On the possible mathematical connections between several Ramanujan equations concerning p(n) and τ(n), some equations concerning the Partition Function of the SO(8192) bosonic string, various parameters regarding Particle Physics, ϕ and ζ(2). VII

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Abstract

In this paper (part VII), we describe and analyze further new mathematical connections between some Ramanujan formulas concerning p(n) and τ(n), several equations concerning the Partition Function of the SO(8192) bosonic string various parameters regarding Particle Physics, ϕ and ζ(2).

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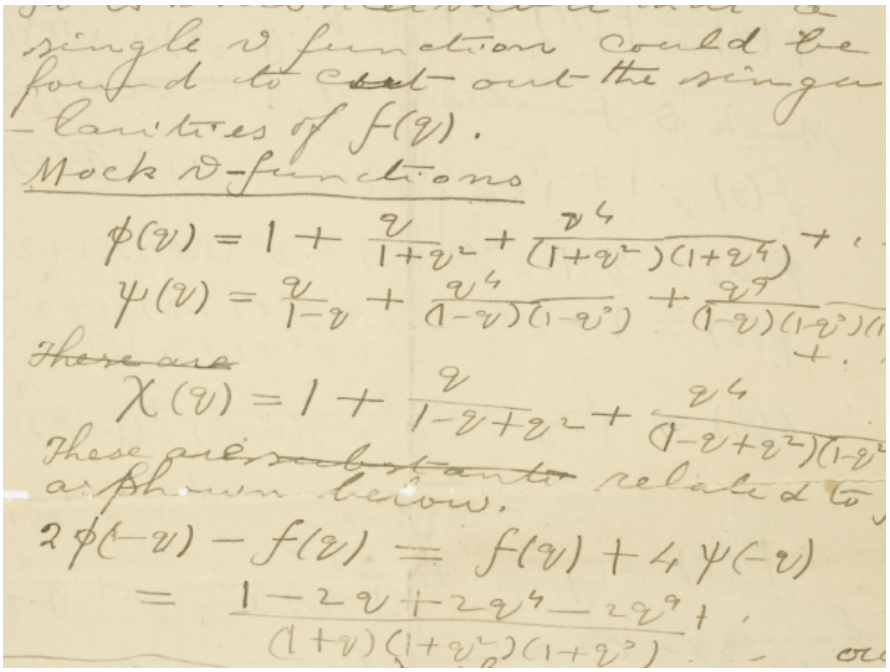

https://royalsociety.org/science-events-and-lectures/2018/10/srinivasa-ramanujan/

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https://web.archive.org/web/20020207051215/http://anduin.eldar.org/~problemi/singmast/ecmutil.html

THE UNREASONABLE UTILITY OF RECREATIONAL MATHEMATICS
by Prof. David Singmaster

WHY IS RECREATIONAL MATHEMATICS SO USEFUL?

"As I said earlier, I have only a tentative answer to this, but it also partly answers Wigner's question. Mathematics has been described as a search for pattern - and that certainly describes much of what we do and also much of what most scientists do. But how do we find patterns? The real world is messy and patterns are difficult to see. As we begin to see a pattern, we tend to remove all the inessential details and get to an ideal or model situation. These models may be so removed from reality that they become fanciful or even recreational. E.g. physicists deal with frictionless perfectly elastic particles, weightless strings, ideal gases, etc. Then such models get modified and adapted into a large variety of models. Now one of the ways in which a science progresses is by seeing analogies between reality and simpler situations. E.g. the idea of the circulation of the blood could not be developed until the idea of a pump was known and somewhat understood. The behaviour of a real system cannot be developed until one can see simpler models within it. But what are these simpler models? They are generally among the large variety of models which have been created in the past, often recreational or fanciful. Perhaps the clearest example is graph theory,

where Euler made a simple model of the reality that he was studying, then later workers found that model useful in other situations. Thus recreational mathematics helps as a major source of mathematical models, which are the raw material for mathematical research"

We, in our papers, through the use of "recreational number theory", obtain possible new matematical connections between various sectors of Ramanujan's mathematics and various physical parameters concerning several topics of physics and cosmology.

From:

https://www.trin.cam.ac.uk/library/wren-digital-library/modern-manuscripts/ramanujan/

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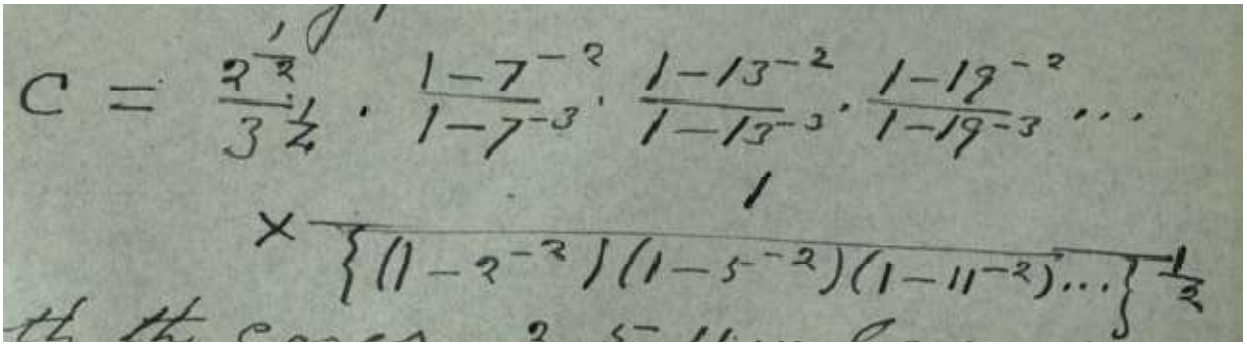


We obtain:

(2^(1/2)) / (3^(1/4)) * (1-7^-2)/(1-7^-3)*(1-13^-2)/(1-13^-3)*(1-19^-2)/(1-19^-3)*1/((1-2^-2)(1-5^-2)(1-11^-2))^0.5

Input:

$$\frac{\sqrt{2}}{\sqrt[4]{3}} \times \frac{1-\frac{1}{7^2}}{1-\frac{1}{7^3}} \times \frac{1-\frac{1}{13^2}}{1-\frac{1}{13^3}} \times \frac{1-\frac{1}{19^2}}{1-\frac{1}{19^3}} \times \frac{1}{\sqrt{\left(1-\frac{1}{2^2}\right)\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{11^2}\right)}}$$

Exact result:

$$\frac{560\,560\sqrt{10}}{627\,507 \times 3^{3/4}}$$

Decimal approximation:

1.23926044669532972917898495365649455515115412013272145760 9...

1.239260446…

Alternate form:

$$\frac{560\,560\left(\sqrt[4]{3}\ \sqrt{10}\right)}{1\,882\,521}$$

1+1/2((((2^(1/2)) / (3^(1/4))*(1-7^-2)/(1-7^-3)*(1-13^-2)/(1-13^-3)*(1-19^-2)/(1-19^-3)*1/((1-2^-2)(1-5^-2)(1-11^-2))^0.5)))

Input:

$$1+\frac{1}{2}\left(\frac{\sqrt{2}}{\sqrt[4]{3}} \times \frac{1-\frac{1}{7^2}}{1-\frac{1}{7^3}} \times \frac{1-\frac{1}{13^2}}{1-\frac{1}{13^3}} \times \frac{1-\frac{1}{19^2}}{1-\frac{1}{19^3}} \times \frac{1}{\sqrt{\left(1-\frac{1}{2^2}\right)\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{11^2}\right)}}\right)$$

Exact result:

$$1+\frac{280\,280\sqrt{10}}{627\,507 \times 3^{3/4}}$$

Decimal approximation:

1.61963022334766486458949247682824727757557706006636072880 4...

1.6196302233…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternate forms:

$$\frac{1\,882\,521 + 280\,280\,\sqrt[4]{3}\,\sqrt{10}}{1\,882\,521}$$

$$\frac{280\,280\left(\sqrt[4]{3}\,\sqrt{10}\right)}{1\,882\,521} + 1$$

$$\frac{627\,507 \times 3^{3/4} + 280\,280\,\sqrt{10}}{627\,507 \times 3^{3/4}}$$

Minimal polynomial:

$$4\,186\,374\,376\,332\,785\,357\,674\,827\,x^4 - 16\,745\,497\,505\,331\,141\,430\,699\,308\,x^3 + 25\,118\,246\,257\,996\,712\,146\,048\,962\,x^2 - 16\,745\,497\,505\,331\,141\,430\,699\,308\,x + 3\,569\,256\,061\,937\,546\,701\,674\,827$$

(322+123+29)((((2^(1/2)) / (3^(1/4))*(1-7^-2)/(1-7^-3)*(1-13^-2)/(1-13^-3)*(1-19^-2)/(1-19^-3)*1/((1-2^-2)(1-5^-2)(1-11^-2))^0.5)))^6+11

Where 322, 123, 29 and 11 are Lucas numbers

Input:

$$(322 + 123 + 29)\left(\frac{\sqrt{2}}{\sqrt[4]{3}} \times \frac{1 - \frac{1}{7^2}}{1 - \frac{1}{7^3}} \times \frac{1 - \frac{1}{13^2}}{1 - \frac{1}{13^3}} \times \frac{1 - \frac{1}{19^2}}{1 - \frac{1}{19^3}} \times \frac{1}{\sqrt{\left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{5^2}\right)\left(1 - \frac{1}{11^2}\right)}}\right)^6 + 11$$

Exact result:

$$11 + \frac{4\,902\,185\,193\,224\,216\,164\,392\,119\,042\,048\,000\,000\,000}{1\,648\,447\,853\,024\,914\,742\,452\,622\,254\,800\,011\,523\,\sqrt{3}}$$

Decimal approximation:

1727.935076673378881590450224544101838402881416428658825140...

1727.9350766…

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

Alternate forms:

$$\frac{4\,902\,185\,193\,224\,216\,164\,392\,119\,042\,048\,000\,000\,000\sqrt{3}}{4\,945\,343\,559\,074\,744\,227\,357\,866\,764\,400\,034\,569}+11$$

$$\left(11\left(4\,945\,343\,559\,074\,744\,227\,357\,866\,764\,400\,034\,569+445\,653\,199\,384\,019\,651\,308\,374\,458\,368\,000\,000\,000\sqrt{3}\right)\right)\Big/ 4\,945\,343\,559\,074\,744\,227\,357\,866\,764\,400\,034\,569$$

$$\left(54\,398\,779\,149\,822\,186\,500\,936\,534\,408\,400\,380\,259+4\,902\,185\,193\,224\,216\,164\,392\,119\,042\,048\,000\,000\,000\sqrt{3}\right)\Big/ 4\,945\,343\,559\,074\,744\,227\,357\,866\,764\,400\,034\,569$$

Minimal polynomial:

$$8\,152\,140\,972\,427\,352\,749\,226\,300\,894\,045\,029\,129\,613\,064\,722\,776\,172\,058\,517\,452\,362\,798\,338\,587\,x^2-179\,347\,101\,393\,401\,760\,482\,978\,619\,668\,990\,640\,851\,487\,423\,901\,075\,785\,287\,383\,951\,981\,563\,448\,914\,x-24\,030\,433\,259\,609\,081\,861\,596\,216\,133\,608\,634\,293\,035\,788\,690\,049\,185\,275\,215\,223\,388\,264\,101\,401\,030\,973$$

4((((2^(1/2)) / (3^(1/4))*(1-7^-2)/(1-7^-3)*(1-13^-2)/(1-13^-3)*(1-19^-2)/(1-19^-3)*1/((1-2^-2)(1-5^-2)(1-11^-2))^0.5)))^16+2

Input:

$$4\left(\frac{\sqrt{2}}{\sqrt[4]{3}}\times\frac{1-\frac{1}{7^2}}{1-\frac{1}{7^3}}\times\frac{1-\frac{1}{13^2}}{1-\frac{1}{13^3}}\times\frac{1-\frac{1}{19^2}}{1-\frac{1}{19^3}}\times\frac{1}{\sqrt{\left(1-\frac{1}{2^2}\right)\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{11^2}\right)}}\right)^{16}+2$$

Exact result:

38 634 438 196 934 306 113 493 514 719 512 808 005 049 681 676 812 395 407 792 ∶
121 613 574 539 583 178 114 158 939 612 129 867 690 082 /
307 151 226 713 002 546 981 790 896 187 811 961 160 118 432 869 932 063 595 044 ∶
846 779 152 863 077 057 079 469 806 064 933 845 041

Decimal approximation:

125.783115406645404245434457660063064321080173961573085558 0...

125.7831154066… result very near to the Higgs boson mass 125.18 GeV

4((((2^(1/2)) / (3^(1/4))*(1-7^-2)/(1-7^-3)*(1-13^-2)/(1-13^-3)*(1-19^-2)/(1-19^-3)*1/((1-2^-2)(1-5^-2)(1-11^-2))^0.5)))^16+13+3

Input:

$$4\left(\frac{\sqrt{2}}{\sqrt[4]{3}}\times\frac{1-\frac{1}{7^2}}{1-\frac{1}{7^3}}\times\frac{1-\frac{1}{13^2}}{1-\frac{1}{13^3}}\times\frac{1-\frac{1}{19^2}}{1-\frac{1}{19^3}}\times\frac{1}{\sqrt{\left(1-\frac{1}{2^2}\right)\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{11^2}\right)}}\right)^{16}+13+3$$

Exact result:

42 934 555 370 916 341 771 238 587 266 142 175 461 291 339 736 991 444 298 122 ∶
749 468 482 679 666 256 913 271 516 897 038 941 520 656 /
307 151 226 713 002 546 981 790 896 187 811 961 160 118 432 869 932 063 595 044 ∶
846 779 152 863 077 057 079 469 806 064 933 845 041

Decimal approximation:

139.783115406645404245434457660063064321080173961573085558 0...

139.7831154… result practically equal to the rest mass of Pion meson 139.57 MeV

[1/((((2^(1/2)) / (3^(1/4))*(1-7^-2)/(1-7^-3)*(1-13^-2)/(1-13^-3)*(1-19^-2)/(1-19^-3)*1/((1-2^-2)(1-5^-2)(1-11^-2))^0.5)))]^1/172

where 172 is a cubic root of a Ramanujan taxicab number

Input:

$$\sqrt[172]{\frac{1}{\frac{\sqrt{2}}{\sqrt[4]{3}}\times\frac{1-\frac{1}{7^2}}{1-\frac{1}{7^3}}\times\frac{1-\frac{1}{13^2}}{1-\frac{1}{13^3}}\times\frac{1-\frac{1}{19^2}}{1-\frac{1}{19^3}}\times\frac{1}{\sqrt{\left(1-\frac{1}{2^2}\right)\left(1-\frac{1}{5^2}\right)\left(1-\frac{1}{11^2}\right)}}}}$$

Exact result:

$$\frac{3^{19/688}\sqrt[172]{\frac{7747}{143}}}{2^{9/344}\times 5^{3/344}\sqrt[86]{7}}$$

Decimal approximation:

0.998753598406040793078203774088680833136896520317000162058...

0.998753598… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the Omega mesons ($\omega/\omega_3 \mid 5+3 \mid m_{u/d}=255-390 \mid 0.988-1.18$) Regge slope value (0.988) connected to the dilaton scalar field $\mathbf{0.989117352243 = \phi}$

A_1^{**} above the two low-lying pseudo-scalars. (bound states of gluons, or 'glueballs').

A_1^{**}	0.943(39) [2.5]	0.988(38)	0.152(53)
A_4	1.03(10) [2.5]	0.999(32)	0.035(21)

(**Glueball Regge trajectories -** *Harvey Byron Meyer*, Lincoln College -Thesis submitted for the degree of Doctor of Philosophy at the University of Oxford Trinity Term, 2004)

All 172nd roots of (627507 3^(3/4))/(560560 sqrt(10)):

$$\frac{3^{19/688}\sqrt[172]{\frac{7747}{143}}\,e^{0}}{2^{9/344}\times 5^{3/344}\sqrt[86]{7}} \approx 0.998754 \text{ (real, principal root)}$$

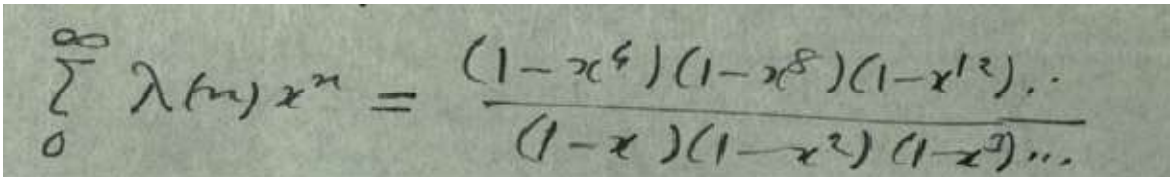
$$\frac{3^{19/688}\sqrt[172]{\frac{7747}{143}}\,e^{(i\pi)/86}}{2^{9/344}\times 5^{3/344}\sqrt[86]{7}} \approx 0.998087 + 0.036477\,i$$

$$\frac{3^{19/688}\sqrt[172]{\frac{7747}{143}}\,e^{(i\pi)/43}}{2^{9/344}\times 5^{3/344}\sqrt[86]{7}} \approx 0.996089 + 0.07290\,i$$

$$\frac{3^{19/688}\sqrt[172]{\frac{7747}{143}}\,e^{(3i\pi)/86}}{2^{9/344}\times 5^{3/344}\sqrt[86]{7}} \approx 0.99276 + 0.10923\,i$$

$$\frac{3^{19/688}\sqrt[172]{\frac{7747}{143}}\,e^{(2i\pi)/43}}{2^{9/344}\times 5^{3/344}\sqrt[86]{7}} \approx 0.98811 + 0.14542\,i$$

Now, we have that:



For x = 2, we obtain:

((1-2^4)(1-2^8)(1-2^12)) / ((1-2)(1-2^2)(1-2^3))

Input:

$$\frac{(1-2^4)(1-2^8)(1-2^{12})}{(1-2)(1-2^2)(1-2^3)}$$

Result:

745 875

745875

We note that:

[((1-2^4)(1-2^8)(1-2^12)) / ((1-2)(1-2^2)(1-2^3))]^1/4

Input:

$$\sqrt[4]{\frac{(1-2^4)(1-2^8)(1-2^{12})}{(1-2)(1-2^2)(1-2^3)}}$$

Result:

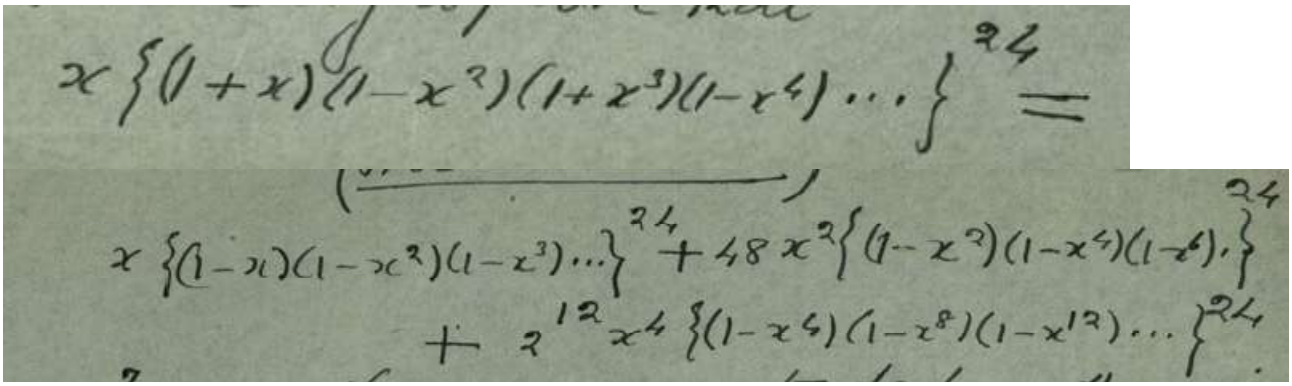
$$15^{3/4}\sqrt[4]{221}$$

Decimal approximation:

29.387761912556167226519333923746280049973447839788806976 54...

29.3877619… result very near to the value of p(9) = 30

Now, we have that:



For x = 2, we obtain:

2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24

Input:

$$2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+ 48\times 2^2\left((1-2^2)(1-2^4)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left((1-2^4)(1-2^8)(1-2^{12})\right)^{24}$$

Result:

$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\ldots$$
$$897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\ldots$$
$$036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762$$

Decimal approximation:

$3.116938437910392611135809249275620382136196071688110798144843\ldots \times 10^{177}$

$3.11693843791\ldots*10^{177}$

1/4(((2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24)))^1/42 - 123 +11+1

Where 123 and 11 are Lucas numbers

Input:

$$\frac{1}{4}\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left((1-2^2)(1-2^4)\left(1-2^6\right)\right)^{24}+ 2^{12}\times 2^4\left((1-2^4)(1-2^8)(1-2^{12})\right)^{24}\right)\,\hat{}\,(1/42)-123+11+1$$

Decimal approximation:

$4096.083743399105754106390140580618230090958353801823248384\ldots$

$4096.0837433\ldots \approx 4096$

We note that:

[2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24]^1/72

Input:

$$\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)\text{ ^ }(1/72)$$

Exact result:

$$\sqrt[3]{3}\ 7^{25/72}\times 8\,229\,379\,891\,689\,707\,374\,920\,335\,661\,902\,915\,074\,267\,874\,700\,492\,182\,152\,952\ldots\cdot 616\,926\,643\,642\,361\,165\,702\,894\,255\,415\,957\,646\,003\,455\,982\,126\,937\,536\,880\ldots\cdot 871\,159\,318\,064\,553\,397\,042\,410\,714\,286\ \text{^}\ (1/72)$$

Decimal approximation:

291.870814314035041684998851960872798240199432494050744732 2…

291.870814… quite close result to the value of p(17) = 297

From which, we obtain:

1/(golden ratio)^2 * sqrt[2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24]

Input:

$$\frac{1}{\phi^2}\sqrt{\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)}$$

ϕ is the golden ratio

Exact result:

$$\frac{1}{\phi^2}\,7\,355\,827\,511\,386\,641\times\sqrt{57\,605\,659\,241\,827\,951\,624\,442\,349\,633\,320\,405\,519\,875\,122\,903\,445\,275\,070\ldots\cdot 668\,318\,486\,505\,496\,528\,159\,920\,259\,787\,911\,703\,522\,024\,191\,874\,888\,562\,758\ldots\cdot 166\,098\,115\,226\,451\,873\,779\,296\,875\,000\,002}$$

Decimal approximation:

$2.13249897869121146192240133447002253598820158628796 16\ldots \times 10^{88}$

$2.13249897869121\ldots *10^{88}$ result very near to the value of Planck thermal transmittance 2.200693×10^{88} W/m^2·K

Indeed:

$$\frac{\lambda_{\Theta P}}{l_P} = \frac{1}{\Omega_{\Theta P}\, l_P^2} = \sqrt{\frac{c^{11} k_B^2}{64\pi^3 \hbar^3 G^3}}$$

sqrt[((299792458^11*(1.380649e-23)^2)) / ((((64*Pi^3*(1.054571817e-34)^3*(6.6743e-11)^3)))]

Input interpretation:

$$\sqrt{\frac{299\,792\,458^{11}\,(1.380649\times 10^{-23})^2}{64\,\pi^3\,(1.054571817\times 10^{-34})^3\,(6.6743\times 10^{-11})^3}}$$

Result:

$2.20069332434394513579358124217129248318816283230165 15\ldots \times 10^{88}$

$2.200693324\ldots *10^{88}$

We have also:

1/3 ln[2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24]+Pi

Input:

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24} + 48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24} + 2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right) + \pi$$

$\log(x)$ is the natural logarithm

Exact result:

$$\pi + \frac{1}{3}\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,\backslash:$$
$$843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,\backslash:$$
$$872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,\backslash:$$
$$525\,762)$$

Decimal approximation:

139.37306355695861630835428469972543610484507929749137969 51...

139.37306355… result practically equal to the rest mass of Pion meson 139.57 MeV

Alternate forms:

$$\pi + \log(37\,822\,859\,361 \times$$
$$57\,605\,659\,241\,827\,951\,624\,442\,349\,633\,320\,405\,519\,875\,122\,903\,445\,275\,070\,\backslash:$$
$$668\,318\,486\,505\,496\,528\,159\,920\,259\,787\,911\,703\,522\,024\,191\,874\,888\,562\,\backslash:$$
$$758\,166\,098\,115\,226\,451\,873\,779\,296\,875\,000\,002\,\hat{}\,(1/3))$$

$$\frac{1}{3}(3\pi + \log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,\backslash:$$
$$144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,\backslash:$$
$$832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,\backslash:$$
$$477\,818\,061\,525\,762))$$

Alternative representations:

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24} + 48 \times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24} + 2^{12} \times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right) + \pi = \pi + \frac{1}{3}\log_e\left(2\,(-21)^{24} + 192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24} + 2^4 \times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)$$

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24} + 48 \times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24} + 2^{12} \times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right) + \pi =$$
$$\pi + \frac{1}{3}\log(a)\log_a\left(2\,(-21)^{24} + 192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24} + 2^4 \times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)$$

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)+\pi=\pi-\frac{1}{3}\mathrm{Li}_1\left(1-2\left(-21\right)^{24}-192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}-2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)$$

Series representations:

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)+\pi=\pi+\frac{2}{3}i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\frac{\log(z_0)}{3}-\frac{1}{3}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k$$
$$(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ldots.$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,\ldots.$$
$$547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,\ldots.$$
$$487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-z_0)^k\,z_0^{-k}$$

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)+\pi=\pi+\frac{2}{3}i\pi\left\lfloor\frac{1}{2\pi}\arg(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ldots.$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,\ldots.$$
$$443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,\ldots.$$
$$912\,513\,835\,855\,440\,477\,818\,061\,525\,762-x)\right\rfloor+\frac{\log(x)}{3}-\frac{1}{3}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k$$
$$(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,\ldots.$$
$$110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,\ldots.$$
$$467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,\ldots.$$
$$129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-x)^k\,x^{-k}\quad\text{for } x<0$$

$$\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)(1-2^4)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)(1-2^8)(1-2^{12})\right)^{24}\right)+\pi=\pi+\frac{1}{3}\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,\ldots$$
$$144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,\ldots$$
$$832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,\ldots$$
$$477\,818\,061\,525\,761)-\frac{1}{3}\sum_{k=1}^{\infty}\frac{1}{k}(-(1/$$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,\ldots$$
$$688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,\ldots$$
$$727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,\ldots$$
$$701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,\ldots$$
$$525\,761))^k$$

Integral representations:

$$\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)(1-2^4)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)(1-2^8)(1-2^{12})\right)^{24}\right)+\pi=\pi-\frac{i}{6\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{1}{\Gamma(1-s)}$$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ldots$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,\ldots$$
$$443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,\ldots$$
$$912\,513\,835\,855\,440\,477\,818\,061\,525\,761^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)\,ds$$
$$\text{for } -1<\gamma<0$$

1/3 ln[2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24]-11

Input:

$$\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)(1-2^4)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)(1-2^8)(1-2^{12})\right)^{24}\right)-11$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{1}{3}\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,\cdot$$
$$843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,\cdot$$
$$872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,\cdot$$
$$525\,762) - 11$$

Decimal approximation:

125.231470903368823069891641316445933220647909898116273874 1...

125.2314709… result very near to the Higgs boson mass 125.18 GeV

Property:

$$-11 + \frac{1}{3}\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,\cdot$$
$$144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,\cdot$$
$$832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,\cdot$$
$$477\,818\,061\,525\,762) \text{ is a transcendental number}$$

Alternate forms:

$$\frac{1}{3}(\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,\cdot$$
$$144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,\cdot$$
$$832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,\cdot$$
$$477\,818\,061\,525\,762) - 33)$$

$$\log(37\,822\,859\,361 \times$$
$$57\,605\,659\,241\,827\,951\,624\,442\,349\,633\,320\,405\,519\,875\,122\,903\,445\,275\,070\,\cdot$$
$$668\,318\,486\,505\,496\,528\,159\,920\,259\,787\,911\,703\,522\,024\,191\,874\,888\,562\,\cdot$$
$$758\,166\,098\,115\,226\,451\,873\,779\,296\,875\,000\,002\,\hat{}\,(1/3)) - 11$$

Alternative representations:

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-11=-11+\frac{1}{3}\log_e\left(2\,(-21)^{24}+192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)$$

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-11=-11+\frac{1}{3}\log(a)\log_a\left(2\,(-21)^{24}+192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)$$

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-11=-11-\frac{1}{3}\mathrm{Li}_1\left(1-2\,(-21)^{24}-192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}-2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)$$

Series representations:

$$\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-11=-11+\frac{2}{3}i\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\frac{\log(z_0)}{3}-\frac{1}{3}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k$$

$$(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\ldots$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\ldots$$
$$547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\ldots$$
$$487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-$$
$$z_0)^k\,z_0^{-k}$$

$$\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left((1-2^2)(1-2^4)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left((1-2^4)(1-2^8)(1-2^{12})\right)^{24}\right)-11=-11+\frac{2}{3}i\pi\left\lfloor\frac{1}{2\pi}\arg(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-x)\right\rfloor+\frac{\log(x)}{3}-\frac{1}{3}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-x)^k x^{-k}\quad \text{for } x<0$$

$$\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left((1-2^2)(1-2^4)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left((1-2^4)(1-2^8)(1-2^{12})\right)^{24}\right)-11=-11+\frac{1}{3}\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,761)-\frac{1}{3}\sum_{k=1}^{\infty}\frac{1}{k}(-(1/3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,761))^k$$

Integral representations:

$$\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left((1-2^2)(1-2^4)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left((1-2^4)(1-2^8)(1-2^{12})\right)^{24}\right)-11=-11-\frac{i}{6\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{1}{\Gamma(1-s)}3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,761^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)\,ds$$

$$\text{for } -1<\gamma<0$$

27*1/2(((1/3 ln[2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24]-8)))-Pi

Input:

$$27\times\frac{1}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{27}{2}\left(\frac{1}{3}\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\cdot\cdot\cdot 798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\cdot\cdot\cdot 194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\cdot\cdot\cdot 835\,855\,440\,477\,818\,061\,525\,762)-8\right)-\pi$$

Decimal approximation:

1727.983264541889318205074514388740595594549614225194591479...

1727.983264… ≈ 1728

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

With regard 27 (From Wikipedia):

"The fundamental group of the complex form, compact real form, or any algebraic version of E_6 is the cyclic group $\boldsymbol{Z}/3\boldsymbol{Z}$, and its outer automorphism group is the cyclic group $\boldsymbol{Z}/2\boldsymbol{Z}$. Its fundamental representation is 27-dimensional (complex), and a basis is given by the 27 lines on a cubic surface. The dual representation, which is inequivalent, is also 27-dimensional. In particle physics, E_6 plays a role in some grand unified theories".

Alternate forms:

$$-108-\pi+\frac{1}{2}9\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,\ddots$$
$$144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,\ddots$$
$$832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,\ddots$$
$$477\,818\,061\,525\,762)$$

$$\frac{9}{2}(\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ddots$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,\ddots$$
$$194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,\ddots$$
$$835\,855\,440\,477\,818\,061\,525\,762)-24)-\pi$$

$$\frac{1}{2}(-216-2\pi+9\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ddots$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,\ddots$$
$$194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,\ddots$$
$$835\,855\,440\,477\,818\,061\,525\,762))$$

Alternative representations:

$$\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\right.\right.$$
$$\left.\left.2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi=$$
$$-\pi+\frac{27}{2}\left(-8+\frac{1}{3}\log_e\left(2\,(-21)^{24}+192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\right.\right.$$
$$\left.\left.2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)\right)$$

$$\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\right.\right.$$
$$\left.\left.2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi=$$
$$-\pi+\frac{27}{2}\left(-8+\frac{1}{3}\log(a)\log_a\left(2\,(-21)^{24}+192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\right.\right.$$
$$\left.\left.2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)\right)$$

$$\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\right.\right.$$
$$\left.\left.2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi=$$
$$-\pi+\frac{27}{2}\left(-8-\frac{1}{3}\mathrm{Li}_1\left(1-2\,(-21)^{24}-192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}-\right.\right.$$
$$\left.\left.2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)\right)$$

Series representations:

$$\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi=$$

$$-108-\pi+9\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor+\frac{9\log(z_0)}{2}-\frac{9}{2}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k$$

$$(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ldots$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,\ldots$$
$$547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,\ldots$$
$$487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-z_0)^k\,z_0^{-k}$$

$$\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi=-108-\pi+9\,i\,\pi\left\lfloor\frac{1}{2\,\pi}\arg(\right.$$

$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ldots$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,\ldots$$
$$443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,\ldots$$
$$912\,513\,835\,855\,440\,477\,818\,061\,525\,762-x)\left.\right\rfloor+$$

$$\frac{9\log(x)}{2}-\frac{9}{2}\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k$$

$$(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,\ldots$$
$$110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,\ldots$$
$$467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,\ldots$$
$$129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-x)^k\,x^{-k}\quad\text{for } x<0$$

$$\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi=-108-\pi+\frac{1}{2}9\log($$

$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,\ldots$$
$$144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,\ldots$$
$$832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,\ldots$$
$$477\,818\,061\,525\,761)-\frac{9}{2}\sum_{k=1}^{\infty}\frac{1}{k}(-(1/$$

$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,\ldots$$
$$688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,\ldots$$
$$727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,\ldots$$
$$701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,\ldots$$
$$525\,761))^k$$

Integral representations:

$$\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-$$

$$\pi=-108-\pi-\frac{9i}{4\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{1}{\Gamma(1-s)}$$

$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,\ddots$$
$$798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,\ddots$$
$$443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,\ddots$$
$$912\,513\,835\,855\,440\,477\,818\,061\,525\,761^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)\,ds$$

for $-1<\gamma<0$

((((27*1/2(((1/3 ln[2((1-2)(1-2^2)(1-2^3))^24+48*2^2((1-2^2)(1-2^4)(1-2^6))^24+2^12*2^4((1-2^4)(1-2^8)(1-2^12))^24]-8)))-Pi))))^1/15

Input:

$$\left(27\times\frac{1}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi\right)\text{^}(1/15)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\left(\frac{27}{2}\left(\frac{1}{3}\log($$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,\ddots$$
$$110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,\ddots$$
$$547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,\ddots$$
$$137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762)-8\Big)-$$
$$\pi\Big)\text{^}(1/15)$$

Decimal approximation:

1.643750768210735885445476374163770287948016934035473840157...

$1.643750768\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Alternate forms:

$$\left(-108 - \pi + \frac{1}{2}9\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762)\right)\text{^}(1/15)$$

$$\left(\frac{9}{2}(\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762) - 24) - \pi\right)\text{^}(1/15)$$

$$\left(\frac{1}{2}(-216 - 2\pi + 9\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762))\right)\text{^}(1/15)$$

All 15th roots of 27/2 (log(3116938437910392611135809249275620382136196071688110798144843897043535633074523854301790727805467547443194837832410872513036320328701487771129487137912513835855440477818061525762)/3 - 8) - π:

$$e^0\left(\frac{27}{2}\left(\frac{1}{3}\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762) - 8\right) - \pi\right)\text{^}(1/15) \approx 1.64375 \text{ (real, principal root)}$$

$$e^{(2\,i\,\pi)/15}\left(\frac{27}{2}\left(\frac{1}{3}\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,\ldots\\ 688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,\ldots\\ 805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,\ldots\\ 771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762)-8\right)-\pi\right)\,\hat{}\,(1/15)\approx 1.50164+0.6686\,i$$

$$e^{(4\,i\,\pi)/15}\left(\frac{27}{2}\left(\frac{1}{3}\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,\ldots\\ 688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,\ldots\\ 805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,\ldots\\ 771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762)-8\right)-\pi\right)\,\hat{}\,(1/15)\approx 1.0999+1.2215\,i$$

$$e^{(2\,i\,\pi)/5}\left(\frac{27}{2}\left(\frac{1}{3}\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,\ldots\\ 688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,\ldots\\ 805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,\ldots\\ 771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762)-8\right)-\pi\right)\,\hat{}\,(1/15)\approx 0.5079+1.5633\,i$$

$$e^{(8\,i\,\pi)/15}\left(\frac{27}{2}\left(\frac{1}{3}\log(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,\ldots\\ 688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,\ldots\\ 805\,467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,\ldots\\ 771\,129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762)-8\right)-\pi\right)\,\hat{}\,(1/15)\approx -0.17182+1.63475\,i$$

Alternative representations:

$$\left(\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\\ 2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi\right)\,\hat{}\,(1/15)=\\ \left(-\pi+\frac{27}{2}\left(-8+\frac{1}{3}\log_e\left(2\,(-21)^{24}+192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\\ 2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)\right)\right)\,\hat{}\,(1/15)$$

$$\left(\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi\right)\,\hat{}\,(1/15)=\left(-\pi+\frac{27}{2}\left(-8+\frac{1}{3}\log(a)\log_a\left(2\,(-21)^{24}+192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)\right)\right)\,\hat{}\,(1/15)$$

$$\left(\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi\right)\,\hat{}\,(1/15)=\left(-\pi+\frac{27}{2}\left(-8-\frac{1}{3}\,\mathrm{Li}_1\left(1-2\,(-21)^{24}-192\left(-3\left(1-2^4\right)\left(1-2^6\right)\right)^{24}-2^4\times 2^{12}\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)\right)\right)\,\hat{}\,(1/15)$$

Series representations:

$$\left(\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi\right)\,\hat{}\,(1/15)=\left(-\pi+\frac{27}{2}\left(-8+\frac{1}{3}\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\,\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\,(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\ldots\right.\right.\right.$$
$$196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\ldots$$
$$523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\ldots$$
$$410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\ldots$$
$$912\,513\,835\,855\,440\,477\,818\,061\,525\,762-$$
$$\left.\left.\left.z_0)^k\,z_0^{-k}\right)\right)\right)\,\hat{}\,(1/15)$$

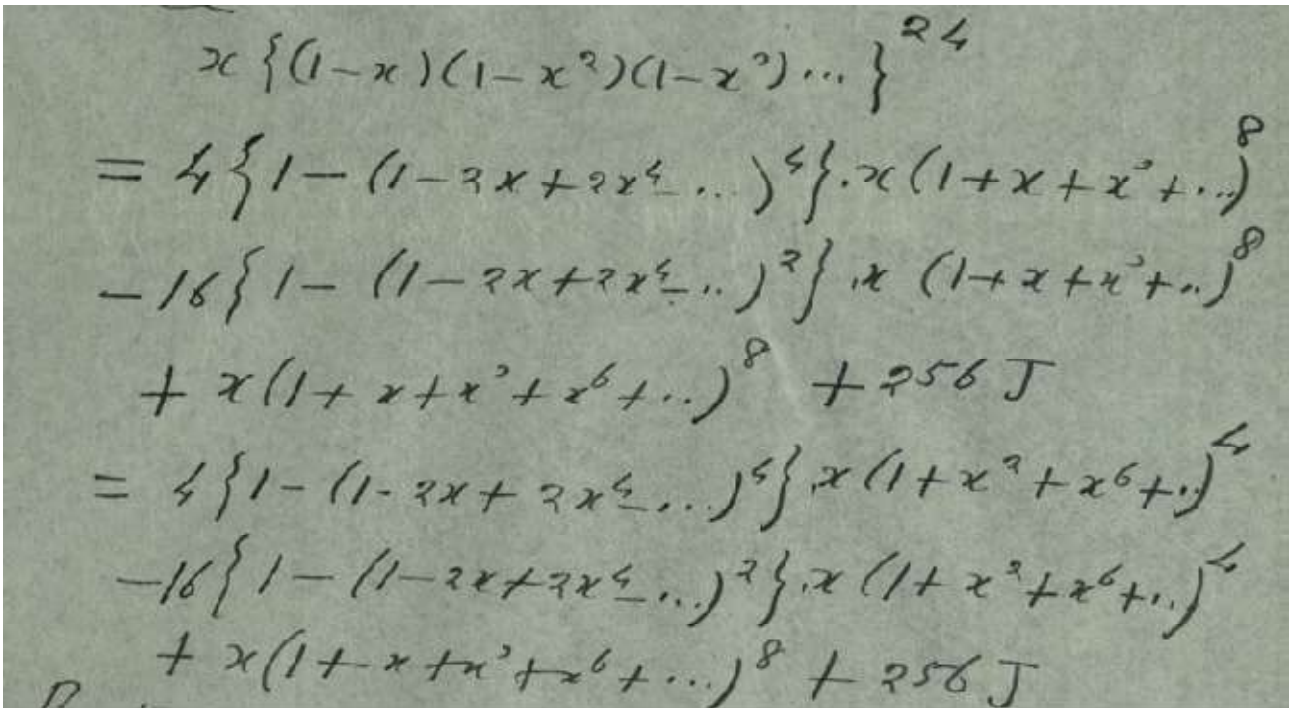
$$\left(\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\right.\right.\right.$$
$$\left.\left.\left.2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi\right)\wedge$$
$$(1/15)=\left(-\pi+\frac{27}{2}\left(-8+\frac{1}{3}\left(2\,i\,\pi\left\lfloor\frac{1}{2\,\pi}\arg(\right.\right.\right.\right.$$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\ddots$$
$$136\,196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\ddots$$
$$074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\ddots$$
$$832\,410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\ddots$$
$$137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,762-$$
$$\left.\left.\left.\left.x)\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\right.\right.\right.\right.$$
$$\left.\left.\left.\left.(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\ddots\right.\right.\right.\right.$$
$$196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\ddots$$
$$074\,523\,854\,301\,790\,727\,805\,467\,547\,443\,194\ddots$$
$$837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\ddots$$
$$129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\ddots$$
$$\left.\left.\left.\left.525\,762-x)^k\right.\right.\right.\right.$$
$$\left.\left.\left.\left.x^{-k}\right)\right)\right)\right)\wedge(1/15)\quad\text{for } x<0$$

$$\left(\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)\left(1-2^2\right)\left(1-2^3\right)\right)^{24}+48\times 2^2\left(\left(1-2^2\right)\left(1-2^4\right)\left(1-2^6\right)\right)^{24}+\right.\right.\right.$$
$$\left.\left.\left.2^{12}\times 2^4\left(\left(1-2^4\right)\left(1-2^8\right)\left(1-2^{12}\right)\right)^{24}\right)-8\right)-\pi\right)\wedge$$
$$(1/15)=\left(-\pi+\frac{27}{2}\left(-8+\frac{1}{3}\left(\log(z_0)+\left\lfloor\frac{1}{2\,\pi}\arg(\right.\right.\right.\right.$$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\ddots$$
$$196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\,523\ddots$$
$$854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\,410\,872\ddots$$
$$513\,036\,320\,328\,701\,487\,771\,129\,487\,137\,912\,513\,835\ddots$$
$$855\,440\,477\,818\,061\,525\,762-$$
$$\left.\left.\left.\left.z_0)\right\rfloor\left(\log\left(\frac{1}{z_0}\right)+\log(z_0)\right)-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\right.\right.\right.\right.$$
$$\left.\left.\left.\left.(3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\ddots\right.\right.\right.\right.$$
$$196\,071\,688\,110\,798\,144\,843\,897\,043\,535\,633\,074\ddots$$
$$523\,854\,301\,790\,727\,805\,467\,547\,443\,194\,837\,832\ddots$$
$$410\,872\,513\,036\,320\,328\,701\,487\,771\,129\,487\,137\ddots$$
$$912\,513\,835\,855\,440\,477\,818\,061\,525\,762-$$
$$\left.\left.\left.\left.z_0)^k\,z_0^{-k}\right)\right)\right)\right)\wedge(1/15)$$

Integral representations:

$$\left(\frac{27}{2}\left(\frac{1}{3}\log\left(2\left((1-2)(1-2^2)(1-2^3)\right)^{24}+48\times 2^2\left((1-2^2)(1-2^4)\left(1-2^6\right)\right)^{24}+\right.\right.\right.$$
$$\left.\left.\left.2^{12}\times 2^4\left((1-2^4)(1-2^8)(1-2^{12})\right)^{24}\right)-8\right)-\pi\right)\wedge$$
$$(1/15)=\left(-108-\pi-\frac{9i}{4\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{1}{\Gamma(1-s)}\right.$$
$$3\,116\,938\,437\,910\,392\,611\,135\,809\,249\,275\,620\,382\,136\,196\,071\,688\cdot\cdot$$
$$110\,798\,144\,843\,897\,043\,535\,633\,074\,523\,854\,301\,790\,727\,805\cdot\cdot$$
$$467\,547\,443\,194\,837\,832\,410\,872\,513\,036\,320\,328\,701\,487\,771\cdot\cdot$$
$$129\,487\,137\,912\,513\,835\,855\,440\,477\,818\,061\,525\,761^{-s}$$
$$\left.\Gamma(-s)^2\,\Gamma(1+s)\,ds\right)\wedge(1/15)\quad \text{for } -1<\gamma<0$$

Now, we have that:



For x = 2 and J = 279.1936 , we obtain:

4(1-(1-2*2+2*2^4)^4) 2(1+2^2+2^6)^4 - 16(1-(1-2*2+2*2^4)^2)
2(1+2^2+2^6)^4+2(1+2+2^3+2^6)^8+256*279.1936

Input interpretation:

$$4\left(1-\left(1-2\times 2+2\times 2^4\right)^4\right)\left(2\left(1+2^2+2^6\right)^4\right)- \left(16\left(1-\left(1-2\times 2+2\times 2^4\right)^2\right)\right)\left(2\left(1+2^2+2^6\right)^4\right)+2\left(1+2+2^3+2^6\right)^8+256\times 279.1936$$

Result:

$1.87461158233816356 16 \times 10^{15}$

$1.87461158233816356*10^{15}$

(((4(1-(1-2*2+2*2^4)^4) 2(1+2^2+2^6)^4 - 16(1-(1-2*2+2*2^4)^2) 2(1+2^2+2^6)^4+2(1+2+2^3+2^6)^8+256*279.1936)))^1/7-13

Input interpretation:

$$\left(4\left(1-\left(1-2\times 2+2\times 2^4\right)^4\right)\left(2\left(1+2^2+2^6\right)^4\right)-\left(16\left(1-\left(1-2\times 2+2\times 2^4\right)^2\right)\right)\left(2\left(1+2^2+2^6\right)^4\right)+2\left(1+2+2^3+2^6\right)^8+256\times 279.1936\right)\text{ }\hat{}\text{ }(1/7)-13$$

Result:

139.000309013339819...

139.000309013… result practically equal to the rest mass of Pion meson 139.57 MeV

(((4(1-(1-2*2+2*2^4)^4) 2(1+2^2+2^6)^4 - 16(1-(1-2*2+2*2^4)^2) 2(1+2^2+2^6)^4+2(1+2+2^3+2^6)^8+256*279.1936)))^1/7-29+2

Input interpretation:

$$\left(4\left(1-\left(1-2\times 2+2\times 2^4\right)^4\right)\left(2\left(1+2^2+2^6\right)^4\right)-\left(16\left(1-\left(1-2\times 2+2\times 2^4\right)^2\right)\right)\left(2\left(1+2^2+2^6\right)^4\right)+2\left(1+2+2^3+2^6\right)^8+256\times 279.1936\right)\text{ }\hat{}\text{ }(1/7)-29+2$$

Result:

125.000309013339819...

125.00030901… result very near to the Higgs boson mass 125.18 GeV

32(((((4(1-(1-2*2+2*2^4)^4) 2(1+2^2+2^6)^4 - 16(1-(1-2*2+2*2^4)^2) 2(1+2^2+2^6)^4+2(1+2+2^3+2^6)^8+256*279.1936)))^1/7-29+2+3))

Input interpretation:

$$32\left(\left(4\left(1-\left(1-2\times 2+2\times 2^4\right)^4\right)\left(2\left(1+2^2+2^6\right)^4\right)-\left(16\left(1-\left(1-2\times 2+2\times 2^4\right)^2\right)\right)\left(2\left(1+2^2+2^6\right)^4\right)+2\left(1+2+2^3+2^6\right)^8+256\times 279.1936\right)\text{ ^ }(1/7)-29+2+3\right)$$

Result:

4096.00988842687421...

4096.009888… ≈ 4096

27*1/2(((((4(1-(1-2*2+2*2^4)^4) 2(1+2^2+2^6)^4 - 16(1-(1-2*2+2*2^4)^2) 2(1+2^2+2^6)^4+2(1+2+2^3+2^6)^8+256*279.1936)))^1/7-29+2+3))

Input interpretation:

$$27\times\frac{1}{2}\left(\left(4\left(1-\left(1-2\times 2+2\times 2^4\right)^4\right)\left(2\left(1+2^2+2^6\right)^4\right)-\left(16\left(1-\left(1-2\times 2+2\times 2^4\right)^2\right)\right)\left(2\left(1+2^2+2^6\right)^4\right)+2\left(1+2+2^3+2^6\right)^8+256\times 279.1936\right)\text{ ^ }(1/7)-29+2+3\right)$$

Result:

1728.00417168008756...

1728.00417168…

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

[27*1/2(((((4(1-(1-2*2+2*2^4)^4) 2(1+2^2+2^6)^4 - 16(1-(1-2*2+2*2^4)^2) 2(1+2^2+2^6)^4+2(1+2+2^3+2^6)^8+256*279.1936)))^1/7-29+2+3))]^1/15

Input interpretation:

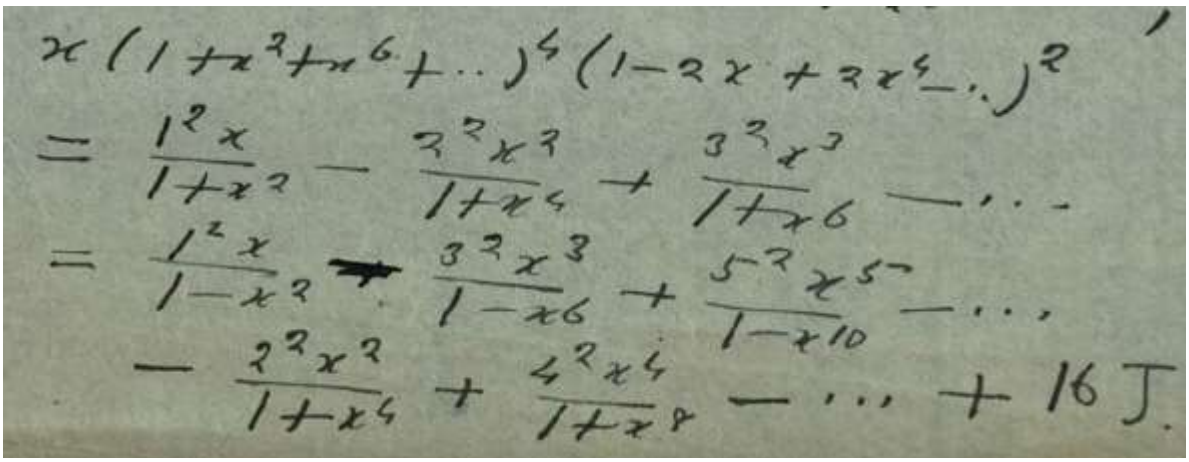
$$\left(27\times\frac{1}{2}\left(\left(4\left(1-\left(1-2\times2+2\times2^4\right)^4\right)\left(2\left(1+2^2+2^6\right)^4\right)-\left(16\left(1-\left(1-2\times2+2\times2^4\right)^2\right)\right)\left(2\left(1+2^2+2^6\right)^4\right)+2\left(1+2+2^3+2^6\right)^8+256\times279.1936\right)\text{^}(1/7)-29+2+3\right)\right)\text{^}(1/15)$$

Result:

1.643752094069658274...

$1.643752094\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Now, we have that:



For x = 2 and J = 279.1936 , we obtain:

2/(1-2^2) – (3^2*2^3)/(1-2^6) + (5^2*2^5)/(1-2^10) – (2^2*2^2)/(1+2^4) + (4^2*2^4)/(1+2^8) + 16*279.1936

Input interpretation:

$$\frac{2}{1-2^2}-\frac{3^2\times2^3}{1-2^6}+\frac{5^2\times2^5}{1-2^{10}}-\frac{2^2\times2^2}{1+2^4}+\frac{4^2\times2^4}{1+2^8}+16\times279.1936$$

Result:

4466.846709269779091617705310954670444920668268448449932365...

4466.8467….

We note that:

(((2/(1-2^2) – (3^2*2^3)/(1-2^6) + (5^2*2^5)/(1-2^10) – (2^2*2^2)/(1+2^4) + (4^2*2^4)/(1+2^8) + 16*279.1936)))-322-47-2

Input interpretation:

$$\left(\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.1936\right)-322-47-2$$

Result:

4095.846709269779091617705310954670444920668268448449932365...

4095.8467092… ≈ 4096

From the formula of coefficients of the '5th order' mock theta function $\psi_1(q)$: (A053261 OEIS Sequence)

sqrt(golden ratio) * exp(Pi*sqrt(n/15)) / (2*5^(1/4)*sqrt(n)) for n = 217 , we obtain:

sqrt(golden ratio) * exp(Pi*sqrt(217/15)) / (2*5^(1/4)*sqrt(217))

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{217}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{217}}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{217/15}\,\pi}\sqrt{\frac{\phi}{217}}}{2\sqrt[4]{5}}$$

Decimal approximation:

4465.876186236099129506585538095969524671295301761806091071...

4465.87618623…

Property:

$\frac{e^{\sqrt{217/15}\,\pi}\sqrt{\frac{\phi}{217}}}{2\sqrt[4]{5}}$ is a transcendental number

Alternate forms:

$$\frac{1}{2}\sqrt{\frac{5+\sqrt{5}}{2170}}\;e^{\sqrt{217/15}\,\pi}$$

$$\frac{\sqrt{\frac{1}{434}\left(1+\sqrt{5}\right)}\;e^{\sqrt{217/15}\,\pi}}{2\sqrt[4]{5}}$$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{217}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{217}} = \frac{\exp\left(\pi\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{217}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}}{2\sqrt[4]{5}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(217-z_0)^k z_0^{-k}}{k!}}$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{217}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{217}} = \left(\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{217}{15}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{217}{15}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$
$$\left(2\sqrt[4]{5}\,\exp\left(i\pi\left\lfloor\frac{\arg(217-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(217-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{217}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{217}} =$$
$$\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{217}{15}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{217}{15}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{217}{15}-z_0\right)^k z_0^{-k}}{k!}\right)\right.$$
$$\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(217-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}z_0^{-1/2\lfloor\arg(217-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(2\sqrt[4]{5}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(217-z_0)^k z_0^{-k}}{k!}\right)$$

From the previous expression, we obtain also:

1/e (((2/(1-2^2) – (3^2*2^3)/(1-2^6) + (5^2*2^5)/(1-2^10) – (2^2*2^2)/(1+2^4) + (4^2*2^4)/(1+2^8) + 16*279.1936)))+89-Pi

Input interpretation:

$$\frac{1}{e}\left(\frac{2}{1-2^2}-\frac{3^2\times2^3}{1-2^6}+\frac{5^2\times2^5}{1-2^{10}}-\frac{2^2\times2^2}{1+2^4}+\frac{4^2\times2^4}{1+2^8}+16\times279.1936\right)+89-\pi$$

Result:

1729.119...

1729.119…

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

Alternative representations:

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$89-180^\circ+\frac{4467.1+-\frac{2}{3}-\frac{16}{1+2^4}-\frac{72}{1-2^6}+\frac{2^4\times 4^2}{1+2^8}+\frac{2^5\times 5^2}{1-2^{10}}}{e}$$

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$89+i\log(-1)+\frac{4467.1+-\frac{2}{3}-\frac{16}{1+2^4}-\frac{72}{1-2^6}+\frac{2^4\times 4^2}{1+2^8}+\frac{2^5\times 5^2}{1-2^{10}}}{e}$$

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$89-2\,i\log\left(\frac{1-i}{1+i}\right)+\frac{4467.1+-\frac{2}{3}-\frac{16}{1+2^4}-\frac{72}{1-2^6}+\frac{2^4\times 4^2}{1+2^8}+\frac{2^5\times 5^2}{1-2^{10}}}{e}$$

Series representations:

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$89+\sum_{k=0}^{\infty}(-1)^k\left(-\frac{4}{1+2\,k}+\frac{4466.85}{k!}\right)$$

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$4466.85\left(0.0199246+\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}-0.000223872\times\sum_{k=1}^{\infty}4^{-k}\left(-1+3^k\right)\zeta(1+k)\right)$$

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$-4\left(-22.25+\sum_{k=1}^{\infty}\tan^{-1}\left(\frac{1}{F_{1+2k}}\right)-1116.71\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}\right)$$

Integral representations:

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$89+\frac{4466.85}{e}-2\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$89+\frac{4466.85}{e}-4\int_0^{1}\sqrt{1-t^2}\,dt$$

$$\frac{\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.194}{e}+89-\pi=$$
$$89+\frac{4466.85}{e}-2\int_0^{\infty}\frac{\sin(t)}{t}\,dt$$

(((1/e (((2/(1-2^2) – (3^2*2^3)/(1-2^6) + (5^2*2^5)/(1-2^10) – (2^2*2^2)/(1+2^4) + (4^2*2^4)/(1+2^8) + 16*279.1936)))+89-Pi)))^1/15

Input interpretation:

$$\sqrt[15]{\frac{1}{e}\left(\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.1936\right)+89-\pi}$$

Result:

1.6438228...

$1.6438228\ldots \approx \zeta(2)=\frac{\pi^2}{6}=1.644934\ldots$

1/32 (((2/(1-2^2) – (3^2*2^3)/(1-2^6) + (5^2*2^5)/(1-2^10) – (2^2*2^2)/(1+2^4) + (4^2*2^4)/(1+2^8) + 16*279.1936)))

Input interpretation:

$$\frac{1}{32}\left(\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.1936\right)$$

Result:

139.588959664680596613053290967333451403770883389014060386 4...

Repeating decimal:

139.588959664680596613053290967333451403770883389014060386 4...

(period 3840)

139.588959… result practically equal to the rest mass of Pion meson 139.57 MeV

1/32 (((2/(1-2^2) – (3^2*2^3)/(1-2^6) + (5^2*2^5)/(1-2^10) – (2^2*2^2)/(1+2^4) + (4^2*2^4)/(1+2^8) + 16*279.1936))) - 11 – 3

Input interpretation:

$$\frac{1}{32}\left(\frac{2}{1-2^2}-\frac{3^2\times 2^3}{1-2^6}+\frac{5^2\times 2^5}{1-2^{10}}-\frac{2^2\times 2^2}{1+2^4}+\frac{4^2\times 2^4}{1+2^8}+16\times 279.1936\right)-11-3$$

Result:

125.588959664680596613053290967333451403770883389014060386 4...

125.588959… result very near to the Higgs boson mass 125.18 GeV

From:

THE PARTITION FUNCTION OF THE SO(8192) BOSONIC STRING

Massimo BIANCHI and Augusto SAGNOTTI - Dipartimento di Fisica, Universita" di Roma II, "Tor Vergata'; Via Orazio Raimondo, 1-00173 Rome, Italy and lNFN, Sezione di Roma, 1-00185 Rome, Italy - Received 28 March 1988

Now, we have that:

involutive automorphisms. Thus, in the cases that correspond to the examples above, the parameters t_1, t_2 and x are not arbitrary complex numbers, but must satisfy some restrictions. Actually, they must always be real. They are positive whenever the corresponding τ_{ij} is purely imaginary, and negative when τ_{ij} has a nonzero real part. Moreover, the cross-ratios cor-

We put $t_1 = 0.61803398$ $t_2 = 1.61803398$ x = ((sqrt5)+5)/2

The factorization of the partition function in the open-string channels gives

$$Z_{[\chi=-1]} \to \sum N^B \frac{2^{14}}{(2\pi)^3}$$

$$\times \int dp_1\, dp_2 \int \frac{dt_1\, dt_2}{|t_1|\,|t_2|}\, |t_1|^{p_1^2-1}\, |t_2|^{p_2^2-1}$$

$$\times \int dx\, |1-x|^{-2} |x|^{2p_1 p_2}. \qquad (26)$$

We consider $N^B = 144$; $p_i{}^2 = 2$; $p_1 = p_2 = \sqrt{2}$, we obtain:

144 * (2^14) / (((2Pi)^3)) * ((integrate (sqrt2*sqrt2)x)) * ((integrate (1/(0.61803398 * 1.61803398) * 0.61803398 *1.61803398)x)) * integrate ((1-((((((sqrt5)+5)/2))^-2))))(((sqrt5)+5)/2)^4 x

Input interpretation:

$$144 \times \frac{2^{14}}{(2\pi)^3} \left(\int \left(\sqrt{2}\ \sqrt{2}\right) x\, dx\right)$$
$$\left(\int \left(\frac{1}{0.61803398 \times 1.61803398} \times 0.61803398 \times 1.61803398\right) x\, dx\right)$$
$$\int \left(1 - \frac{1}{\left(\frac{1}{2}\left(\sqrt{5}+5\right)\right)^2}\right) \left(\frac{1}{2}\left(\sqrt{5}+5\right)\right)^4 x\, dx$$

Result:

$$4755.68\,x^4\left(\frac{1}{32}\left(5+\sqrt{5}\right)^4x^2-\frac{1}{8}\left(5+\sqrt{5}\right)^2x^2\right)$$

That for x = 1, we obtain:

Input interpretation:

$$4755.68\left(-\frac{1}{8}\left(5+\sqrt{5}\right)^2+\frac{1}{32}\left(5+\sqrt{5}\right)^4\right)$$

Result:

376322.615786633497609835633075959225928804198607653461487 0...

376322.61578663349…

We can to obtain:

376323/(-1/8 (5 + sqrt(5))^2 + 1/32 (5 + sqrt(5))^4) - (521+123+11+4)

Where 521, 123, 11 and 4 are Lucas numbers

Input:

$$\frac{376\,323}{-\frac{1}{8}\left(5+\sqrt{5}\right)^2+\frac{1}{32}\left(5+\sqrt{5}\right)^4}-(521+123+11+4)$$

Exact result:

$$\frac{376\,323}{\frac{1}{32}\left(5+\sqrt{5}\right)^4-\frac{1}{8}\left(5+\sqrt{5}\right)^2}-659$$

Decimal approximation:

4096.684855397327074453591353973801190980408705141186692960...

4096.684855… ≈ 4096

Minimal polynomial:

$$275\,x^2-120\,060\,910\,x+487\,236\,434\,351$$

Now, we have also:

1/(8*3^3)(((4755.68 (1/4 (-15 - 5 sqrt(5)) + 1/4 (175 + 75 sqrt(5))))))-13

Input interpretation:

$$\frac{1}{8\times 3^3}\left(4755.68\left(\frac{1}{4}\left(-15-5\sqrt{5}\right)+\frac{1}{4}\left(175+75\sqrt{5}\right)\right)\right)-13$$

Result:

1729.23...

1729.23…

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

[1/(8*3^3)(((4755.68 (1/4 (-15 - 5 sqrt(5)) + 1/4 (175 + 75 sqrt(5))))))-13]^1/15

Input interpretation:

$$\sqrt[15]{\frac{1}{8\times 3^3}\left(4755.68\left(\frac{1}{4}\left(-15-5\sqrt{5}\right)+\frac{1}{4}\left(175+75\sqrt{5}\right)\right)\right)-13}$$

Result:

1.643830...

1.643830…. $\approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

3/(8192)(((4755.68 (1/4 (-15 - 5 sqrt(5)) + 1/4 (175 + 75 sqrt(5))))))+2

Input interpretation:

$$\frac{3}{8192}\left(4755.68\left(\frac{1}{4}\left(-15-5\sqrt{5}\right)+\frac{1}{4}\left(175+75\sqrt{5}\right)\right)\right)+2$$

Result:

139.813...

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

3/(8192)(((4755.68 (1/4 (-15 - 5 sqrt(5)) + 1/4 (175 + 75 sqrt(5))))))-11-golden ratio

Input interpretation:

$$\frac{3}{8192}\left(4755.68\left(\frac{1}{4}\left(-15-5\sqrt{5}\right)+\frac{1}{4}\left(175+75\sqrt{5}\right)\right)\right)-11-\phi$$

ϕ is the golden ratio

Result:

125.195...

125.195… result very near to the Higgs boson mass 125.18 GeV

Series representations:

$$\frac{\left(4755.68\left(\frac{1}{4}\left(-15-5\sqrt{5}\right)+\frac{1}{4}\left(175+75\sqrt{5}\right)\right)\right)3}{8192}-11-\phi=$$
$$58.6633-\phi+30.4777\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\binom{\frac{1}{2}}{k}$$

$$\frac{\left(4755.68\left(\frac{1}{4}\left(-15-5\sqrt{5}\right)+\frac{1}{4}\left(175+75\sqrt{5}\right)\right)\right)3}{8192}-11-\phi=$$
$$58.6633-\phi+30.4777\sqrt{4}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{4}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}$$

$$\frac{\left(4755.68\left(\frac{1}{4}\left(-15-5\sqrt{5}\right)+\frac{1}{4}\left(175+75\sqrt{5}\right)\right)\right)3}{8192}-11-\phi=$$
$$58.6633-\phi+\frac{15.2388\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}4^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

From

$$4755.68\,x^4\left(\frac{1}{32}\left(5+\sqrt{5}\right)^4x^2-\frac{1}{8}\left(5+\sqrt{5}\right)^2x^2\right)$$

For x = J1 ((((7*(5)^1/3)/9))) =

$$J_1\left(\frac{1}{9}\left(7\sqrt[3]{5}\right)\right)$$

$J_n(z)$ is the Bessel function of the first kind

$$J_1\left(\frac{7\sqrt[3]{5}}{9}\right)$$

0.528403080667110561550591443205972743783757079229265434654...

We obtain:

4755.68 (J1 ((((7*(5)^1/3)/9))))^4 (-1/8 (5 + sqrt(5))^2 (J1 ((((7*(5)^1/3)/9))))^2 + 1/32 (5 + sqrt(5))^4 (J1 ((((7*(5)^1/3)/9))))^2)

Input interpretation:

$$4755.68\,J_1\left(\frac{1}{9}\left(7\sqrt[3]{5}\right)\right)^4\left(-\frac{1}{8}\left(5+\sqrt{5}\right)^2J_1\left(\frac{1}{9}\left(7\sqrt[3]{5}\right)\right)^2+\frac{1}{32}\left(5+\sqrt{5}\right)^4J_1\left(\frac{1}{9}\left(7\sqrt[3]{5}\right)\right)^2\right)$$

$J_n(z)$ is the Bessel function of the first kind

Result:

8191.29...

8191.29…. very near to the value 8192 = 2 * 64^2

Alternative representations:

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$

$$4755.68\left({}_0\tilde{F}_1\left(;2;-\frac{1}{4}\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)\left(\frac{7\sqrt[3]{5}}{2\times9}\right)^1\right)^4\left(-\frac{1}{8}\left({}_0\tilde{F}_1\left(;2;-\frac{1}{4}\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)\left(\frac{7\sqrt[3]{5}}{2\times9}\right)^1\right)^2\left(5+\sqrt{5}\right)^2+\frac{1}{32}\left({}_0\tilde{F}_1\left(;2;-\frac{1}{4}\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)\left(\frac{7\sqrt[3]{5}}{2\times9}\right)^1\right)^2\left(5+\sqrt{5}\right)^4\right)$$

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$
$$4755.68\left(\frac{{}_0F_1\left(;\,2;\,-\frac{1}{4}\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)\left(\frac{7\sqrt[3]{5}}{2\times 9}\right)^1}{\Gamma(2)}\right)^4$$
$$\left(-\frac{1}{8}\left(\frac{{}_0F_1\left(;\,2;\,-\frac{1}{4}\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)\left(\frac{7\sqrt[3]{5}}{2\times 9}\right)^1}{\Gamma(2)}\right)^2\left(5+\sqrt{5}\right)^2+\right.$$
$$\left.\frac{1}{32}\left(\frac{{}_0F_1\left(;\,2;\,-\frac{1}{4}\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)\left(\frac{7\sqrt[3]{5}}{2\times 9}\right)^1}{\Gamma(2)}\right)^2\left(5+\sqrt{5}\right)^4\right)$$

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$
$$4755.68\left(\frac{I_1\left(\frac{7i\sqrt[3]{5}}{9}\right)\left(\frac{7\sqrt[3]{5}}{9}\right)^1}{\left(\frac{7i\sqrt[3]{5}}{9}\right)^1}\right)^4$$
$$\left(-\frac{1}{8}\left(\frac{I_1\left(\frac{7i\sqrt[3]{5}}{9}\right)\left(\frac{7\sqrt[3]{5}}{9}\right)^1}{\left(\frac{7i\sqrt[3]{5}}{9}\right)^1}\right)^2\left(5+\sqrt{5}\right)^2+\frac{1}{32}\left(\frac{I_1\left(\frac{7i\sqrt[3]{5}}{9}\right)\left(\frac{7\sqrt[3]{5}}{9}\right)^1}{\left(\frac{7i\sqrt[3]{5}}{9}\right)^1}\right)^2\left(5+\sqrt{5}\right)^4\right)$$

Series representations:

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$
$$148.615\left(5+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\left(\frac{\frac{1}{2}}{k}\right)\right)^2\left(-4+\left(5+\sqrt{4}\sum_{k=0}^{\infty}4^{-k}\left(\frac{\frac{1}{2}}{k}\right)\right)^2\right)$$
$$\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,5^{1/3+(2k)/3}\times 7^{1+2k}\times 18^{-1-2k}}{k!\,\Gamma(2+k)}\right)^6$$

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$

$$148.615\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,5^{1/3+(2k)/3}\times 7^{1+2k}\times 18^{-1-2k}}{k!\,\Gamma(2+k)}\right)^6$$

$$\left(525+460.\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+\right.$$

$$146\exp^2\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2+$$

$$20\exp^3\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^3\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$\left.\exp^4\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^4\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^4\right)\text{ for }(x\in$$

$\mathbb{R}$ and $x<0$)

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$

$$148.615\left(\sum_{j=0}^{\infty}\text{Res}_{s=-\frac{1}{2}-j}\,\frac{5^{-(2s)/3}\left(\frac{324}{49}\right)^s\Gamma\left(\frac{1}{2}+s\right)}{\Gamma\left(\frac{3}{2}-s\right)}\right)^6$$

$$\left(525+460.\exp\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+\right.$$

$$146\exp^2\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^2+$$

$$20\exp^3\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^3\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^3+$$

$$\left.\exp^4\left(i\pi\left\lfloor\frac{\arg(5-x)}{2\pi}\right\rfloor\right)\sqrt{x}^4\left(\sum_{k=0}^{\infty}\frac{(-1)^k\,(5-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^4\right)\text{ for }(x\in$$

$\mathbb{R}$ and $x<0$)

Integral representations:

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$

$$\frac{148.615\left(\int_0^{\pi}\cos\left(t-\frac{7}{9}\sqrt[3]{5}\,\sin(t)\right)dt\right)^6\left(5+\sqrt{5}\right)^2\left(21+10\sqrt{5}+\sqrt{5}^2\right)}{\pi^6}$$

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$
$$\frac{148.615\left(\int_0^{\pi} e^{7/9\sqrt[3]{5}\,i\cos(t)}\cos(t)\,dt\right)^6\left(5+\sqrt{5}\right)^2\left(21+10\sqrt{5}+\sqrt{5}^2\right)}{i^6\pi^6}$$

$$4755.68\,J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^4\left(\frac{1}{8}\left(\left(5+\sqrt{5}\right)^2 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)(-1)+\frac{1}{32}\left(5+\sqrt{5}\right)^4 J_1\left(\frac{7\sqrt[3]{5}}{9}\right)^2\right)=$$
$$\frac{2.32211\left(\int_{-\pi}^{\pi} e^{i(-\pi/2+t)+7/9\sqrt[3]{5}\,i\cos(t)}\,dt\right)^6\left(5+\sqrt{5}\right)^2\left(21+10\sqrt{5}+\sqrt{5}^2\right)}{\pi^6}$$

Further:

$$P(x)=\left(\prod_{i<j=1}^{3} x_{ij}\right)^2+\sum_{i<j=1}^{3}(x_{ij})^2+\left(\prod_{i<j=1}^{3} x_{ij}\right)$$
$$\times\left(8-2\sum_{i<j=1}^{3} x_{ij}-2\sum_{i<j=1}^{3}(x_{ij})^{-1}\right). \qquad (21)$$

For $x_{ij} = 5$, we obtain:

5^2 + 5^2 + 5 *(((8-2*(5-2)*5^(-1))))

$$5^2+5^2+5\left(8-2\times\frac{5-2}{5}\right)$$

84

P(x) = 84

Now, we have:

$$Z_{[\chi=-2]} = \sum N^B \frac{2^{25}}{(2\pi)^6} \int \prod_{i=1}^{3} dp_i \int \prod_{i=1}^{3} |t_i|^{p_i^2-1} \frac{dt_i}{|t_i|}$$

$$\times \int \left(\prod_{i<j=1}^{3} |x_{ij}|^{2p_ip_j} \frac{dx_{ij}}{|1-x_{ij}|} \right) |P(x)|^{-1/2}, \quad (33)$$

We put $t_1 = 0.61803398$ $t_2 = 1.61803398$ $x_{ij} = 5$, and obtain:

144 * (2^25) / (((2Pi)^6)) * ((integrate (sqrt2)x)) * ((integrate (0.61803398 * 1.61803398)x)) * integrate ((5)^4)(5/((1-5)))* 84^(-1/2) x

Input interpretation:

$$144 \times \frac{2^{25}}{(2\pi)^6} \left(\int \sqrt{2}\, x\, dx \right) \left(\int (0.61803398 \times 1.61803398)\, x\, dx \right) \int 5^4 \times \frac{5}{1-5} \times 84^{-1/2}\, x\, dx$$

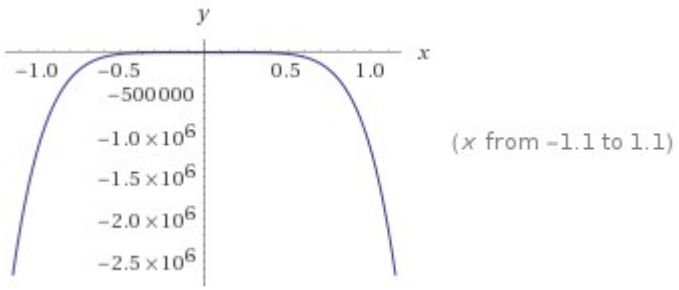
Result:

$$-1.18334 \times 10^6\, x^6$$

For x = 1, we obtain:

-1183340

Plot:



From which:

-1183340* [-1/2(((((J2 ((sqrt2)/6)))+(1/12)^2)))] - 7+1/3

Input:

$$-1\,183\,340\left(-\frac{1}{2}\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)\right)-7+\frac{1}{3}$$

$J_n(z)$ is the Bessel function of the first kind

Exact result:

$$-\frac{20}{3}-591\,670\left(-\frac{1}{144}-J_2\left(\frac{1}{3\sqrt{2}}\right)\right)$$

Decimal approximation:

8191.982904266193889643469958558100133783538829932240389530...

8191.982904… ≈ 8192 = 2 * 64^2

Alternate forms:

$$\frac{5}{72}\left(59\,167\,{}_0F_1\left(;\,3;\,-\frac{1}{72}\right)+59\,071\right)$$

$$\frac{295\,355}{72}+591\,670\,J_2\left(\frac{1}{3\sqrt{2}}\right)$$

$$\frac{5}{72}\left(59\,071+8\,520\,048\,J_2\left(\frac{1}{3\sqrt{2}}\right)\right)$$

Alternative representations:

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=$$
$$-\frac{20}{3}+591\,670\left(\left(\frac{1}{12}\right)^2+{}_0\tilde{F}_1\left(;\,3;\,-\frac{1}{4}\left(\frac{\sqrt{2}}{6}\right)^2\right)\left(\frac{\sqrt{2}}{2\times 6}\right)^2\right)$$

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=-\frac{20}{3}+591\,670\left(\left(\frac{1}{12}\right)^2+\frac{I_2\left(\frac{i\sqrt{2}}{6}\right)\left(\frac{\sqrt{2}}{6}\right)^2}{\left(\frac{i\sqrt{2}}{6}\right)^2}\right)$$

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=$$
$$-\frac{20}{3}+591\,670\left(\left(\frac{1}{12}\right)^2+\frac{{}_0F_1\left(;\,3;\,-\frac{1}{4}\left(\frac{\sqrt{2}}{6}\right)^2\right)\left(\frac{\sqrt{2}}{2\times 6}\right)^2}{\Gamma(3)}\right)$$

${}_0\tilde{F}_1(;a;x)$ is the regularized hypergeometric function

$I_n(z)$ is the modified Bessel function of the first kind

Series representations:

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=\frac{295\,355}{72}+591\,670\sum_{k=0}^{\infty}\frac{(-1)^k\,72^{-1-k}}{k!\,\Gamma(3+k)}$$

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=\frac{295\,355}{72}+\frac{295\,835}{72}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{72}\right)^k}{k!\,(3)_k}$$

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=$$
$$\frac{295\,355}{72}+591\,670\sum_{j=0}^{\infty}\text{Res}_{s=-1-j}\,\frac{72^s\,\Gamma(1+s)}{\Gamma(2-s)}$$

Integral representations:

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=$$
$$\frac{295\,355}{72}+\frac{591\,670}{\pi}\int_0^{\pi}\cos\left(2t-\frac{\sin(t)}{3\sqrt{2}}\right)dt$$

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=$$
$$\frac{295\,355}{72}-\frac{295\,835}{\pi}\int_{-\pi}^{\pi}e^{1/6\,i\left(12t+\sqrt{2}\,\cos(t)\right)}\,dt$$

$$-\frac{1\,183\,340}{2}(-1)\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)-7+\frac{1}{3}=$$
$$\frac{295\,355}{72}+\frac{591\,670}{27\,\pi}\int_0^1(1-t^2)^{3/2}\cos\left(\frac{t}{3\sqrt{2}}\right)dt$$

Where

[-1/2(((((J2 ((sqrt2)/6)))+(1/12)^2)))]

$$-\frac{1}{2}\left(J_2\left(\frac{\sqrt{2}}{6}\right)+\left(\frac{1}{12}\right)^2\right)$$

$J_n(z)$ is the Bessel function of the first kind

$$\frac{1}{2}\left(-\frac{1}{144}-J_2\left(\frac{1}{3\sqrt{2}}\right)\right)$$

−0.006928397223902564399335893847266860581447602123311057 73...

-0.0069283972239….

From the formula of coefficients of the '5th order' mock theta function $\psi_1(q)$: (A053261 OEIS Sequence)

sqrt(golden ratio) * exp(Pi*sqrt(n/15)) / (2*5^(1/4)*sqrt(n)) for n = 425 – 0.176 = 424.824

We note that 0.176 = 176 / 10^3 and p(15) = 176

sqrt(golden ratio) * exp(Pi*sqrt((425-0.176)/15)) / (2*5^(1/4)*sqrt(425-0.176))

Input:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{425-0.176}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{425-0.176}}$$

ϕ is the golden ratio

Result:

376322.88...

376322.88…

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{425-0.176}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{425-0.176}}=\frac{\exp\left(\pi\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\,(28.3216-z_0)^k\,z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\,(\phi-z_0)^k\,z_0^{-k}}{k!}}{2\sqrt[4]{5}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\,(424.824-z_0)^k\,z_0^{-k}}{k!}}$$

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

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{425-0.176}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{425-0.176}} = \left(\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(28.3216-x)}{2\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k\,(28.3216-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\,(\phi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$
$$\left(2\sqrt[4]{5}\ \exp\left(i\pi\left\lfloor\frac{\arg(424.824-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(424.824-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\ \exp\left(\pi\sqrt{\frac{425-0.176}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{425-0.176}} = \left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\,[\arg(28.3216-z_0)/(2\pi)]}\right.\right.$$
$$\left.z_0^{1/2\,(1+[\arg(28.3216-z_0)/(2\pi)])}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\,(28.3216-z_0)^k\,z_0^{-k}}{k!}\right)$$
$$\left(\frac{1}{z_0}\right)^{-1/2\,[\arg(424.824-z_0)/(2\pi)]+1/2\,[\arg(\phi-z_0)/(2\pi)]}$$
$$\left.z_0^{-1/2\,[\arg(424.824-z_0)/(2\pi)]+1/2\,[\arg(\phi-z_0)/(2\pi)]}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\,(\phi-z_0)^k\,z_0^{-k}}{k!}\right)\Big/$$
$$\left(2\sqrt[4]{5}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\,(424.824-z_0)^k\,z_0^{-k}}{k!}\right)$$

For n = 488.86 , we obtain:

sqrt(golden ratio) * exp(Pi*sqrt((488.86)/15)) / (2*5^(1/4)*sqrt(488.86))

Input interpretation:

$$\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{488.86}{15}}\right)}{2\sqrt[4]{5}\ \sqrt{488.86}}$$

ϕ is the golden ratio

Result:

$1.183493385474238208375379748078850457627921992040667 2\ldots \times 10^6$

$1.183349338\ldots *10^6 = 1183349.338$

Series representations:

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{488.86}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{488.86}} = \frac{\exp\left(\pi\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (32.5907-z_0)^k z_0^{-k}}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (\phi-z_0)^k z_0^{-k}}{k!}}{2\sqrt[4]{5}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (488.86-z_0)^k z_0^{-k}}{k!}}$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{488.86}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{488.86}} = \left(\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg(32.5907-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k (32.5907-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k (\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(2\sqrt[4]{5}\,\exp\left(i\pi\left\lfloor\frac{\arg(488.86-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k (488.86-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{488.86}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{488.86}} = \left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(32.5907-z_0)/(2\pi)\rfloor} z_0^{1/2(1+\lfloor\arg(32.5907-z_0)/(2\pi)\rfloor)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (32.5907-z_0)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(488.86-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(488.86-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(2\sqrt[4]{5}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (488.86-z_0)^k z_0^{-k}}{k!}\right)$$

Observations

From:
https://www.scientificamerican.com/article/mathematics-ramanujan/?fbclid=IwAR2caRXrn_RpOSvJ1QxWsVLBcJ6KVgd_Af_hrmDYBNyU8mpSjRs1BDeremA

Ramanujan's statement concerned the deceptively simple concept of partitions—the different ways in which a whole number can be subdivided into smaller numbers. Ramanujan's original statement, in fact, stemmed from the observation of patterns, such as the fact that p(9) = 30, p(9 + 5) = 135, p(9 + 10) = 490, p(9 + 15) = 1,575 and so on are all divisible by 5. Note that here the n's come at intervals of five units.

Ramanujan posited that this pattern should go on forever, and that similar patterns exist when 5 is replaced by 7 or 11—there are infinite sequences of p(n) that are all divisible by 7 or 11, or, as mathematicians say, in which the "moduli" are 7 or 11.

Then, in nearly oracular tone Ramanujan went on: "There appear to be corresponding properties," he wrote in his 1919 paper, "in which the moduli are powers of 5, 7 or 11...and no simple properties for any moduli involving primes other than these three." (Primes are whole numbers that are only divisible by themselves or by 1.) Thus, for instance, there should be formulas for an infinity of n's separated by 5^3 = 125 units, saying that the corresponding p(n)'s should all be divisible by 125.
In the past methods developed to understand partitions have later been applied to physics problems such as the theory of the strong nuclear force or the entropy of black holes.

From Wikipedia

In particle physics, Yukawa's interaction or Yukawa coupling, named after Hideki Yukawa, is an interaction between a scalar field ϕ and a Dirac field ψ. The Yukawa interaction can be used to describe the nuclear force between nucleons (which are fermions), mediated by pions (which are pseudoscalar mesons). The Yukawa interaction is also used in the Standard Model to describe the coupling between the Higgs field and massless quark and lepton fields (i.e., the fundamental fermion particles). Through spontaneous symmetry breaking, these fermions acquire a mass proportional to the vacuum expectation value of the Higgs field.

Can be this the motivation that from the development of the Ramanujan's equations we obtain results very near to the dilaton mass calculated as a type of Higgs boson:

125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV and practically equal to the rest mass of Pion meson 139.57 MeV

Note that:

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

Hence

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

so that

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

Hence

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

Thence:

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

And

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

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

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

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

In mathematics, the Fibonacci numbers, commonly denoted F_n, form a sequence, called the Fibonacci sequence, such that each number is the sum of the two preceding ones, starting from 0 and 1. Fibonacci numbers are strongly related to the golden ratio: Binet's formula expresses the nth Fibonacci number in terms of n and the golden ratio, and implies that the ratio of two consecutive Fibonacci numbers tends to the golden ratio as n increases.
Fibonacci numbers are also closely related to Lucas numbers ,in that the Fibonacci and Lucas numbers form a complementary pair of Lucas sequences

The beginning of the sequence is thus:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418, 317811, 514229, 832040, 1346269, 2178309, 3524578, 5702887, 9227465, 14930352, 24157817, 39088169, 63245986, 102334155...

The Lucas numbers or Lucas series are an integer sequence named after the mathematician François Édouard Anatole Lucas (1842–91), who studied both that sequence and the closely related Fibonacci numbers. Lucas numbers and Fibonacci numbers form complementary instances of Lucas sequences.

The Lucas sequence has the same recursive relationship as the Fibonacci sequence, where each term is the sum of the two previous terms, but with different starting values. This produces a sequence where the ratios of successive terms approach the golden ratio, and in fact the terms themselves are roundings of integer powers of the golden ratio.[1] The sequence also has a variety of relationships with the Fibonacci numbers, like the fact that adding any two Fibonacci numbers two terms apart in the Fibonacci sequence results in the Lucas number in between.

The sequence of Lucas numbers is:

2, 1, 3, 4, 7, 11, 18, 29, 47, 76, 123, 199, 322, 521, 843, 1364, 2207, 3571, 5778, 9349, 15127, 24476, 39603, 64079, 103682, 167761, 271443, 439204, 710647, 1149851, 1860498, 3010349, 4870847, 7881196, 12752043, 20633239, 33385282, 54018521, 87403803……

All Fibonacci-like integer sequences appear in shifted form as a row of the Wythoff array; the Fibonacci sequence itself is the first row and the Lucas sequence is the second row. Also like all Fibonacci-like integer sequences, the ratio between two consecutive Lucas numbers converges to the golden ratio.

A Lucas prime is a Lucas number that is prime. The first few Lucas primes are:

2, 3, 7, 11, 29, 47, 199, 521, 2207, 3571, 9349, 3010349, 54018521, 370248451, 6643838879, ... (sequence A005479 in the OEIS).

In geometry, a golden spiral is a logarithmic spiral whose growth factor is φ, the golden ratio.[1] That is, a golden spiral gets wider (or further from its origin) by a factor of φ for every quarter turn it makes. Approximate logarithmic spirals can occur in nature, for example the arms of spiral galaxies[3] - golden spirals are one special case of these logarithmic spirals

We observe that 1728 and 1729 are results very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. 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 (taxicab number).

Furthermore, we obtain as results of our computations, always values very near to the Higgs boson mass 125.18 GeV and practically equals to the rest mass of Pion meson 139.57 MeV. In conclusion we obtain also many results that are very good approximations to the value of the golden ratio 1.618033988749... and to ζ(2) = $\frac{\pi^2}{6} = 1.644934 \ldots$

We note how the following three values: 137.508 (golden angle), 139.57 (mass of the Pion - meson Pi) and 125.18 (mass of the Higgs boson), are connected to each other. In fact, just add 2 to 137.508 to obtain a result very close to the mass of the Pion and subtract 12 to 137.508 to obtain a result that is also very close to the mass of the Higgs boson. We can therefore hypothesize that it is the golden angle (and the related golden ratio inherent in it) to be a fundamental ingredient both in the structures of the microcosm and in those of the macrocosm.

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THE PARTITION FUNCTION OF THE SO(8192) BOSONIC STRING

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