

Further equations concerning the “Bra-ket Wormholes”. New possible mathematical connections with some Number Theory parameters, String Theory, Supersymmetry Breaking, Planck CMB data and Phi Frequency System. II

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Abstract

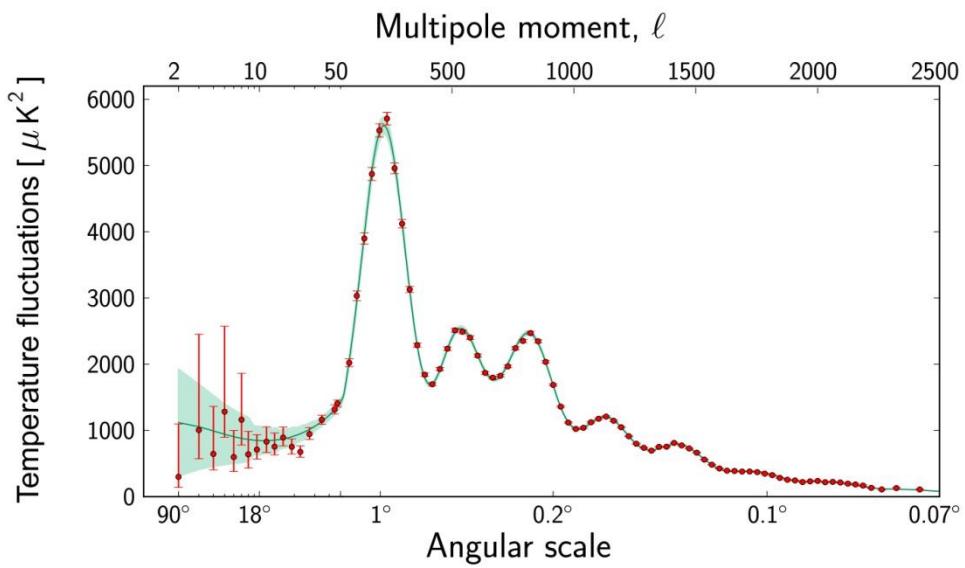
In this research thesis (Part II), we analyze further equations concerning the “Bra-ket Wormholes”. We describe the possible mathematical connections with some Number Theory parameters, String Theory, Supersymmetry Breaking, Planck CMB data and Phi Frequency System.

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<http://matematicaeducativa.com/foro/viewtopic.php?t=1998>



From:

The Sound of the Big Bang - Planck Version (2013) - John G. Cramer - Professor of Physics - University of Washington - Seattle, WA 98195-1560

http://faculty.washington.edu/jcramer/BigBang/Planck_2013/PlanckData.txt

103,1

103,98

124,55

127,88

162,27

179,33

191,16

m

171.7528

208,67

213,07

215,63

218,14

226,13

232,56

239,6

250,1

278,34

299,495

m

238.1735

319,73

342,35

365,19

373,95

374,45

382,85

387,21

m

363.675

420,02

477,66

m

448.84

554,48

581,438

599,185

m

578.367

620,243

631,571

639,652

645,569

645,593

658,099

658,83

689,45

691,994

m

653.444

704,645

722,68

729,551

732,75

736,931

743,136

746,75

749,62

763,366

768,34

786,337

793,96

797,376

m

751.957

806,23

841,08

889,209

m

845.506

903,34

907,4

917,942

931,293

931,908

973,755

975,998

985,83

m

940.933

1003,34

1006,77

1017,97

1033,69

1034,38

1042,69

1042,9

1065,2

1076,17

1081,01

m

1040.412

1113,53

1113,58

1118,05

1140,7

1162,04

1163,21

1170,97

1185,37

m

1145.93125

1204,04

1254,91

1283,88

1284,54

1298

1298,08

m

1270.575

1354,41

1375,35

1402,5

1407,61

1425,6

1580,53

1619,33

1682,61

1691,91

1792,35

1819,88

1836,2

1863,84

1922,19

1927,53

1962,25

m

1666.505

2016,71

2030,01

2124,69

2229,41

2237,31

2282,71

2341,59

2345,97

2396,51

2464,71

2484,24

2506,61

m

2288.3725

3027,82

3123,86

3893,83

m

3348.503

4116,06

4867,41

4953,54

m

4645.67

5524,53

5703,16

m

5613.845

TOTAL SUM 150802.7363

m 171.7528 m 238.1735 | m 363.675 m 448.84 | | m 578.367 m 653.444 | m 751.957

m 406.2575 m 615.9055

m 845.506 m 940.933 | m 1040.412 m 1145.93125 m 1270.575 m 1666.505 |

m 1024.68465

m 2288.3725 m 3348.503 m 4645.67 m 5613.845

From:

Trabajo de Fin de Máster Art music in decline? Time for the Golden Ratio

Autor: *Julio Emilio Marco Franco* - Tutor: *Thomas L. Schmitt* - MÁSTER: Máster en musicología (654M) - Escuela de Máster y Doctorado Universidad de la Rioja - AÑO ACADÉMICO: 2017/2018

Table 46
Phiⁿ(n/7) scale (octave = 4)

#	Phi ⁿ (n/7)	Frequency (Hz)
1	1.0000000	306.342
2	1.0711625	328.142
3	1.1473892	351.494
4	1.2290403	376.508
5	1.3165020	403.300
6	1.4101876	432.000
7	1.5105401	462.742
8	1.6180340	495.672
9	1.7331774	530.945
10	1.8565147	568.729
11	1.9886290	609.201
		612.684

Note. Author's calculation with data
 From Lange, Nardelli, & Bini (2013,
 p.3). ©

Table of Frequency System based on Phi

We note that:

$$(306,342 + 328,142 + 351,494 + 376,508)/4 = 340.6215 \approx 342.35$$

Ratio = 1,0050745475

$$(403,3 + 432,2 + 462,742 + 495,672)/4 = 448.4785 \approx m 448.84$$

Ratio = 1,0008060587

$$(530,945 + 568,729 + 609,201 + 612,684)/4 = 580.38975 \approx 581.438$$

Ratio = 1,0018061139

Ratios mean = 1,0025622400333 and the inverse is equal to 0,9974443082

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

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

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 $0.989117352243 = \phi$
 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)

Note that $((\zeta(2)-1)^{1/32}) = 0.9863870313564812915\dots$

Furthermore:

$(1.002562240033333)^{188.254}$

Where $188.254 = 376.508 / 2$, where 376.508 is a value of the Table of Phi frequencies

Input interpretation:

$1.002562240033333^{188.254}$

Result:

$1.6188807866605198613263289802712912628956813985132391562497079482$

...

$1.61888078666051986\dots$ result that is a very good approximation to the value of the golden ratio $1.618033988749\dots$

From:

Bra-ket wormholes in gravitationally prepared states

Yiming Chen, Victor Gorbenko, Juan Maldacena - arXiv:2007.16091v2 [hep-th] 14 Sep 2020

Now, we have that:

$$S_{\text{gen}} = 2 \left\{ S_0 + \frac{\phi_r}{-\eta} + \frac{c}{6} \log \left[\frac{(t - \eta)^2}{(-\eta)\varepsilon_{uv}} \right] + i \frac{c\pi}{6} \right\} \quad (6.7)$$

ε_{uv} is a UV cutoff in the definition of the field theory entropy,

$$\eta < 0.$$

For:

$$S_0 = \ln(196883) = 12.1904\dots; \quad c = 144; \quad \phi_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

From:

$$2 \left\{ S_0 + \frac{\phi_r}{-\eta} + \frac{c}{6} \log \left[\frac{(t - \eta)^2}{(-\eta) \varepsilon_{uv}} \right] + i \frac{c\pi}{6} \right\}$$

$$2[\ln(196883)+432/2+144/6 \ln((3+2)^2)/(2*14.0489))+i*(144*6)/6]$$

Input interpretation:

$$2 \left(\log(196883) + \frac{432}{2} + \frac{144}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) + i \times \frac{144 \times 6}{6} \right)$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

Result:

$$450.7736\dots + \\ 288 i$$

Polar coordinates:

$$r = 534.921 \text{ (radius)}, \quad \theta = 32.5746^\circ \text{ (angle)}$$

534.921 result very near to $e^{2\pi} - 0.5 = 534.99165\dots$ and quite near to the value of Planck multipole spectrum data 530.945

Alternative representations:

$$2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) = \\ 2 \left(216 + 144 i + \log_e(196883) + \frac{144 \log_e \left(\frac{5^2}{28.0978} \right)}{6} \right)$$

$$2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) = \\ 2 \left(216 + 144 i + \log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(\frac{5^2}{28.0978} \right) \right)$$

$$2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) = \\ 2 \left(216 + 144 i - \text{Li}_1(-196882) - \frac{144}{6} \text{Li}_1 \left(1 - \frac{5^2}{28.0978} \right) \right)$$

Series representations:

$$2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) = \\ 432 + 288 i + 96 \pi \mathcal{A} \left[\frac{\arg(0.889749 - x)}{2\pi} \right] + 4 \pi \mathcal{A} \left[\frac{\arg(196883 - x)}{2\pi} \right] + \\ 50 \log(x) + \sum_{k=1}^{\infty} - \frac{2(-1)^k (24(0.889749 - x)^k + (196883 - x)^k) x^{-k}}{k} \quad \text{for } x < 0$$

$$2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) = \\ 432 + 288 i + 48 \left[\frac{\arg(0.889749 - z_0)}{2\pi} \right] \log \left(\frac{1}{z_0} \right) + 2 \left[\frac{\arg(196883 - z_0)}{2\pi} \right] \log \left(\frac{1}{z_0} \right) + \\ 50 \log(z_0) + 48 \left[\frac{\arg(0.889749 - z_0)}{2\pi} \right] \log(z_0) + 2 \left[\frac{\arg(196883 - z_0)}{2\pi} \right] \log(z_0) + \\ \sum_{k=1}^{\infty} - \frac{2(-1)^k (24(0.889749 - z_0)^k + (196883 - z_0)^k) z_0^{-k}}{k}$$

$$2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) = \\ 432 + 288 i + 96 \pi \mathcal{A} \left[- \frac{-\pi + \arg \left(\frac{0.889749}{z_0} \right) + \arg(z_0)}{2\pi} \right] + \\ 4 \pi \mathcal{A} \left[- \frac{-\pi + \arg \left(\frac{196883}{z_0} \right) + \arg(z_0)}{2\pi} \right] + 50 \log(z_0) + \\ \sum_{k=1}^{\infty} - \frac{2(-1)^k (24(0.889749 - z_0)^k + (196883 - z_0)^k) z_0^{-k}}{k}$$

Integral representation:

$$2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log\left(\frac{(3+2)^2}{2 \times 14.0489}\right) 144 + \frac{1}{6} i (144 \times 6) \right) = \\ 432 + 288 i + \int_1^{0.889749 - 48. + 50 t} \frac{dt}{(-1. + t) t}$$

We note that:

$$\left[2 \left(\log(196883) + \frac{432}{2} + \frac{144}{6} \log\left(\frac{(3+2)^2}{2 \times 14.0489}\right) + i \times \frac{144 \times 6}{6} \right) \right] \approx \left[e^{2\pi} - \frac{1}{2} \right]$$

$$534.921 \approx 534.991$$

We have also:

$$\text{Pi}*2*[\ln(196883)+432/2+144/6 \ln(((3+2)^2)/(2*14.0489))+i*(144*6)/6]+(55+2)$$

Input interpretation:

$$\pi \times 2 \left(\log(196883) + \frac{432}{2} + \frac{144}{6} \log\left(\frac{(3+2)^2}{2 \times 14.0489}\right) + i \times \frac{144 \times 6}{6} \right) + (55 + 2)$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

Result:

$$1473.147\dots + \\ 904.7787\dots i$$

Polar coordinates:

$$r = 1728.81 \text{ (radius)}, \quad \theta = 31.5574^\circ \text{ (angle)}$$

$$1728.81$$

This result is very near to the mass of candidate glueball **f₀(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:

$$\pi 2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + (55 + 2) = \\ 57 + 2 \pi \left(216 + 144 i + \log_e(196883) + \frac{144 \log_e \left(\frac{5^2}{28.0978} \right)}{6} \right)$$

$$\pi 2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + (55 + 2) = \\ 57 + 2 \pi \left(216 + 144 i + \log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(\frac{5^2}{28.0978} \right) \right)$$

$$\pi 2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + (55 + 2) = \\ 57 + 2 \pi \left(216 + 144 i - \text{Li}_1(-196882) - \frac{144}{6} \text{Li}_1 \left(1 - \frac{5^2}{28.0978} \right) \right)$$

Series representations:

$$\pi 2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + (55 + 2) = \\ 57 + 432 \pi + 288 i \pi + 96 \pi^2 \mathcal{A} \left[\frac{\arg(0.889749 - x)}{2\pi} \right] + \\ 4 \pi^2 \mathcal{A} \left[\frac{\arg(196883 - x)}{2\pi} \right] + 50 \pi \log(x) + \\ \sum_{k=1}^{\infty} -\frac{2 (-1)^k \pi (24 (0.889749 - x)^k + (196883 - x)^k) x^{-k}}{k} \quad \text{for } x < 0$$

$$\begin{aligned} & \pi 2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + (55 + 2) = \\ & 57 + 432 \pi + 288 i \pi + 96 \pi^2 \Re \left[-\frac{-\pi + \arg \left(\frac{0.889749}{z_0} \right) + \arg(z_0)}{2\pi} \right] + \\ & 4 \pi^2 \Re \left[-\frac{-\pi + \arg \left(\frac{196883}{z_0} \right) + \arg(z_0)}{2\pi} \right] + 50 \pi \log(z_0) + \\ & \sum_{k=1}^{\infty} -\frac{2(-1)^k \pi (24 (0.889749 - z_0)^k + (196883 - z_0)^k) z_0^{-k}}{k} \end{aligned}$$

$$\begin{aligned} & \pi 2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + (55 + 2) = \\ & 57 + 432 \pi + 288 i \pi + 48 \pi \left[\frac{\arg(0.889749 - z_0)}{2\pi} \right] \log \left(\frac{1}{z_0} \right) + \\ & 2\pi \left[\frac{\arg(196883 - z_0)}{2\pi} \right] \log \left(\frac{1}{z_0} \right) + 50 \pi \log(z_0) + \\ & 48 \pi \left[\frac{\arg(0.889749 - z_0)}{2\pi} \right] \log(z_0) + 2\pi \left[\frac{\arg(196883 - z_0)}{2\pi} \right] \log(z_0) + \\ & \sum_{k=1}^{\infty} -\frac{2(-1)^k \pi (24 (0.889749 - z_0)^k + (196883 - z_0)^k) z_0^{-k}}{k} \end{aligned}$$

Integral representation:

$$\begin{aligned} & \pi 2 \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + (55 + 2) = \\ & 57 + 432 \pi + 288 i \pi + \int_1^{0.889749} \frac{\pi (-48. + 50 t)}{(-1. + t) t} dt \end{aligned}$$

2Pi*[ln(196883)+432/2+144/6 ln((3+2)^2)/(2*14.0489))+i*(144*6)/6]+144-13

Input interpretation:

$$2\pi \left(\log(196883) + \frac{432}{2} + \frac{144}{6} \log\left(\frac{(3+2)^2}{2 \times 14.0489}\right) + i \times \frac{144 \times 6}{6} \right) + 144 - 13$$

$\log(x)$ is the natural logarithm

i is the imaginary unit

Result:

$$1547.147\dots + 904.7787\dots i$$

Polar coordinates:

$$r = 1792.29 \text{ (radius)}, \theta = 30.3193^\circ \text{ (angle)}$$

1792.29 result very near to the value of Planck multipole spectrum data 1792.35

Alternative representations:

$$\begin{aligned} & 2\pi \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log\left(\frac{(3+2)^2}{2 \times 14.0489}\right) 144 + \frac{1}{6} i (144 \times 6) \right) + 144 - 13 = \\ & 131 + 2\pi \left(216 + 144 i + \log_e(196883) + \frac{144 \log_e\left(\frac{5^2}{28.0978}\right)}{6} \right) \end{aligned}$$

$$\begin{aligned} & 2\pi \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log\left(\frac{(3+2)^2}{2 \times 14.0489}\right) 144 + \frac{1}{6} i (144 \times 6) \right) + 144 - 13 = \\ & 131 + 2\pi \left(216 + 144 i + \log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a\left(\frac{5^2}{28.0978}\right) \right) \end{aligned}$$

$$2\pi \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + 144 - 13 = \\ 131 + 2\pi \left(216 + 144 i - \text{Li}_1(-196882) - \frac{144}{6} \text{Li}_1 \left(1 - \frac{5^2}{28.0978} \right) \right)$$

Series representations:

$$2\pi \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + 144 - 13 = \\ 131 + 432\pi + 288i\pi + 96\pi^2 \mathcal{A} \left[\frac{\arg(0.889749 - x)}{2\pi} \right] + \\ 4\pi^2 \mathcal{A} \left[\frac{\arg(196883 - x)}{2\pi} \right] + 50\pi \log(x) + \\ \sum_{k=1}^{\infty} -\frac{2(-1)^k \pi (24(0.889749 - x)^k + (196883 - x)^k) x^{-k}}{k} \quad \text{for } x < 0$$

$$2\pi \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + 144 - 13 = \\ 131 + 432\pi + 288i\pi + 96\pi^2 \mathcal{A} \left[-\frac{-\pi + \arg \left(\frac{0.889749}{z_0} \right) + \arg(z_0)}{2\pi} \right] + \\ 4\pi^2 \mathcal{A} \left[-\frac{-\pi + \arg \left(\frac{196883}{z_0} \right) + \arg(z_0)}{2\pi} \right] + 50\pi \log(z_0) + \\ \sum_{k=1}^{\infty} -\frac{2(-1)^k \pi (24(0.889749 - z_0)^k + (196883 - z_0)^k) z_0^{-k}}{k}$$

$$\begin{aligned}
& 2\pi \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + 144 - 13 = \\
& 131 + 432\pi + 288i\pi + 48\pi \left[\frac{\arg(0.889749 - z_0)}{2\pi} \right] \log \left(\frac{1}{z_0} \right) + \\
& 2\pi \left[\frac{\arg(196883 - z_0)}{2\pi} \right] \log \left(\frac{1}{z_0} \right) + 50\pi \log(z_0) + \\
& 48\pi \left[\frac{\arg(0.889749 - z_0)}{2\pi} \right] \log(z_0) + 2\pi \left[\frac{\arg(196883 - z_0)}{2\pi} \right] \log(z_0) + \\
& \sum_{k=1}^{\infty} -\frac{2(-1)^k \pi (24(0.889749 - z_0)^k + (196883 - z_0)^k) z_0^{-k}}{k}
\end{aligned}$$

Integral representation:

$$\begin{aligned}
& 2\pi \left(\log(196883) + \frac{432}{2} + \frac{1}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) 144 + \frac{1}{6} i (144 \times 6) \right) + 144 - 13 = \\
& 131 + 432\pi + 288i\pi + \int_1^{0.889749} \frac{\pi(-48 + 50t)}{(-1 + t)t} dt
\end{aligned}$$

$$(((2\text{Pi}^*[\ln(196883)+432/2+144/6 \ln(((3+2)^2)/(2*14.0489))+i*(144*6)/6]+144-13)))^{1/15}$$

Input interpretation:

$$\sqrt[15]{2\pi \left(\log(196883) + \frac{432}{2} + \frac{144}{6} \log \left(\frac{(3+2)^2}{2 \times 14.0489} \right) + i \times \frac{144 \times 6}{6} \right) + 144 - 13}$$

$\log(x)$ is the natural logarithm
 i is the imaginary unit

Result:

$$1.6467342\dots + 0.058117765\dots i$$

Polar coordinates:

$$r = 1.64776 \text{ (radius)}, \theta = 2.02129^\circ \text{ (angle)}$$

$$1.64776 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\dots$$

We have that:

$$\eta = i\frac{\pi}{2} - \tilde{\eta},$$

$$- \tilde{\eta} = \eta - i\pi/2 ; \quad \tilde{\eta} = -\eta + i\pi/2 ; \quad \tilde{\eta} = i\pi/2 - \eta$$

i.e.

$$i\pi/2 - \eta = i\pi/2 + 2$$

Result:

$$2 + \frac{i\pi}{2}$$

Decimal approximation:

$$2 + \frac{i\pi}{2} \approx 2 + 1.570796326794896619231321691639751442098584699687552910487472296...i$$

Property:

$2 + \frac{i\pi}{2}$ is a transcendental number

Polar coordinates:

$$r \approx 2.54311 \text{ (radius)}, \quad \theta \approx 38.146^\circ \text{ (angle)}$$

$$\tilde{\eta} = 2.54311$$

Alternate forms:

$$\frac{1}{2}(4 + i\pi)$$

$$\frac{1}{2}i(\pi + -4i)$$

Alternative representations:

$$\frac{i\pi}{2} + 2 = 2 + 90^\circ i$$

$$\frac{i\pi}{2} + 2 = 2 - \frac{1}{2} i^2 \log(-1)$$

$$\frac{i\pi}{2} + 2 = 2 + i E(0)$$

Series representations:

$$\frac{i\pi}{2} + 2 = 2 + 2i \sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}$$

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

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

Integral representations:

$$\frac{i\pi}{2} + 2 = 2 + 2i \int_0^1 \sqrt{1-t^2} dt$$

$$\frac{i\pi}{2} + 2 = 2 + i \int_0^1 \frac{1}{\sqrt{1-t^2}} dt$$

$$\frac{i\pi}{2} + 2 = 2 + i \int_0^\infty \frac{1}{1+t^2} dt$$

For:

$$S_0 = \ln(196883) = 12.1904\dots; \quad c = 144; \quad \phi_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

$$\tilde{\eta} = 2.54311$$

From:

$$S_{\text{gen}}(\tilde{\eta}) = 2 \left\{ S_0 + \tilde{\phi}_r \tanh \tilde{\eta} + \frac{c}{6} \log \left(\frac{\left(2 \cosh \frac{\tilde{\eta}}{2} \right)^2}{\cosh \tilde{\eta} \varepsilon_{uv,\chi}} \right) \right\}. \quad (6.17)$$

$$2 [\ln(196883) + 432 \tanh(2.54311) + 144/6 \\ \ln(((2 \cosh(2.54311/2))^2) / (\cosh(2.54311) * 14.0489))]$$

Input interpretation:

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{144}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) \times 14.0489} \right) \right)$$

$\log(x)$ is the natural logarithm

$\tanh(x)$ is the hyperbolic tangent function

$\cosh(x)$ is the hyperbolic cosine function

Result:

791.164...

791.164...

Alternative representations:

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{1}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) 14.0489} \right) 144 \right) = \\ 2 \left(\log(196883) + \frac{144}{6} \log \left(\frac{\left(\frac{1}{e^{1.27156}} + e^{1.27156} \right)^2}{7.02445 \left(\frac{1}{e^{2.54311}} + e^{2.54311} \right)} \right) + 432 \left(-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}} \right) \right)$$

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{1}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) 14.0489} \right) 144 \right) = \\ 2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(\frac{(2 \cosh(1.27156))^2}{14.0489 \cosh(2.54311)} \right) + 432 \left(-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}} \right) \right)$$

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{1}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) 14.0489} \right) 144 \right) = \\ 2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(\frac{(2 \cosh(1.27156))^2}{14.0489 \cosh(2.54311)} \right) + 432 \left(-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}} \right) \right)$$

$$2 [\ln(196883)+432 \tanh(2.54311)+144/6 \ln(((2\cosh(2.54311/2))^2)/(\cosh(2.54311)*14.0489))]+3$$

Input interpretation:

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{144}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) \times 14.0489} \right) \right) + 3$$

$\log(x)$ is the natural logarithm

$\tanh(x)$ is the hyperbolic tangent function

$\cosh(x)$ is the hyperbolic cosine function

Result:

794.164...

794.164... result very near to the value of Planck multipole spectrum data 793.96

Alternative representations:

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{1}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) 14.0489} \right) 144 \right) + 3 = \\ 3 + 2 \left(\log(196883) + \frac{144}{6} \log \left(\frac{\left(\frac{1}{e^{1.27156}} + e^{1.27156} \right)^2}{7.02445 \left(\frac{1}{e^{2.54311}} + e^{2.54311} \right)} \right) + 432 \left(-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}} \right) \right)$$

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{1}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) 14.0489} \right) 144 \right) + 3 = \\ 3 + 2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(\frac{(2 \cosh(1.27156))^2}{14.0489 \cosh(2.54311)} \right) + 432 \left(-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}} \right) \right)$$

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{1}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) 14.0489} \right) 144 \right) + 3 = \\ 3 + 2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(\frac{(2 \cosh(1.27156))^2}{14.0489 \cosh(2.54311)} \right) + 432 \left(-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}} \right) \right)$$

$$(((2 [\ln(196883)+432 \tanh(2.54311)+144/6 \ln(((2 \cosh(2.54311/2))^2)/(\cosh(2.54311)*14.0489))]))^{1/14}$$

Input interpretation:

$$\sqrt[14]{2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{144}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) \times 14.0489} \right) \right)}$$

$\log(x)$ is the natural logarithm

$\tanh(x)$ is the hyperbolic tangent function

$\cosh(x)$ is the hyperbolic cosine function

Result:

$$1.6107162086616126799151582357663482684541893820232665255599405503$$

...

1.61071620866.... result that is a very good approximation to the value of the golden ratio 1.618033988749...

From:

$$S_{\text{gen}}(\sigma) = 2 \left\{ S_0 + \frac{2\pi\phi_r}{L} \frac{1}{(-\tanh \sigma)} + \frac{c}{6} \log \left[\frac{\left(2 \sinh \frac{\frac{2\pi\tau}{L} - \sigma}{2}\right)^2}{(-\sinh \sigma)\varepsilon_{uv,\theta}} \right] \right\}, \quad (\text{B.2})$$

$$S_0 = \ln(196883) = 12.1904...; \quad c = 144; \quad \phi_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

$$\tilde{\eta} = 2.54311 \quad \tau = 1/8 \quad L = 3072/\pi$$

$$\sigma = \pi/2,$$

From:

$$S_{\text{gen}}(\sigma) = 2 \left\{ S_0 + \frac{2\pi\phi_r}{L} \frac{1}{(-\tanh \sigma)} + \frac{c}{6} \log \left[\frac{\left(2 \sinh \frac{\frac{2\pi\tau}{L} - \sigma}{2}\right)^2}{(-\sinh \sigma) \varepsilon_{uv,\theta}} \right] \right\}, \quad (\text{B.2})$$

we obtain:

$$2 [\ln(196883) + ((2\pi*432)/(3072*1/\pi)) * 1 / (-\tanh(\pi/2)) + 144/6 \ln(((2 \sinh((1/2(2*\pi*1/8)/(3072*1/\pi)-\pi/2)))^2) / (-\sinh(\pi/2)*14.0489)))]$$

Input interpretation:

$$2 \left(\log(196883) + \frac{2\pi \times 432}{3072 \times \frac{1}{\pi}} \left(-\frac{1}{\tanh\left(\frac{\pi}{2}\right)} \right) + \frac{144}{6} \log \left(\frac{\left(2 \sinh\left(\frac{1}{2} \times \frac{2\pi \times \frac{1}{8}}{3072 \times \frac{1}{\pi}} - \frac{\pi}{2}\right)\right)^2}{\sinh\left(\frac{\pi}{2}\right) \times (-14.0489)} \right) \right)$$

$\log(x)$ is the natural logarithm

$\tanh(x)$ is the hyperbolic tangent function

$\sinh(x)$ is the hyperbolic sine function

Result:

$$-2.00770\dots + 150.796\dots i$$

Polar coordinates:

$$r = 150.81 \text{ (radius)}, \quad \theta = 90.7628^\circ \text{ (angle)}$$

$$150.81$$

Alternative representations:

$$2 \left(\log(196883) + -\frac{2\pi 432}{\tanh(\frac{\pi}{2}) 3072} + \frac{1}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8 \cdot 3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) 144 \right) =$$

$$2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(-\frac{\left(2 \sinh\left(-\frac{\pi}{2} + \frac{8 \cdot 3072}{\pi}\right)\right)^2}{14.0489 \sinh(\frac{\pi}{2})} \right) + \frac{864\pi}{3072 \left(1 - \frac{2}{1+e^{-\pi}}\right)} \right)$$

$$2 \left(\log(196883) + -\frac{2\pi 432}{\tanh(\frac{\pi}{2}) 3072} + \frac{1}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8 \cdot 3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) 144 \right) =$$

$$2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(-\frac{\left(2 \sinh\left(-\frac{\pi}{2} + \frac{8 \cdot 3072}{\pi}\right)\right)^2}{14.0489 \sinh(\frac{\pi}{2})} \right) + \frac{864\pi}{3072 \left(1 - \frac{2}{1+e^{-\pi}}\right)} \right)$$

$$2 \left(\log(196883) + -\frac{2\pi 432}{\tanh(\frac{\pi}{2}) 3072} + \frac{1}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8 \cdot 3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) 144 \right) =$$

$$2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(-\frac{\left(2 \sinh\left(-\frac{\pi}{2} + \frac{8 \cdot 3072}{\pi}\right)\right)^2}{14.0489 \sinh(\frac{\pi}{2})} \right) + -\frac{864\pi}{(i \cot(\frac{\pi}{2} + \frac{i\pi}{2})) 3072} \right)$$

Series representations:

$$\begin{aligned}
& 2 \left(\log(196883) + -\frac{2\pi 432}{\tanh(\frac{\pi}{2}) 3072} + \frac{1}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8 \cdot 3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) 144 \right) = \\
& \frac{1}{64 \sum_{k=1}^{\infty} \frac{1}{1+(1-2k)^2}} \left(-9\pi^3 + 128 \log(196882) \sum_{k=1}^{\infty} \frac{1}{1+(1-2k)^2} + \right. \\
& 3072 \log \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right) \sum_{k=1}^{\infty} \frac{1}{1+(1-2k)^2} + \\
& \left. 64 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{\frac{(-1)^{1+k_2} 2^{1-k_2} \times 98441^{-k_2}}{k_2} + \frac{48(-1)^{1+k_2} \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right)^{-k_2}}{k_2}}{1+(1-2k_1)^2} \right)
\end{aligned}$$

$$\begin{aligned}
& 2 \left(\log(196883) + -\frac{2\pi 432}{\tanh(\frac{\pi}{2}) 3072} + \frac{1}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8 \cdot 3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) 144 \right) = \\
& \left(-9\pi + 128 \log(196882) \sum_{k=1}^{\infty} \frac{1}{(1+(1-2k)^2)\pi^2} + \right. \\
& 3072 \log \left(-1 - \frac{0.28472 \sinh^2\left(-\frac{\pi}{2} + \frac{\pi^2}{24576}\right)}{\sinh(\frac{\pi}{2})} \right) \sum_{k=1}^{\infty} \frac{1}{(1+(1-2k)^2)\pi^2} + \\
& 64 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{\frac{(-\frac{1}{2})^{-1+k_2} 98441^{-k_2}}{k_2} + \frac{48(-1)^{-1+k_2} \left(-1 - \frac{0.28472 \sinh^2\left(-\frac{\pi}{2} + \frac{\pi^2}{24576}\right)}{\sinh(\frac{\pi}{2})} \right)^{-k_2}}{k_2}}{\pi^2 + \pi^2 (-1+2k_1)^2} \Bigg) / \\
& \left(64 \sum_{k=1}^{\infty} \frac{1}{(1+(1-2k)^2)\pi^2} \right)
\end{aligned}$$

$$\begin{aligned}
& 2 \left(\log(196883) + -\frac{2\pi \cdot 432}{\tanh(\frac{\pi}{2}) \cdot 3072} + \frac{1}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8 \cdot 3072)} - \frac{\pi}{2}\right) \right)^2}{\sinh(\frac{\pi}{2}) \cdot 14.0489} \right) \cdot 144 \right) = \\
& \left(9\pi^2 + 32 \log(196882) + 768 \log \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right) + \right. \\
& 64 \log(196882) \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& 1536 \log \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right) \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& 16 \sum_{k=1}^{\infty} \frac{2(-1)^k \left(-196882^{-k} - 24 \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right)^{-k} \right)}{k} + \\
& \left. 32 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} (-1)^{k_1} q^{2k_1} \left(\frac{(-1)^{1+k_2} 2^{1-k_2} \times 98441^{-k_2}}{k_2} + \right. \right. \\
& \left. \left. 48 (-1)^{1+k_2} \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right)^{-k_2} \right) \right) / \\
& \left(16 \left(1 + 2 \sum_{k=1}^{\infty} (-1)^k q^{2k} \right) \right) \text{ for } q = e^{\pi/2}
\end{aligned}$$

From the two expressions, we obtain:

$$791.163797269128 - ((2 [\ln(196883)+((2\pi*432)/(3072*1/\pi))*1/(-\tanh(\pi/2))+144/6 \ln((((((2 \sinh((1/2(2*\pi*1/8)/(3072*1/\pi)-\pi/2))))^2))/(-\sinh(\pi/2)*14.0489))))])$$

Input interpretation:

$$791.163797269128 -$$

$$2 \left(\log(196883) + \frac{2\pi \times 432}{3072 \times \frac{1}{\pi}} \left(-\frac{1}{\tanh(\frac{\pi}{2})} \right) + \frac{144}{6} \log \left(\frac{\left(2 \sinh\left(\frac{1}{2} \times \frac{2\pi \times \frac{1}{8}}{3072 \times \frac{1}{\pi}} - \frac{\pi}{2}\right) \right)^2}{\sinh(\frac{\pi}{2}) \times (-14.0489)} \right) \right)$$

$\log(x)$ is the natural logarithm

$\tanh(x)$ is the hyperbolic tangent function

$\sinh(x)$ is the hyperbolic sine function

Result:

$$793.1715\dots - \\ 150.7964\dots i$$

Polar coordinates:

$$r = 807.379 \text{ (radius), } \theta = -10.7645^\circ \text{ (angle)}$$

807.379 result very near to the value of Planck multipole spectrum data 806.23

Alternative representations:

$$791.1637972691280000 -$$

$$2 \left\{ \log(196883) + \frac{2\pi 432}{\frac{3072(-\tanh(\frac{\pi}{2}))}{\pi}} + \frac{144}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8-3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) \right\} =$$

$$791.1637972691280000 -$$

$$2 \left\{ \log_e(196883) + \frac{144}{6} \log_e \left(-\frac{\left(2 \sinh\left(-\frac{\pi}{2} + \frac{\pi}{8-3072}\right)\right)^2}{14.0489 \sinh(\frac{\pi}{2})} \right) + \frac{864\pi}{\frac{3072\left(1-\frac{2}{1+e^{-\pi}}\right)}{\pi}} \right\}$$

$$791.1637972691280000 -$$

$$2 \left\{ \log(196883) + \frac{2\pi 432}{\frac{3072(-\tanh(\frac{\pi}{2}))}{\pi}} + \frac{144}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8-3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) \right\} =$$

$$791.1637972691280000 - 2 \left\{ \log(a) \log_a(196883) + \right.$$

$$\left. \frac{144}{6} \log(a) \log_a \left(-\frac{\left(2 \sinh\left(-\frac{\pi}{2} + \frac{\pi}{8-3072}\right)\right)^2}{14.0489 \sinh(\frac{\pi}{2})} \right) + \frac{864\pi}{\frac{3072\left(1-\frac{2}{1+e^{-\pi}}\right)}{\pi}} \right\}$$

$$791.1637972691280000 -$$

$$2 \left(\log(196883) + \frac{2\pi 432}{3072(-\tanh(\frac{\pi}{2}))} + \frac{144}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8-3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) \right) =$$

$$791.1637972691280000 - 2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(-\frac{\left(2 \sinh\left(-\frac{\pi}{2} + \frac{\pi}{8-3072}\right)\right)^2}{14.0489 \sinh(\frac{\pi}{2})} \right) + -\frac{864\pi}{\left(i \cot\left(\frac{\pi}{2} + \frac{i\pi}{2}\right)\right) 3072} \right)$$

Series representations:

791.1637972691280000 -

$$\begin{aligned}
& 2 \left(\log(196883) + \frac{2\pi 432}{3072(-\tanh(\frac{\pi}{2}))} + \frac{144}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8-3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) \right) = \\
& - \frac{1}{\sum_{k=1}^{\infty} \frac{1}{1+(1-2k)^2}} 2.00000000000000000000 \\
& \left(-0.07031250000000000000 \pi^3 - 395.581898634564000 \sum_{k=1}^{\infty} \frac{1}{1+(1-2k)^2} + \right. \\
& 1.00000000000000000000 \log(196882) \sum_{k=1}^{\infty} \frac{1}{1+(1-2k)^2} + \\
& 24.00000000000000000000 \log \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right) \\
& \sum_{k=1}^{\infty} \frac{1}{1+(1-2k)^2} - 0.50000000000000000000 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \\
& \left. \frac{(-1)^{2+k_2} 2^{1-k_2} 98441^{-k_2}}{k_2} - \frac{48 (-1)^{1+k_2} \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right)^{-k_2}}{k_2} \right) \\
& \frac{1}{1+(1-2k_1)^2}
\end{aligned}$$

$$\begin{aligned}
& 791.1637972691280000 - \\
& 2 \left(\log(196883) + \frac{2\pi 432}{\frac{3072(-\tanh(\frac{\pi}{2}))}{\pi}} + \frac{144}{6} \log \left(-\frac{\left(2 \sinh \left(\frac{2\pi}{2(8-3072)} - \frac{\pi}{2} \right) \right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) \right) = \\
& - \frac{1}{\sum_{k=1}^{\infty} \frac{1}{(1+(1-2k)^2)\pi^2}} 2.0000000000000000000 \left(-0.07031250000000000000 \pi - \right. \\
& 395.581898634564000 \sum_{k=1}^{\infty} \frac{1}{(1+(1-2k)^2)\pi^2} + \\
& 1.0000000000000000000 \log(196882) \sum_{k=1}^{\infty} \frac{1}{(1+(1-2k)^2)\pi^2} + \\
& 24.0000000000000000000 \log \left(-1 - \frac{0.28472 \sinh^2 \left(-\frac{\pi}{2} + \frac{\pi^2}{24576} \right)}{\sinh(\frac{\pi}{2})} \right) \\
& \sum_{k=1}^{\infty} \frac{1}{(1+(1-2k)^2)\pi^2} - 0.5000000000000000000 \\
& \left. \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{\left(-\frac{1}{98441} \right)^{k_2} 2^{1-k_2}}{k_2} - \frac{48(-1)^{-1+k_2} \left(-1 - \frac{0.28472 \sinh^2 \left(-\frac{\pi}{2} + \frac{\pi^2}{24576} \right)}{\sinh(\frac{\pi}{2})} \right)^{-k_2}}{\pi^2 + \pi^2 (-1+2k_1)^2} \right)
\end{aligned}$$

791.1637972691280000 -

$$\begin{aligned}
& 2 \left(\log(196883) + \frac{2\pi 432}{\frac{3072(-\tanh(\frac{\pi}{2}))}{\pi}} + \frac{144}{6} \log \left(-\frac{\left(2 \sinh\left(\frac{2\pi}{2(8-3072)} - \frac{\pi}{2}\right)\right)^2}{\sinh(\frac{\pi}{2}) 14.0489} \right) \right) = \\
& - \left(2.000000000000000000000000000000 \right. \\
& \quad \left(-197.7909493172820000 + 0.1406250000000000000000 \pi^2 + \right. \\
& \quad \left. 0.500000000000000000000000000000 \log(196882) + \right. \\
& \quad \left. 12.0000000000000000000000000000 \log \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right) - \right. \\
& \quad 395.581898634564000 \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& \quad 1.000000000000000000000000000000 \log(196882) \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& \quad \left. 24.0000000000000000000000000000 \log \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right) \right. \\
& \quad \left. \sum_{k=1}^{\infty} (-1)^k q^{2k} - 0.250000000000000000000000000000 \right. \\
& \quad \left. \sum_{k=1}^{\infty} \frac{2 \left(\left(-\frac{1}{196882}\right)^k + 24 (-1)^k \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right)^{-k} \right)}{k} \right) \\
& \quad - 0.500000000000000000000000000000 \\
& \quad \left. \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} (-1)^{k_1} q^{2k_1} \left(\frac{(-1)^{2+k_2} 2^{1-k_2} \times 98441^{-k_2}}{k_2} - \right. \right. \\
& \quad \left. \left. \frac{48 (-1)^{1+k_2} \left(-1 - \frac{0.28472 \sinh^2\left(\frac{(-12288+\pi)\pi}{24576}\right)}{\sinh(\frac{\pi}{2})} \right)^{-k_2}}{k_2} \right) \right) / \\
& \quad \left(0.500000000000000000000000000000 + 1.000000000000000000000000 \sum_{k=1}^{\infty} (-1)^k q^{2k} \right)
\end{aligned}$$

for $q = e^{\pi/2}$

$$((2 \ln(196883) + ((2\pi \cdot 432)/(3072 \cdot 1/\pi)) \cdot 1 / (-\tanh(\pi/2)) + 144/6 \ln(((2 \sinh((1/2 \cdot (2\pi \cdot 1/8)/(3072 \cdot 1/\pi) - \pi/2)))^2)) / (-\sinh(\pi/2) \cdot 14.0489)))])^{1/10}$$

Input interpretation:

$$\sqrt[10]{2 \left(\log(196883) + \frac{2\pi \cdot 432}{3072 \cdot \frac{1}{\pi}} \left(-\frac{1}{\tanh(\frac{\pi}{2})} \right) + \frac{144}{6} \log \left(\frac{\left(2 \sinh \left(\frac{1}{2} \times \frac{2\pi \cdot \frac{1}{8}}{3072 \cdot \frac{1}{\pi}} - \frac{\pi}{2} \right) \right)^2}{\sinh(\frac{\pi}{2}) \cdot (-14.0489)} \right) \right)}$$

$\log(x)$ is the natural logarithm

$\tanh(x)$ is the hyperbolic tangent function

$\sinh(x)$ is the hyperbolic sine function

Result:

$$1.630688\dots +$$

$$0.2605015\dots i$$

Polar coordinates:

$$r = 1.65136 \text{ (radius)}, \quad \theta = 9.07628^\circ \text{ (angle)}$$

1.65136 result very near to the 14th root of the following Ramanujan's class

$$\text{invariant } Q = (G_{505}/G_{101/5})^3 = 1164.2696 \text{ i.e. } 1.65578\dots$$

And:

$$((2 \ln(196883) + ((2\pi \cdot 432)/(3072 \cdot 1/\pi)) \cdot 1 / (-\tanh(\pi/2)) + 144/6 \ln(((2 \sinh((1/2 \cdot (2\pi \cdot 1/8)/(3072 \cdot 1/\pi) - \pi/2)))^2)) / (-\sinh(\pi/2) \cdot 14.0489)))])^{1/(10+0.5269391135)}$$

Where 0.5269391135 is the result of the following Rogers- Ramanujan continued fraction:

$$2 \int_0^{\infty} \frac{t^2 dt}{e^{\sqrt{3}t} \sinh t} = \frac{1}{1 + \frac{1^3}{1 + \frac{1^3}{3 + \frac{2^3}{1 + \frac{2^3}{5 + \frac{3^3}{1 + \frac{3^3}{7 + \dots}}}}}} \approx 0.5269391135$$

Input interpretation:

$$\left(\frac{1}{10 + 0.5269391135} \right) \left(2 \left(\log(196883) + \frac{2\pi \times 432}{3072 \times \frac{1}{\pi}} \left(-\frac{1}{\tanh(\frac{\pi}{2})} \right) + \frac{144}{6} \log \left(\frac{\left(2 \sinh \left(\frac{1}{2} \times \frac{2\pi \times \frac{1}{8}}{3072 \times \frac{1}{\pi}} - \frac{\pi}{2} \right) \right)^2}{\sinh(\frac{\pi}{2}) \times (-14.0489)} \right) \right) \right)$$

$\log(x)$ is the natural logarithm

$\tanh(x)$ is the hyperbolic tangent function

$\sinh(x)$ is the hyperbolic sine function

Result:

$$1.592218\dots + 0.2414245\dots i$$

Polar coordinates:

$$r = 1.61042 \text{ (radius)}, \quad \theta = 8.62195^\circ \text{ (angle)}$$

1.61042 result that is a very good approximation to the value of the golden ratio
1.618033988749...

From:

$$T_x = \frac{1}{\pi + 2\tau \frac{b}{L}},$$

$$S_0 = \ln(196883) = 12.1904\dots; \quad c = 144; \quad \phi_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

$$\tilde{\eta} = 2.54311; \quad \tau = 1/8; \quad L = 3072/\pi; \quad b = 128$$

$$\sigma = \pi/2,$$

$$1/(\text{Pi}+2*1/8*128/(3072*1/\text{Pi}))$$

Input:

$$\frac{1}{\pi + 2 \times \frac{1}{8} \times \frac{128}{3072 \times \frac{1}{\pi}}}$$

Result:

$$\frac{96}{97\pi}$$

Decimal approximation:

$$0.3150283409654010769858317790466263660888273400223467851500219593$$

$$\dots \\ T_\chi = 0.3150283409654\dots$$

Property:

$\frac{96}{97\pi}$ is a transcendental number

Combining the dilaton and the matter entropy, we have:

$$S_{\text{gen}}(\sigma) = 2 \left\{ S_0 + \left[\frac{c}{3(1 + \frac{2\tau b}{\pi L})^2} - \frac{c}{12} \right] \left(\frac{\frac{\pi}{2} - \sigma}{\tan \sigma} + 1 \right) + \frac{c}{6} \log \left[\frac{\sin^2 (\pi T_\chi(\sigma + \frac{\tau b}{L}))}{(\pi T_\chi)^2 \sin \sigma \varepsilon_{uv,\chi}} \right] \right\}, \quad (\text{B.13})$$

$$S_{\text{gen}}(\sigma) = 2 \left\{ S_0 + \left[\frac{c}{3(1 + \frac{2\tau b}{\pi L})^2} - \frac{c}{12} \right] \left(\frac{\frac{\pi}{2} - \sigma}{\tan \sigma} + 1 \right) + \frac{c}{6} \log \left[\frac{\sin^2 (\pi T_\chi(\sigma + \frac{\tau b}{L}))}{(\pi T_\chi)^2 \sin \sigma \varepsilon_{uv,\chi}} \right] \right\},$$

$$S_0 = \ln(196883) = 12.1904\dots; \quad c = 144; \quad \phi_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

$$\tilde{\eta} = 2.54311; \quad \tau = 1/8; \quad L = 3072/\pi; \quad b = 128$$

$$\sigma = \pi/2,$$

$$T_\chi = 0.3150283409654$$

$$2 [\ln(196883) + (144/(3(((1+(2*1/8*128)/3072)^2))-144/12)+144/6 \ln(((\sin^2(((\text{Pi}*0.3150283409654(\text{Pi}/2+(1/8*128)/(3072*1/\text{Pi})))))))/((\text{Pi}*\text{Pi})*0.3150283409654^2 \sin(\text{Pi}/2)*14.0489))]$$

Input interpretation:

$$2 \left[\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times \frac{1}{8} \times 128}{3072} \right)^2} - \frac{144}{12} \right) + \frac{144}{6} \log \left(\frac{\sin^2 \left(\pi \times 0.3150283409654 \left(\frac{\pi}{2} + \frac{\frac{1}{8} \times 128}{3072 \times \frac{1}{\pi}} \right) \right)}{(\pi \times 0.3150283409654)^2 \sin \left(\frac{\pi}{2} \right) \times 14.0489} \right) \right]$$

$\log(x)$ is the natural logarithm

Result:

$$-31.4357\dots$$

$$-31.4357\dots$$

Alternative representations:

$$\begin{aligned}
& 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& 2 \left(\log(196883) + \frac{144}{6} \log \left(\frac{\cos^2 \left(\frac{\pi}{2} - 0.31502834096540000 \pi \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{14.0489 \cos(0) (0.31502834096540000 \pi)^2} \right) - \right. \\
& \quad \left. \frac{144}{12} + \frac{144}{3 \left(1 + \frac{256}{8 \times 3072} \right)^2} \right)
\end{aligned}$$

$$\begin{aligned}
& 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \frac{1}{6} \log \left(\right. \right. \\
& \quad \left. \left. \frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = 2 \left(\log(196883) + \right. \\
& \quad \left. \frac{144}{6} \log \left(- \frac{\left(-\cos \left(\frac{\pi}{2} + 0.31502834096540000 \pi \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right) \right)^2}{14.0489 \cos(\pi) (0.31502834096540000 \pi)^2} \right) - \right. \\
& \quad \left. \frac{144}{12} + \frac{144}{3 \left(1 + \frac{256}{8 \times 3072} \right)^2} \right)
\end{aligned}$$

$$\begin{aligned}
& 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi \cdot 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{(\pi \cdot 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& 2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(\frac{\sin^2 \left(0.31502834096540000 \pi \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{14.0489 (0.31502834096540000 \pi)^2 \sin \left(\frac{\pi}{2} \right)} \right) - \right. \\
& \quad \left. \frac{144}{12} + \frac{144}{3 \left(1 + \frac{256}{8 \cdot 3072} \right)^2} \right)
\end{aligned}$$

Half-argument formula:

$$\begin{aligned}
& 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi \cdot 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{(\pi \cdot 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \frac{658920}{9409} - \\
& 50 \log(2) + 2 \log(393766) + 48 \log \left(\frac{1.43446 \sin^2(0.15915494309189479 \pi^2)}{\pi^2 \sin \left(\frac{\pi}{2} \right)} \right)
\end{aligned}$$

Multiple-argument formulas:

$$\begin{aligned}
& 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right)^{144} \right) = \\
& 2 \left(\frac{329460}{9409} + \log(196883) + \right. \\
& \quad \left. 24 \left(\log \left(\frac{1}{\sin \left(\frac{\pi}{2} \right)} \right) + \log \left(\frac{0.71723 \sin^2(0.15915494309189479 \pi^2)}{\pi^2} \right) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right)^{144} \right) = 2 \left(\frac{329460}{9409} + \right. \\
& \quad \left. \log(196883) + 24 \left(\log(0.71723) + \log \left(\frac{\sin^2(0.15915494309189479 \pi^2)}{\pi^2 \sin \left(\frac{\pi}{2} \right)} \right) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi \cdot 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi \cdot 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& 2 \left(\frac{329460}{9409} + \log(196883) + 24 \log \left(\frac{1}{\pi^2 \cos \left(\frac{\pi}{4} \right) \sin \left(\frac{\pi}{4} \right)} 1.43446 \right. \right. \\
& \left. \left. \cos^2(0.079577471545947396 \pi^2) \sin^2(0.079577471545947396 \pi^2) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& -4 \cdot 2 [\ln(196883) + (144/(3((1+(2*1/8*128)/3072)^2))-144/12)+144/6 \\
& \ln(((\sin^2(((\text{Pi}*0.3150283409654(\text{Pi}/2+(1/8*128)/(3072*1/\text{Pi}))))) / ((\text{Pi}*0.3150283409654)^2 \sin(\text{Pi}/2)*14.0489))]
\end{aligned}$$

Input interpretation:

$$\begin{aligned}
& -4 \cdot 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times \frac{1}{8} \times 128}{3072} \right)^2} - \frac{144}{12} \right) + \right. \\
& \left. \frac{144}{6} \log \left(\frac{\sin^2 \left(\pi \times 0.3150283409654 \left(\frac{\pi}{2} + \frac{\frac{1}{8} \times 128}{3072 \times \frac{1}{\pi}} \right) \right)}{(\pi \times 0.3150283409654)^2 \sin \left(\frac{\pi}{2} \right) \times 14.0489} \right) \right)
\end{aligned}$$

$\log(x)$ is the natural logarithm

Result:

125.743...

125.743... result very near to the value of Planck multipole spectrum data 124.55 and very near to the Higgs boson mass 125.18 GeV

Alternative representations:

$$\begin{aligned}
& -4 \times 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& -8 \left(\log(196883) + \frac{144}{6} \log \left(\frac{\cos^2 \left(\frac{\pi}{2} - 0.31502834096540000 \pi \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{14.0489 \cos(0) (0.31502834096540000 \pi)^2} \right) - \right. \\
& \quad \left. \frac{144}{12} + \frac{144}{3 \left(1 + \frac{256}{8 \cdot 3072} \right)^2} \right)
\end{aligned}$$

$$\begin{aligned}
& -4 \times 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& -8 \left(\log(196883) + \frac{144}{6} \right. \\
& \quad \left. \log \left(- \frac{\left(-\cos \left(\frac{\pi}{2} + 0.31502834096540000 \pi \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right) \right)^2}{14.0489 \cos(\pi) (0.31502834096540000 \pi)^2} \right) - \right. \\
& \quad \left. \frac{144}{12} + \frac{144}{3 \left(1 + \frac{256}{8 \cdot 3072} \right)^2} \right)
\end{aligned}$$

$$\begin{aligned}
& -4 \times 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& -8 \left(\log_e(196883) + \frac{144}{6} \log_e \left(\frac{\sin^2 \left(0.31502834096540000 \pi \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{14.0489 (0.31502834096540000 \pi)^2 \sin \left(\frac{\pi}{2} \right)} \right) - \right. \\
& \quad \left. \frac{144}{12} + \frac{144}{3 \left(1 + \frac{256}{8 \cdot 3072} \right)^2} \right)
\end{aligned}$$

Half-argument formula:

$$\begin{aligned}
& -4 \times 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \cdot 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& -\frac{2635680}{9409} + 200 \log(2) - 8 \log(393766) - \\
& 192 \log \left(\frac{1.43446 \sin^2(0.15915494309189479 \pi^2)}{\pi^2 \sin \left(\frac{\pi}{2} \right)} \right)
\end{aligned}$$

Multiple-argument formulas:

$$\begin{aligned}
& -4 \times 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& -8 \left(\frac{329460}{9409} + \log(196883) + \right. \\
& \quad \left. 24 \left(\log \left(\frac{1}{\sin \left(\frac{\pi}{2} \right)} \right) + \log \left(\frac{0.71723 \sin^2(0.15915494309189479 \pi^2)}{\pi^2} \right) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& -4 \times 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = -8 \left(\frac{329460}{9409} + \right. \\
& \quad \left. \log(196883) + 24 \left(\log(0.71723) + \log \left(\frac{\sin^2(0.15915494309189479 \pi^2)}{\pi^2 \sin \left(\frac{\pi}{2} \right)} \right) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& -4 \times 2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times 128}{3072 \times 8} \right)^2} - \frac{144}{12} \right) + \right. \\
& \quad \left. \frac{1}{6} \log \left(\frac{\sin^2 \left(\pi \cdot 0.31502834096540000 \left(\frac{\pi}{2} + \frac{128}{8 \times 3072} \right) \right)}{(\pi \cdot 0.31502834096540000)^2 \sin \left(\frac{\pi}{2} \right) 14.0489} \right) 144 \right) = \\
& -8 \left(\frac{329460}{9409} + \log(196883) + 24 \log \left(\frac{1}{\pi^2 \cos \left(\frac{\pi}{4} \right) \sin \left(\frac{\pi}{4} \right)} 1.43446 \right. \right. \\
& \quad \left. \left. \cos^2(0.079577471545947396 \pi^2) \sin^2(0.079577471545947396 \pi^2) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& -55 / ((2 [\ln(196883) + (144 / (3((1 + (2 * 1/8 * 128) / 3072)^2))) - 144 / 12) + 144 / 6 \\
& \ln(((\sin^2((\text{Pi} * 0.31502834(\text{Pi}/2 + (1/8 * 128) / (3072 * 1/\text{Pi})))))) / ((\text{Pi} * 0.31502834)^2 \\
& \sin(\text{Pi}/2) * 14.0489)))] - (2 + 0.5269391135)))
\end{aligned}$$

Input interpretation:

$$\begin{aligned}
& -55 / \left(2 \left(\log(196883) + \left(\frac{144}{3 \left(1 + \frac{2 \times \frac{1}{8} \times 128}{3072} \right)^2} - \frac{144}{12} \right) + \frac{144}{6} \right. \right. \\
& \quad \left. \left. \log \left(\frac{\sin^2 \left(\pi \times 0.31502834 \left(\frac{\pi}{2} + \frac{\frac{1}{8} \times 128}{3072 \times \frac{1}{\pi}} \right) \right)}{(\pi \times 0.31502834)^2 \sin \left(\frac{\pi}{2} \right) \times 14.0489} \right) - (2 + 0.5269391135) \right) \right)
\end{aligned}$$

$\log(x)$ is the natural logarithm

Result:

1.6194247724631267646940480515154097677377388494732818336808390536

...

1.6194247724.... result that is a very good approximation to the value of the golden ratio 1.618033988749...

From

$$S_{\text{gen}}(\eta) = 2 \left\{ S_0 - \frac{\tilde{\phi}_r}{\tanh \eta} + \frac{c}{6} \log \left[\frac{(2 \sinh \frac{\eta}{2})^2}{(-\sinh \eta) \varepsilon_{uv,\chi}} \right] \right\}. \quad (\text{C.6})$$

$$S_0 = \ln(196883) = 12.1904\dots; \quad c = 144; \quad \tilde{\phi}_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

$$\tilde{\eta} = 2.54311; \quad \tau = 1/8; \quad L = 3072/\pi; \quad b = 128$$

$$2 [\ln(196883) - 432/(\tanh(-2)) + 144/6 \ln(((2\sinh(-1))^2)/((- \sinh(-2))14.0489)))]$$

Input interpretation:

$$2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) \times 14.0489} \right) \right)$$

Result:

813.9772...

813.9772...

Alternative representations:

$$2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{1}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) 144 \right) =$$

$$2 \left(\log(196883) + \frac{144}{6} \log \left(- \frac{\left(\frac{1}{e} - e^1 \right)^2}{7.02445 \left(\frac{1}{e^2} - e^2 \right)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)$$

$$2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{1}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) 144 \right) =$$

$$2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(- \frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)$$

$$2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{1}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) 144 \right) =$$

$$2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(- \frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)$$

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

From the two results of the previous expressions

Input interpretation:

$$2 \left(\log(196883) + \frac{2\pi \times 432}{3072 \times \frac{1}{\pi}} \left(- \frac{1}{\tanh(\frac{\pi}{2})} \right) + \frac{144}{6} \log \left(\frac{\left(2 \sinh \left(\frac{1}{2} \times \frac{2\pi \times \frac{1}{8}}{3072 \times \frac{1}{\pi}} - \frac{\pi}{2} \right) \right)^2}{\sinh(\frac{\pi}{2}) \times (-14.0489)} \right) \right)$$

Result:

$$-2.00770\dots + 150.796\dots i$$

Polar coordinates:

$$r = 150.81 \text{ (radius)}, \quad \theta = 90.7628^\circ \text{ (angle)}$$

$$150.81$$

and:

Input interpretation:

$$2 \left(\log(196883) + 432 \tanh(2.54311) + \frac{144}{6} \log \left(\frac{(2 \cosh(\frac{2.54311}{2}))^2}{\cosh(2.54311) \times 14.0489} \right) \right)$$

Result:

791.164...

791.164...

We obtain:

$$-[((2 [\ln(196883) - 432/(\tanh(-2)) + 144/6 \ln(((2 \sinh(-1))^2)/((- \sinh(-2)) 14.0489))))] - 150.81 - 791.164]$$

Input interpretation:

$$-\left(2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) \times 14.0489} \right) \right) - 150.81 - 791.164 \right)$$

Result:

127.997...

127.997.... result very near to the value of Planck multipole spectrum data 127.88

Alternative representations:

$$\begin{aligned}
& - \left[2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{1}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) 144 \right) - \right. \\
& \quad \left. 150.81 - 791.164 \right] = \\
& 941.974 - 2 \left(\log(196883) + \frac{144}{6} \log \left(- \frac{\left(\frac{1}{e} - e^1 \right)^2}{7.02445 \left(\frac{1}{e^2} - e^2 \right)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)
\end{aligned}$$

$$\begin{aligned}
& - \left[2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{1}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) 144 \right) - \right. \\
& \quad \left. 150.81 - 791.164 \right] = \\
& 941.974 - 2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(- \frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)
\end{aligned}$$

$$\begin{aligned}
& - \left[2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{1}{6} \log \left(- \frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) 144 \right) - \right. \\
& \quad \left. 150.81 - 791.164 \right] = 941.974 - \\
& 2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(- \frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)
\end{aligned}$$

From:

$$S_{\text{gen}}(\eta') = 2 \left\{ S_0 + \frac{\tilde{\phi}_r}{\tanh \eta'} + \frac{c}{6} \log \left[\frac{2(1 + \cosh \eta')}{(-\sinh \eta') \varepsilon_{uv,\chi}} \right] \right\}. \quad (\text{C.15})$$

$$S_0 = \ln(196883) = 12.1904\dots; \quad c = 144; \quad \phi_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

$$\tilde{\eta} = 2.54311; \quad \tau = 1/8; \quad L = 3072/\pi; \quad b = 128$$

$$((((((2 [\ln(196883) + 432/(\tanh(2.54311)) + 144/6 \ln(((2(1+\cosh(2.54311)))))/((- \sinh(2.54311))14.0489))))]))))$$

Input interpretation:

$$2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{144}{6} \log \left(-\frac{2(1+\cosh(2.54311))}{\sinh(2.54311) \times 14.0489} \right) \right)$$

Result:

$$813.121\dots + 150.796\dots i$$

Polar coordinates:

$$r = 826.985 \text{ (radius)}, \quad \theta = 10.5064^\circ \text{ (angle)}$$

$$826.985$$

Alternative representations:

$$2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1+\cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) =$$

$$2 \left(\log(196883) + \frac{144}{6} \log \left(-\frac{2 \left(1 + \frac{1}{2} \left(\frac{1}{e^{2.54311}} + e^{2.54311} \right) \right)}{7.02445 \left(-\frac{1}{e^{2.54311}} + e^{2.54311} \right)} \right) + \frac{432}{-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}}} \right)$$

$$2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) =$$

$$2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(-\frac{2(1 + \cosh(2.54311))}{14.0489 \sinh(2.54311)} \right) + \frac{432}{-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}}} \right)$$

$$2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) =$$

$$2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(-\frac{2(1 + \cosh(2.54311))}{14.0489 \sinh(2.54311)} \right) + \frac{432}{-1 + \frac{2}{1 + \frac{1}{e^{5.08622}}}} \right)$$

Series representations:

$$2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) =$$

$$\left(2 \left(21.2338 + \log(196882) \sum_{k=1}^{\infty} \frac{1}{25.8696 + (1 - 2k)^2 \pi^2} + \right. \right.$$

$$\left. \left. 24 \log \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right) \sum_{k=1}^{\infty} \frac{1}{25.8696 + (1 - 2k)^2 \pi^2} + \right. \right.$$

$$0.5 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{\frac{(-1)^{1+k_2} 2^{1-k_2} 98441^{-k_2}}{k_2} + \frac{48(-1)^{1+k_2} \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right)^{-k_2}}{k_2}}{25.8696 + \pi^2 (1 - 2k_1)^2} \Bigg) \Bigg)$$

$$\Bigg/ \left(\sum_{k=1}^{\infty} \frac{1}{25.8696 + (1 - 2k)^2 \pi^2} \right)$$

$$\begin{aligned}
& 2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) = \\
& \left(-864 + 2 \log(196882) + 48 \log \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right) + \right. \\
& 4 \log(196882) \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& 96 \log \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right) \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& \sum_{k=1}^{\infty} \frac{2(-1)^k \left(-196882^{-k} - 24 \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right)^{-k} \right)}{k} + \\
& \left. 2 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} (-1)^{k_1} q^{2k_1} \left(\frac{(-1)^{1+k_2} 2^{1-k_2} \times 98441^{-k_2}}{k_2} + \right. \right. \\
& \left. \left. \frac{48(-1)^{1+k_2} \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right)^{-k_2}}{k_2} \right) \right) / \\
& \left(1 + 2 \sum_{k=1}^{\infty} (-1)^k q^{2k} \right) \text{ for } q = 12.7192
\end{aligned}$$

$$\begin{aligned}
& 2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) = \\
& \left(-864 + 2 \log(196882) + 48 \log \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right) + \right. \\
& 4 \log(196882) \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& 96 \log \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right) \sum_{k=1}^{\infty} (-1)^k q^{2k} + \\
& \sum_{k=1}^{\infty} \frac{2(-1)^k \left(-196882^{-k} - 24 \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right)^{-k} \right)}{k} + \\
& \left. 2 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} (-1)^{k_1} q^{2k_1} \left(\frac{\left(-\frac{1}{2} \right)^{-1+k_2} 98441^{-k_2}}{k_2} + \right. \right. \\
& \left. \left. \frac{48(-1)^{-1+k_2} \left(-1 - \frac{0.14236(1 + \cosh(2.54311))}{\sinh(2.54311)} \right)^{-k_2}}{k_2} \right) \right) / \\
& \left(1 + 2 \sum_{k=1}^{\infty} (-1)^k q^{2k} \right) \text{ for } q = 12.7192
\end{aligned}$$

Integral representations:

$$\begin{aligned}
& 2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) = \\
& \frac{1}{\int_0^{2.54311} \operatorname{sech}^2(t) dt} \\
& \left(864 + 0.000253959 \int_0^1 \int_0^1 \left((\operatorname{sech}^2(2.54311 t_1) (4.87602 \times 10^{-6} + 4.87602 \times 10^{-6} \right. \right. \\
& \quad \cosh(2.54311) - 0.280944 \sinh(2.54311) + \\
& \quad (1 + \cosh(2.54311) + 7.02445 \sinh(2.54311)) t_2) / \\
& \quad ((5.07918 \times 10^{-6} + t_2) (-7.02445 \sinh(2.54311) + (1 + \cosh(\\
& \quad 2.54311) + 7.02445 \sinh(2.54311)) t_2)) dt_2 dt_1 \Big)
\end{aligned}$$

$$2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) =$$

$$\frac{1}{\int_0^{2.54311} \operatorname{sech}^2(t) dt} 2 \left(432 + \log(196883) \int_0^{2.54311} \operatorname{sech}^2(t) dt + \right.$$

$$\left. 24 \log \left(\frac{-0.111957 - 0.14236 \int_0^1 \sinh(2.54311 t) dt}{\int_0^1 \cosh(2.54311 t) dt} \right) \int_0^{2.54311} \operatorname{sech}^2(t) dt \right)$$

$$2 \left(\log(196883) + \frac{432}{\tanh(2.54311)} + \frac{1}{6} \log \left(-\frac{2(1 + \cosh(2.54311))}{\sinh(2.54311) 14.0489} \right) 144 \right) =$$

$$\frac{1}{\int_0^{2.54311} \operatorname{sech}^2(t) dt} 2 \left(432 + \log(196883) \int_0^{2.54311} \operatorname{sech}^2(t) dt + \right.$$

$$\left. 24 \log \left(-\frac{0.0559787 \left(1 + \int_{\frac{i\pi}{2}}^{2.54311} \sinh(t) dt \right)}{\int_0^1 \cosh(2.54311 t) dt} \right) \int_0^{2.54311} \operatorname{sech}^2(t) dt \right)$$

From the difference between the two results, we obtain:

$$826.986 - (((2 [\ln(196883) - 432/(\tanh(-2))+144/6 \ln(((2\sinh(-1))^2)/((-sinh(-2))14.0489))))]))$$

Input interpretation:

$$826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) \times 14.0489} \right) \right)$$

Result:

13.0088...

13.0088....

Alternative representations:

$$826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) \right) = \\ 826.986 - 2 \left(\log(196883) + \frac{144}{6} \log \left(-\frac{\left(\frac{1}{e} - e^1\right)^2}{7.02445 \left(\frac{1}{e^2} - e^2\right)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)$$

$$826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) \right) = \\ 826.986 - 2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(-\frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)$$

$$826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) \right) = \\ 826.986 - \\ 2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(-\frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)$$

From which:

$$21 / ((826.986 - (((2 [\ln(196883) - 432/(\tanh(-2)) + 144/6 \ln(((2\sinh(-1))^2)/((-sinh(-2))14.0489))))]))))$$

Input interpretation:

$$\frac{21}{826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) \times 14.0489} \right) \right)}$$

Result:

1.6142925923703514097825820146986172382746580714676614103070006037

...

1.61429259237..... result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternative representations:

$$\frac{21}{826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) \right)} =$$

$$\frac{21}{826.986 - 2 \left(\log_e(196883) + \frac{144}{6} \log_e \left(-\frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)}$$

$$\frac{21}{826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) \right)} =$$

$$\frac{21}{826.986 - 2 \left(\log(a) \log_a(196883) + \frac{144}{6} \log(a) \log_a \left(-\frac{(2 \sinh(-1))^2}{14.0489 \sinh(-2)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)}$$

$$\frac{21}{826.986 - 2 \left(\log(196883) - \frac{432}{\tanh(-2)} + \frac{144}{6} \log \left(-\frac{(2 \sinh(-1))^2}{\sinh(-2) 14.0489} \right) \right)} =$$

$$\frac{21}{826.986 - 2 \left(\log(196883) + \frac{144}{6} \log \left(-\frac{\left(\frac{1}{e}-e^1\right)^2}{7.02445 \left(\frac{1}{e^2}-e^2\right)} \right) - \frac{432}{-1 + \frac{2}{1+e^4}} \right)}$$

From:

$$S_{\text{gen}}(\tilde{\eta}) = S_0 + \frac{\tilde{\phi}_r}{\coth \tilde{\eta}} + \frac{c}{6} \log \left[\frac{\left(2 \sinh \frac{\Delta\eta}{2} \right)^2}{\cosh \tilde{\eta} \varepsilon_{uv,\chi}} \right]$$

$$= S_0 + \frac{\tilde{\phi}_r}{\coth \tilde{\eta}} + \frac{c}{6} \log \left[\frac{\left(2 \cosh \frac{\tilde{\eta} + \frac{\pi t_L}{2\tau}}{2} \right)^2}{\cosh \tilde{\eta} \varepsilon_{uv,\chi}} \right].$$

$$S_0 = \ln(196883) = 12.1904\dots; \quad c = 144; \quad \phi_r = 432; \quad \varepsilon_{uv} = 14.0489; \quad \eta = -2; \quad t = 3$$

$$\tilde{\eta} = 2.54311; \quad \tau = 1/8; \quad L = 3072/\pi; \quad b = 128; \quad t_L = 5$$

$$\ln(196883) + 432/(\coth(2.54311))+144/6$$

$$\ln[(2(\cosh(1/2(2.54311+((5\pi)/(2*1/8))))))^2/(((\cosh(2.54311))14.0489)))]$$

Input interpretation:

$$\log(196883) + \frac{432}{\coth(2.54311)} + \frac{144}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2 \times \frac{1}{8}} \right) \right) \right)^2}{\cosh(2.54311) \times 14.0489} \right)$$

Result:

1899.914...

1899.914...

Alternative representations:

$$\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 =$$

$$\log_e(196883) + \frac{144}{6} \log_e \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{14.0489 \cosh(2.54311)} \right) + \frac{432}{1 + \frac{2}{-1+e^{5.08622}}}$$

$$\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 =$$

$$\log(a) \log_a(196883) +$$

$$\frac{144}{6} \log(a) \log_a \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{14.0489 \cosh(2.54311)} \right) + \frac{432}{1 + \frac{2}{-1+e^{5.08622}}}$$

$$\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 =$$

$$\log_e(196883) + \frac{144}{6} \log_e \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{14.0489 \cosh(2.54311)} \right) + -\frac{432}{i \cot(-2.54311 i)}$$

Series representations:

$$\begin{aligned}
& \log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 = \\
& \left(169.871 + \log(196882) \sum_{k=-\infty}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \right. \\
& 24 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) \sum_{k=-\infty}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \\
& \sum_{k_1=-\infty}^{\infty} \sum_{k_2=1}^{\infty} \frac{\frac{(-1)^{1+k_2} 196882^{-k_2}}{k_2} + \frac{24(-1)^{1+k_2} \left(-1 + \frac{0.28472 \cosh^2(1.27156+10\pi)}{\cosh(2.54311)} \right)^{-k_2}}{k_2}}{6.46741 + \pi^2 k_1^2} \Bigg) / \\
& \left(\sum_{k=-\infty}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} \right)
\end{aligned}$$

$$\begin{aligned}
& \log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} = \\
& \frac{1}{1 + 2 \sum_{k=1}^{\infty} q^{2k}} \left(-432 + \log(196882) + \right. \\
& 24 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) + 2 \log(196882) \sum_{k=1}^{\infty} q^{2k} + \\
& 48 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) \sum_{k=1}^{\infty} q^{2k} + \\
& \sum_{k=1}^{\infty} \frac{(-1)^k \left(-196882^{-k} - 24 \left(-1 + \frac{0.28472 \cosh^2(1.27156+10\pi)}{\cosh(2.54311)} \right)^{-k} \right)}{k} + \\
& \left. 2 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} q^{2k_1} \left(\frac{(-1)^{1+k_2} 196882^{-k_2}}{k_2} + \right. \right. \\
& \left. \left. \frac{24 (-1)^{1+k_2} \left(-1 + \frac{0.28472 \cosh^2(1.27156+10\pi)}{\cosh(2.54311)} \right)^{-k_2}}{k_2} \right) \right)
\end{aligned}$$

for $q = 12.7192$

$$\begin{aligned}
& \log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} = \\
& \frac{1}{1 + 2 \sum_{k=1}^{\infty} q^{2k}} \left(-432 + \log(196882) + 24 \right. \\
& \left. \log \left(-1 + \frac{0.28472 \cosh^2 \left(\frac{1}{2} (2.54311 + 20\pi) \right)}{\cosh(2.54311)} \right) + 2 \log(196882) \sum_{k=1}^{\infty} q^{2k} + \right. \\
& \left. 48 \log \left(-1 + \frac{0.28472 \cosh^2 \left(\frac{1}{2} (2.54311 + 20\pi) \right)}{\cosh(2.54311)} \right) \sum_{k=1}^{\infty} q^{2k} + \right. \\
& \left. \sum_{k=1}^{\infty} \frac{(-1)^k \left(-196882^{-k} - 24 \left(-1 + \frac{0.28472 \cosh^2(1.27156+10\pi)}{\cosh(2.54311)} \right)^{-k} \right)}{k} + \right. \\
& \left. 2 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} q^{2k_1} \left(\frac{(-1)^{-1+k_2} 196882^{-k_2}}{k_2} + \right. \right. \\
& \left. \left. \frac{24 (-1)^{-1+k_2} \left(-1 + \frac{0.28472 \cosh^2 \left(\frac{1}{2} (2.54311+20\pi) \right)}{\cosh(2.54311)} \right)^{-k_2}}{k_2} \right) \right)
\end{aligned}$$

for $q = 12.7192$

$$\begin{aligned}
& \log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh\left(\frac{1}{2}\left(2.54311 + \frac{5\pi}{8}\right)\right)\right)^2}{\cosh(2.54311) 14.0489} \right)^{144} = \\
& \left(84.9354 + 0.0773107 \log(196882) + \right. \\
& 1.85546 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) + \\
& \log(196882) \sum_{k=1}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \\
& 24 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) \sum_{k=1}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \\
& 0.0773107 \sum_{k=1}^{\infty} \frac{(-1)^k \left(-196882^{-k} - 24 \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right)^{-k} \right)}{k} + \\
& \left. \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{\frac{(-1)^{1+k_2} 196882^{-k_2}}{k_2} + \frac{24(-1)^{1+k_2} \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right)^{-k_2}}{k_2}}{6.46741 + \pi^2 k_1^2} \right) / \\
& \left(0.0773107 + \sum_{k=1}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} \right)
\end{aligned}$$

Integral representations:

$$\begin{aligned}
& \log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh\left(\frac{1}{2}\left(2.54311 + \frac{5\pi}{8}\right)\right)\right)^2}{\cosh(2.54311) 14.0489} \right)^{144} = \\
& \frac{1}{\int_{\frac{i\pi}{2}}^{2.54311} \csch^2(t) dt} \\
& \left(-432 + 0.00012698 \int_0^1 \int_0^1 ((\csch^2(0.5i\pi + (2.54311 - 0.5i\pi)t_2) \right. \\
& (\cosh^2(1.27156 + 10\pi)(-1.3883 \times 10^{-6} - 0.28472 t_1) + \\
& \left. \cosh(2.54311)(-0.0399951 + t_1)) / \right. \\
& ((5.07918 \times 10^{-6} + t_1)(-\cosh(2.54311) + (\cosh(2.54311) - \\
& \left. 0.28472 \cosh^2(1.27156 + 10\pi)t_1))) dt_2 dt_1 \right)
\end{aligned}$$

$$\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 =$$

$$\frac{1}{\int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt} \left(-432 + \log(196883) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt + \right.$$

$$\left. 24 \log \left(\frac{0.28472 \left(\int_{\frac{i\pi}{2}}^{1.27156+10\pi} \sinh(t) dt \right)^2}{\int_{\frac{i\pi}{2}}^{2.54311} \sinh(t) dt} \right) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt \right)$$

$$\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 =$$

$$\frac{1}{\int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt} \left(-432 + \log(196883) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt + \right.$$

$$\left. 24 \log \left(\frac{11.1957 (0.1 + 0.127156 + \pi \int_0^1 \sinh(10(0.127156 + \pi)t) dt)^2}{0.393219 + \int_0^1 \sinh(2.54311t) dt} \right) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt \right)$$

$$(((\ln(196883) + 432/(\coth(2.54311)) + 144/6 \ln[(2(\cosh(1/2(2.54311 + ((5\pi)/(2*1/8))))))^2 / (((\cosh(2.54311))14.0489)))]) + 24$$

Input interpretation:

$$\left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{144}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{\frac{5\pi}{2}}{8} \right) \right) \right)^2}{\cosh(2.54311) \times 14.0489} \right) \right) + 24$$

Result:

1923.914...

1923.914... result very near to the value of Planck multipole spectrum data 1922.19

Alternative representations:

$$\left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 \right) + 24 = \\ 24 + \log_e(196883) + \frac{144}{6} \log_e \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{14.0489 \cosh(2.54311)} \right) + \frac{432}{1 + \frac{2}{-1+e^{5.08622}}}$$

$$\left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 \right) + 24 = \\ 24 + \log(a) \log_a(196883) + \\ \frac{144}{6} \log(a) \log_a \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{14.0489 \cosh(2.54311)} \right) + \frac{432}{1 + \frac{2}{-1+e^{5.08622}}}$$

$$\left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} \right) + 24 =$$

$$24 + \log_e(196883) +$$

$$\frac{144}{6} \log_e \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{14.0489 \cosh(2.54311)} \right) + -\frac{432}{i \cot(-2.54311 i)}$$

Series representations:

$$\left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} \right) + 24 =$$

$$\left(169.871 + 24 \sum_{k=-\infty}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \log(196882) \sum_{k=-\infty}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \right.$$

$$24 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) \sum_{k=-\infty}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} +$$

$$\left. \sum_{k_1=-\infty}^{\infty} \sum_{k_2=1}^{\infty} \frac{\frac{(-1)^{1+k_2} 196882^{-k_2}}{k_2} + \frac{24(-1)^{1+k_2} \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right)^{-k_2}}{k_2}}{6.46741 + \pi^2 k_1^2} \right) /$$

$$\left(\sum_{k=-\infty}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} \right)$$

$$\begin{aligned}
& \left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} + 24 \right) \\
& \frac{1}{1 + 2 \sum_{k=1}^{\infty} q^{2k}} \\
& \left(-408 + \log(196882) + 24 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) + \right. \\
& 48 \sum_{k=1}^{\infty} q^{2k} + 2 \log(196882) \sum_{k=1}^{\infty} q^{2k} + \\
& 48 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) \sum_{k=1}^{\infty} q^{2k} + \\
& \sum_{k=1}^{\infty} \frac{(-1)^k \left(-196882^{-k} - 24 \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right)^{-k} \right)}{k} + \\
& 2 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} q^{2k_1} \left(\frac{(-1)^{1+k_2} 196882^{-k_2}}{k_2} + \right. \\
& \left. \left. \frac{24 (-1)^{1+k_2} \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right)^{-k_2}}{k_2} \right) \right)
\end{aligned}$$

for $q = 12.7192$

$$\begin{aligned}
& \left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{8} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} \right) + 24 = \\
& \frac{1}{1 + 2 \sum_{k=1}^{\infty} q^{2k}} \\
& \left(-408 + \log(196882) + 24 \log \left(-1 + \frac{0.28472 \cosh^2 \left(\frac{1}{2} (2.54311 + 20\pi) \right)}{\cosh(2.54311)} \right) + \right. \\
& 48 \sum_{k=1}^{\infty} q^{2k} + 2 \log(196882) \sum_{k=1}^{\infty} q^{2k} + \\
& 48 \log \left(-1 + \frac{0.28472 \cosh^2 \left(\frac{1}{2} (2.54311 + 20\pi) \right)}{\cosh(2.54311)} \right) \sum_{k=1}^{\infty} q^{2k} + \\
& \sum_{k=1}^{\infty} \frac{(-1)^k \left(-196882^{-k} - 24 \left(-1 + \frac{0.28472 \cosh^2(1.27156+10\pi)}{\cosh(2.54311)} \right)^{-k} \right)}{k} + \\
& \left. 2 \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} q^{2k_1} \left(\frac{(-1)^{-1+k_2} 196882^{-k_2}}{k_2} + \right. \right. \\
& \left. \left. \frac{24 (-1)^{-1+k_2} \left(-1 + \frac{0.28472 \cosh^2 \left(\frac{1}{2} (2.54311+20\pi) \right)}{\cosh(2.54311)} \right)^{-k_2}}{k_2} \right) \right)
\end{aligned}$$

for $q = 12.7192$

$$\begin{aligned}
& \left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} \right) + 24 = \\
& \left(86.7908 + 0.0773107 \log(196882) + \right. \\
& \quad 1.85546 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) + \\
& \quad 24 \sum_{k=1}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \log(196882) \sum_{k=1}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \\
& \quad 24 \log \left(-1 + \frac{0.28472 \cosh^2(1.27156 + 10\pi)}{\cosh(2.54311)} \right) \sum_{k=1}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} + \\
& \quad 0.0773107 \sum_{k=1}^{\infty} \frac{(-1)^k \left(-196882^{-k} - 24 \left(-1 + \frac{0.28472 \cosh^2(1.27156+10\pi)}{\cosh(2.54311)} \right)^{-k} \right)}{k} + \\
& \quad \left. \sum_{k_1=1}^{\infty} \sum_{k_2=1}^{\infty} \frac{\frac{(-1)^{1+k_2} 196882^{-k_2}}{k_2} + \frac{24(-1)^{1+k_2} \left(-1 + \frac{0.28472 \cosh^2(1.27156+10\pi)}{\cosh(2.54311)} \right)^{-k_2}}{k_2}}{6.46741 + \pi^2 k_1^2} \right) / \\
& \left(0.0773107 + \sum_{k=1}^{\infty} \frac{1}{6.46741 + k^2 \pi^2} \right)
\end{aligned}$$

Integral representations:

$$\begin{aligned}
& \left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right)^{144} \right) + 24 = \\
& \frac{1}{\int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt} \left(-432 + 24 \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt + \right. \\
& \quad 0.00012698 \int_0^1 \int_0^1 ((\operatorname{csch}^2(0.5 i \pi + (2.54311 - 0.5 i \pi) t_2) \\
& \quad (\cosh^2(1.27156 + 10\pi) (-1.3883 \times 10^{-6} - 0.28472 t_1) + \\
& \quad \cosh(2.54311) (-0.0399951 + t_1))) / \\
& \quad ((5.07918 \times 10^{-6} + t_1) (-\cosh(2.54311) + (\cosh(2.54311) - \\
& \quad 0.28472 \cosh^2(1.27156 + 10\pi) t_1))) dt_2 dt_1 \left. \right)
\end{aligned}$$

$$\left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 \right) + 24 =$$

$$\frac{1}{\int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt}$$

$$\left(-432 + 24 \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt + \log(196883) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt + \right.$$

$$\left. 24 \log \left(\frac{0.28472 \left(\int_{\frac{i\pi}{2}}^{1.27156+10\pi} \sinh(t) dt \right)^2}{\int_{\frac{i\pi}{2}}^{2.54311} \sinh(t) dt} \right) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt \right)$$

$$\left(\log(196883) + \frac{432}{\coth(2.54311)} + \frac{1}{6} \log \left(\frac{\left(2 \cosh \left(\frac{1}{2} \left(2.54311 + \frac{5\pi}{2} \right) \right) \right)^2}{\cosh(2.54311) 14.0489} \right) 144 \right) + 24 =$$

$$\frac{1}{\int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt}$$

$$\left(-432 + 24 \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt + \log(196883) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt + \right.$$

$$\left. 24 \log \left(\frac{11.1957 \left(0.1 + 0.127156 + \pi \int_0^1 \sinh(10(0.127156 + \pi)t) dt \right)^2}{0.393219 + \int_0^1 \sinh(2.54311t) dt} \right) \int_{\frac{i\pi}{2}}^{2.54311} \operatorname{csch}^2(t) dt \right)$$

Mathematical connections with some sectors of String Theory

From:

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

We have that:

Hence

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

so that

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

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982 \dots$$

Again

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

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \dots, \\ 64G_{37}^{-24} &= \quad \quad \quad 4096e^{-\pi\sqrt{37}} - \dots, \end{aligned}$$

so that

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

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978 \dots$$

Similarly, from

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

we obtain

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

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982 \dots$$

From:

An Update on Brane Supersymmetry Breaking

J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$\begin{aligned} T e^{\gamma_E \phi} &= - \frac{\beta_E^{(p)} h^2}{\gamma_E} e^{-2(8-p)C + 2\beta_E^{(p)} \phi} \\ 16 k' e^{-2C} &= \frac{h^2 \left(p + 1 - \frac{2\beta_E^{(p)}}{\gamma_E} \right) e^{-2(8-p)C + 2\beta_E^{(p)} \phi}}{(7-p)} \\ (A')^2 &= k e^{-2A} + \frac{h^2}{16(p+1)} \left(7 - p + \frac{2\beta_E^{(p)}}{\gamma_E} \right) e^{-2(8-p)C + 2\beta_E^{(p)} \phi} \end{aligned}$$

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

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

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

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

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

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

For

$\exp(-\pi\sqrt{18})$ we obtain:

Input:

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

Exact result:

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

Decimal approximation:

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

$$1.6272016\dots \times 10^{-6}$$

Property:

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

Series representations:

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

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

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

Now, we have the following calculations:

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

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

from which:

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

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

Now:

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

And:

$$(1.6272016 * 10^{-6}) * 1 / (0.000244140625)$$

Input interpretation:

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

Result:

0.0066650177536

0.006665017...

Thence:

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

Dividing both sides by 0.000244140625, we obtain:

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

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

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

Input interpretation:

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

Result:

$$0.00666501785\dots$$

$$0.00666501785\dots$$

Series representations:

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

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

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

Now:

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

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

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

$$= 0.00666501785\dots$$

From:

$$\ln(0.00666501784619)$$

Input interpretation:

$$\log(0.00666501784619)$$

Result:

$$-5.010882647757\dots$$

$$-5.010882647757\dots$$

Alternative representations:

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

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

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

Series representations:

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

$$\log(0.006665017846190000) = 2i\pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2\pi} \right\rfloor +$$

$$\log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.006665017846190000) = \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log\left(\frac{1}{z_0}\right) +$$

$$\log(z_0) + \left\lfloor \frac{\arg(0.006665017846190000 - z_0)}{2\pi} \right\rfloor \log(z_0) -$$

$$\sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.006665017846190000) = \int_1^{0.006665017846190000} \frac{1}{t} dt$$

In conclusion:

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

and for $C = 1$, we obtain:

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

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

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

≈ 0.9568666373

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

≈ 0.9991104684

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

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

$$\Psi \quad | \quad 3 \quad | \quad m_c = 1500 \quad | \quad 0.979 \quad | \quad -0.09$$

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

$$((1/(139.57)))^{1/512}$$

Input interpretation:

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

Result:

0.990400732708644027550973755713301415460732796178555551684...

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

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

From

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

We have:

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

For

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

$$\xi = 1$$

we obtain:

$$(2 * e^{(0.989117352243/2)}) / (1 + \sqrt{1 - \frac{1}{3} \times \frac{16}{\pi^2} e^{2 \times 0.989117352243}})$$

Input interpretation:

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

Result:

$$0.83941881822\dots - 1.4311851867\dots i$$

Polar coordinates:

$$r = 1.65919106525 \text{ (radius)}, \quad \theta = -59.607521917^\circ \text{ (angle)}$$

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

Series representations:

$$\frac{2 e^{0.9891173522430000/2}}{1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}}} = \\ \frac{2 e^{0.4945586761215000}}{1 + \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \left(\frac{3}{16}\right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k} \binom{\frac{1}{2}}{k}}$$

$$\frac{2 e^{0.9891173522430000/2}}{1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}}} = \\ \frac{2 e^{0.4945586761215000}}{1 + \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{16}\right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2 e^{0.9891173522430000/2}}{1 + \sqrt{1 - \frac{16 e^2 \times 0.9891173522430000}{3 \pi^2}}} =$$

$$\frac{2 e^{0.4945586761215000}}{1 + \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1 - \frac{16 e^{1.978234704486000}}{3 \pi^2} z_0\right)^k z_0^{-k}}{k!}}$$

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

From

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

we obtain:

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

Input interpretation:

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

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

Result:

$$50.84107889\dots - 20.34506335\dots i$$

Polar coordinates:

$$r = 54.76072411 \text{ (radius)}, \quad \theta = -21.80979492^\circ \text{ (angle)}$$

54.76072411.....

Series representations:

$$\begin{aligned}
& \left(\left(42 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right) + \frac{5 \times 16 e^{2 \times 0.9891173522430000}}{\pi^2} \right) \right. \\
& \quad \left. e^{4 \times 0.9891173522430000} \right) / \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right)^7 = \\
& 2 \left(40 e^{5.934704113458000} + 21 e^{3.956469408972000} \pi^2 + 21 e^{3.956469408972000} \pi^2 \right. \\
& \quad \left. \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \left(\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \binom{\frac{1}{2}}{k} \right) / \\
& \left. \left(\pi^2 \left(1 + \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \left(\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \binom{\frac{1}{2}}{k} \right)^7 \right) \right) \\
& \left(\left(42 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right) + \frac{5 \times 16 e^{2 \times 0.9891173522430000}}{\pi^2} \right) \right. \\
& \quad \left. e^{4 \times 0.9891173522430000} \right) / \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right)^7 = \\
& 2 \left(40 e^{5.934704113458000} + 21 e^{3.956469408972000} \pi^2 + 21 e^{3.956469408972000} \pi^2 \right. \\
& \quad \left. \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \left(-\frac{1}{2} \right)_k}{k!} \right) / \\
& \left. \left(\pi^2 \left(1 + \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \left(-\frac{1}{2} \right)_k}{k!} \right)^7 \right) \right)
\end{aligned}$$

$$\begin{aligned}
& \left(\left(42 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right) + \frac{5 \times 16 e^{2 \times 0.9891173522430000}}{\pi^2} \right)^7 \right. \\
& \left. / \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right)^7 \right) = \\
& \left(2 \left(40 e^{5.934704113458000} + 21 e^{3.956469408972000} \pi^2 + 21 e^{3.956469408972000} \right. \right. \\
& \left. \left. \pi^2 \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2} \right)_k \left(1 - \frac{16 e^{1.978234704486000}}{3 \pi^2} - z_0 \right)^k z_0^{-k}}{k!} \right) \right) / \\
& \left(\pi^2 \left(1 + \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2} \right)_k \left(1 - \frac{16 e^{1.978234704486000}}{3 \pi^2} - z_0 \right)^k z_0^{-k}}{k!} \right)^7 \right) \\
& \text{for } (\text{not } (z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \leq 0))
\end{aligned}$$

From which:

$$\begin{aligned}
& e^{(4 * 0.989117352243) / (((1 + \sqrt{1 - 1/3 * 16 / (\pi)})^2 * e^{(2 * 0.989117352243)})))^7} \\
& [42(1 + \sqrt{1 - \\
& 1/3 * 16 / (\pi)})^2 * e^{(2 * 0.989117352243)}) + 5 * 16 / (\pi)]^{1/34}
\end{aligned}$$

Input interpretation:

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

Result:

$$\begin{aligned}
& 1.495325850\dots - \\
& 0.5983842161\dots i
\end{aligned}$$

Polar coordinates:

$$r = 1.610609533 \text{ (radius), } \theta = -21.80979492^\circ \text{ (angle)}$$

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

Series representations:

$$\begin{aligned}
& \left(\left(42 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right) + \frac{5 \times 16 e^{2 \times 0.9891173522430000}}{\pi^2} \right) \right. \\
& \quad \left. e^{4 \times 0.9891173522430000} \right) / \left(34 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right)^7 \right) = \\
& \left(40 e^{5.934704113458000} + 21 e^{3.956469408972000} \pi^2 + 21 e^{3.956469408972000} \pi^2 \right. \\
& \quad \left. \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \left(\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \binom{\frac{1}{2}}{k} \right) / \\
& \left(17 \pi^2 \left(1 + \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \left(\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \binom{\frac{1}{2}}{k} \right)^7 \right)
\end{aligned}$$

$$\begin{aligned}
& \left(\left(42 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right) + \frac{5 \times 16 e^{2 \times 0.9891173522430000}}{\pi^2} \right) \right. \\
& \quad \left. e^{4 \times 0.9891173522430000} \right) / \left(34 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right)^7 \right) = \\
& \left(40 e^{5.934704113458000} + 21 e^{3.956469408972000} \pi^2 + 21 e^{3.956469408972000} \pi^2 \right. \\
& \quad \left. \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \left(-\frac{1}{2} \right)_k}{k!} \right) / \\
& \left(17 \pi^2 \left(1 + \sqrt{-\frac{16 e^{1.978234704486000}}{3 \pi^2}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{16} \right)^k \left(-\frac{e^{1.978234704486000}}{\pi^2} \right)^{-k} \left(-\frac{1}{2} \right)_k}{k!} \right)^7 \right)
\end{aligned}$$

$$\begin{aligned}
& \left(\left(42 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right) + \frac{5 \times 16 e^{2 \times 0.9891173522430000}}{\pi^2} \right) \right. \\
& \left. e^{4 \times 0.9891173522430000} \right) \Bigg/ \left(34 \left(1 + \sqrt{1 - \frac{16 e^{2 \times 0.9891173522430000}}{3 \pi^2}} \right)^7 \right) = \\
& \left(40 e^{5.934704113458000} + 21 e^{3.956469408972000} \pi^2 + 21 e^{3.956469408972000} \right. \\
& \left. \pi^2 \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2} \right)_k \left(1 - \frac{16 e^{1.978234704486000}}{3 \pi^2} - z_0 \right)^k z_0^{-k}}{k!} \right) \Bigg/ \\
& \left. \left(17 \pi^2 \left(1 + \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2} \right)_k \left(1 - \frac{16 e^{1.978234704486000}}{3 \pi^2} - z_0 \right)^k z_0^{-k}}{k!} \right)^7 \right) \right)
\end{aligned}$$

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

Now, we have:

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

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

For:

$$\xi = 1$$

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

$$\phi = 0.989117352243$$

From

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

we obtain:

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

Input interpretation:

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

Result:

0.382082347529...

0.382082347529....

Series representations:

$$\frac{2 e^{-0.9891173522430000/2}}{1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}}} = 2 / \left(e^{0.4945586761215000} \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} } \right) \right)$$

$$\frac{2 e^{-0.9891173522430000/2}}{1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}}} = 2 / \left(e^{0.4945586761215000} \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k (e^{1.978234704486000} \pi^2)^{-k} \left(-\frac{1}{2}\right)_k}{k!} \right) \right)$$

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

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

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

From which:

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

Input interpretation:

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

Result:

1.65430921270...

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

Indeed:

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

Thus, it remains to show that

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

which is straightforward. \square

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

Series representations:

$$1 + \frac{1}{\frac{4(2e^{-0.9891173522430000/2})}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}}} = \\ 1 + \frac{e^{0.4945586761215000}}{8} + \frac{1}{8} e^{0.4945586761215000} \sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}} \\ \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k (e^{1.978234704486000}\pi^2)^{-k} \binom{\frac{1}{2}}{k}$$

$$1 + \frac{1}{\frac{4(2e^{-0.9891173522430000/2})}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}}} = \\ 1 + \frac{e^{0.4945586761215000}}{8} + \frac{1}{8} e^{0.4945586761215000} \sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}} \\ \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k (e^{1.978234704486000}\pi^2)^{-k} \left(-\frac{1}{2}\right)_k}{k!}$$

$$1 + \frac{1}{\frac{4(2e^{-0.9891173522430000/2})}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}}} = 1 + \frac{e^{0.4945586761215000}}{8} +$$

$$\frac{\frac{1}{8} e^{0.4945586761215000} \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1 + \frac{4e^{1.978234704486000}\pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}}{\text{for } (\text{not } (z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \leq 0))}$$

And from

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

we obtain:

$$e^{-4 \times 0.989117352243} / [1 + \sqrt{((1+1/3*(4\pi^2)/25)*e^{(2*0.989117352243)})}]^7 * [42(1 + \sqrt{1 + \frac{\Lambda}{3} e^{2\phi}}) - 13\Lambda e^{2\phi}]$$

Input interpretation:

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

Result:

-0.034547055658...

-0.034547055658...

Series representations:

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

$$\begin{aligned}
& \left(\left(42 \left(1 + \sqrt{1 + \frac{(4\pi^2)e^{2 \times 0.9891173522430000}}{3 \times 25}} - \frac{1}{25} (4\pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right. \\
& \quad \left. e^{-4 \times 0.9891173522430000} \right) / \left(1 + \sqrt{1 + \frac{(4\pi^2)e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 = \\
& - \left(\left(42 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - \right. \right. \right. \\
& \quad \left. \left. \left. 25 e^{1.978234704486000} \sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}} \right. \right. \\
& \quad \left. \left. \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000}\pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right) \right) / \left(25 e^{5.934704113458000} \right. \\
& \quad \left. \left. \left. \left(1 + \sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}} \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000}\pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right)^7 \right) \right)
\end{aligned}$$

$$\begin{aligned}
& \left(\left(42 \left(1 + \sqrt{1 + \frac{(4\pi^2)e^{2 \times 0.9891173522430000}}{3 \times 25}} - \frac{1}{25} (4\pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right. \\
& \quad \left. e^{-4 \times 0.9891173522430000} \right) / \left(1 + \sqrt{1 + \frac{(4\pi^2)e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 = \\
& - \left(\left(42 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - 25 e^{1.978234704486000} \right. \right. \right. \\
& \quad \left. \left. \left. \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4e^{1.978234704486000}\pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right) \right) / \left(25 \right. \\
& \quad \left. \left. \left. e^{5.934704113458000} \right. \right. \\
& \quad \left. \left. \left. \left(1 + \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4e^{1.978234704486000}\pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right)^7 \right) \right)
\end{aligned}$$

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

From which:

$$\begin{aligned}
& 47 * 1 / (((-1 / (((((e^{(-4 * 0.989117352243)} / \\
& [1 + \text{sqrt}(((1 + 1/3 * (4\pi^2)/25) * e^{(2 * 0.989117352243)})))])^7 * \\
& [42(1 + \text{sqrt}(((1 + 1/3 * (4\pi^2)/25) * e^{(2 * 0.989117352243)}))) - \\
& 13 * (4\pi^2)/25 * e^{(2 * 0.989117352243)}])))))))))
\end{aligned}$$

Input interpretation:

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

Result:

1.6237116159...

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

Series representations:

$$- \left(47 / 1 / \left(e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4\pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \right. \right. \\ \left. \left. \left. \left. \left. \left. \frac{1}{25} (4\pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right) / \right. \\ \left. \left(1 + \sqrt{1 + \frac{(4\pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 \right) = \\ \left(1974 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - \right. \right. \\ \left. \left. 25 e^{1.978234704486000} \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \\ \left. \left. \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k \left(e^{1.978234704486000} \pi^2 \right)^{-k} \binom{\frac{1}{2}}{k} \right) \right) / \left(25 e^{5.934704113458000} \right. \\ \left. \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k \left(e^{1.978234704486000} \pi^2 \right)^{-k} \binom{\frac{1}{2}}{k} \right)^7 \right)$$

$$\begin{aligned}
& - \left(47 / 1 / \left(e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right) / \right. \\
& \quad \left. \left. \left. \left. \left. \left. \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 \right) \right) = \right. \\
& \left(1974 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. 25 e^{1.978234704486000} \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \right. \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000} \pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right) \right) \right) / \left(25 e^{5.934704113458000} \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000} \pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right)^7 \right) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& - \left(47 / 1 / \left(e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right) / \right. \\
& \quad \left. \left. \left. \left. \left. \left. \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 \right) \right) = \right. \\
& \left(1974 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - 25 e^{1.978234704486000} \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4 e^{1.978234704486000} \pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right) \right) \right) / \left(25 \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. e^{5.934704113458000} \right. \right. \right. \right. \right. \\
& \quad \left. \left. \left. \left. \left. \left. \left(1 + \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4 e^{1.978234704486000} \pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right)^7 \right) \right) \right)
\end{aligned}$$

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

And again:

$$32(((e^{-4 \cdot 0.989117352243}) / [1 + \sqrt{((1 + 1/3 \cdot (4\pi^2)/25) \cdot e^{(2 \cdot 0.989117352243)})}])^7 * [42(1 + \sqrt{((1 + 1/3 \cdot (4\pi^2)/25) \cdot e^{(2 \cdot 0.989117352243)})}) - 13 \cdot (4\pi^2)/25 \cdot e^{(2 \cdot 0.989117352243)})]))$$

Input interpretation:

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

Result:

-1.1055057810...

-1.1055057810....

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

Series representations:

$$\begin{aligned}
& \left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \\
& \quad \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \Bigg) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 = \\
& - \left(\left(1344 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - \right. \right. \right. \\
& \quad \left. \left. \left. 25 e^{1.978234704486000} \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \right. \\
& \quad \left. \left. \left. \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right) \right) \Bigg) / \left(25 e^{5.934704113458000} \right. \\
& \quad \left. \left. \left. \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right)^7 \right) \right)
\end{aligned}$$

$$\begin{aligned}
& \left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \\
& \quad \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \Bigg) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 = \\
& - \left(\left(1344 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - \right. \right. \right. \\
& \quad \left. \left. \left. 25 e^{1.978234704486000} \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \right. \\
& \quad \left. \left. \left. \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000} \pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right) \right) \Bigg) / \left(25 e^{5.934704113458000} \right. \\
& \quad \left. \left. \left. \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000} \pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right)^7 \right) \right) \\
& \left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \\
& \quad \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \Bigg) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 = \\
& - \left(\left(1344 \left(-25 e^{1.978234704486000} + 52 e^{3.956469408972000} \pi^2 - 25 e^{1.978234704486000} \right. \right. \right. \\
& \quad \left. \left. \left. \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4 e^{1.978234704486000} \pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right) \right) \Bigg) / \left(25 \right. \\
& \quad \left. \left. \left. e^{5.934704113458000} \right. \right. \right. \\
& \quad \left. \left. \left. \left(1 + \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4 e^{1.978234704486000} \pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right)^7 \right) \right) \Bigg)
\end{aligned}$$

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

And:

$$-[32(((e^{-4 \cdot 0.989117352243}) / [1 + \sqrt{((1+1/3 \cdot (4\pi^2)/25) \cdot e^{(2 \cdot 0.989117352243)}))}))])^7 * [42(1 + \sqrt{((1+1/3 \cdot (4\pi^2)/25) \cdot e^{(2 \cdot 0.989117352243)}))} - 13 \cdot (4\pi^2)/25 \cdot e^{(2 \cdot 0.989117352243)})]))]^5$$

Input interpretation:

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

Result:

1.651220569...

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

Series representations:

$$\begin{aligned}
& - \left(\left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \right. \\
& \quad \left. \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^5 = \\
& \left(4385270057140224 \left(-25 + 52 e^{1.978234704486000} \pi^2 - 25 \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \\
& \quad \left. \left. \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right)^5 \right) / \\
& \left(9765625 e^{19.78234704486000} \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \\
& \quad \left. \left. \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right)^{35} \right)
\end{aligned}$$

$$\begin{aligned}
& - \left(\left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \right. \\
& \quad \left. \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^5 \Bigg) = \\
& \left(4385270057140224 \left(-25 + 52 e^{1.978234704486000} \pi^2 - 25 \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \\
& \quad \left. \left. \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000} \pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right) \right) / \\
& \left(9765625 e^{19.78234704486000} \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \\
& \quad \left. \left. \sum_{k=0}^{\infty} \frac{(-\frac{75}{4})^k (e^{1.978234704486000} \pi^2)^{-k} (-\frac{1}{2})_k}{k!} \right)^{35} \right)
\end{aligned}$$

$$\begin{aligned}
& - \left(\left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} - \right. \right. \right. \right. \\
& \quad \left. \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^5 \Bigg) = \\
& \left(4385270057140224 \left(-25 + 52 e^{1.978234704486000} \pi^2 - \right. \right. \\
& \quad \left. \left. 25 \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4 e^{1.978234704486000} \pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right) \right) / \\
& \left(9765625 e^{19.78234704486000} \right. \\
& \quad \left. \left(1 + \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k (-\frac{1}{2})_k \left(1 + \frac{4 e^{1.978234704486000} \pi^2}{75} - z_0 \right)^k z_0^{-k}}{k!} \right)^{35} \right)
\end{aligned}$$

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

We obtain also:

$$-[32(((e^{-4 \cdot 0.989117352243}) / [1+\sqrt{((1+1/3*(4\pi^2)/25)*e^{(2 \cdot 0.989117352243)})}])^7 * [42(1+\sqrt{((1+1/3*(4\pi^2)/25)*e^{(2 \cdot 0.989117352243)})}-13*(4\pi^2)/25]*e^{(2 \cdot 0.989117352243)})])^{1/2}$$

Input interpretation:

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

Result:

$$-0 \\ 1.0514303501... i$$

Polar coordinates:

$$r = 1.05143035007 \text{ (radius), } \theta = -90^\circ \text{ (angle)}$$

1.05143035007

Series representations:

$$\begin{aligned}
& - \sqrt{\left(\left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25} } \right)^7 - \right. \right. \right. \\
& \quad \left. \left. \left. \frac{1}{25} (4 \pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4 \pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25} } \right)^7 \right) = - \frac{8}{5} \sqrt{21} \\
& \sqrt{\left(\left(25 - 52 e^{1.978234704486000} \pi^2 + 25 \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \\
& \quad \left. \left. \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right) / \left(e^{3.956469408972000} \right. \\
& \quad \left. \left. \left. \left. 1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right)^7 \right) \right)
\end{aligned}$$

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

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

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

$$1 / -[32(((e^{-4 \cdot 0.989117352243}) / [1 + \sqrt{((1 + 1/3 \cdot (4\pi^2) / 25) \cdot e^{(2 \cdot 0.989117352243)})}))])^7 * [42(1 + \sqrt{((1 + 1/3 \cdot (4\pi^2) / 25) \cdot e^{(2 \cdot 0.989117352243)})}) - 13 \cdot (4\pi^2) / 25 \cdot e^{(2 \cdot 0.989117352243)})])])^{1/2}$$

Input interpretation:

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

Result:

0.95108534763... i

Polar coordinates:

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

0.95108534763

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

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

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

≈ 0.9568666373

Series representations:

$$\begin{aligned}
& -\left(1 / \left(\sqrt{\left(32 e^{-4 \times 0.9891173522430000} \left(42 \left(1 + \sqrt{1 + \frac{(4\pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25} } \right) \right) / \right.} \right. \right. \\
& \quad \left. \left. \left. \left(\frac{1}{25} (4\pi^2) 13 e^{2 \times 0.9891173522430000} \right) \right) \right) / \\
& \quad \left(1 + \sqrt{1 + \frac{(4\pi^2) e^{2 \times 0.9891173522430000}}{3 \times 25}} \right)^7 \right) \right) = \\
& -\left(5 / \left(8 \sqrt{21} \sqrt{\left(25 - 52 e^{1.978234704486000} \pi^2 + 25 \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right.} \right. \right. \\
& \quad \left. \left. \left. \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right) / \right. \right. \\
& \quad \left. \left. e^{3.956469408972000} \left(1 + \sqrt{\frac{4 e^{1.978234704486000} \pi^2}{75}} \right. \right. \right. \\
& \quad \left. \left. \left. \sum_{k=0}^{\infty} \left(\frac{75}{4} \right)^k (e^{1.978234704486000} \pi^2)^{-k} \binom{\frac{1}{2}}{k} \right)^7 \right) \right) \right)
\end{aligned}$$

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

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

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

From the previous expression

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

= -0.034547055658...

we have also:

$$1 + \frac{1}{((4((2^*e^{-0.989117352243/2}))) / (((1+sqrt(((1+1/3*(4Pi^2)/25^*e^{2*0.989117352243})))))))}) + (-0.034547055658)$$

Input interpretation:

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

Result:

1.61976215705...

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

Series representations:

$$1 + \frac{1}{\frac{4(2e^{-0.9891173522430000/2})}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times0.9891173522430000}}{3\times25}}} - 0.0345470556580000} = \\ 0.9654529443420000 + \frac{e^{0.4945586761215000}}{8} + \frac{1}{8} e^{0.4945586761215000} \\ \sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\pi^2\right)^{-k} \binom{\frac{1}{2}}{k}$$

$$1 + \frac{1}{\frac{4(2e^{-0.9891173522430000/2})}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times0.9891173522430000}}{3\times25}}} - 0.0345470556580000} = \\ 0.9654529443420000 + \frac{e^{0.4945586761215000}}{8} + \frac{1}{8} e^{0.4945586761215000} \\ \sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}$$

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

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

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

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

From

Properties of Nilpotent Supergravity

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

We have that:

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

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

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

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

We analyzing the following equation:

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

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

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

We have:

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

i.e.

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

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

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

we obtain:

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

Input interpretation:

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

Result:

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

Solutions:

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

Alternate forms:

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

$$V = 0.00221324 (b^2 M^2 + 24.5445 b M^2 + 150.609 M^2)$$

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

Expanded form:

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

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

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

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

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

Derivative:

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

Implicit derivatives:

$$\frac{\partial b(M, V)}{\partial V} = \frac{154317775011120075}{36961748(226802245 + 18480874 b) M^2}$$

$$\frac{\partial b(M, V)}{\partial M} = -\frac{\frac{226802245}{18480874} + b}{M}$$

$$\frac{\partial M(b, V)}{\partial V} = \frac{154317775011120075}{2(226802245 + 18480874 b)^2 M}$$

$$\frac{\partial M(b, V)}{\partial b} = -\frac{18480874 M}{226802245 + 18480874 b}$$

$$\frac{\partial V(b, M)}{\partial M} = \frac{2(226802245 + 18480874 b)^2 M}{154317775011120075}$$

$$\frac{\partial V(b, M)}{\partial b} = \frac{36961748(226802245 + 18480874 b) M^2}{154317775011120075}$$

Global minimum:

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

Global minima:

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

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

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

for $M = 0$

From:

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

we obtain

$$(225.913 (-0.054323 M^2 + 6.58545 \times 10^{-10} \sqrt{M^4})) / M^2$$

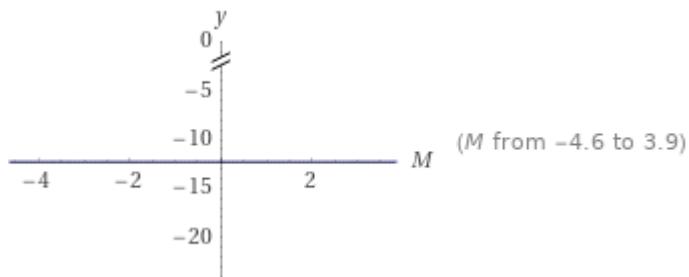
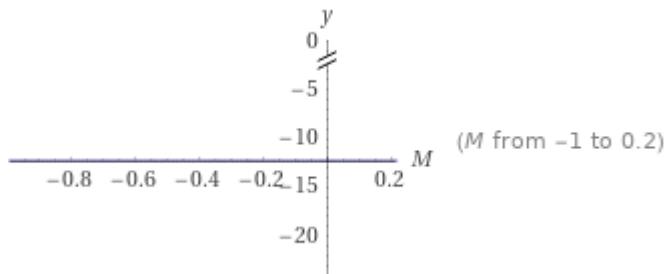
Input interpretation:

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

Result:

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

Plots:



Alternate form assuming M is real:

$$-12.2723$$

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

Alternate forms:

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

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

Expanded form:

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

Property as a function:

Parity

even

Series expansion at M = 0:

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

(generalized Puiseux series)

Series expansion at M = ∞:

- 12.2723

Derivative:

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

Indefinite integral:

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

Global maximum:

$$\max \left\{ \frac{\frac{225.913 (6.58545 \times 10^{-10} \sqrt{M^4} - 0.054323 M^2)}{M^2}}{-\frac{140119826723990341497649}{11417594849251000000000}} \right\} =$$

at $M = -1$

Global minimum:

$$\min \left\{ \frac{\frac{225.913 (6.58545 \times 10^{-10} \sqrt{M^4} - 0.054323 M^2)}{M^2}}{-\frac{140119826723990341497649}{11417594849251000000000}} \right\} =$$

at $M = -1$

Limit:

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

Definite integral after subtraction of diverging parts:

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

From b that is equal to

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

from:

Result:

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

we obtain:

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

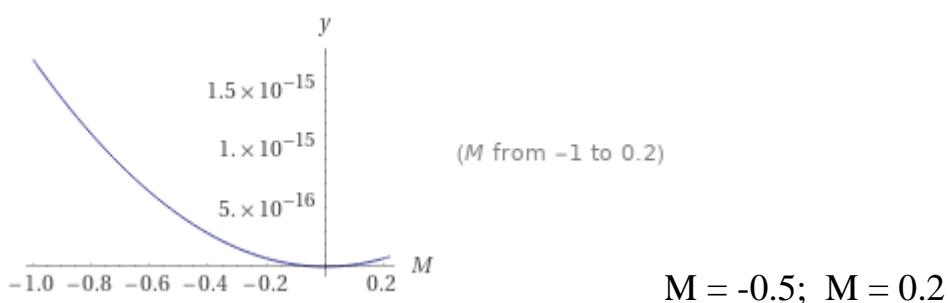
Input interpretation:

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

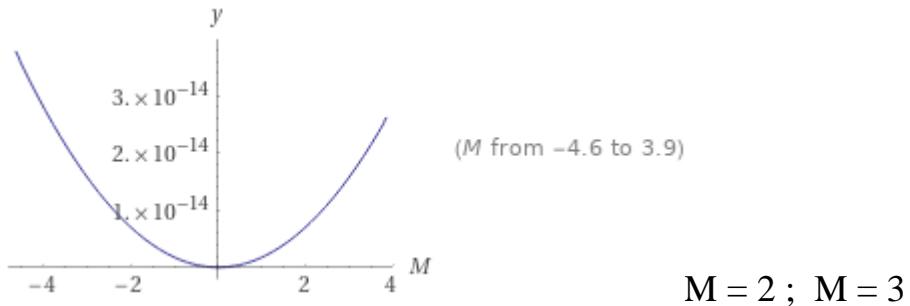
Result:

0

Plots: (possible mathematical connection with an open string)



(possible mathematical connection with an open string)



Root:

$$M = 0$$

Property as a function:

Parity

even

Series expansion at M = 0:

$$O(M^{62194})$$

(Taylor series)

Series expansion at M = ∞ :

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

(Taylor series)

Definite integral after subtraction of diverging parts:

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

For $M = -0.5$, we obtain:

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

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

Input interpretation:

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

Result:

$$-4.38851344947 \times 10^{-16}$$

For $M = 0.2$:

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

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

Input interpretation:

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

Result:

$7.021621519159 \times 10^{-17}$

For M = 3:

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

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

Input interpretation:

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

Result:

$$1.579864841810872363256294820161116875 \times 10^{-14}$$

$$1.57986484181 \times 10^{-14}$$

For M = 2:

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

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

Input interpretation:

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

Result:

7.021621519*10⁻¹⁵

From the four results

$$7.021621519 \times 10^{-15}; 1.57986484181 \times 10^{-14}; 7.021621519159 \times 10^{-17}; \\ -4.38851344947 \times 10^{-16}$$

we obtain, after some calculations:

$\text{sqrt}[1/(2\pi)(7.021621519 \cdot 10^{-15} + 1.57986484181 \cdot 10^{-14} + 7.021621519 \cdot 10^{-17} - 4.38851344947 \cdot 10^{-16})]$

Input interpretation:

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

Result:

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

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

$$\phi_P^E = E_P l_P^2 = \phi_P l_P = \sqrt{\frac{\hbar c}{\epsilon_0}}$$

We note that:

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

Input interpretation:

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

$\log(x)$ is the natural logarithm

Result:

1.6181818182...

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

From the Planck units:

[Planck Length](#)

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

5.729475×10^{-35} Lorentz-Heaviside value

Planck's Electric field strength

$$\mathbf{E}_P = \frac{F_P}{q_P} = \sqrt{\frac{c^7}{16\pi^2 \epsilon_0 \hbar G^2}}$$

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

Planck's Electric flux

$$\phi_P^E = \mathbf{E}_P l_P^2 = \phi_P l_P = \sqrt{\frac{\hbar c}{\epsilon_0}}$$

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

Planck's Electric potential

$$\phi_P = V_P = \frac{E_P}{q_P} = \sqrt{\frac{c^4}{4\pi\epsilon_0 G}}$$

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

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

$$\mathbf{E_P * I_P} = (1.820306 * 10^{61}) * 5.729475 * 10^{-35}$$

Input interpretation:

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

Result:

1 042 939 771 935 000 000 000 000 000

Scientific notation:

$$1.042939771935 \times 10^{27}$$

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

Or:

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

Input interpretation:

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

Result:

$$1.04293988541707573556041347592929544155441816222254220500133\dots \times 10^{27}$$

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

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References

The Sound of the Big Bang - Planck Version (2013) - John G. Cramer - Professor of Physics - University of Washington - Seattle, WA 98195-1560

Trabajo de Fin de Máster Art music in decline? Time for the Golden Ratio

Autor: *Julio Emilio Marco Franco* - Tutor: *Thomas L. Schmitt* - MÁSTER: Máster en musicología (654M) - Escuela de Máster y Doctorado Universidad de la Rioja - AÑO ACADÉMICO: 2017/2018

Bra-ket wormholes in gravitationally prepared states

Yiming Chen, Victor Gorbenko, Juan Maldacena - arXiv:2007.16091v2 [hep-th] 14 Sep 2020

Modular equations and approximations to π - Srinivasa Ramanujan

Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

An Update on Brane Supersymmetry Breaking

J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

AdS Vacua from Dilaton Tadpoles and Form Fluxes - J. Mourad and A. Sagnotti

- arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

Properties of Nilpotent Supergravity

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