representations:

- More

$$\frac{1}{\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{1.63828987970956656772394588270120562457983147225840000}{10^{7429}}}}} =$$

$$1\Big/\left(\left(1\Big/\left(1.63828987970956656772394588270120562457983147225840000\times 10^{-7429}+5\,e^{-\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}4^{-k}\binom{1/2}{k}\right)^5}+\frac{1}{32}\left(-1+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\right)\text{^}(1/5)\right)$$

Open code

Enlarge Data Customize A Plaintext Interactive

$$\frac{1}{\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{1.63828987970956656772394588270120562457983147225840000}{10^{7429}}}}} =$$

$$1\Big/\left(\left(1\Big/\left(1.63828987970956656772394588270120562457983147225840000\times 10^{-7429}+5\exp\left(-\pi^5\sqrt{4}^5\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)+\frac{1}{32}\left(-1+\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\right)\text{^}(1/5)\right)$$

Open code

$$\frac{1}{\sqrt[5]{\frac{1}{\left(\frac{1}{32}\left(-1+\sqrt{5}\right)^5+5\,e^{\left(-\sqrt{5}\,\pi\right)^5}\right)-\frac{1.6382898797095665677239458827012056245798314722584000}{10^{7429}}}}} =$$

$$1\Bigg/\left(\left(1\Bigg/\left(1.6382898797095665677239458827012056245798314722584000\times 10^{-7429}+5\exp\left(-\frac{\pi^5\left(\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)\right)^5}{32\sqrt{\pi}^5}\right)+\frac{1}{32}\left(-1+\frac{\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)^5\right)\right)\hat{}\,(1/5)\right)$$

- $\binom{n}{m}$ is the binomial coefficient
- $n!$ is the factorial function
- $(a)_n$ is the Pochhammer symbol (rising factorial)
- $\Gamma(x)$ is the gamma function
- $\operatorname{Res}_{z=z_0} f$ is a complex residue
- More information

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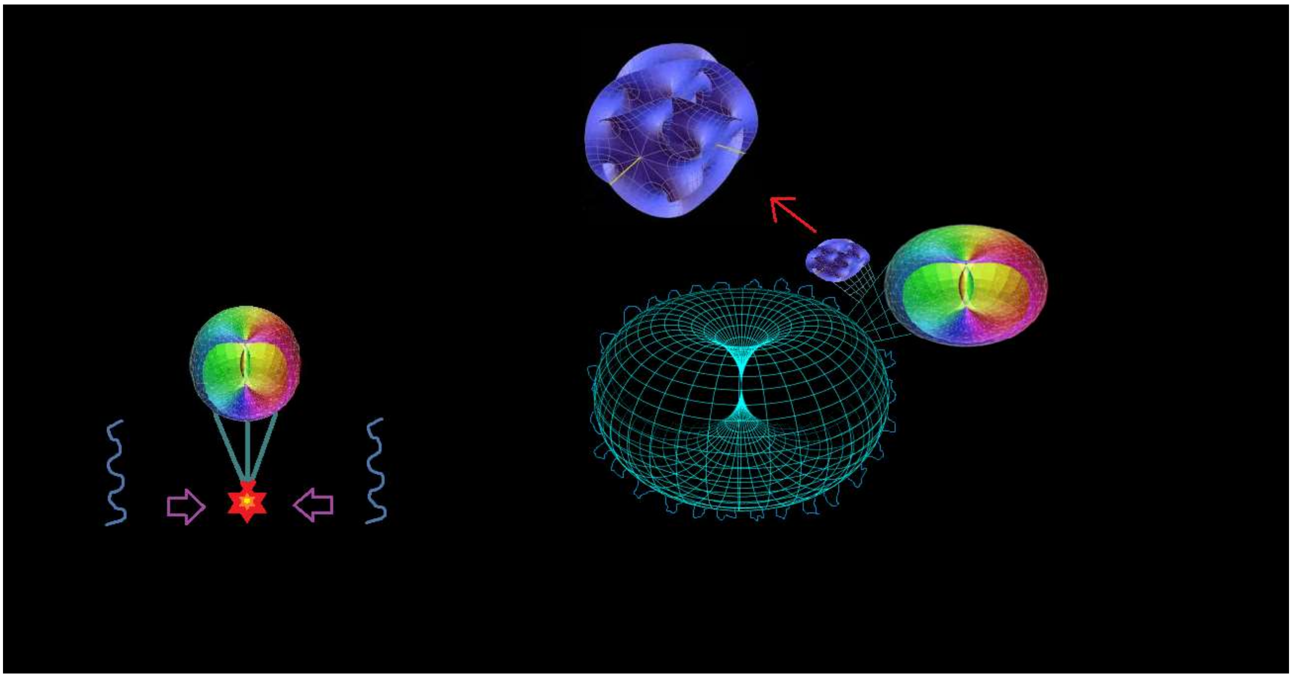
The result 0.61803398... is practically equal to the value of eigenvalue ν, that is 0.6181 or 0.618, practically equals to the reciprocal of the golden ratio.

Conclusion

Translating the formula from the cosmological point of view, the two infinitesimal values with exponents -7427 and -7428 could represent the slightest ripples of the so-called supersymmetric vacuum which, therefore, like any vacuum, is not really "empty". The golden ratio represents then the very first symmetry break, even before the Big Bang, from which it emerged and was formalized the infinite-dimensional Hilbert space that is of a fractal nature, as is the golden ratio whose value is also a Hausdorff dimension. So ϕ represents the thought-information that becomes a creative act and from which the formal phase begins with the infinite representations of the absolute reality that corresponds to the two infinitesimal values mentioned above.



From the picture we can see the Hilbert space, (in green) represented by an infinite-dimensional torus on which lie infinity open strings, the infinite 1-branes from whose collision of a pair of them, emerges a multiverse-brane as ours that contains an immeasurable but finite number of bubbles, which probably coincides with the size number of the Monster Group 8.1 * 10^{53} which, in turn, is related to Ramanaujan's mathematics through the j-invariants of the Monstrous Moonshine.

References

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