Analyzing some parts of Ramanujan's Manuscripts: Mathematical connections between several Ramanujan's equations, the Rogers-Ramanujan continued fractions and some sectors of Cosmology and Theoretical Physics. II

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Abstract

In this research thesis, we have analyzed some parts of Ramanujan's Manuscripts and obtained new mathematical connections between several Ramanujan's equations, the Rogers-Ramanujan continued fractions and some sectors of Cosmology and Theoretical Physics .

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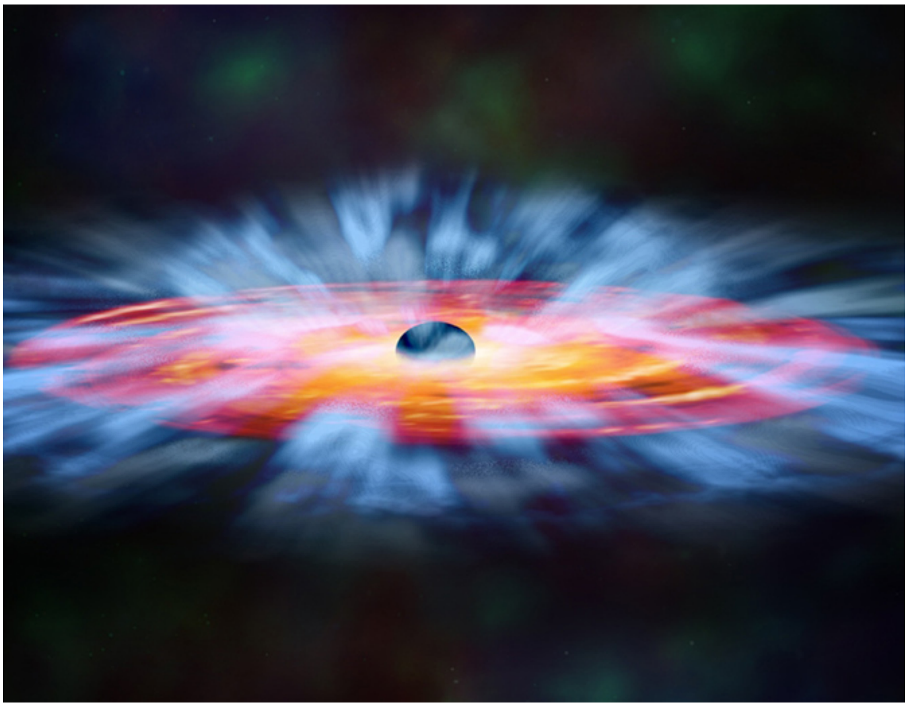

http://esciencecommons.blogspot.com/2012/12/math-formula-gives-new-glimpse-into.html

"...Expansion of modular forms is one of the fundamental tools for computing the entropy of a modular black hole. Some black holes, however, are not modular, but the new formula based on Ramanujan's vision may allow physicists to compute their entropy as though they were....."

https://blogs.royalsociety.org/history-of-science/2014/02/17/movie-maths/

From:

Manuscript Book 2 of *Srinivasa Ramanujan*

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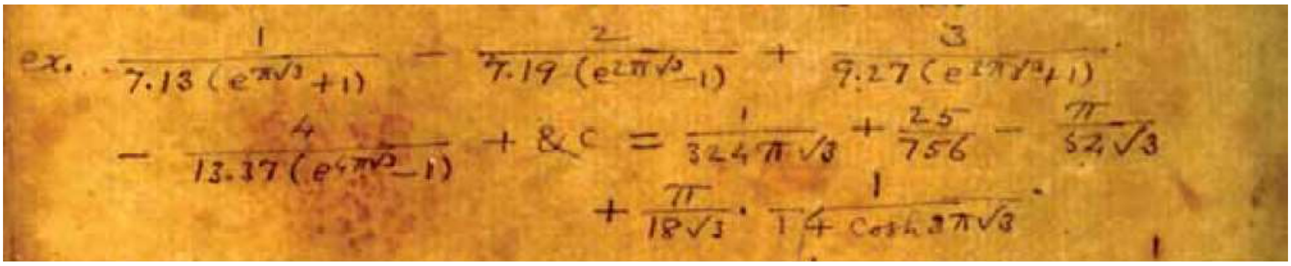

$$\text{ex.}\ \frac{1}{7.13\,(e^{\pi\sqrt{3}}+1)} - \frac{2}{7.19\,(e^{2\pi\sqrt{3}}-1)} + \frac{3}{9.27\,(e^{3\pi\sqrt{3}}+1)} - \frac{4}{13.37\,(e^{4\pi\sqrt{3}}-1)} + \&c = \frac{1}{324\pi\sqrt{3}} + \frac{25}{756} - \frac{\pi}{54\sqrt{3}} + \frac{\pi}{18\sqrt{3}} \cdot \frac{1}{14\cosh 3\pi\sqrt{3}}.$$

1/(((324Pi)*sqrt(3)))+25/756-Pi/(54*sqrt(3))+(((Pi/(18*sqrt(3)))))*1/(14*cosh(3Pi*sqrt(3)))

Input:

$$\frac{1}{(324\,\pi)\sqrt{3}} + \frac{25}{756} - \frac{\pi}{54\sqrt{3}} + \frac{\pi}{18\sqrt{3}} \times \frac{1}{14\cosh(3\,\pi\sqrt{3})}$$

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

Exact result:

$$\frac{25}{756} + \frac{1}{324\sqrt{3}\,\pi} - \frac{\pi}{54\sqrt{3}} + \frac{\pi\,\mathrm{sech}(3\sqrt{3}\,\pi)}{252\sqrt{3}}$$

$\mathrm{sech}(x)$ is the hyperbolic secant function

Decimal approximation:

0.0000471179225097759008654625885847538738310336427768145 32...

Result:

$4.71179225097759008654625885847538738310336427768145 32 \times 10^{-5}$

$4.71179225\ldots * 10^{-5}$

Alternate forms:

$$\frac{7\sqrt{3}+3\pi\left(75+\sqrt{3}\,\pi\left(3\operatorname{sech}\left(3\sqrt{3}\,\pi\right)-14\right)\right)}{6804\pi}$$

$$\frac{7\sqrt{3}+225\pi-42\sqrt{3}\,\pi^2+9\sqrt{3}\,\pi^2\operatorname{sech}\left(3\sqrt{3}\,\pi\right)}{6804\pi}$$

$$\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{126\sqrt{3}\left(e^{-3\sqrt{3}\,\pi}+e^{3\sqrt{3}\,\pi}\right)}$$

Alternative representations:

$$\frac{1}{\sqrt{3}\;324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(14\cosh\left(3\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}= \frac{25}{756}+\frac{\pi}{\left(14\cos\left(-3i\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\pi\sqrt{3}}$$

$$\frac{1}{\sqrt{3}\;324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(14\cosh\left(3\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}= \frac{25}{756}+\frac{\pi}{\left(14\cos\left(3i\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\pi\sqrt{3}}$$

$$\frac{1}{\sqrt{3}\;324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(14\cosh\left(3\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}= \frac{25}{756}+\frac{\pi}{\left(7\left(e^{-3\pi\sqrt{3}}+e^{3\pi\sqrt{3}}\right)\right)\left(18\sqrt{3}\right)}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\pi\sqrt{3}}$$

Series representations:

$$\frac{1}{\sqrt{3}\;324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(14\cosh\left(3\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}= \frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\sum_{k=0}^{\infty}\frac{(-1)^k(1+2k)}{109+4k+4k^2}}{63\sqrt{3}}$$

$$\frac{1}{\sqrt{3}\;324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(14\cosh\left(3\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}= \frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}-\frac{\pi\sum_{k=1}^{\infty}(-1)^k q^{-1+2k}}{126\sqrt{3}} \quad \text{for } q=e^{3\sqrt{3}\,\pi}$$

$$\frac{1}{\sqrt{3}\ 324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\pi\sqrt{3}))(18\sqrt{3})}=$$
$$\frac{25}{756}+\frac{1}{324\sqrt{3}\ \pi}-\frac{\pi}{54\sqrt{3}}+\frac{e^{-3\sqrt{3}\pi}\,\pi\sum_{k=0}^{\infty}(-1)^k e^{-6\sqrt{3}k\pi}}{126\sqrt{3}}$$

Integral representation:

$$\frac{1}{\sqrt{3}\ 324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\pi\sqrt{3}))(18\sqrt{3})}=$$
$$\frac{25}{756}+\frac{1}{324\sqrt{3}\ \pi}-\frac{\pi}{54\sqrt{3}}+\frac{1}{126\sqrt{3}}\int_0^{\infty}\frac{t^{6i\sqrt{3}}}{1+t^2}\,dt$$

(((((1/(((324Pi)*sqrt(3)))+25/756-Pi/(54*sqrt(3))+(((Pi/(18*sqrt(3)))))*
1/(14*cosh(3Pi*sqrt(3))))))))^1/1024

Input:

$$\sqrt[1024]{\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{18\sqrt{3}}\times\frac{1}{14\cosh(3\pi\sqrt{3})}}$$

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

Exact result:

$$\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\ \pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\,\mathrm{sech}(3\sqrt{3}\pi)}{252\sqrt{3}}}$$

$\mathrm{sech}(x)$ is the hyperbolic secant function

Decimal approximation:

0.990317824381383794203738279426892199335057434473544561135...

0.990317824…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate forms:

$$\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{126\sqrt{3}\left(e^{-3\sqrt{3}\,\pi}+e^{3\sqrt{3}\,\pi}\right)}}$$

$$\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\cosh(3\sqrt{3}\,\pi)}{126\sqrt{3}\,(1+\cosh(6\sqrt{3}\,\pi))}}$$

$$\frac{1}{\sqrt[512]{2}\;3^{5/1024}\sqrt[1024]{\frac{7\pi}{7\sqrt{3}+225\pi-42\sqrt{3}\,\pi^2+9\sqrt{3}\,\pi^2\operatorname{sech}(3\sqrt{3}\,\pi)}}}$$

All 1024th roots of 25/756 + 1/(324 sqrt(3) π) - π/(54 sqrt(3)) + (π sech(3 sqrt(3) π))/(252 sqrt(3)):

$$e^0\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\operatorname{sech}(3\sqrt{3}\,\pi)}{252\sqrt{3}}}\approx 0.9903 \text{ (real, principal root)}$$

$$e^{(i\pi)/512}\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\operatorname{sech}(3\sqrt{3}\,\pi)}{252\sqrt{3}}}\approx 0.9903+0.006076\,i$$

$$e^{(i\pi)/256}\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\operatorname{sech}(3\sqrt{3}\,\pi)}{252\sqrt{3}}}\approx 0.9902+0.012153\,i$$

$$e^{(3i\pi)/512}\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\operatorname{sech}(3\sqrt{3}\,\pi)}{252\sqrt{3}}}\approx 0.9902+0.018229\,i$$

$$e^{(i\pi)/128}\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\operatorname{sech}(3\sqrt{3}\,\pi)}{252\sqrt{3}}}\approx 0.9900+0.02430\,i$$

Alternative representations:

$$\sqrt[1024]{\frac{1}{\sqrt{3}\ 324\,\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\,\pi\sqrt{3}))(18\sqrt{3})}} = \sqrt[1024]{\frac{25}{756}+\frac{\pi}{(14\cos(-3\,i\,\pi\sqrt{3}))(18\sqrt{3})}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\,\pi\sqrt{3}}}$$

$$\sqrt[1024]{\frac{1}{\sqrt{3}\ 324\,\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\,\pi\sqrt{3}))(18\sqrt{3})}} = \sqrt[1024]{\frac{25}{756}+\frac{\pi}{(14\cos(3\,i\,\pi\sqrt{3}))(18\sqrt{3})}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\,\pi\sqrt{3}}}$$

$$\sqrt[1024]{\frac{1}{\sqrt{3}\ 324\,\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\,\pi\sqrt{3}))(18\sqrt{3})}} = \sqrt[1024]{\frac{25}{756}+\frac{\pi}{\frac{14(18\sqrt{3})}{\sec(3\,i\,\pi\sqrt{3})}}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\,\pi\sqrt{3}}}$$

Series representations:

$$\sqrt[1024]{\frac{1}{\sqrt{3}\ 324\,\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\,\pi\sqrt{3}))(18\sqrt{3})}} = \sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}-\frac{\pi\sum_{k=1}^{\infty}(-1)^k q^{-1+2k}}{126\sqrt{3}}} \quad \text{for } q=e^{3\sqrt{3}\,\pi}$$

$$\sqrt[1024]{\frac{1}{\sqrt{3}\ 324\,\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\,\pi\sqrt{3}))(18\sqrt{3})}} = \sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{e^{-3\sqrt{3}\,\pi}\,\pi\sum_{k=0}^{\infty}(-1)^k e^{-6\sqrt{3}\,k\,\pi}}{126\sqrt{3}}}$$

$$\sqrt[1024]{\frac{1}{\sqrt{3}\ 324\,\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\,\pi\sqrt{3}))(18\sqrt{3})}} = \sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi^2\sum_{k=0}^{\infty}\frac{(-1)^k(1+2k)}{27\pi^2+\left(\frac{1}{2}+k\right)^2\pi^2}}{252\sqrt{3}}}$$

Integral representation:

$$\sqrt[1024]{\frac{1}{\sqrt{3}\ 324\pi}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{(14\cosh(3\pi\sqrt{3}))(18\sqrt{3})}} =$$

$$\sqrt[1024]{\frac{25}{756}+\frac{1}{324\sqrt{3}\pi}-\frac{\pi}{54\sqrt{3}}+\frac{1}{126\sqrt{3}}\int_0^\infty \frac{t^{6i\sqrt{3}}}{1+t^2}\,dt}$$

-782-8+(7/2)*1/(((((1/(((324Pi)*sqrt(3)))+25/756-Pi/(54*sqrt(3))+(((Pi/(18*sqrt(3)))))* 1/(14*cosh(3Pi*sqrt(3))))))))

Input:

$$-782-8+\frac{7}{2}\times\frac{1}{\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{18\sqrt{3}}\times\frac{1}{14\cosh(3\pi\sqrt{3})}}$$

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

Exact result:

$$\frac{7}{2\left(\frac{25}{756}+\frac{1}{324\sqrt{3}\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\,\mathrm{sech}(3\sqrt{3}\pi)}{252\sqrt{3}}\right)}-790$$

$\mathrm{sech}(x)$ is the hyperbolic secant function

Decimal approximation:

73491.713063088240721532491069403473060255932113829452877118...

73491.713063…

Alternate forms:

$$\frac{23814\pi}{7\sqrt{3}+225\pi+3\sqrt{3}\pi^2(3\,\mathrm{sech}(3\sqrt{3}\pi)-14)}-790$$

$$\frac{23814\pi}{7\sqrt{3}+225\pi-42\sqrt{3}\pi^2+9\sqrt{3}\pi^2\,\mathrm{sech}(3\sqrt{3}\pi)}-790$$

$$\frac{7}{2\left(\frac{25}{756}+\frac{1}{324\sqrt{3}\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{126\sqrt{3}\left(e^{-3\sqrt{3}\pi}+e^{3\sqrt{3}\pi}\right)}\right)}-790$$

Alternative representations:

$$-782-8+\frac{7}{\left(\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(18\sqrt{3}\right)\left(14\cosh\left(3\pi\sqrt{3}\right)\right)}\right)2}=$$
$$-790+\frac{7}{2\left(\frac{25}{756}+\frac{\pi}{\left(14\cos\left(-3i\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\pi\sqrt{3}}\right)}$$

$$-782-8+\frac{7}{\left(\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(18\sqrt{3}\right)\left(14\cosh\left(3\pi\sqrt{3}\right)\right)}\right)2}=$$
$$-790+\frac{7}{2\left(\frac{25}{756}+\frac{\pi}{\left(14\cos\left(3i\pi\sqrt{3}\right)\right)\left(18\sqrt{3}\right)}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\pi\sqrt{3}}\right)}$$

$$-782-8+\frac{7}{\left(\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(18\sqrt{3}\right)\left(14\cosh\left(3\pi\sqrt{3}\right)\right)}\right)2}=$$
$$-790+\frac{7}{2\left(\frac{25}{756}+\frac{\pi}{\frac{14\left(18\sqrt{3}\right)}{\sec\left(3i\pi\sqrt{3}\right)}}-\frac{\pi}{54\sqrt{3}}+\frac{1}{324\pi\sqrt{3}}\right)}$$

Series representations:

$$-782-8+\frac{7}{\left(\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(18\sqrt{3}\right)\left(14\cosh\left(3\pi\sqrt{3}\right)\right)}\right)2}=$$
$$-790-\frac{23814\pi}{-7\sqrt{3}-225\pi+42\sqrt{3}\pi^2+18\sqrt{3}\pi^2\sum_{k=1}^{\infty}(-1)^k q^{-1+2k}}\quad \text{for } q=e^{3\sqrt{3}\pi}$$

$$-782-8+\frac{7}{\left(\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(18\sqrt{3}\right)\left(14\cosh\left(3\pi\sqrt{3}\right)\right)}\right)2}=$$
$$-790+\frac{23814\pi}{7\sqrt{3}+225\pi-42\sqrt{3}\pi^2+36\sqrt{3}\pi\sum_{k=0}^{\infty}\frac{(-1)^k(1+2k)}{109+4k+4k^2}}$$

$$-782-8+\frac{7}{\left(\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(18\sqrt{3}\right)\left(14\cosh\left(3\pi\sqrt{3}\right)\right)}\right)2}=$$

$$-790+\frac{23814}{225+\frac{7\sqrt{3}}{\pi}-42\sqrt{3}\,\pi+18\sqrt{3}\,e^{-3\sqrt{3}\,\pi}\,\pi\sum_{k=0}^{\infty}(-1)^k\,e^{-6\sqrt{3}\,k\,\pi}}$$

Integral representation:

$$-782-8+\frac{7}{\left(\frac{1}{(324\pi)\sqrt{3}}+\frac{25}{756}-\frac{\pi}{54\sqrt{3}}+\frac{\pi}{\left(18\sqrt{3}\right)\left(14\cosh\left(3\pi\sqrt{3}\right)\right)}\right)2}=$$

$$-790+\frac{7}{2\left(\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{1}{126\sqrt{3}}\int_0^{\infty}\frac{t^{6i\sqrt{3}}}{1+t^2}\,dt\right)}$$

Thence, we have the following mathematical connection:

$$\left(\frac{7}{2\left(\frac{25}{756}+\frac{1}{324\sqrt{3}\,\pi}-\frac{\pi}{54\sqrt{3}}+\frac{\pi\,\mathrm{sech}\left(3\sqrt{3}\,\pi\right)}{252\sqrt{3}}\right)}-790\right)=73491.713063\ldots\Rightarrow$$

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

$$-3927+2\sqrt[13]{2.2983717437\times10^{59}+2.0823329825883\times10^{59}}$$

$$=73490.8437525\ldots.\Rightarrow$$

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

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

$$= 73491.78832548118710549159572042220548025195726563413398700\ldots$$

$$= 73491.7883254\ldots \Rightarrow$$

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

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

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

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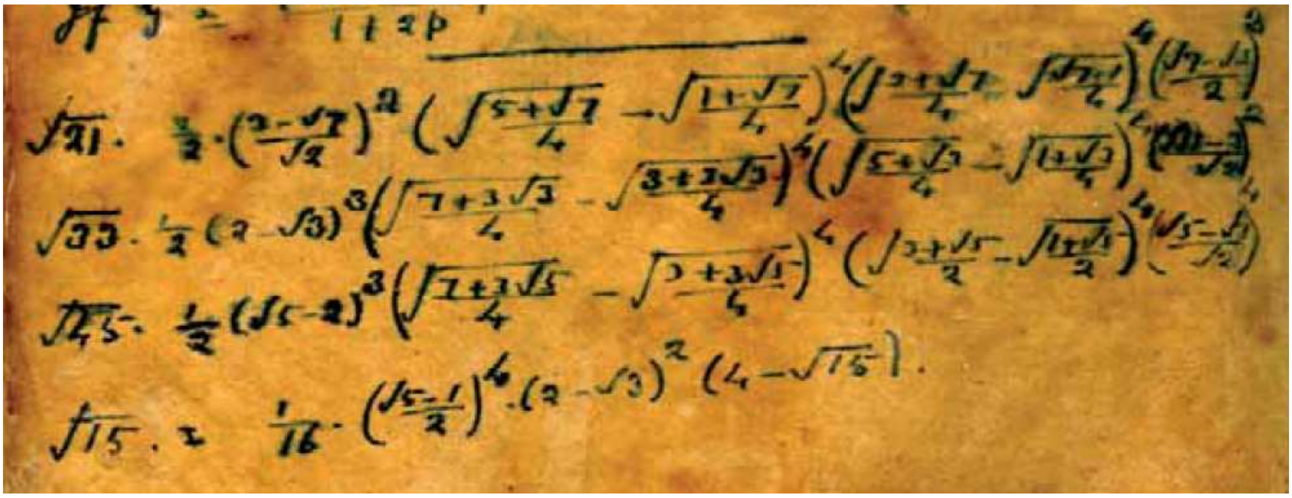

We have:

sqrt(21) 1/2((((3-sqrt(7))/sqrt(2))))^2 (((sqrt(((5+sqrt(7))/4)))-sqrt(((1+sqrt(7))/4))))^4 (((sqrt(((3+sqrt(7))/4)))-sqrt((((sqrt(7)+1))/4)))^4 (1/2*sqrt(7)-sqrt(3))^2

Input:

$$\sqrt{21}\left(\frac{1}{2}\left(\frac{3-\sqrt{7}}{\sqrt{2}}\right)^2\right)\left(\sqrt{\frac{1}{4}\left(5+\sqrt{7}\right)}-\sqrt{\frac{1}{4}\left(1+\sqrt{7}\right)}\right)^4 \left(\sqrt{\frac{1}{4}\left(3+\sqrt{7}\right)}-\sqrt{\frac{1}{4}\left(\sqrt{7}+1\right)}\right)^4\left(\frac{1}{2}\sqrt{7}-\sqrt{3}\right)^2$$

Result:

$$\frac{1}{4}\sqrt{21}\left(3-\sqrt{7}\right)^2\left(\frac{\sqrt{7}}{2}-\sqrt{3}\right)^2 \left(\frac{\sqrt{3+\sqrt{7}}}{2}-\frac{1}{2}\sqrt{1+\sqrt{7}}\right)^4\left(\frac{\sqrt{5+\sqrt{7}}}{2}-\frac{1}{2}\sqrt{1+\sqrt{7}}\right)^4$$

Decimal approximation:

$2.3915524816624164664374098055386443887961318323545792\ldots \times 10^{-6}$

$2.3915524816\ldots * 10^{-6}$

Alternate forms:

$$\frac{1}{2048}\left(-32\sqrt{2\left(5+\sqrt{7}\right)\left(11+5\sqrt{7}\right)}+48\sqrt{7}+12\sqrt{14\left(5+\sqrt{7}\right)\left(11+5\sqrt{7}\right)}-32\sqrt{2\left(1+\sqrt{7}\right)\left(115+41\sqrt{7}\right)}+12\sqrt{14\left(1+\sqrt{7}\right)\left(115+41\sqrt{7}\right)}-112\right)\left(\sqrt{3+\sqrt{7}}-\sqrt{1+\sqrt{7}}\right)^4\left(19\sqrt{21}-84\right)$$

$$\frac{\sqrt{21}\left(2\sqrt{3}-\sqrt{7}\right)^2\left(\sqrt{7}-3\right)^2\left(\sqrt{1+\sqrt{7}}-\sqrt{3+\sqrt{7}}\right)^4\left(\sqrt{1+\sqrt{7}}-\sqrt{5+\sqrt{7}}\right)^4}{4096}$$

$$\text{root of } 1\,208\,925\,819\,614\,629\,174\,706\,176\,x^{16} + 1\,066\,272\,572\,900\,102\,932\,090\,847\,232\,x^{15} + 52\,042\,471\,479\,879\,261\,245\,210\,099\,712\,x^{14} + 11\,466\,902\,464\,047\,792\,010\,302\,125\,506\,560\,x^{13} + 268\,522\,316\,518\,239\,021\,476\,930\,106\,949\,632\,x^{12} + 46\,911\,589\,457\,958\,527\,140\,659\,385\,941\,884\,928\,x^{11} - 808\,765\,686\,867\,360\,903\,096\,041\,774\,996\,520\,960\,x^{10} + 57\,518\,512\,275\,172\,950\,055\,158\,185\,352\,757\,248\,x^9 - 2\,273\,601\,509\,826\,907\,571\,634\,757\,618\,498\,535\,424\,x^8 - 1\,188\,432\,066\,556\,571\,834\,863\,445\,242\,753\,843\,200\,x^7 - 2\,576\,436\,753\,017\,819\,098\,275\,602\,371\,706\,880\,000\,x^6 - 4\,456\,804\,560\,805\,111\,404\,527\,207\,055\,360\,000\,000\,x^5 - 414\,358\,661\,156\,186\,273\,863\,724\,236\,800\,000\,000\,x^4 + 9\,347\,379\,325\,695\,247\,854\,366\,720\,000\,000\,000\,x^3 - 16\,871\,240\,529\,992\,096\,010\,000\,000\,000\,000\,x^2 - 2\,372\,911\,639\,160\,737\,500\,000\,000\,000\,x + 5\,771\,310\,327\,301\,025\,390\,625 \text{ near } x = 2.39155 \times 10^{-6}$$

Minimal polynomial:

$$1\,208\,925\,819\,614\,629\,174\,706\,176\,x^{16} + 1\,066\,272\,572\,900\,102\,932\,090\,847\,232\,x^{15} + 52\,042\,471\,479\,879\,261\,245\,210\,099\,712\,x^{14} + 11\,466\,902\,464\,047\,792\,010\,302\,125\,506\,560\,x^{13} + 268\,522\,316\,518\,239\,021\,476\,930\,106\,949\,632\,x^{12} + 46\,911\,589\,457\,958\,527\,140\,659\,385\,941\,884\,928\,x^{11} - 808\,765\,686\,867\,360\,903\,096\,041\,774\,996\,520\,960\,x^{10} + 57\,518\,512\,275\,172\,950\,055\,158\,185\,352\,757\,248\,x^9 - 2\,273\,601\,509\,826\,907\,571\,634\,757\,618\,498\,535\,424\,x^8 - 1\,188\,432\,066\,556\,571\,834\,863\,445\,242\,753\,843\,200\,x^7 - 2\,576\,436\,753\,017\,819\,098\,275\,602\,371\,706\,880\,000\,x^6 - 4\,456\,804\,560\,805\,111\,404\,527\,207\,055\,360\,000\,000\,x^5 - 414\,358\,661\,156\,186\,273\,863\,724\,236\,800\,000\,000\,x^4 + 9\,347\,379\,325\,695\,247\,854\,366\,720\,000\,000\,000\,x^3 - 16\,871\,240\,529\,992\,096\,010\,000\,000\,000\,000\,x^2 - 2\,372\,911\,639\,160\,737\,500\,000\,000\,000\,x + 5\,771\,310\,327\,301\,025\,390\,625$$

sqrt(33) 1/2 * (((2-sqrt(3))^3 (((sqrt(((7+3*sqrt(3))/4)))-sqrt(((3+3sqrt(3))/4))))^4 (((sqrt(((5+sqrt(3))/4)))-sqrt(((1+sqrt(3)))/4)))^4 ((((sqrt(3)-2))/(sqrt(2)))^2)))

Input:

$$\sqrt{33} \times \frac{1}{2} \left(\left(2 - \sqrt{3}\right)^3 \left(\sqrt{\frac{1}{4}\left(7 + 3\sqrt{3}\right)} - \sqrt{\frac{1}{4}\left(3 + 3\sqrt{3}\right)} \right)^4 \left(\sqrt{\frac{1}{4}\left(5 + \sqrt{3}\right)} - \sqrt{\frac{1}{4}\left(1 + \sqrt{3}\right)} \right)^4 \left(\frac{\sqrt{3} - 2}{\sqrt{2}} \right)^2 \right)$$

Exact result:

$$\frac{1}{4}\sqrt{33}\left(2-\sqrt{3}\right)^3\left(\sqrt{3}-2\right)^2\left(\frac{\sqrt{5+\sqrt{3}}}{2}-\frac{1}{2}\sqrt{1+\sqrt{3}}\right)^4\left(\frac{1}{2}\sqrt{7+3\sqrt{3}}-\frac{1}{2}\sqrt{3+3\sqrt{3}}\right)^4$$

Decimal approximation:

$9.5641535164851598615720165586116228685173468809096524\ldots \times 10^{-7}$

$9.5641535\ldots * 10^{-7}$

Alternate forms:

root of $65536x^8+51904512x^7+141384105984x^6+55824100687872x^5+76366762805380608x^4-314341398791202816x^3-3256884091099584x^2-1236849191424x+1185921$ near $x=9.56415\times10^{-7}$

$$-\frac{\sqrt{33}\,(\sqrt{3}-2)^5\left(\sqrt{1+\sqrt{3}}-\sqrt{5+\sqrt{3}}\right)^4\left(\sqrt{3(1+\sqrt{3})}-\sqrt{7+3\sqrt{3}}\right)^4}{1024}$$

$$-\frac{9\sqrt{33}\,(\sqrt{3}-2)^5(1+\sqrt{3})^2\left(\sqrt{1+\sqrt{3}}-\sqrt{5+\sqrt{3}}\right)^4}{1024}-\frac{9}{512}\sqrt{33}\left(\sqrt{3}-2\right)^5\left(1+\sqrt{3}\right)\left(7+3\sqrt{3}\right)\left(\sqrt{1+\sqrt{3}}-\sqrt{5+\sqrt{3}}\right)^4+\frac{3}{256}\left(\sqrt{3}-2\right)^5\sqrt{11\left(1+\sqrt{3}\right)}\left(7+3\sqrt{3}\right)^{3/2}\left(\sqrt{1+\sqrt{3}}-\sqrt{5+\sqrt{3}}\right)^4-\frac{\sqrt{33}\,(\sqrt{3}-2)^5(7+3\sqrt{3})^2\left(\sqrt{1+\sqrt{3}}-\sqrt{5+\sqrt{3}}\right)^4}{1024}+\frac{9}{256}\left(\sqrt{3}-2\right)^5\left(1+\sqrt{3}\right)^{3/2}\sqrt{11\left(7+3\sqrt{3}\right)}\left(\sqrt{1+\sqrt{3}}-\sqrt{5+\sqrt{3}}\right)^4$$

Minimal polynomial:

$65536x^8+51904512x^7+141384105984x^6+55824100687872x^5+76366762805380608x^4-314341398791202816x^3-3256884091099584x^2-1236849191424x+1185921$

sqrt(45) 1/2 *(sqrt(5)-2)^3 (((sqrt(((7+3*sqrt(5))/4)))-sqrt(((3+3sqrt(5))/4))))^4 (((sqrt(((3+sqrt(5))/2)))-sqrt(((1+sqrt(5)))/2)))^4 (((sqrt(5)-sqrt(3))/(sqrt(2))))^4

Input:

$$\sqrt{45}\left(\frac{1}{2}\left(\sqrt{5}-2\right)^3\right)\left(\sqrt{\frac{1}{4}\left(7+3\sqrt{5}\right)}-\sqrt{\frac{1}{4}\left(3+3\sqrt{5}\right)}\right)^4 \left(\sqrt{\frac{1}{2}\left(3+\sqrt{5}\right)}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\right)^4\left(\frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}}\right)^4$$

Exact result:

$$\frac{3}{8}\sqrt{5}\left(\sqrt{5}-2\right)^3\left(\sqrt{5}-\sqrt{3}\right)^4 \left(\sqrt{\frac{1}{2}\left(3+\sqrt{5}\right)}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\right)^4\left(\frac{1}{2}\sqrt{7+3\sqrt{5}}-\frac{1}{2}\sqrt{3+3\sqrt{5}}\right)^4$$

Decimal approximation:

$7.554598965553897568027725511797898870065056426 1449067... \times 10^{-8}$

$7.5545989... * 10^{-8}$

sqrt(15) * 1/16*((((sqrt(5)-1))/2))^4 * ((2-sqrt(3)))^2 * ((4-sqrt(15)))

Input:

$$\sqrt{15}\times\frac{1}{16}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^4\left(2-\sqrt{3}\right)^2\left(4-\sqrt{15}\right)$$

Result:

$$\frac{1}{256}\sqrt{15}\left(2-\sqrt{3}\right)^2\left(\sqrt{5}-1\right)^4\left(4-\sqrt{15}\right)$$

Decimal approximation:

0.000322062869471454321112479786299775908555054150731656741...

Result:

$3.22062869471454321112479786299775908555054150731656741 \times 10^{-4}$

$3.220628694… * 10^{-4}$

Alternate forms:

$$\frac{1}{32}\left(7-3\sqrt{5}\right)\left(7-4\sqrt{3}\right)\left(4\sqrt{15}-15\right)$$

$$\frac{1}{32}\left(-15-21\sqrt{5}+16\sqrt{15}\right)$$

$$-\frac{15}{32}-\frac{21\sqrt{5}}{32}+\frac{\sqrt{15}}{2}$$

Minimal polynomial:

$$65\,536\,x^4+122\,880\,x^3-687\,360\,x^2-698\,400\,x+225$$

Now, we have that:

-1024 + 24/ ((((sqrt(15) * 1/16*((((sqrt(5)-1))/2))^4 * ((2-sqrt(3)))^2 * ((4-sqrt(15)))))))

Input:

$$-1024+\frac{24}{\sqrt{15}\times\frac{1}{16}\left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^4\left(2-\sqrt{3}\right)^2\left(4-\sqrt{15}\right)}$$

Result:

$$\frac{2048\sqrt{\frac{3}{5}}}{\left(2-\sqrt{3}\right)^2\left(\sqrt{5}-1\right)^4\left(4-\sqrt{15}\right)}-1024$$

Decimal approximation:

73495.611774517872227236233926747851151065312339167502398 26...

73495.6117745…

Alternate forms:

$$-\frac{1}{55}\left(67\,840+6720\sqrt{3}+5376\sqrt{5}+3136\sqrt{15}\right)$$

$$\frac{256}{5}\left(\frac{1}{1+\frac{\sqrt{15}}{7\sqrt{3}-16}}-21\right)$$

$$17\,600+24\,064\sqrt{\frac{3}{5}}+\frac{1}{2}\sqrt{\frac{13\,879\,885\,824}{5}+3\,583\,770\,624\sqrt{\frac{3}{5}}}$$

Minimal polynomial:

$$25x^4 - 1760000x^3 - 5607997440x^2 - 5841134551040x - 2018181241634816$$

Thence, we have the following mathematical connection:

$$\left(\frac{2048\sqrt{\frac{3}{5}}}{(2-\sqrt{3})^2(\sqrt{5}-1)^4(4-\sqrt{15})} - 1024\right) = 73495.6117745\ldots \Rightarrow$$

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

$$-3927 + 2\sqrt[13]{2.2983717437\times10^{59} + 2.0823329825883\times10^{59}}$$

$= 73490.8437525\ldots. \Rightarrow$

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

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

$= 73491.788325481187105491595720422205480251957265634133987 00\ldots$

$= 73491.7883254\ldots \Rightarrow$

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

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

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

Now, we have:

((((sqrt(15) * 1/16*(((((sqrt(5)-1))/2))^4 * ((2-sqrt(3)))^2 * ((4-sqrt(15)))))))^1/1024

Input:

$$\sqrt[1024]{\sqrt{15} \times \frac{1}{16} \left(\frac{1}{2}\left(\sqrt{5}-1\right)\right)^4 \left(2-\sqrt{3}\right)^2 \left(4-\sqrt{15}\right)}$$

Exact result:

$$\frac{\sqrt[2048]{15}\ \sqrt[512]{2-\sqrt{3}}\ \sqrt[256]{\sqrt{5}-1}\ \sqrt[1024]{4-\sqrt{15}}}{\sqrt[128]{2}}$$

Decimal approximation:

0.9921784404542495203104113117507767760689985919046718135 14...

0.9921784404.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

(((((sqrt(21)1/2((((3-sqrt(7))/sqrt(2))))^2(((sqrt(((5+sqrt(7))/4)))-sqrt(((1+sqrt(7))/4))))^4(((sqrt(((3+sqrt(7))/4)))-sqrt(((sqrt(7)+1))/4)))^4(1/2*sqrt(7)-sqrt(3))^2)))))^1/1024

Input:

$$\left(\sqrt{21}\left(\frac{1}{2}\left(\frac{3-\sqrt{7}}{\sqrt{2}}\right)^2\right)\left(\sqrt{\frac{1}{4}\left(5+\sqrt{7}\right)}-\sqrt{\frac{1}{4}\left(1+\sqrt{7}\right)}\right)^4\left(\sqrt{\frac{1}{4}\left(3+\sqrt{7}\right)}-\sqrt{\frac{1}{4}\left(\sqrt{7}+1\right)}\right)^4\left(\frac{1}{2}\sqrt{7}-\sqrt{3}\right)^2\right)\widehat{\ }(1/1024)$$

Exact result:

$$\frac{1}{\sqrt[512]{2}}\sqrt[2048]{21}\sqrt[512]{\left(3-\sqrt{7}\right)\left(\sqrt{3}-\frac{\sqrt{7}}{2}\right)}\sqrt[256]{\left(\frac{\sqrt{3+\sqrt{7}}}{2}-\frac{1}{2}\sqrt{1+\sqrt{7}}\right)\left(\frac{\sqrt{5+\sqrt{7}}}{2}-\frac{1}{2}\sqrt{1+\sqrt{7}}\right)}$$

Decimal approximation:

0.987439348870893804562981265483323778329220689630847778127...

0.987439348…. result very near to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$

Alternate forms:

$$\frac{1}{2^{3/256}}\sqrt[2048]{21}\sqrt[512]{\left(3-\sqrt{7}\right)\left(2\sqrt{3}-\sqrt{7}\right)}\sqrt[256]{\left(\sqrt{3+\sqrt{7}}-\sqrt{1+\sqrt{7}}\right)\left(\sqrt{5+\sqrt{7}}-\sqrt{1+\sqrt{7}}\right)}$$

$$\frac{1}{2^{3/256}}\sqrt[2048]{21}\sqrt[512]{7+6\sqrt{3}-3\sqrt{7}-2\sqrt{21}}\left(1+\sqrt{7}-\sqrt{\left(1+\sqrt{7}\right)\left(3+\sqrt{7}\right)}-\sqrt{\left(1+\sqrt{7}\right)\left(5+\sqrt{7}\right)}+\sqrt{\left(3+\sqrt{7}\right)\left(5+\sqrt{7}\right)}\right)\widehat{\ }(1/256)$$

(((((sqrt(33) 1/2 * (((2-sqrt(3))^3 (((sqrt(((7+3*sqrt(3))/4)))-sqrt(((3+3sqrt(3))/4))))^4 (((sqrt(((5+sqrt(3))/4)))-sqrt(((1+sqrt(3)))/4)))^4 ((((sqrt(3)-2))/(sqrt(2)))^2))))))))^1/1024

Input:

$$\left(\sqrt{33}\times\frac{1}{2}\left((2-\sqrt{3})^3\left(\sqrt{\frac{1}{4}\left(7+3\sqrt{3}\right)}-\sqrt{\frac{1}{4}\left(3+3\sqrt{3}\right)}\right)^4\left(\sqrt{\frac{1}{4}\left(5+\sqrt{3}\right)}-\sqrt{\frac{1}{4}\left(1+\sqrt{3}\right)}\right)^4\left(\frac{\sqrt{3}-2}{\sqrt{2}}\right)^2\right)\right)\hat{}\,(1/1024)$$

Exact result:

$$\frac{\sqrt[2048]{33}\,(2-\sqrt{3})^{5/1024}\sqrt[256]{\left(\frac{\sqrt{5+\sqrt{3}}}{2}-\frac{1}{2}\sqrt{1+\sqrt{3}}\right)\left(\frac{1}{2}\sqrt{7+3\sqrt{3}}-\frac{1}{2}\sqrt{3+3\sqrt{3}}\right)}}{\sqrt[512]{2}}$$

Decimal approximation:

0.986555961237011117594683147326554333473724037551432510022...

0.986555961237.... result very near to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$

(((((((sqrt(45) 1/2 *(sqrt(5)-2)^3 (((sqrt(((7+3*sqrt(5))/4)))-sqrt(((3+3sqrt(5))/4))))^4 (((sqrt(((3+sqrt(5))/2)))-sqrt(((1+sqrt(5)))/2)))^4 (((sqrt(5)-sqrt(3))/(sqrt(2))))^4)))))))^1/1024

Input:

$$\left(\sqrt{45}\left(\frac{1}{2}\left(\sqrt{5}-2\right)^3\right)\left(\sqrt{\frac{1}{4}\left(7+3\sqrt{5}\right)}-\sqrt{\frac{1}{4}\left(3+3\sqrt{5}\right)}\right)^4\left(\sqrt{\frac{1}{2}\left(3+\sqrt{5}\right)}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\right)^4\left(\frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}}\right)^4\right)\hat{}\,(1/1024)$$

Exact result:

$$\frac{1}{2^{3/1024}}\sqrt[1024]{3}\,\sqrt[2048]{5}\left(\sqrt{5}-2\right)^{3/1024}\sqrt[256]{\left(\sqrt{5}-\sqrt{3}\right)\left(\sqrt{\frac{1}{2}\left(3+\sqrt{5}\right)}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\right)\left(\frac{1}{2}\sqrt{7+3\sqrt{5}}-\frac{1}{2}\sqrt{3+3\sqrt{5}}\right)}$$

Decimal approximation:

0.984113361469563511529046508637472734079204162729013649674...

0.98411336146…. result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$

2207-1364-123-29+0.0055/((((sqrt(45)1/2 *(sqrt(5)-2)^3 (((sqrt(((7+3*sqrt(5))/4)))-sqrt(((3+3sqrt(5))/4))))^4 (((sqrt(((3+sqrt(5))/2)))-sqrt(((1+sqrt(5)))/2)))^4 (((sqrt(5)-sqrt(3))/(sqrt(2))))^4))))

Where 29, 123, 1364, 2207 are Lucas numbers and 0.0055 = 55/10^4 where 55 is a Fibonacci number

Input:

$$2207-1364-123-29+0.0055\Big/\left(\left(\sqrt{45}\times\frac{1}{2}\left(\sqrt{5}-2\right)^3\right)\left(\sqrt{\frac{1}{4}\left(7+3\sqrt{5}\right)}-\sqrt{\frac{1}{4}\left(3+3\sqrt{5}\right)}\right)^4\left(\sqrt{\frac{1}{2}\left(3+\sqrt{5}\right)}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\right)^4\left(\frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}}\right)^4\right)$$

Result:

73494.3...

73494.3...

Thence, we have the following mathematical connection:

$$\left(2207-1364-123-29+0.0055\Big/\left(\left(\sqrt{45}\times\frac{1}{2}\left(\sqrt{5}-2\right)^3\right)\left(\sqrt{\frac{1}{4}\left(7+3\sqrt{5}\right)}-\sqrt{\frac{1}{4}\left(3+3\sqrt{5}\right)}\right)^4\left(\sqrt{\frac{1}{2}\left(3+\sqrt{5}\right)}-\sqrt{\frac{1}{2}\left(1+\sqrt{5}\right)}\right)^4\left(\frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}}\right)^4\right)\right)=73494.3\ldots\Rightarrow$$

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

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

$= 73490.8437525.... \Rightarrow$

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

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

$= 73491.788325481187105491595720422205480251957265634133987 00...$

$= 73491.7883254... \Rightarrow$

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

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

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

From the results of the already analyzed expressions, we obtain:

(2.39155248166 × 10^-6) * (1 / 9.5641535164 × 10^-7) * (1 / 7.5545989655 × 10^-8) * (1 / 3.2206286947 * 10^-4)

Input interpretation:

$$2.39155248166\times10^{-6}\times\frac{1}{9.5641535164\times10^{-7}}\times\frac{1}{7.5545989655\times10^{-8}}\times\frac{\frac{1}{3.2206286947}}{10^{4}}$$

Result:

1027.735372756695967150068231886714891405595570757250597699...

1027.7353727…

And:

(1/2.39155248166e-6) * (1 / 9.5641535164e-7) * (1 / 7.5545989655e-8) * (1 / 3.2206286947e-4)

Input interpretation:

$$\frac{1}{2.39155248166\times10^{-6}}\times\frac{1}{9.5641535164\times10^{-7}}\times\frac{1}{7.5545989655\times10^{-8}}\times\frac{1}{3.2206286947\times10^{-4}}$$

Result:

$1.796889922088463255595016527392064803996420390647720 4... \times 10^{22}$

$1.796889922... * 10^{22}$

[4096/(((1/2.39155248166e-6) * (1 / 9.5641535164e-7) * (1 / 7.5545989655e-8) * (1 / 3.2206286947e-4)))]^1/4096

Note that, if we insert 4096, either as a numerator, or as a root index, we obtain:

Input interpretation:

$$\sqrt[4096]{\frac{4096}{\frac{1}{2.39155248166\times10^{-6}}\times\frac{1}{9.5641535164\times10^{-7}}\times\frac{1}{7.5545989655\times10^{-8}}\times\frac{1}{3.2206286947\times10^{-4}}}}$$

Result:

0.98957494535224...

0.989574.... result very near to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$

((((1/2.39155248166e-6) * (1 / 9.5641535164e-7) * (1 / 7.5545989655e-8) * (1 / 3.2206286947e-4))))5/((64^2)^5) - (64^2 + 64*5 + 16)

Input interpretation:

$$\left(\frac{1}{2.39155248166\times 10^{-6}}\times\frac{1}{9.5641535164\times 10^{-7}}\times\frac{1}{7.5545989655\times 10^{-8}}\times\frac{1}{3.2206286947\times 10^{-4}}\right)\times\frac{5}{(64^2)^5}-(64^2+64\times 5+16)$$

Result:

73495.678289824826498222535399454415257059127230739403876 22...

73495.6782898...

Thence, we have the following mathematical connection:

$$\left(\left(\frac{1}{2.39155248166\times 10^{-6}}\times\frac{1}{9.5641535164\times 10^{-7}}\times\frac{1}{7.5545989655\times 10^{-8}}\times\frac{1}{3.2206286947\times 10^{-4}}\right)\times\frac{5}{(64^2)^5}-(64^2+64\times 5+16)\right) = 73495.678 \Rightarrow$$

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

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

$= 73490.8437525.... \Rightarrow$

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

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

$= 73491.78832548118710549159572042220548025195726563413398700...$

$= 73491.7883254... \Rightarrow$

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

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

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

From the results of 1024th roots of the expressions:

0.9921784404542495203104113117507767760689985919046718135 14

0.98743934887089380456298126548332377832922068963084777812 7

0.98655596123701111759468314732655433347372403755143251002 2

0.98411336146956351152904650863747273407920416272901364967 4 we obtain the following mean:

1/4 (0.99217844045424952031041l311+0.98743934887089380456298126+0.986555961237011117594683l+0.98411336146956351l529046)

Input interpretation:

$$\frac{1}{4}(0.99217844045424952031041311 + 0.98743934887089380456298126 + 0.98655596123701111759468 31 + 0.98411336146956351152904 6)$$

Result:

0.98757177800792948849928041775

0.987571778... result very near to the result of:

(2.3915524816 * 10^-6)^1/1024 = 0.98743934887087

We note that, performing the following calculation on the results signed in red, we obtain:

((((0.98743934887087*1/(2.3915524816e-6)*1/2)))) - 4096*(golden ratio)^2+(1.65578)^14

Where there are 4096 = 64^2, ϕ = golden ratio and the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3$ = 1164,2696 i.e. $(1,65578)^{14}$

Input interpretation:

$$0.98743934887087 \times \frac{1}{2.3915524816 \times 10^{-6}} \times \frac{1}{2} - 4096\,\phi^2 + 1.65578^{14}$$

ϕ is the golden ratio

Result:

196883.92715037936654678744805554138324943539783586131002 75...

196883.92715... result very near to 196884, that is a fundamental number of the following ***j*-invariant**

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's ***j*-invariant** or ***j* function**, regarded as a function of a complex variable τ, is a modular function of weight zero for SL(2, **Z**) defined on the upper half plane of complex numbers. Several remarkable properties of j have to do with its q expansion (Fourier series expansion), written as a Laurent series in terms of $q = e^{2\pi i\tau}$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that j has a simple pole at the cusp, so its q-expansion has no terms below q^{-1}.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of q^n is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\,n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

From the following calculation of the four above results, we obtain:

1/
(0.992178440454249520310411311*1/0.98743934887089380456298126*1/0.9865559612370111175946831*1/0.984113361469563511529046)

Input interpretation:

$$1 \Big/ \left(0.992178440454249520310411311 \times \frac{1}{0.98743934887089380456298126} \times \frac{1}{0.9865559612370111175946831} \times \frac{1}{0.984113361469563511529046}\right)$$

Result:

0.966245528794624343760338481601039771812738767989917932463...

0.9662455287.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\frac{e^{-\pi}}{1+\frac{e^{-2\pi}}{1+\frac{e^{-3\pi}}{1+\frac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

and also to the spectral index n_s and to the mesonic Regge slope (see Appendix)

From the algebraic sum, we obtain:

(0.98743934887089380456298126+0.98655596123701111175946831+0.984113361469563511529046- 0.992178440454249520310411311)

Input interpretation:

0.98743934887089380456298126 + 0.98655596123701111175946831 + 0.984113361469563511529046 − 0.992178440454249520310411311

Result:

1.965930231123218913376299049

1.96593023... result practically near to the mean value $1.962 * 10^{19}$ of DM particle

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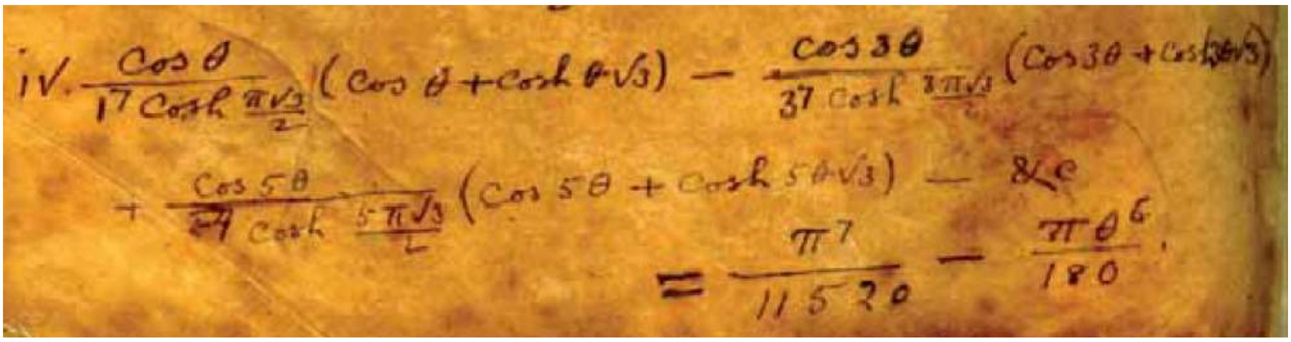

$$\text{iv.}\ \frac{\cos\theta}{1^7\cosh\frac{\pi\sqrt{3}}{2}}(\cos\theta+\cosh\theta\sqrt{3})-\frac{\cos 3\theta}{3^7\cosh\frac{3\pi\sqrt{3}}{2}}(\cos 3\theta+\cosh 3\theta\sqrt{3})+\frac{\cos 5\theta}{5^7\cosh\frac{5\pi\sqrt{3}}{2}}(\cos 5\theta+\cosh 5\theta\sqrt{3})-\&c=\frac{\pi^7}{11520}-\frac{\pi\theta^6}{180}.$$

From:

(Pi^7)/11520 – (Pi*θ^6/180), we obtain:

(x^6*Pi/180) = (Pi^7)/11520

Input:

$$x^6 \times \frac{\pi}{180} = \frac{\pi^7}{11520}$$

Alternate form:

$$\frac{\pi x^6}{180} - \frac{\pi^7}{11520} = 0$$

Real solutions:

$$x = -\frac{\pi}{2}$$

$$x = \frac{\pi}{2}$$

$$\theta^6 = \left(-\frac{\pi}{2}, +\frac{\pi}{2}\right)$$

Complex solutions:

$$x = -\frac{1}{4} i \left(\sqrt{3} + -i\right) \pi$$

$$x = \frac{1}{4} \left(1 - i \sqrt{3}\right) \pi$$

$$x = \frac{1}{4} i \left(\sqrt{3} + i\right) \pi$$

$$x = \frac{1}{4} \left(1 + i \sqrt{3}\right) \pi$$

Input:

$$\left(\frac{\pi}{2}\right)^6 \times \frac{\pi}{180} = \frac{\pi^7}{11520}$$

Result:

True

Thence, we obtain:

(Pi^7)/11520

Input:

$$\frac{\pi^7}{11520}$$

Decimal approximation:

0.262178231577846533638385980301392520131721569036059224197...

0.2621782315778…

Property:

$\frac{\pi^7}{11520}$ is a transcendental number

Alternative representations:

$$\frac{\pi^7}{11520} = \frac{(180\,°)^7}{11520}$$

$$\frac{\pi^7}{11520} = \frac{(-i\log(-1))^7}{11520}$$

$$\frac{\pi^7}{11520} = \frac{\cos^{-1}(-1)^7}{11520}$$

Series representations:

$$\frac{\pi^7}{11520} = \frac{64}{45}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^7$$

$$\frac{\pi^7}{11520} = \frac{64}{45}\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^7$$

$$\frac{\pi^7}{11520} = \frac{\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^7}{11520}$$

Integral representations:

$$\frac{\pi^7}{11520} = \frac{64}{45}\left(\int_0^1\sqrt{1-t^2}\,dt\right)^7$$

$$\frac{\pi^7}{11520} = \frac{1}{90}\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^7$$

$$\frac{\pi^7}{11520} = \frac{1}{90}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^7$$

And:

((((Pi^7)/11520)))^1/128

Input:

$$\sqrt[128]{\frac{\pi^7}{11\,520}}$$

Exact result:

$$\frac{\pi^{7/128}}{\sqrt[16]{2}\ \sqrt[64]{3}\ \sqrt[128]{5}}$$

Decimal approximation:

0.9895956695692764806465500818846155369791409241671658510 18...

0.9895956695692….. result very near to the dilaton value **0.989117352243** = $\boldsymbol{\phi}$

Property:

$$\frac{\pi^{7/128}}{\sqrt[16]{2}\ \sqrt[64]{3}\ \sqrt[128]{5}} \text{ is a transcendental number}$$

All 128th roots of π^7/11520:

$$\frac{\pi^{7/128}\, e^0}{\sqrt[16]{2}\ \sqrt[64]{3}\ \sqrt[128]{5}} \approx 0.98960 \text{ (real, principal root)}$$

$$\frac{\pi^{7/128}\, e^{(i\pi)/64}}{\sqrt[16]{2}\ \sqrt[64]{3}\ \sqrt[128]{5}} \approx 0.98840 + 0.04856\, i$$

$$\frac{\pi^{7/128}\, e^{(i\pi)/32}}{\sqrt[16]{2}\ \sqrt[64]{3}\ \sqrt[128]{5}} \approx 0.98483 + 0.09700\, i$$

$$\frac{\pi^{7/128}\, e^{(3i\pi)/64}}{\sqrt[16]{2}\ \sqrt[64]{3}\ \sqrt[128]{5}} \approx 0.97888 + 0.14520\, i$$

$$\frac{\pi^{7/128}\, e^{(i\pi)/16}}{\sqrt[16]{2}\,\sqrt[64]{3}\,\sqrt[128]{5}} \approx 0.97058 + 0.19306\, i$$

Alternative representations:

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \sqrt[128]{\frac{(180\,°)^7}{11\,520}}$$

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \sqrt[128]{\frac{(-i\log(-1))^7}{11\,520}}$$

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \sqrt[128]{\frac{\cos^{-1}(-1)^7}{11\,520}}$$

Series representations:

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \frac{2^{3/64}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{7/128}}{\sqrt[64]{3}\,\sqrt[128]{5}}$$

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \frac{2^{3/64}\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^{7/128}}{\sqrt[64]{3}\,\sqrt[128]{5}}$$

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \frac{\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^{7/128}}{\sqrt[16]{2}\,\sqrt[64]{3}\,\sqrt[128]{5}}$$

Integral representations:

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \frac{\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^{7/128}}{\sqrt[64]{3}\,\sqrt[128]{10}}$$

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \frac{\left(\int_0^{1}\frac{1}{\sqrt{1-t^2}}\,dt\right)^{7/128}}{\sqrt[64]{3}\,\sqrt[128]{10}}$$

$$\sqrt[128]{\frac{\pi^7}{11\,520}} = \frac{2^{3/64}\left(\int_0^1 \sqrt{1-t^2}\, dt\right)^{7/128}}{\sqrt[64]{3}\ \sqrt[128]{5}}$$

Now, we have:

36*1/(((Pi^7)/11520))

Input:

$$36 \times \frac{1}{\frac{\pi^7}{11520}}$$

Result:

$$\frac{414\,720}{\pi^7}$$

Decimal approximation:

137.31117104324048850125914573567236782364594623172796394 74...

137.311171… result near to the rest mass of Pion meson 139.57 and practically equal to the reciprocal of fine-structure constant 137.035...

Property:

$\frac{414\,720}{\pi^7}$ is a transcendental number

Alternative representations:

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{36}{\frac{(180\,°)^7}{11\,520}}$$

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{36}{\frac{(-i\log(-1))^7}{11\,520}}$$

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{36}{\frac{\cos^{-1}(-1)^7}{11\,520}}$$

Series representations:

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{405}{16\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^7}$$

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{405}{16\left(\sum_{k=0}^{\infty} \frac{(-1)^{1+k}\, 1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^7}$$

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{414\,720}{\left(\sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^7}$$

Integral representations:

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{3240}{\left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^7}$$

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{3240}{\left(\int_0^{1} \frac{1}{\sqrt{1-t^2}}\, dt\right)^7}$$

$$\frac{36}{\frac{\pi^7}{11520}} = \frac{405}{16\left(\int_0^{1} \sqrt{1-t^2}\, dt\right)^7}$$

We note that:

1/(((36*1/(((Pi^7)/11520)))))^1/1024

Input:

$$\frac{1}{\sqrt[1024]{36\times\frac{1}{\frac{\pi^7}{11\,520}}}}$$

Exact result:

$$\frac{\pi^{7/1024}}{2^{5/512}\,\sqrt[256]{3}\,\sqrt[1024]{5}}$$

Decimal approximation:

0.995204650134757443388135466900444429050754894465357320562...

0.99520465… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

and to the dilaton value **0.989117352243 = ϕ**

Property:

$\frac{\pi^{7/1024}}{2^{5/512}\sqrt[256]{3}\sqrt[1024]{5}}$ is a transcendental number

Alternative representations:

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11520}}}} = \frac{1}{\sqrt[1024]{\frac{36}{\frac{(180°)^7}{11520}}}}$$

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11520}}}} = \frac{1}{\sqrt[1024]{\frac{36}{\frac{\cos^{-1}(-1)^7}{11520}}}}$$

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11520}}}} = \frac{1}{\sqrt[1024]{\frac{36}{\frac{(-i\log(-1))^7}{11520}}}}$$

Series representations:

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11\,520}}}} = \frac{\sqrt[256]{\frac{2}{3}} \left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^{7/1024}}{\sqrt[1024]{5}}$$

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11\,520}}}} = \frac{\sqrt[256]{\frac{2}{3}} \left(\sum_{k=0}^{\infty} \frac{(-1)^{1+k}\, 1195^{-1-2k} \left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}\right)^{7/1024}}{\sqrt[1024]{5}}$$

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11\,520}}}} = \frac{\left(\sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)\right)^{7/1024}}{2^{5/512}\, \sqrt[256]{3}\, \sqrt[1024]{5}}$$

Integral representations:

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11\,520}}}} = \frac{\sqrt[256]{\frac{2}{3}} \left(\int_0^1 \sqrt{1-t^2}\, dt\right)^{7/1024}}{\sqrt[1024]{5}}$$

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11\,520}}}} = \frac{\left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^{7/1024}}{2^{3/1024}\, \sqrt[256]{3}\, \sqrt[1024]{5}}$$

$$\frac{1}{\sqrt[1024]{\frac{36}{\frac{\pi^7}{11\,520}}}} = \frac{\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt\right)^{7/1024}}{2^{3/1024}\, \sqrt[256]{3}\, \sqrt[1024]{5}}$$

1/16 * log base 0.99520465 (1/(((36*1/(((Pi^7)/11520))))))

Input interpretation:

$$\frac{1}{16}\log_{0.99520465}\left(\frac{1}{36\times\frac{1}{\frac{\pi^7}{11\,520}}}\right)$$

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

Result:

64.0000...

64

Alternative representation:

$$\frac{1}{16}\log_{0.995205}\left(\frac{1}{\frac{36}{\frac{\pi^7}{11\,520}}}\right)=\frac{\log\left(\frac{1}{\frac{36}{\frac{\pi^7}{11\,520}}}\right)}{16\log(0.995205)}$$

Series representations:

$$\frac{1}{16}\log_{0.995205}\left(\frac{1}{\frac{36}{\frac{\pi^7}{11\,520}}}\right)=-\frac{\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{\pi^7}{414\,720}\right)^k}{k}}{16\log(0.995205)}$$

$$\frac{1}{16}\log_{0.995205}\left(\frac{1}{\frac{36}{\frac{\pi^7}{11\,520}}}\right)=$$
$$-13.0022\log\left(\frac{\pi^7}{414\,720}\right)-0.0625\log\left(\frac{\pi^7}{414\,720}\right)\sum_{k=0}^{\infty}(-0.00479535)^k\,G(k)$$
$$\text{for }\left(G(0)=0\text{ and }\frac{(-1)^k\,k}{2(1+k)(2+k)}+G(k)=\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

And:

21+[64*7*1/(((Pi^7)/11520))]

Input:

$$21+64\times 7\times \frac{1}{\frac{\pi^7}{11520}}$$

Result:

$$21+\frac{5160960}{\pi^7}$$

Decimal approximation:

1729.761239649214968015669369155033910694260664217059106901...

1729.761239649…..

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

Property:

$21+\frac{5160960}{\pi^7}$ is a transcendental number

Alternate form:

$$\frac{21\left(\pi^7+245760\right)}{\pi^7}$$

Alternative representations:

$$21+\frac{64\times 7}{\frac{\pi^7}{11520}}=21+\frac{448}{\frac{(180\,°)^7}{11520}}$$

$$21+\frac{64\times 7}{\frac{\pi^7}{11520}}=21+\frac{448}{\frac{(-i\log(-1))^7}{11520}}$$

$$21+\frac{64\times 7}{\frac{\pi^7}{11520}}=21+\frac{448}{\frac{\cos^{-1}(-1)^7}{11520}}$$

Series representations:

$$21 + \frac{64 \times 7}{\frac{\pi^7}{11520}} = 21 + \frac{315}{\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^7}$$

$$21 + \frac{64 \times 7}{\frac{\pi^7}{11520}} = 21 + \frac{315}{\left(\sum_{k=0}^{\infty} \frac{(-1)^{1+k}\, 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}\right)^7}$$

$$21 + \frac{64 \times 7}{\frac{\pi^7}{11520}} = 21 + \frac{5160960}{\left(\sum_{k=0}^{\infty} \left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)\right)^7}$$

Integral representations:

$$21 + \frac{64 \times 7}{\frac{\pi^7}{11520}} = 21 + \frac{315}{\left(\int_0^1 \sqrt{1-t^2}\, dt\right)^7}$$

$$21 + \frac{64 \times 7}{\frac{\pi^7}{11520}} = 21 + \frac{40320}{\left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^7}$$

$$21 + \frac{64 \times 7}{\frac{\pi^7}{11520}} = 21 + \frac{40320}{\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt\right)^7}$$

Furthermore:

2Pi*(Pi^7)/11520

Input:

$$2\pi \times \frac{\pi^7}{11520}$$

Result:

$$\frac{\pi^8}{5760}$$

Decimal approximation:

1.647314412512252431793155469428257950815482547159910189602...

$1.6473144125122\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Property:

$\frac{\pi^8}{5760}$ is a transcendental number

Alternative representations:

$$\frac{(2\pi)\pi^7}{11520} = \frac{360^\circ (180^\circ)^7}{11520}$$

$$\frac{(2\pi)\pi^7}{11520} = -\frac{2 i \log(-1)(-i \log(-1))^7}{11520}$$

$$\frac{(2\pi)\pi^7}{11520} = \frac{2 \cos^{-1}(-1) \cos^{-1}(-1)^7}{11520}$$

Series representations:

$$\frac{(2\pi)\pi^7}{11520} = \frac{512}{45}\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^8$$

$$\frac{(2\pi)\pi^7}{11520} = \frac{512}{45}\left(\sum_{k=0}^{\infty} \frac{(-1)^k\, 1195^{-1-2k}\left(5^{1+2k} - 4 \times 239^{1+2k}\right)}{1+2k}\right)^8$$

$$\frac{(2\pi)\pi^7}{11520} = \frac{\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k \left(\frac{1}{1+2k} + \frac{2}{1+4k} + \frac{1}{3+4k}\right)\right)^8}{5760}$$

Integral representations:

$$\frac{(2\pi)\pi^7}{11520} = \frac{2}{45}\left(\int_0^{\infty} \frac{1}{1+t^2}\, dt\right)^8$$

$$\frac{(2\pi)\pi^7}{11520} = \frac{512}{45}\left(\int_0^1 \sqrt{1-t^2}\, dt\right)^8$$

$$\frac{(2\pi)\pi^7}{11520} = \frac{2}{45}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\,dt\right)^8$$

We note that:

$$\zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots \approx \frac{\pi^8}{5768.33516} = 1.647314\ldots \cong 1.644934\ldots$$

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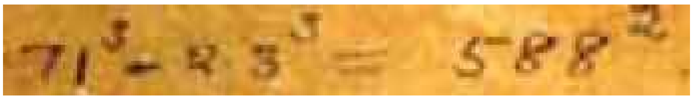


71^3-23^3=588^2

Input:

$71^3 - 23^3 = 588^2$

Result:

True

Left hand side:

$71^3 - 23^3 = 345\,744$

Right hand side:

$588^2 = 345\,744$

(71^3-23^3)/4-(4096*3)-588-71

$4096 = 64^2$

Input:

$\frac{1}{4}(71^3 - 23^3) - 4096 \times 3 - 588 - 71$

Result:

73489

73489

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

Input:

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

Result:

True

Left hand side:

$1^3 + 135^3 + 138^3 = 5\,088\,448$

Right hand side:

$172^3 = 5\,088\,448$

(1^3+135^3+138^3)/64-4096-2048+128

4096 = 64^2; 2048 = 64*8*4; 128 = 64*2

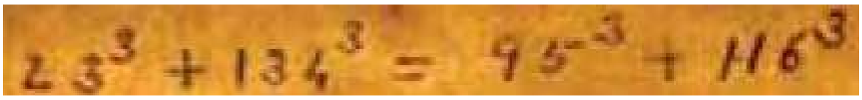
Input:

$\frac{1}{64}(1^3 + 135^3 + 138^3) - 4096 - 2048 + 128$

Result:

73491

73491



23^3+134^3=95^3+116^3

Input:

$23^3 + 134^3 = 95^3 + 116^3$

Result:

True

Left hand side:

$23^3 + 134^3 = 2\,418\,271$

Right hand side:

$95^3 + 116^3 = 2418271$

(23^3+134^3)/32-4096+2048-32

$4096 = 64^2$; 2048 = 64*8*4; 32 = 8*4

Input:

$$\frac{1}{32}(23^3 + 134^3) - 4096 + 2048 - 32$$

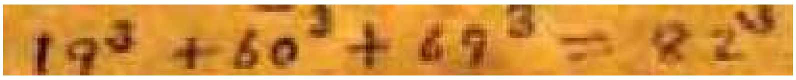
Exact result:

$$\frac{2351711}{32}$$

Decimal form:

73490.96875

73490.96875



19^3+60^3+69^3=82^3

Input:

$19^3 + 60^3 + 69^3 = 82^3$

Result:

True

Left hand side:

$19^3 + 60^3 + 69^3 = 551368$

Right hand side:

$82^3 = 551368$

(19^3+60^3+69^3)/8+4096+512-32-8

$4096 = 64^2$; 512 = 64*8; 32 = 8*4

Input:

$$\frac{1}{8}\left(19^3+60^3+69^3\right)+4096+512-32-8$$

Result:

73 489

73489

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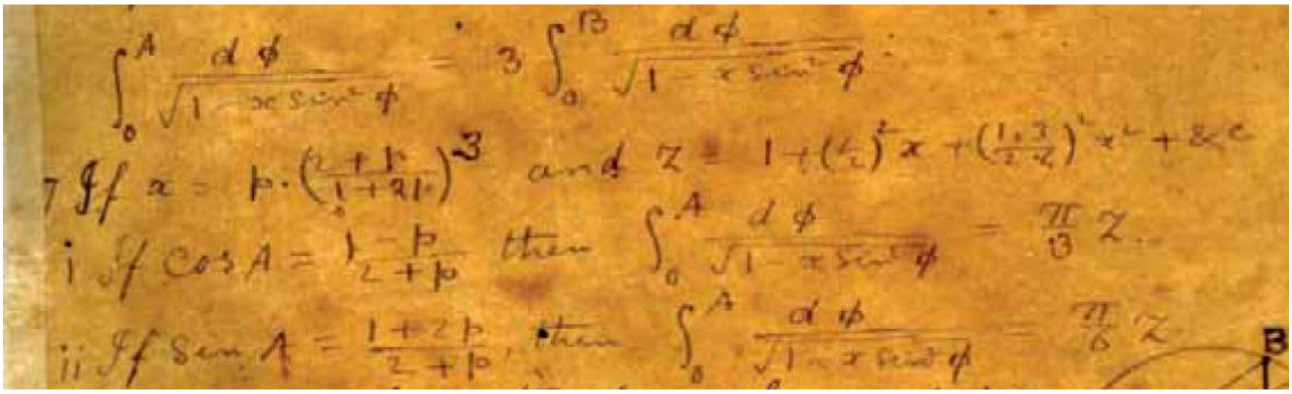


$$\int_0^A \frac{d\phi}{\sqrt{1-x\sin^2\phi}} = 3\int_0^B \frac{d\phi}{\sqrt{1-x\sin^2\phi}}$$

7 If $x = p\cdot\left(\frac{2+p}{1+2p}\right)^3$ and $z = 1+\left(\frac{1}{2}\right)^2 x+\left(\frac{1\cdot 3}{2\cdot 4}\right)^2 x^2 + \&c$

i If $\cos A = \frac{1-p}{2+p}$ then $\int_0^A \frac{d\phi}{\sqrt{1-x\sin^2\phi}} = \frac{\pi}{3}z$.

ii If $\sin A = \frac{1+2p}{2+p}$, then $\int_0^A \frac{d\phi}{\sqrt{1-x\sin^2\phi}} = \frac{\pi}{6}z$

1+(1/4)x+(3/8)^2 x^2

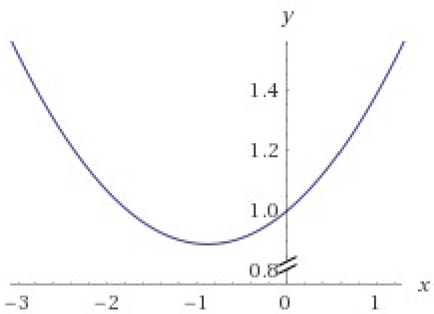
Input:

$$1+\frac{1}{4}x+\left(\frac{3}{8}\right)^2 x^2$$

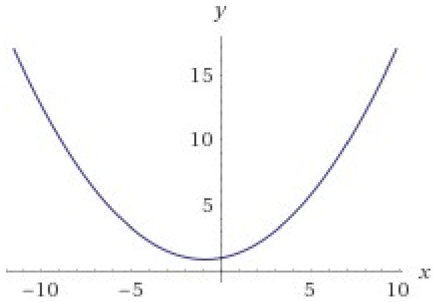
Result:

$$\frac{9x^2}{64}+\frac{x}{4}+1$$

Plots:



(x from −3.1 to 1.3)



(x from −11.6 to 9.8)

Geometric figure:

parabola

Alternate forms:

$$\frac{1}{64}(9x^2+16x+64)$$

$$\frac{1}{64}x(9x+16)+1$$

$$\left(\frac{9x}{64}+\frac{1}{4}\right)x+1$$

Complex roots:

$x \approx -0.8889 - 2.5142\,i$

$x \approx -0.8889 + 2.5142\,i$

Polynomial discriminant:

$$\Delta = -\frac{1}{2}$$

Properties as a real function:

Domain

$\mathbb{R}$ (all real numbers)

Range

$$\{y \in \mathbb{R} : y \ge \frac{8}{9}\}$$

$\mathbb{R}$ is the set of real numbers

Derivative:

$$\frac{d}{dx}\left(1+\frac{x}{4}+\left(\frac{3}{8}\right)^2 x^2\right) = \frac{1}{32}(9x+8)$$

Indefinite integral:

$$\int \left(1 + \frac{x}{4} + \frac{9x^2}{64}\right) dx = \frac{3x^3}{64} + \frac{x^2}{8} + x + \text{constant}$$

Global minimum:

$$\min\left\{1 + \frac{x}{4} + \left(\frac{3}{8}\right)^2 x^2\right\} = \frac{8}{9} \text{ at } x = -\frac{8}{9}$$

(-0.8889+2.5142i)*Pi/3

Input interpretation:

$$(-0.8889 + 2.5142\,i) \times \frac{\pi}{3}$$

i is the imaginary unit

Result:

$-0.930854\ldots +$
$2.63286\ldots\,i$

Polar coordinates:

$r = 2.79257$ (radius), $\theta = 109.471°$ (angle)

2.79257

Alternative representations:

$$\frac{1}{3}(-0.8889 + 2.5142\,i)\,\pi = 60\,°\,(-0.8889 + 2.5142\,i)$$

$$\frac{1}{3}(-0.8889 + 2.5142\,i)\,\pi = -\frac{1}{3}\,i\,(-0.8889 + 2.5142\,i)\log(-1)$$

$$\frac{1}{3}(-0.8889 + 2.5142\,i)\,\pi = \frac{1}{3}(-0.8889 + 2.5142\,i)\cos^{-1}(-1)$$

Series representations:

$$\frac{1}{3}(-0.8889 + 2.5142\,i)\,\pi = 3.35227\,(-0.353552 + i)\sum_{k=0}^{\infty}\frac{(-1)^k}{1 + 2k}$$

$$\frac{1}{3}(-0.8889+2.5142\,i)\pi = 1.67613(-0.353552+i)\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)$$

$$\frac{1}{3}(-0.8889+2.5142\,i)\pi = 0.838067(-0.353552+i)\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$\frac{1}{3}(-0.8889+2.5142\,i)\pi = \int_0^{\infty}\frac{-0.5926+1.67613\,i}{1+t^2}\,dt$$

$$\frac{1}{3}(-0.8889+2.5142\,i)\pi = 3.35227(-0.353552+i)\int_0^1\sqrt{1-t^2}\,dt$$

$$\frac{1}{3}(-0.8889+2.5142\,i)\pi = \int_0^{\infty}\frac{(-0.5926+1.67613\,i)\sin(t)}{t}\,dt$$

((((-0.8889+2.5142i)*Pi/3)))^1/2

Input interpretation:

$$\sqrt{(-0.8889+2.5142\,i)\times\frac{\pi}{3}}$$

i is the imaginary unit

Result:

0.964811... +
1.36445... i

Polar coordinates:

$r = 1.6711$ (radius), $\theta = 54.7356°$ (angle)

1.6711

We note that 1.6711 is a result practically equal to the value of the formula:

$$m_{p'} = 2 \times \frac{\eta}{R} m_P = 1.6714213 \times 10^{-24} \text{ gm}$$

that is the holographic proton mass (N. Haramein)

1/((((-0.8889+2.5142i)*Pi/3)))^1/4096

Input interpretation:

$$\frac{1}{\sqrt[4096]{(-0.8889 + 2.5142\, i) \times \frac{\pi}{3}}}$$

i is the imaginary unit

Result:

0.99974920... −
0.00046634590... i

Polar coordinates:

$r = 0.999749$ (radius), $\theta = -0.0267264°$ (angle)

0.999749 result practically equal to the value of the following Rogers-Ramanujan continued fraction:

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

Alternative representations:

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889 + 2.5142\, i)\pi}} = \frac{1}{\sqrt[4096]{60\,°\,(-0.8889 + 2.5142\, i)}}$$

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889 + 2.5142\, i)\pi}} = \frac{1}{\sqrt[4096]{-\frac{1}{3}\, i\,(-0.8889 + 2.5142\, i)\log(-1)}}$$

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\,\pi}}=\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\cos^{-1}(-1)}}$$

Series representations:

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\,\pi}}=\frac{0.999705}{\sqrt[4096]{(-0.353552+i)\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}$$

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\,\pi}}=\frac{0.999874}{\sqrt[4096]{(-0.353552+i)\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)}}$$

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\,\pi}}=\frac{1.00004}{\sqrt[4096]{(-0.353552+i)\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\,\pi}}=\frac{0.999874}{\sqrt[4096]{-0.353552+i\int_0^{\infty}\frac{1}{1+t^2}\,dt}}$$

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\,\pi}}=\frac{0.999705}{\sqrt[4096]{-0.353552+i\int_0^{1}\sqrt{1-t^2}\,dt}}$$

$$\frac{1}{\sqrt[4096]{\frac{1}{3}(-0.8889+2.5142\,i)\,\pi}}=\frac{0.999874}{\sqrt[4096]{-0.353552+i\int_0^{\infty}\frac{\sin(t)}{t}\,dt}}$$

-512-2048-1/3((((-0.8889+2.5142i)*Pi/3)))^12

Input interpretation:

$$-512-2048-\frac{1}{3}\left((-0.8889+2.5142\,i)\times\frac{\pi}{3}\right)^{12}$$

i is the imaginary unit

Result:

41876.7... +
60390.8... i

Polar coordinates:

$r = 73489.5$ (radius), $\theta = 55.2615°$ (angle)

73489.5

Alternative representations:

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-\frac{1}{3}\left(60\,°\,(-0.8889+2.5142\,i)\right)^{12}$$

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-\frac{1}{3}\left(-\frac{1}{3}\,i\,(-0.8889+2.5142\,i)\log(-1)\right)^{12}$$

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\cos^{-1}(-1)\right)^{12}$$

Series representations:

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-671\,338.\,(0.353552-i)^{12}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{12}$$

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-0.0400149\,(0.353552-i)^{12}\left(\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^{12}$$

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-163.901\,(0.353552-i)^{12}\,\sqrt{3}^{12}\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{3}\right)^k}{1+2\,k}\right)^{12}$$

Integral representations:

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-163.901\,(0.353552-i)^{12}\left(\int_0^{\infty}\frac{1}{1+t^2}\,dt\right)^{12}$$

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-671\,338.\,(0.353552-i)^{12}\left(\int_0^{1}\sqrt{1-t^2}\,dt\right)^{12}$$

$$-512-2048-\frac{1}{3}\left(\frac{1}{3}(-0.8889+2.5142\,i)\,\pi\right)^{12} = -2560-163.901\,(0.353552-i)^{12}\left(\int_0^{\infty}\frac{\sin(t)}{t}\,dt\right)^{12}$$

(-0.8889+2.5142i)*Pi/6

Input interpretation:

$$(-0.8889+2.5142\,i)\times\frac{\pi}{6}$$

i is the imaginary unit

Result:

$-0.465427\ldots +$
$1.31643\ldots\, i$

Polar coordinates:

$r = 1.39629$ (radius), $\theta = 109.471°$ (angle)

1.39629

Alternative representations:

$$\frac{1}{6}(-0.8889+2.5142\,i)\,\pi = \frac{180}{6}\,°\,(-0.8889+2.5142\,i)$$

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = -\frac{1}{6}\,i\,((-0.8889+2.5142\,i)\log(-1))$$

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = \frac{1}{6}(-0.8889+2.5142\,i)\cos^{-1}(-1)$$

Series representations:

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = 1.67613\,(-0.353552+i)\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = 0.838067\,(-0.353552+i)\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)$$

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = 0.419033\,(-0.353552+i)\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

$\binom{n}{m}$ is the binomial coefficient

Integral representations:

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = \int_0^{\infty}\frac{-0.2963+0.838067\,i}{1+t^2}\,dt$$

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = 1.67613\,(-0.353552+i)\int_0^1\sqrt{1-t^2}\,dt$$

$$\frac{1}{6}(-0.8889+2.5142\,i)\pi = \int_0^{\infty}\frac{(-0.2963+0.838067\,i)\sin(t)}{t}\,dt$$

1/((((-0.8889+2.5142i)*Pi/6)))^1/1024

Input interpretation:

$$\frac{1}{\sqrt[1024]{(-0.8889+2.5142\,i)\times\frac{\pi}{6}}}$$

i is the imaginary unit

Result:

0.99967232... −
0.0018652422... i

Polar coordinates:

$r = 0.999674$ (radius), $\theta = -0.106905°$ (angle)

0.999674 result practically equal to the value of the following Rogers-Ramanujan continued fraction:

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

Alternative representations:

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}}=\frac{1}{\sqrt[1024]{\frac{180}{6}\,°\,(-0.8889+2.5142\,i)}}$$

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}}=\frac{1}{\sqrt[1024]{-\frac{1}{6}\,i\,((-0.8889+2.5142\,i)\log(-1))}}$$

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}}=\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\cos^{-1}(-1)}}$$

Series representations:

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}}=\frac{0.999496}{\sqrt[1024]{(-0.353552+i)\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}}$$

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}}=\frac{1.00017}{\sqrt[1024]{(-0.353552+i)\left(-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)}}$$

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}} = \frac{1.00085}{\sqrt[1024]{(-0.353552+i)\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50\,k)}{\binom{3k}{k}}}}$$

Integral representations:

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}} = \frac{1.00017}{\sqrt[1024]{-0.353552+i\int_0^{\infty}\frac{1}{1+t^2}\,dt}}$$

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}} = \frac{0.999496}{\sqrt[1024]{-0.353552+i\int_0^{1}\sqrt{1-t^2}\,dt}}$$

$$\frac{1}{\sqrt[1024]{\frac{1}{6}(-0.8889+2.5142\,i)\,\pi}} = \frac{1.00017}{\sqrt[1024]{-0.353552+i\int_0^{\infty}\frac{\sin(t)}{t}\,dt}}$$

((((-0.8889+2.5142i)*Pi/6)))^32*1.61803398-4096*Pi-276-320-384-89

Input interpretation:

$$\left((-0.8889+2.5142\,i)\times\frac{\pi}{6}\right)^{32}\times 1.61803398-4096\,\pi-276-320-384-89$$

i is the imaginary unit

Result:

$-22435.0\ldots -$
$69983.1\ldots\,i$

Polar coordinates:

$r = 73491.2$ (radius), $\theta = -107.775°$ (angle)

73491.2

Alternative representations:

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803-4096\,\pi-276-320-384-89 = -1069-737280\,°+1.61803\left(\frac{180}{6}\,°\,(-0.8889+2.5142\,i)\right)^{32}$$

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803-4096\,\pi-276-320-384-89 = -1069+4096\,i\log(-1)+1.61803\left(-\frac{1}{6}\,i\,((-0.8889+2.5142\,i)\log(-1))\right)^{32}$$

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803-4096\,\pi-276-320-384-89 = -1069-4096\cos^{-1}(-1)+1.61803\left(\frac{1}{6}(-0.8889+2.5142\,i)\cos^{-1}(-1)\right)^{32}$$

Series representations:

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803-4096\,\pi-276-320-384-89 = -1069-16384\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}+2.43703\times10^{7}\,(0.353552-i)^{32}\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^{32}$$

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803-4096\,\pi-276-320-384-89 = -1069-4096\left(-2+2\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)+ 2.03305\times10^{-25}\,(-0.8889+2.5142\,i)^{32}\left(-2+2\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}\right)^{32}$$

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803-4096\,\pi-276-320-384-89 = -1069-4096\left(x+2\sum_{k=1}^{\infty}\frac{\sin(k\,x)}{k}\right)+2.03305\times10^{-25} (-0.8889+2.5142\,i)^{32}\left(x+2\sum_{k=1}^{\infty}\frac{\sin(k\,x)}{k}\right)^{32} \quad \text{for } (x\in\mathbb{R} \text{ and } x>0)$$

Integral representations:

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803 - 4096\,\pi - 276 - 320 - 384 - 89 =$$
$$-1069 - 8192\int_0^\infty \frac{1}{1+t^2}\,dt + 0.00567416\,(0.353552 - i)^{32}\left(\int_0^\infty \frac{1}{1+t^2}\,dt\right)^{32}$$

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803 - 4096\,\pi - 276 - 320 - 384 - 89 =$$
$$-1069 - 8192\int_0^\infty \frac{\sin(t)}{t}\,dt + 0.00567416\,(0.353552 - i)^{32}\left(\int_0^\infty \frac{\sin(t)}{t}\,dt\right)^{32}$$

$$\left(\frac{1}{6}(-0.8889+2.5142\,i)\,\pi\right)^{32} 1.61803 - 4096\,\pi - 276 - 320 - 384 - 89 =$$
$$-1069 - 16\,384\int_0^1 \sqrt{1-t^2}\,dt + 2.43703\times 10^7\,(0.353552 - i)^{32}\left(\int_0^1 \sqrt{1-t^2}\,dt\right)^{32}$$

Note that we have obtained various very similar results:

73489; 73491; 73490.96875; 73489; 73489.5; 73491.2

Performing the average of these values, we obtain:

(73489 + 73491+ 73490.96875+73489+ 73489.5+ 73491.2)/6 =

= 73490.1114583...

Thence, we have the following mathematical connection:

$$\left(\frac{1}{6}(73\,489 + 73\,491 + 73\,490.96875 + 73\,489 + 73\,489.5 + 73\,491.2)\right) = 73490.1114\ldots \Rightarrow$$

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

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

= 73490.8437525.... ⇒

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

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

$$= 73491.78832548118710549159572042220548025195726563413398700\ldots$$

$$= 73491.7883254\ldots \Rightarrow$$

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

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

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

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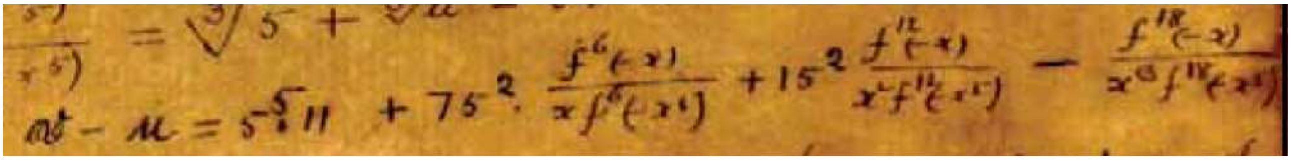


For $v = y$; $u = z$, and $f^6/f^6 = f^{12}/f^{12} = -1$ $f^{18}/f^{18} = 1$, we obtain:

y-z = 5^5*11+75^2*-1/x^5+15^2*-1/x^6-1/x^7

Input:

$$y - z = 5^5 \times 11 + \frac{75^2 \times (-1)}{x^5} + \frac{15^2 \times (-1)}{x^6} - \frac{1}{x^7}$$

Result:

$$y - z = -\frac{1}{x^7} - \frac{225}{x^6} - \frac{5625}{x^5} + 34\,375$$

Alternate forms:

$$\frac{1}{x^7} + \frac{225}{x^6} + \frac{5625}{x^5} + y - 34\,375 = z$$

$$y - z = \frac{34\,375\,x^7 - 5625\,x^2 - 225\,x - 1}{x^7}$$

$$y - z = \frac{25\,x\,(25\,x\,(55\,x^5 - 9) - 9) - 1}{x^7}$$

Solution:

$$x \neq 0\,, \quad z = \frac{x^7\,y - 34\,375\,x^7 + 5625\,x^2 + 225\,x + 1}{x^7}$$

Integer solutions:

$$x = -1\,, \quad z = y - 39\,776$$

$$x = 1\,, \quad z = y - 28\,524$$

Implicit derivatives:

$$\frac{\partial x(y,\,z)}{\partial z} = -\frac{x^8}{7 + 1350\,x + 28\,125\,x^2}$$

$$\frac{\partial x(y,\,z)}{\partial y} = \frac{x^8}{7 + 1350\,x + 28\,125\,x^2}$$

$$\frac{\partial y(x,\,z)}{\partial z} = 1$$

$$\frac{\partial y(x,\,z)}{\partial x} = \frac{7 + 1350\,x + 28\,125\,x^2}{x^8}$$

$$\frac{\partial z(x,\,y)}{\partial y} = 1$$

$$\frac{\partial z(x,\,y)}{\partial x} = -\frac{7 + 1350\,x + 28\,125\,x^2}{x^8}$$

y-39776 = (1 + 225 x + 5625 x^2 - 34375 x^7 + x^7 y)/x^7

Input:

$$y - 39\,776 = \frac{1 + 225\,x + 5625\,x^2 - 34\,375\,x^7 + x^7\,y}{x^7}$$

Alternate form assuming x and y are real:

$$5401\, x^6 + 5625\, x + \frac{1}{x} + 225 = 0$$

Alternate forms:

$$y - 39\,776 = \frac{1}{x^7} + \frac{225}{x^6} + \frac{5625}{x^5} + y - 34\,375$$

$$y - 39\,776 = \frac{225\, x\,(25\, x + 1) + 1}{x^7} + y - 34\,375$$

Real solutions:

$x = -1$

$x \approx -0.0349071$

$x \approx -0.00509288$

Complex solutions:

$x \approx -0.303495 - 0.958968\, i$

$x \approx -0.303495 + 0.958968\, i$

$x \approx 0.823495 - 0.592668\, i$

$x \approx 0.823495 + 0.592668\, i$

Implicit derivatives:

$$\frac{\partial x(y)}{\partial y} = 0$$

For x = - 1

y=39776+ (1 + 225 *-1 + 5625 - 34375 *-1 - y)/-1

Input:

$$y = 39\,776 + -\frac{1}{1}\,(1 + 225 \times (-1) + 5625 - 34\,375 \times (-1) - y)$$

Result:

True

y-39776+ (1 + 225 *-1 + 5625 - 34375 *-1 - y)/-1=0

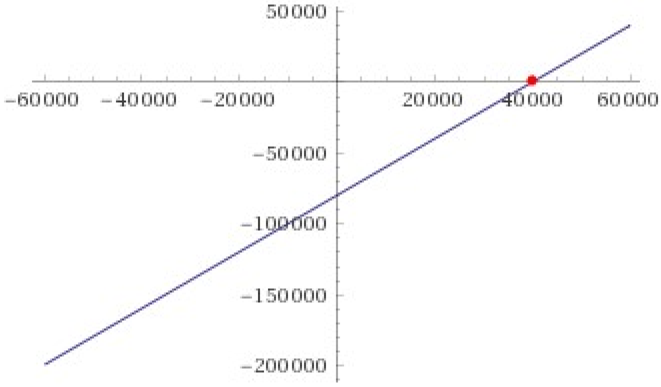
Input:

$$y - 39\,776 + -\frac{1}{1}\,(1 + 225 \times (-1) + 5625 - 34\,375 \times (-1) - y) = 0$$

Result:

$2\, y - 79\,552 = 0$

Root plot:



Alternate form:

$2(y - 39776) = 0$

Solution:

$y = 39776$

39776-0 = 5^5*11+75^2*-1/(-1)^5+15^2*-1+1

Input:

$$39776 - 0 = 5^5 \times 11 + \frac{75^2 \times (-1)}{(-1)^5} + 15^2 \times (-1) + 1$$

Result:

True

Left hand side:

$39776 - 0 = 39776$

Right hand side:

$$5^5 \times 11 + \frac{75^2 (-1)}{(-1)^5} + 15^2 (-1) + 1 = 39776$$

Now, we have that:

((5^5*11+75^2*-1/(-1)^5+15^2*-1+1))*2-4096-2048+64+16+4

Input:

$$\left(5^5 \times 11 + \frac{75^2 \times (-1)}{(-1)^5} + 15^2 \times (-1) + 1\right) \times 2 - 4096 - 2048 + 64 + 16 + 4$$

Result:

73492

73492

Thence, we have the following mathematical connection:

$$\left(\left(5^5 \times 11 + \frac{75^2 \times (-1)}{(-1)^5} + 15^2 \times (-1) + 1\right) \times 2 - 4096 - 2048 + 64 + 16 + 4\right) = 73492 \Rightarrow$$

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

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

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

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

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

$$= 73491.788325481187105491595720422205480251957265634133987 00...$$

$$= 73491.7883254... \Rightarrow$$

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

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

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

The above expression, can be calculated also as follows:

y-z = 5^5*11+75^2*1/x^5+15^2*1/x^6-1/x^7

Input:

$$y - z = 5^5 \times 11 + 75^2 \times \frac{1}{x^5} + 15^2 \times \frac{1}{x^6} - \frac{1}{x^7}$$

Result:

$$y - z = -\frac{1}{x^7} + \frac{225}{x^6} + \frac{5625}{x^5} + 34375$$

Alternate forms:

$$z = \frac{1}{x^7} - \frac{225}{x^6} - \frac{5625}{x^5} + y - 34375$$

$$\frac{1}{x^7} + y = \frac{225}{x^6} + \frac{5625}{x^5} + z + 34375$$

$$y - z = \frac{34375\,x^7 + 5625\,x^2 + 225\,x - 1}{x^7}$$

Solution:

$$x \neq 0, \quad z = \frac{x^7\,y - 34375\,x^7 - 5625\,x^2 - 225\,x + 1}{x^7}$$

Integer solutions:

$$x = -1, \quad z = y - 28976$$

$$x = 1, \quad z = y - 40224$$

Implicit derivatives:

$$\frac{\partial x(y, z)}{\partial z} = \frac{x^8}{-7 + 1350\,x + 28125\,x^2}$$

$$\frac{\partial x(y, z)}{\partial y} = \frac{x^8}{7 - 1350\,x - 28125\,x^2}$$

$$\frac{\partial y(x, z)}{\partial z} = 1$$

$$\frac{\partial y(x, z)}{\partial x} = \frac{7 - 1350\,x - 28\,125\,x^2}{x^8}$$

$$\frac{\partial z(x, y)}{\partial y} = 1$$

$$\frac{\partial z(x, y)}{\partial x} = \frac{-7 + 1350\,x + 28\,125\,x^2}{x^8}$$

y-40224 = (1 - 225 x - 5625 x^2 - 34375 x^7 + x^7 y)/x^7

Input:

$$y - 40\,224 = \frac{1 - 225\,x - 5625\,x^2 - 34\,375\,x^7 + x^7\,y}{x^7}$$

Alternate form assuming x and y are real:

$$5849\,x^6 + \frac{1}{x} = 5625\,x + 225$$

Alternate forms:

$$y - 40\,224 = \frac{1}{x^7} - \frac{225}{x^6} - \frac{5625}{x^5} + y - 34\,375$$

$$y - 40\,224 = \frac{1 - 225\,x\,(25\,x + 1)}{x^7} + y - 34\,375$$

Alternate form assuming x and y are positive:

$$5849\,x^7 + 1 = 225\,x\,(25\,x + 1)$$

Real solutions:

$$x = 1$$

$$x \approx -0.044037$$

$$x \approx 0.00403701$$

Complex solutions:

$$x \approx -0.794535 - 0.583357\,i$$

$$x \approx -0.794535 + 0.583357\,i$$

$$x \approx 0.314535 - 0.94387\,i$$

$x \approx 0.314535 + 0.94387\, i$

Implicit derivatives:

$$\frac{\partial x(y)}{\partial y} = 0$$

y-40224 =-34375 + (1 - 225 (1 + 25)) + y

Input:

$y - 40\,224 = -34\,375 + (1 - 225\,(1 + 25)) + y$

Result:

True

-34375 + (1 - 225 (1 + 25)) + y = 0

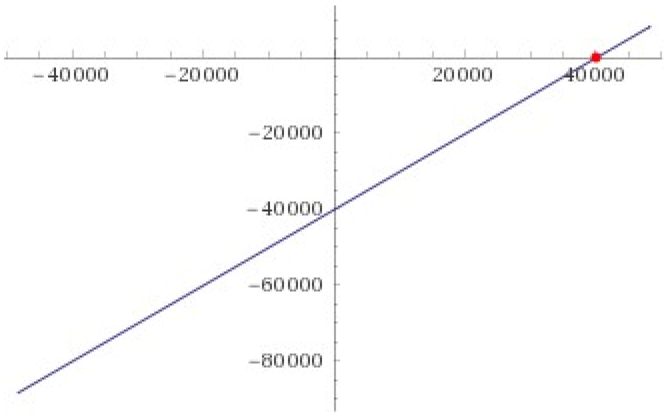
Input:

$-34\,375 + (1 - 225\,(1 + 25)) + y = 0$

Result:

$y - 40\,224 = 0$

Root plot:



Solution:

$y = 40\,224$

40224*2-(64^2+64*4*8+64*8+64*4+8*4+16)

Input:

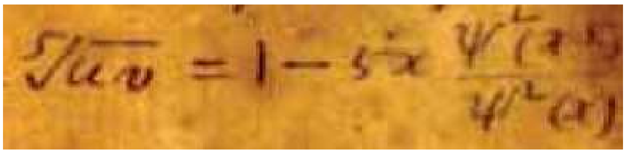
$$40\,224\times 2-(64^2+64\times 4\times 8+64\times 8+64\times 4+8\times 4+16)$$

Result:

$$73\,488$$

73488

Now, we have that:



$$\sqrt[5]{uv} = 1 - 5x\frac{\psi^2(x^5)}{\psi^2(x)}$$

For x = -1 and X = (Ψ^2/Ψ^2), we obtain:

0 = 1-5*X

$$5X = 1$$

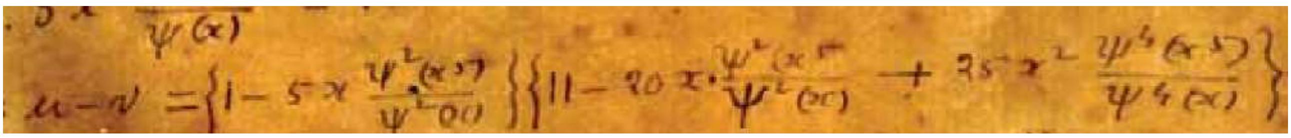
$$5X - 1 = 0$$

$$X = \frac{1}{5}$$

X = (Ψ^2/Ψ^2) = 1/5

v = y; u = z; v = 40224; u = 0

We have that:



$$u - v = \left\{1 - 5x\frac{\psi^2(x^5)}{\psi^2(x)}\right\}\left\{11 - 20x\frac{\psi^2(x^5)}{\psi^2(x)} + 25x^2\frac{\psi^4(x^5)}{\psi^4(x)}\right\}$$

-40224 - (1-5*1/5)*((11-20*1/5+25*(1/5)^2)) = -40224

Input:

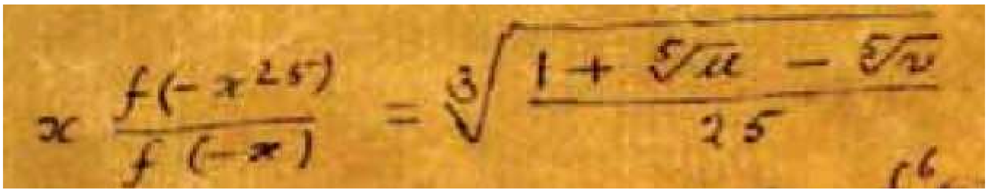
$$-40\,224-\left(1-5\times\frac{1}{5}\right)\left(11-20\times\frac{1}{5}+25\left(\frac{1}{5}\right)^2\right)=-40\,224$$

Result:

True

-40224 = -40224;   40224 = 40224

And:



$$x\frac{f(-x^{25})}{f(-x)} = \sqrt[3]{\frac{1+\sqrt[5]{u}-\sqrt[5]{v}}{25}}$$

(((1+0-40224)/25)))^1/3

Input:

$$\sqrt[3]{\frac{1}{25}(1+0-40\,224)}$$

Result:

$$\frac{\sqrt[3]{-40\,223}}{5^{2/3}}$$

Decimal approximation:

5.85888294238292786529883089587725142144433920849672873689... +
10.1478829318058701834705486960572299586888687249430612018... i

Polar coordinates:

$r \approx 11.7178$ (radius), $\theta = 60°$ (angle)

11.7178 result very near to the black hole entropy 11.8458

Alternate forms:

$$\frac{\sqrt[3]{-201\,115}}{5}$$

root of $25x^3 + 40\,223$ near $x = 5.85888 + 10.1479\,i$

$$\frac{\sqrt[3]{40\,223}}{2\times 5^{2/3}} + \frac{i\sqrt{3}\,\sqrt[3]{40\,223}}{2\times 5^{2/3}}$$

1/(((1+0-40224)/25)))^1/3

Input:

$$\frac{1}{\sqrt[3]{\frac{1}{25}(1+0-40\,224)}}$$

Result:

$$-\frac{(-5)^{2/3}}{\sqrt[3]{40\,223}}$$

Decimal approximation:

0.04267025002181044979262887140046482427577369945595943074... − 0.07390704100944269351090280626296223509316942160101431505... i

Polar coordinates:

$r \approx 0.0853405$ (radius), $\theta = -60°$ (angle)

0.0853405

Alternate forms:

$$-\frac{(-201\,115)^{2/3}}{40\,223}$$

(((1/(((1+0-40224)/25)))^1/3))^1/64

Input:

$$\sqrt[64]{\sqrt[3]{\frac{1}{\frac{1}{25}(1+0-40\,224)}}}$$

Result:

$$\sqrt[192]{-\frac{1}{40\,223}}\ \sqrt[96]{5}$$

Decimal approximation:

0.9621464023344880154486574313176803411252001447397312689... + 0.01574448881057173225038021685401795511252820425883944368... i

Polar coordinates:

$r \approx 0.962275$ (radius), $\theta \approx 0.9375°$ (angle)

0.962275 result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\frac{e^{-\pi}}{1+\frac{e^{-2\pi}}{1+\frac{e^{-3\pi}}{1+\frac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

and to the spectral index n_s and to the mesonic Regge slope (see Appendix)

Alternate forms:

$$\frac{40\,223^{191/192}\sqrt[192]{-25}}{40\,223}$$

$$\frac{\sqrt[96]{5}\cos\left(\frac{\pi}{192}\right)}{\sqrt[192]{40\,223}}+\frac{i\sqrt[96]{5}\sin\left(\frac{\pi}{192}\right)}{\sqrt[192]{40\,223}}$$

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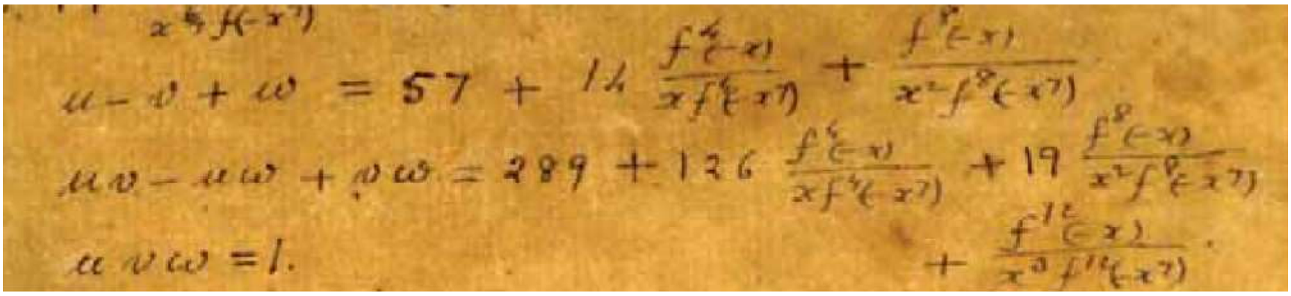


$$x^5 f(-x^7)$$

$$u-v+w=57+14\frac{f^4(-x)}{x f^4(-x^7)}+\frac{f^8(-x)}{x^2 f^8(-x^7)}$$

$$uv-uw+vw=289+126\frac{f^4(-x)}{x f^4(-x^7)}+19\frac{f^8(-x)}{x^2 f^8(-x^7)}+\frac{f^{12}(-x)}{x^3 f^{12}(-x^7)}.$$

$$uvw=1.$$

For x = 0.00403701, we obtain:

57+14*1/(0.00403701)^7+1/(0.00403701)^8-1

Input interpretation:

$$57+14\times\frac{1}{0.00403701^7}+\frac{1}{0.00403701^8}-1$$

Result:

$1.4976087076988711276669815936609084297451154706750441... \times 10^{19}$

1.4976087… * 10^{19}

289+126*1/(0.00403701)^7+19*1/(0.00403701)^8+1/(0.00403701)^9-1

Input interpretation:

$$289 + 126 \times \frac{1}{0.00403701^7} + 19 \times \frac{1}{0.00403701^8} + \frac{1}{0.00403701^9} - 1$$

Result:

$3.787782792047973537293711023894100541685822653549730 3... \times 10^{21}$

3.787782792… * 10^{21}

3.78778279204797353 × 10^21 / 1.497608707698871 × 10^19

Input interpretation:

$$\frac{3.78778279204797353 \times 10^{21}}{1.497608707698871 \times 10^{19}}$$

Result:

252.92205985287281059361717906173215675084091633782352065 21...

252.922059…

(3.78778279204797353 × 10^21 / 1.497608707698871 × 10^19)^1/11

Input interpretation:

$$\sqrt[11]{\frac{3.78778279204797353 \times 10^{21}}{1.497608707698871 \times 10^{19}}}$$

Result:

1.653687095030971...

1.653687…. is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164,2696$ i.e. 1,65578...

1/(((3.78778279204797353 × 10^21 / 1.497608707698871 × 10^19)))^1/512

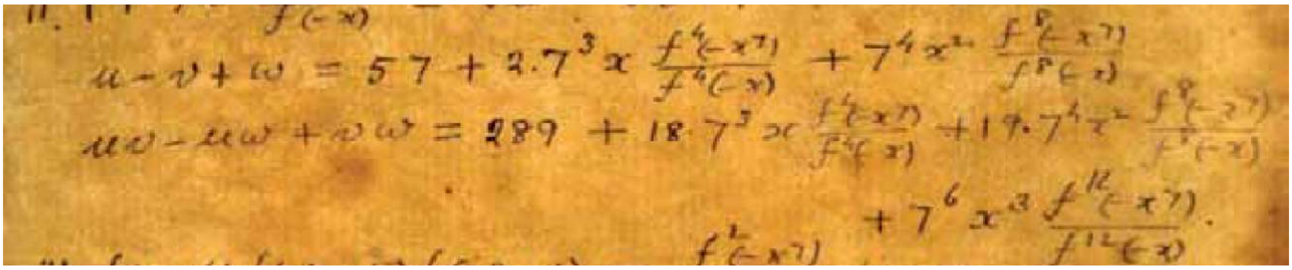
Input interpretation:

$$\frac{1}{\sqrt[512]{\frac{3.78778279204797353 \times 10^{21}}{1.497608707698871 \times 10^{19}}}}$$

Result:

0.989251384111376078...

0.98925138…. result very near to the dilaton value $\mathbf{0.989117352243} = \boldsymbol{\phi}$



$$u - v + w = 57 + 2 \cdot 7^3 x \frac{f^4(-x^7)}{f^4(-x)} + 7^4 x^2 \frac{f^8(-x^7)}{f^8(-x)}$$

$$uv - uw + vw = 289 + 18 \cdot 7^3 x \frac{f^4(-x^7)}{f^4(-x)} + 19 \cdot 7^4 x^2 \frac{f^8(-x^7)}{f^8(-x)} + 7^6 x^3 \frac{f^{12}(-x^7)}{f^{12}(-x)}.$$

57+2*7^3*(0.00403701)^7+7^4*(0.00403701)^8-1

Input interpretation:

$57 + 2 \times 7^3 \times 0.00403701^7 + 7^4 \times 0.00403701^8 - 1$

Result:

56.00000000000001215727730954987175619516546307399143728263...

56

289+18*7^3*(0.00403701)^7+19*7^4*(0.00403701)^8+7^6*(0.00403701)^9

Input interpretation:

$$289+18\times 7^3\times 0.00403701^7+19\times 7^4\times 0.00403701^8+7^6\times 0.00403701^9$$

Result:

289.000000000000111142835771300623144953035266037707429l756...

289

((((1/2(((289+18*7^3*(0.00403701)^7+19*7^4*(0.00403701)^8+7^6*(0.00403701)^9)))/(((57+2*7^3*(0.00403701)^7+7^4*(0.00403701)^8-1)))))))^1/2

Input interpretation:

$$\sqrt{\frac{1}{2}\times\frac{289+18\times 7^3\times 0.00403701^7+19\times 7^4\times 0.00403701^8+7^6\times 0.00403701^9}{57+2\times 7^3\times 0.00403701^7+7^4\times 0.00403701^8-1}}$$

Result:

1.6063490102892158501 8...

1.606349.... result very near to the elementary charge

In conclusion, we have that, from the multiplication of the two previous results, we obtain:

1/10^4(((57+2*7^3*(0.00403701)^7+7^4*(0.00403701)^8-1)))*(((289+18*7^3*(0.00403701)^7+19*7^4*(0.00403701)^8+7^6*(0.00403701)^9)))

where $f = 1/10^4$

Input interpretation:

$$\frac{1}{10^4}\left(57+2\times 7^3\times 0.00403701^7+7^4\times 0.00403701^8-1\right)\left(289+18\times 7^3\times 0.00403701^7+19\times 7^4\times 0.00403701^8+7^6\times 0.00403701^9\right)$$

Result:

1.618400000000000973745194565274918485204823518738061318220...

1.6184...

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

[1/((((1/2(((289+18*7^3*(0.00403701)^7+19*7^4*(0.00403701)^8+7^6*(0.00403701)^9)))/(((57+2*7^3*(0.00403701)^7+7^4*(0.00403701)^8-1)))))))^1/2]^1/32

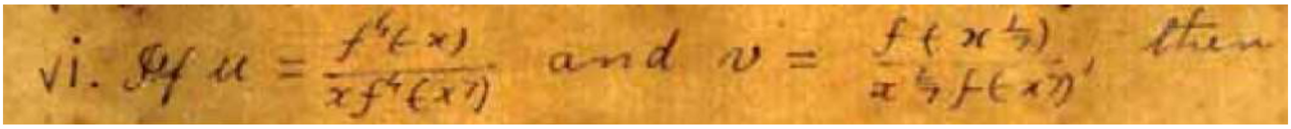
Input interpretation:

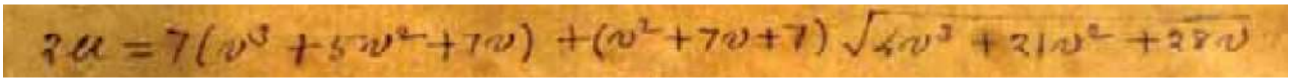
$$\sqrt[32]{\frac{1}{\sqrt{\frac{1}{2}\times\frac{289+18\times 7^3\times 0.00403701^7+19\times 7^4\times 0.00403701^8+7^6\times 0.00403701^9}{57+2\times 7^3\times 0.00403701^7+7^4\times 0.00403701^8-1}}}}$$

Result:

0.985297776687614314869...

0.985297776... result very near to the dilaton value **0.989117352243 = ϕ**





For u = v = 1, we obtain:

(((7(1+5+7)+(1+7+7)*sqrt(4+21+28))))-2

Input:

$$\left(7(1+5+7)+(1+7+7)\sqrt{4+21+28}\right)-2$$

Result:

$$89+15\sqrt{53}$$

Decimal approximation:

198.20164833920777406645953737290549190666504523864716157 56...

198.201648…

Minimal polynomial:

$x^2 - 178x - 4004$

Note that:

289 - 56 = 233; 198.201648 – 56 = 142.201648; 233 / 142.201648 =

= 1.63851828215 ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934\ldots$

We note also that:

((1/(1.63851828215)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{1.63851828215}}$$

Result:

0.999036026743384...

0.999036... result practically equal to the value of the following Rogers-Ramanujan continued fraction:

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

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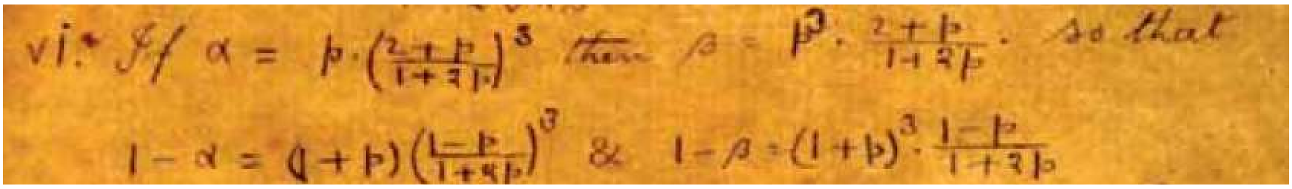
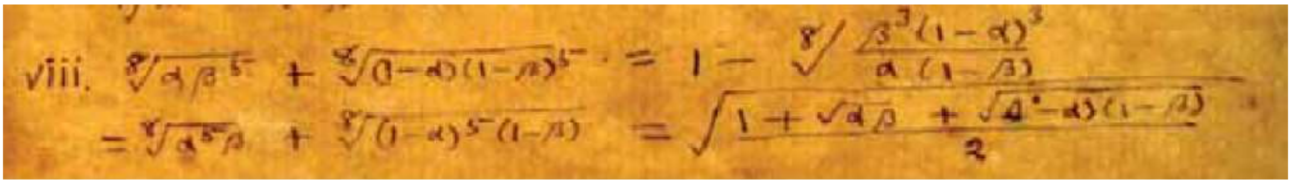


vi. If $\alpha = p\cdot\left(\frac{2+p}{1+2p}\right)^3$ then $\beta = p^3\cdot\frac{2+p}{1+2p}$. so that

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

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

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



viii. $\sqrt[8]{\alpha\beta^5} + \sqrt[8]{(1-\alpha)(1-\beta)^5} = 1 - \sqrt[8]{\frac{\beta^3(1-\alpha)^3}{\alpha(1-\beta)}}$

$= \sqrt[8]{\alpha^5\beta} + \sqrt[8]{(1-\alpha)^5(1-\beta)} = \sqrt{\frac{1+\sqrt{\alpha\beta}+\sqrt{(1-\alpha)(1-\beta)}}{2}}$

1-(((6.4^3(-0.024)^3)/(1.024(1-6.4))))^1/8

Input:

$$1-\sqrt[8]{\frac{6.4^3\,(-0.024)^3}{1.024\,(1-6.4)}}$$

Result:

0.6

0.6

sqrt((((((1+sqrt(1.024*6.4)+sqrt(-0.024*-5.4)))/2))))

Input:

$$\sqrt{\frac{1}{2}\left(1+\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}\right)}$$

Result:

1.4

1.4

We have that:

((((((1-(((6.4^3(-0.024)^3)/(1.024(1-6.4))))^1/8)))*(((sqrt((((((1+sqrt(1.024*6.4)+sqrt(-0.024*-5.4)))/2)))))

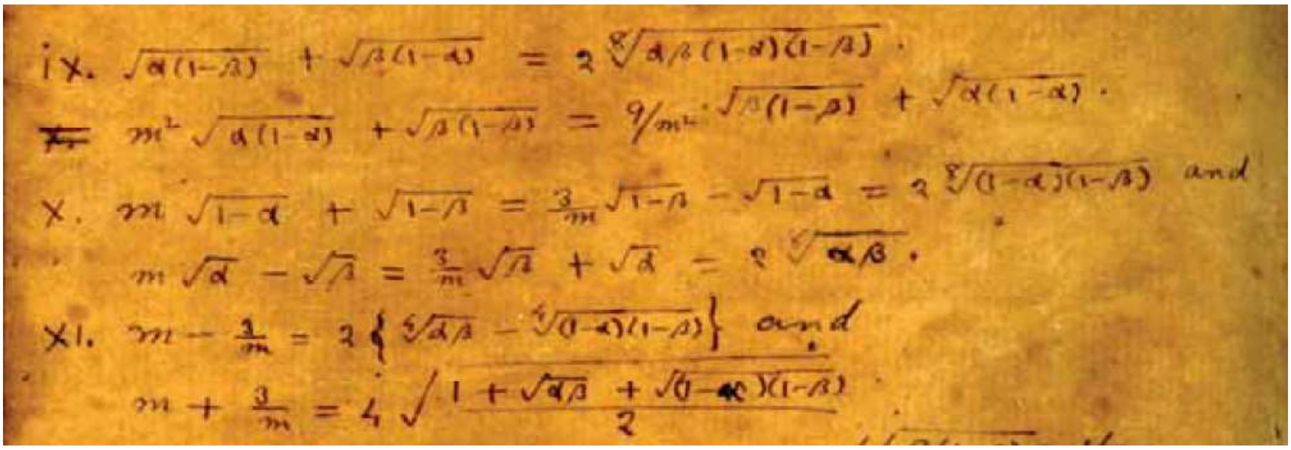
Input:

$$\sqrt[16]{\left(1-\sqrt[8]{\frac{6.4^3\,(-0.024)^3}{1.024\,(1-6.4)}}\right)\sqrt{\frac{1}{2}\left(1+\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}\right)}}$$

Result:

0.9891621...

0.9891621.... result practically equal to the dilaton value **0.989117352243 = ϕ**



ix. $\sqrt{\alpha(1-\beta)} + \sqrt{\beta(1-\alpha)} = 2\sqrt[8]{\alpha\beta(1-\alpha)(1-\beta)}$.

$m^2\sqrt{\alpha(1-\alpha)} + \sqrt{\beta(1-\beta)} = \frac{9}{m^2}\sqrt{\beta(1-\beta)} + \sqrt{\alpha(1-\alpha)}$.

x. $m\sqrt{1-\alpha} + \sqrt{1-\beta} = \frac{3}{m}\sqrt{1-\beta} - \sqrt{1-\alpha} = 2\sqrt[8]{(1-\alpha)(1-\beta)}$ and

$m\sqrt{\alpha} - \sqrt{\beta} = \frac{3}{m}\sqrt{\beta} + \sqrt{\alpha} = 2\sqrt[8]{\alpha\beta}$.

xi. $m - \frac{3}{m} = 2\left\{\sqrt[8]{\alpha\beta} - \sqrt[8]{(1-\alpha)(1-\beta)}\right\}$ and

$m + \frac{3}{m} = 4\sqrt{\frac{1+\sqrt{\alpha\beta}+\sqrt{(1-\alpha)(1-\beta)}}{2}}$

For:

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

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

we obtain:

2*((((1.024*6.4*(-0.024)*(-5.4)))))^1/8

Input:

$$2\sqrt[8]{1.024\times 6.4\times(-0.024)\times(-5.4)}$$

Result:

1.95959...

1.95959…. result practically near to the mean value $1.962 * 10^{19}$ of DM particle

1/2*2((((1.024*6.4*(-0.024)*(-5.4))))^1/8

Input:

$$\frac{1}{2} \times 2 \sqrt[8]{1.024 \times 6.4 \times (-0.024) \times (-5.4)}$$

Result:

0.979796...

0.979796… result near to the value of the following Rogers-Ramanujan continued fraction:

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

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

2*((((-0.024)*(-5.4))))^1/8

Input:

$$2 \sqrt[8]{-0.024 \times (-5.4)}$$

Result:

1.549193...

1.549193…

And, inverting the formula, we obtain:

1/(((2*((((-0.024)*(-5.4))))^1/8)))

Input:

$$\frac{1}{2\sqrt[8]{-0.024\times(-5.4)}}$$

Result:

0.6454972...

0.6454972...

And:

(((1/(((2*((((-0.024)*(-5.4))))^1/8))))))^(1/(24/2))

Input:

$$\sqrt[\frac{24}{2}]{\frac{1}{2\sqrt[8]{-0.024\times(-5.4)}}}$$

Result:

0.96417944...

0.96417944.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

to the spectral index n_s and to the mesonic Regge slope (see Appendix)

2*((((1.024)*(6.4))))^1/8

Input:

$$2\sqrt[8]{1.024\times 6.4}$$

Result:

2.529822...

2.529822... result very near to the inflaton (dilaton) mass 2.53

4*sqrt((((1/2(((1+sqrt(1.024*6.4)+sqrt((-0.024)(-5.4))))))))

Input:

$$4\sqrt{\frac{1}{2}\left(1+\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}\right)}$$

Result:

5.6

5.6

From the below four results obtained:

5.6;   2.529822; 1.549193; 1.95959

We have the following expressions:

(5.6 - 2.529822 +1.549193 + 1.95959)

Input interpretation:

$5.6 - 2.529822 + 1.549193 + 1.95959$

Result:

6.578961

6.578961 result very near to the value of reduced Planck constant 6.58 without exponent

And:

(5.6 - 2.529822 +1.549193 + 1.95959)*1/4

Input interpretation:

$(5.6 - 2.529822 + 1.549193 + 1.95959) \times \frac{1}{4}$

Result:

1.64474025

$1.64474025 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Multiplying the four results obtained, we have:

(5.6 * 2.529822 *1.549193 * 1.95959)

Input interpretation:

$5.6 \times 2.529822 \times 1.549193 \times 1.95959$

Result:

43.007949046201244784

43.007949...

(5.6 * 2.529822 *1.549193 * 1.95959)*1597+((4181+610+13))

Where 1597, 4181, 610 and 13 are Fibonacci numbers

Input interpretation:

$(5.6 \times 2.529822 \times 1.549193 \times 1.95959) \times 1597 + (4181 + 610 + 13)$

Result:

73487.694626783387920048

73487.694626...

We note that, from the following formula concerning the '5th order' mock theta function psi_1(q). (OEIS – sequence A053261)

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

we obtain, for n = 69 [69 = 64+5 = 47 + 18 + 4 (Lucas number)] sqrt(golden ratio) * exp(Pi*sqrt(69/15)) / (2*5^(1/4)*sqrt(69))

Input:

$$\sqrt{\phi} \times \frac{\exp\left(\pi \sqrt{\frac{69}{15}}\right)}{2 \sqrt[4]{5} \sqrt{69}}$$

ϕ is the golden ratio

Exact result:

$$\frac{e^{\sqrt{23/5}\,\pi} \sqrt{\frac{\phi}{69}}}{2 \sqrt[4]{5}}$$

Decimal approximation:

43.207391842323182774138185533138123614673802504636956909 32...

Property:

$$\frac{e^{\sqrt{23/5}\,\pi} \sqrt{\frac{\phi}{69}}}{2 \sqrt[4]{5}} \text{ is a transcendental number}$$

Alternate forms:

$$\frac{1}{2} \sqrt{\frac{1}{690}\left(5+\sqrt{5}\right)}\, e^{\sqrt{23/5}\,\pi}$$

$$\frac{\sqrt{\frac{1}{138}\left(1+\sqrt{5}\right)}\, e^{\sqrt{23/5}\,\pi}}{2 \sqrt[4]{5}}$$

Series representations:

$$\frac{\sqrt{\phi}\, \exp\left(\pi \sqrt{\frac{69}{15}}\right)}{2 \sqrt[4]{5} \sqrt{69}} = \frac{\exp\left(\pi \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(\frac{23}{5}-z_0\right)^k z_0^{-k}}{k!}\right) \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (\phi-z_0)^k z_0^{-k}}{k!}}{2 \sqrt[4]{5} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (69-z_0)^k z_0^{-k}}{k!}}$$

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

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{69}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{69}} =$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{23}{5}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{23}{5}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/$$
$$\left(2\sqrt[4]{5}\,\exp\left(i\pi\left\lfloor\frac{\arg(69-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(69-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{69}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{69}} =$$

$$\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{23}{5}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{23}{5}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{23}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\right.$$
$$\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(69-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor} z_0^{-1/2\lfloor\arg(69-z_0)/(2\pi)\rfloor+1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\Big/\left(2\sqrt[4]{5}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(69-z_0)^k z_0^{-k}}{k!}\right)$$

(((sqrt(golden ratio) * exp(Pi*sqrt(69/15)) / (2*5^(1/4)*sqrt(69)))))*1597+(((64*4+8)*(13+4)))

Where 1597, 8 and 13 are Fibonacci numbers

Input:

$$\left(\sqrt{\phi}\times\frac{\exp\left(\pi\sqrt{\frac{69}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{69}}\right)\times 1597+(64\times 4+8)(13+4)$$

ϕ is the golden ratio

Exact result:

$$\frac{1597\, e^{\sqrt{23/5}\,\pi} \sqrt{\frac{\phi}{69}}}{2\sqrt[4]{5}} + 4488$$

Decimal approximation:

73490.204772190122890298682296421583412634062599905220184 19...

73490.2047721…

Property:

$$4488 + \frac{1597\, e^{\sqrt{23/5}\,\pi} \sqrt{\frac{\phi}{69}}}{2\sqrt[4]{5}} \text{ is a transcendental number}$$

Alternate forms:

$$4488 + \frac{1597}{2} \sqrt{\frac{1}{690}\left(5+\sqrt{5}\right)}\, e^{\sqrt{23/5}\,\pi}$$

$$4488 + \frac{1597 \sqrt{\frac{1}{138}\left(1+\sqrt{5}\right)}\, e^{\sqrt{23/5}\,\pi}}{2\sqrt[4]{5}}$$

$$\frac{6\,193\,440 + 1597 \times 5^{3/4} \sqrt{138\left(1+\sqrt{5}\right)}\, e^{\sqrt{23/5}\,\pi}}{1380}$$

Series representations:

$$\frac{1597\sqrt{\phi}\, \exp\left(\pi\sqrt{\frac{69}{15}}\right)}{2\sqrt[4]{5}\sqrt{69}} + (64\times 4+8)(13+4) = \left(44\,880 \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (69-z_0)^k z_0^{-k}}{k!} + 1597\times 5^{3/4} \exp\left(\pi\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(\frac{23}{5}-z_0\right)^k z_0^{-k}}{k!}\right) \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (\phi-z_0)^k z_0^{-k}}{k!}\right) \Big/ \left(10 \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (69-z_0)^k z_0^{-k}}{k!}\right) \quad \text{for not } ((z_0 \in \mathbb{R} \text{ and } -\infty < z_0 \leq 0))$$

$$\frac{1597\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{69}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{69}}+(64\times4+8)(13+4)=$$

$$\left(44880\exp\left(i\pi\left\lfloor\frac{\arg(69-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(69-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}+1597\times5^{3/4}\exp\left(i\pi\left\lfloor\frac{\arg(\phi-x)}{2\pi}\right\rfloor\right)\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{23}{5}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{23}{5}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\sum_{k=0}^{\infty}\frac{(-1)^k(\phi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(10\exp\left(i\pi\left\lfloor\frac{\arg(69-x)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k(69-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\text{ for }(x\in\mathbb{R}\text{ and }x<0)$$

$$\frac{1597\sqrt{\phi}\,\exp\left(\pi\sqrt{\frac{69}{15}}\right)}{2\sqrt[4]{5}\,\sqrt{69}}+(64\times4+8)(13+4)=$$

$$\left(\left(\frac{1}{z_0}\right)^{-1/2\lfloor\arg(69-z_0)/(2\pi)\rfloor}z_0^{-1/2\lfloor\arg(69-z_0)/(2\pi)\rfloor}\left(44880\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(69-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(69-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(69-z_0)^k z_0^{-k}}{k!}+1597\times5^{3/4}\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{23}{5}-z_0\right)/(2\pi)\right\rfloor}z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{23}{5}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{23}{5}-z_0\right)^k z_0^{-k}}{k!}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}z_0^{1/2\lfloor\arg(\phi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\phi-z_0)^k z_0^{-k}}{k!}\right)\right)\Bigg/\left(10\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(69-z_0)^k z_0^{-k}}{k!}\right)$$

Thence, we have the following mathematical connection:

$$\left((5.6\times2.529822\times1.549193\times1.95959)\times1597+(4181+610+13)\right)=73487.694626\Rightarrow$$

$$\Rightarrow \left(\frac{1597\, e^{\sqrt{23/5}\,\pi} \sqrt{\frac{\phi}{69}}}{2\sqrt[4]{5}} + 4488 \right) = 73490.2047 \Rightarrow$$

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

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

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

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

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

$$= 73491.788325481187105491595720422205480251957265634133987 00...$$

$$= 73491.7883254... \Rightarrow$$

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

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

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

Now, we have that:

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$$\frac{1-\sqrt[3]{2}\sqrt[24]{\frac{\beta^5(1-\beta)^5}{\alpha(1-\alpha)}}-\sqrt[3]{4}\sqrt[12]{\frac{\beta^5(1-\beta)^5}{\alpha(1-\alpha)}}}{\sqrt{1-3\sqrt[6]{16\alpha\beta(1-\alpha)(1-\beta)}+\sqrt[3]{16\alpha\beta(1-\alpha)(1-\beta)}}}$$

for

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

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

we obtain:

1-2^(1/3)*(((((6.4^5(-5.4)^5))/((1.024(-0.024))))))^1/24 – 4^(1/3)*(((((6.4^5(-5.4)^5))/((1.024(-0.024))))))^1/12

Input:

$$1-\sqrt[3]{2}\sqrt[24]{\frac{6.4^5\,(-5.4)^5}{1.024\times(-0.024)}}-\sqrt[3]{4}\sqrt[12]{\frac{6.4^5\,(-5.4)^5}{1.024\times(-0.024)}}$$

Result:

-11.535508289797746415353602805400854571623724020581290744 6...

-11.535508289797746415353 6 / sqrt[1-3*(((16*1.024*6.4*(-0.024)(-5.4)))^1/6)+(((16*1.024*6.4*(-0.024)(-5.4)))^1/3)]

Input interpretation:

$$-\frac{11.5355082897977464153536}{\sqrt{1-3\sqrt[6]{16\times1.024\times6.4\times(-0.024)\times(-5.4)}+\sqrt[3]{16\times1.024\times6.4\times(-0.024)\times(-5.4)}}}$$

Result:

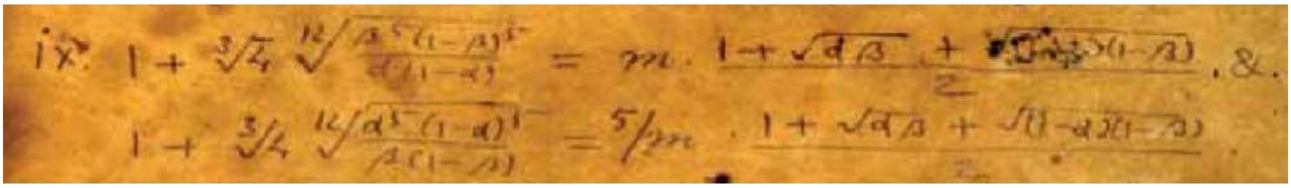
10.3260... i

Polar coordinates:

$r = 10.326$ (radius), $\theta = 90°$ (angle)

10.326

Now:



ix. $1+\sqrt[3]{4}\sqrt[12]{\frac{\beta^5(1-\beta)^5}{\alpha(1-\alpha)}} = m \cdot \frac{1+\sqrt{\alpha\beta}+\sqrt{(1-\alpha)(1-\beta)}}{2}$, &.

$1+\sqrt[3]{4}\sqrt[12]{\frac{\alpha^5(1-\alpha)^5}{\beta(1-\beta)}} = \frac{5}{m} \cdot \frac{1+\sqrt{\alpha\beta}+\sqrt{(1-\alpha)(1-\beta)}}{2}$.

10.326*((((1+sqrt(1.024*6.4)+sqrt(-0.024*-5.4)))))/2

Input interpretation:

$$10.326\left(\frac{1}{2}\left(1+\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}\right)\right)$$

Result:

20.23896

20.23896

5/10.326*((((1+sqrt(1.024*6.4)+sqrt(-0.024*-5.4)))))/2

Input interpretation:

$$\frac{5}{10.326}\left(\frac{1}{2}\left(1+\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}\right)\right)$$

Result:

0.949060623668409839240751501065272128607398799147782297114...

Repeating decimal:

0.949060623668409839240751501065272128607398799147782297114...

(period 430)

0.9490606236684.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

And to the inflaton value at the end of the inflation 0.9402 (see Appendix)

1+4^(1/3)(((((1.024)^5*(-0.024)^5)))/((6.4(-5.4))))^1/12

Input:

$$1+\sqrt[3]{4}\sqrt[12]{\frac{1.024^5\,(-0.024)^5}{6.4\times(-5.4)}}$$

Result:

1.2522620100648035143885816002150846459617751204433181513381...

1.2522620100648....

((((1+4^(1/3)(((((1.024)^5*(-0.024)^5)))/((6.4(-5.4))))^1/12))))-(30/10^2+3/10^3)

Input:

$$\left(1+\sqrt[3]{4}\sqrt[12]{\frac{1.024^5\,(-0.024)^5}{6.4\times(-5.4)}}\right)-\left(\frac{30}{10^2}+\frac{3}{10^3}\right)$$

Result:

0.9492620100648035143885816002150846459617751204433181513381...

0.9492620100648.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

And to the inflaton value at the end of the inflation 0.9402 (see Appendix)

1+1/ (5(1.2522620100648 - 0.9490606236684))

Input interpretation:

$$1+\frac{1}{5\,(1.2522620100648-0.9490606236684)}$$

Result:

1.659627590681671959948709584976407464428121318352722534734...

1.65962759068..... 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...

And:

(((1/ (5(1.2522620100648 - 0.9490606236684)))))^1/8

Input interpretation:

$$\sqrt[8]{\frac{1}{5\,(1.2522620100648-0.9490606236684)}}$$

Result:

0.9493193902436...

0.9493193902436.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

And to the inflaton value at the end of the inflation 0.9402 (see Appendix)

Ramanujan's mathematics applied to cosmology

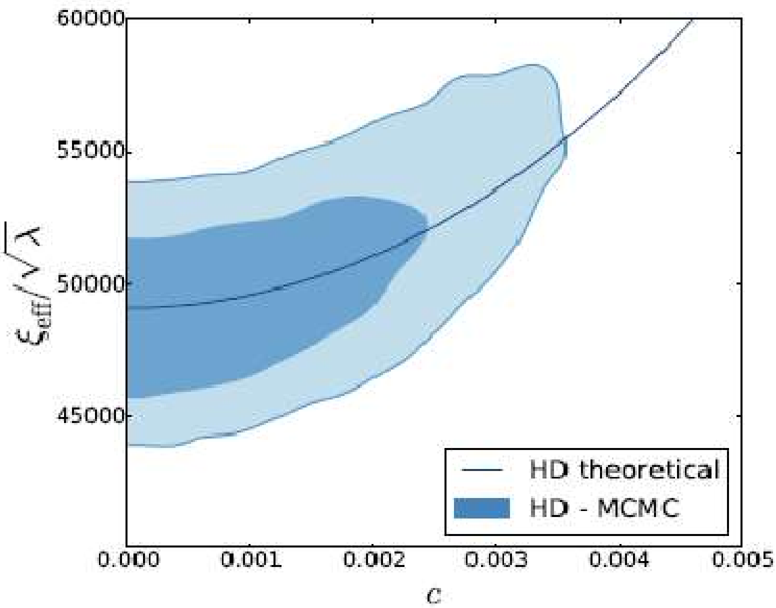
From:

Higgs-dilaton cosmology:
An inflation- dark-energy connection and forecasts for future galaxy surveys
Santiago Casas, Martin Pauly, and Javier Rubio - arXiv:1712.04956v3 [astro-ph.CO] 21 Feb 2018

From

$$\Theta_{\mathrm{E}}=\frac{1-4c-2\sqrt{4c^2-2c-2\kappa}}{1+8\kappa} \qquad (27)$$

$|\kappa| \simeq |\kappa_c| \simeq 1/6$



We obtain, for c = 0.0013 and κ = 1/6 , we obtain:

(((1-4*0.0013-2*sqrt(4*0.0013^2-2*0.0013-2/6)))) / ((1+8/6))

Input:

$$\frac{1-4\times 0.0013-2\sqrt{4\times 0.0013^2-2\times 0.0013-\frac{2}{6}}}{1+\frac{8}{6}}$$

Result:

0.42634286... −
0.49679291... i

Polar coordinates:

$r = 0.654654$ (radius), $\theta = -49.3641°$ (angle)

0.654654 result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\sqrt{\frac{e\pi}{2}} = \sum_{n=0}^{\infty} \frac{1}{(2n+1)!!} + \cfrac{1}{1+\cfrac{1}{1+\cfrac{2}{1+\cfrac{3}{1+\cfrac{4}{1+\dots}}}}} \approx 2.0663656771$$

$$\sqrt{\frac{e\pi}{2}}\, erfc\left(\frac{\sqrt{2}}{2}\right) \approx 0.6556795424$$

Note that: 1+0.654654 = 1.654654;

Continued fraction:

$$1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{8+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{13+\cfrac{1}{5+\cfrac{1}{5+\cfrac{1}{\dots}}}}}}}}}}}}}$$

Possible closed forms:

$1+\sqrt{\frac{3}{7}} \approx 1.6546536707$

From:

$$A_s = \frac{\lambda \sinh^2(4cN_*)}{1152\pi^2 \xi_{\text{eff}}^2 c^2} \qquad (28)$$

For c = 0.0013; N_* = 60 and $\xi_{\text{eff}} / \sqrt{\lambda}$ = 50000, we obtain:

(((sinh^2(4*0.0013*60)))) / (((1152*Pi^2*50000^2*0.0013^2)))

Input:

$$\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\times 50\,000^2\times 0.0013^2}$$

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

Result:

$2.09304\ldots\times 10^{-9}$

2.09304…*10^{-9}

Alternative representations:

$$\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\,50\,000^2\times 0.0013^2} = \frac{\left(\frac{1}{\operatorname{csch}(0.312)}\right)^2}{1152\times 0.0013^2\times 50\,000^2\,\pi^2}$$

$$\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\,50\,000^2\times 0.0013^2} = \frac{\left(\frac{1}{2}\left(-\frac{1}{e^{0.312}} + e^{0.312}\right)\right)^2}{1152\times 0.0013^2\times 50\,000^2\,\pi^2}$$

$$\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\,50\,000^2\times 0.0013^2} = \frac{\left(-\frac{i}{\csc(0.312\,i)}\right)^2}{1152\times 0.0013^2\times 50\,000^2\,\pi^2}$$

Series representations:

$$\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\,50\,000^2\times 0.0013^2} = \frac{1.02728\times 10^{-7}\sum_{k=1}^{\infty}\frac{e^{-0.94321\,k}}{(2\,k)!}}{\pi^2}$$

$$\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\,50\,000^2\times 0.0013^2} = \frac{8.21828\times 10^{-7}\left(\sum_{k=0}^{\infty} I_{1+2\,k}(0.312)\right)^2}{\pi^2}$$

$$\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\,50\,000^2\times 0.0013^2} = \frac{2.05457\times 10^{-7}\left(\sum_{k=0}^{\infty}\frac{0.312^{1+2\,k}}{(1+2\,k)!}\right)^2}{\pi^2}$$

And:

[(((sinh^2(4*0.0013*60)))) / (((1152*Pi^2*50000^2*0.0013^2)))]^1/(64^2)

Input:

$$\sqrt[64^2]{\frac{\sinh^2(4\times 0.0013\times 60)}{1152\,\pi^2\times 50\,000^2\times 0.0013^2}}$$

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

Result:

0.995132818...

0.995132818.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

From:

$$n_s = 1 - 8\,c\coth\left(4cN_*\right)\,, \qquad (29)$$
$$\alpha_s = -32\,c^2\operatorname{csch}^2\left(4cN_*\right)\,, \qquad (30)$$

We have:

1-8*0.0013 coth(4*0.0013*60)

Input:

$1-(8\times 0.0013)\coth(4\times 0.0013\times 60)$

$\coth(x)$ is the hyperbolic cotangent function

Result:

0.9655920...

0.9655920…. result very near to the spectral index n_s and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1} = 1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}} \approx 0.9568666373$$

Alternative representations:

$$1-\coth(4\times 0.0013\times 60)\,8\times 0.0013 = 1-0.0104\left(1+\frac{2}{-1+e^{0.624}}\right)$$

$$1-\coth(4\times 0.0013\times 60)\,8\times 0.0013 = 1-0.0104\,i\cot(0.312\,i)$$

$$1-\coth(4\times 0.0013\times 60)\,8\times 0.0013 = 1+0.0104\,i\cot(-0.312\,i)$$

Series representations:

$$1-\coth(4\times 0.0013\times 60)\,8\times 0.0013 = 1.0104+0.0208\sum_{k=1}^{\infty} q^{2k} \quad \text{for } q = 1.36615$$

$$1-\coth(4\times 0.0013\times 60)\,8\times 0.0013 = 0.966667-0.0064896\sum_{k=1}^{\infty}\frac{1}{0.097344+k^2\pi^2}$$

$$1-\coth(4\times 0.0013\times 60)\,8\times 0.0013 = 1-0.0032448\sum_{k=-\infty}^{\infty}\frac{1}{0.097344+k^2\pi^2}$$

Integral representation:

$$1-\coth(4\times 0.0013\times 60)\,8\times 0.0013 = 1+0.0104\int_{\frac{i\pi}{2}}^{0.312}\operatorname{csch}^2(t)\,dt$$

If we put 0.9568666373, that is the value of the above Rogers-Ramanujan continued fraction instead of 0.9655920 as solution of the above equation, we obtain another value of N_* . Indeed:

1-8*0.0013 coth(4*0.0013*x) = 0.9568666373

Input interpretation:

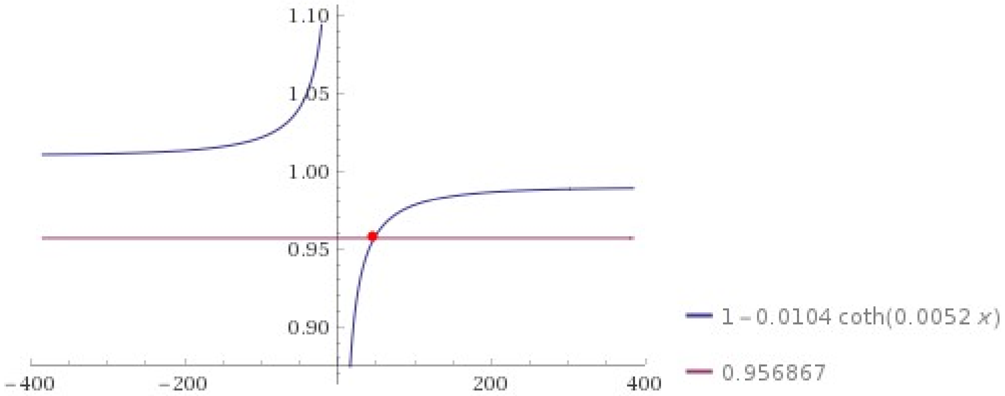
$$1-(8\times 0.0013)\coth(4\times 0.0013\,x) = 0.9568666373$$

coth(x) is the hyperbolic cotangent function

Result:

$$1-0.0104\coth(0.0052\,x) = 0.956867$$

Plot:



Alternate forms:

$$-0.0104(\coth(0.0052\,x)-96.1538) = 0.956867$$

$$1-\frac{0.0104\cosh(0.0052\,x)}{\sinh(0.0052\,x)} = 0.956867$$

$$-0.0104\operatorname{csch}(0.0052\,x)(\cosh(0.0052\,x)-96.1538\sinh(0.0052\,x)) = 0.956867$$

Alternate form assuming x is positive:

$$\coth(0.0052\,x) = 4.14744$$

Alternate form assuming x is real:

$$\frac{0.0104\sinh(0.0104\,x)}{1-\cosh(0.0104\,x)}+1 = 0.956867$$

Real solution:

$x \approx 47.2991$

47.2991

Solution:

$x \approx (192.308\, i)(3.14159\, n + (-0.245955\, i)), \quad n \in \mathbb{Z}$

We note that the result is different from the range of N_* that is 60-62, also if 0.9655920 and 0.9568666373 are very near. This last value, i.e. the Rogers-Ramanujan continued fraction, could provide a value more near to physical reality

Multiplying by 35 = (34+29+7)/2 the following expression, we obtain:

35((((47.2991/(((1-8*0.0013 coth(4*0.0013*47.2991))))))))

Note that we have put 47.2991 also as numerator of the internal fraction

Input interpretation:

$$35 \times \frac{47.2991}{1 - (8 \times 0.0013) \coth(4 \times 0.0013 \times 47.2991)}$$

coth(x) is the hyperbolic cotangent function

Result:

1730.0931778911771962324096428406108135670509562730273009 78...

1730.09317789…

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

Alternative representations:

$$\frac{35 \times 47.2991}{1 - (8 \times 0.0013) \coth(4 \times 0.0013 \times 47.2991)} = \frac{1655.47}{1 - 0.0104\, i \cot(0.245955\, i)}$$

$$\frac{35 \times 47.2991}{1 - (8 \times 0.0013) \coth(4 \times 0.0013 \times 47.2991)} = \frac{1655.47}{1 + 0.0104\, i \cot(-0.245955\, i)}$$

$$\frac{35 \times 47.2991}{1-(8 \times 0.0013) \coth(4 \times 0.0013 \times 47.2991)} = \frac{1655.47}{1-0.0104\left(1+\frac{2}{-1+e^{0.491911}}\right)}$$

Series representations:

$$\frac{35 \times 47.2991}{1-(8 \times 0.0013) \coth(4 \times 0.0013 \times 47.2991)} = \frac{79589.8}{48.5769+\sum_{k=1}^{\infty} q^{2k}} \quad \text{for } q = 1.27884$$

$$\frac{35 \times 47.2991}{1-(8 \times 0.0013) \coth(4 \times 0.0013 \times 47.2991)} = -\frac{323595.}{-187.205+\sum_{k=1}^{\infty} \frac{1}{0.060494+k^2 \pi^2}}$$

$$\frac{35 \times 47.2991}{1-(8 \times 0.0013) \coth(4 \times 0.0013 \times 47.2991)} = \frac{1655.47}{1-0.00255794 \sum_{k=-\infty}^{\infty} \frac{1}{0.060494+k^2 \pi^2}}$$

We have that:

-32*0.0013^2 csch^2(4*0.0013*60)

Input:

$$-32 \times 0.0013^2 \operatorname{csch}^2(4 \times 0.0013 \times 60)$$

$\operatorname{csch}(x)$ is the hyperbolic cosecant function

Result:

$-0.000537874\ldots$

-0.000537874…

Alternative representations:

$$-32 \times 0.0013^2 \operatorname{csch}^2(4 \times 0.0013 \times 60) = -32 \times 0.0013^2 \left(i \csc(0.312\, i)\right)^2$$

$$-32 \times 0.0013^2 \operatorname{csch}^2(4 \times 0.0013 \times 60) = -32 \times 0.0013^2 \left(-i \csc(-0.312\, i)\right)^2$$

$$-32 \times 0.0013^2 \operatorname{csch}^2(4 \times 0.0013 \times 60) = -32 \times 0.0013^2 \left(\frac{2 e^{0.312}}{-1+e^{0.624}}\right)^2$$

Series representations:

$$-32 \times 0.0013^2 \operatorname{csch}^2(4 \times 0.0013 \times 60) = -0.00005408 \sum_{k=-\infty}^{\infty} \frac{1}{(-0.312+i k \pi)^2}$$

$$-32 \times 0.0013^2 \operatorname{csch}^2(4 \times 0.0013 \times 60) = -0.00005408 \sum_{k=-\infty}^{\infty} \frac{1}{(0.312+i k \pi)^2}$$

$$-32\times 0.0013^2\ \mathrm{csch}^2(4\times 0.0013\times 60) = -0.00021632\left(\sum_{k=1}^{\infty} q^{-1+2k}\right)^2 \quad \text{for } q = 1.36615$$

From which:

((-(-32*0.0013^2 csch^2(4*0.0013*60))))^1/(64^2)

Input:

$$\sqrt[64^2]{-(-32\times 0.0013^2\ \mathrm{csch}^2(4\times 0.0013\times 60))}$$

csch(x) is the hyperbolic cosecant function

Result:

0.998163825...

0.998163825... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

From:

$$n_s = 1 - \frac{2}{N_*} X \coth X\,, \qquad (43)$$

with

$$X \equiv 4cN_* = \frac{3N_*(1+w)}{4F(\Omega_{\rm DE})}\,. \qquad (44)$$

We obtain:

4*0.0013*60

Input:

$4 \times 0.0013 \times 60$

Result:

0.312

0.312

And:

1-(2/60*0.312 coth(0.312))

Input:

$$1 - \frac{2}{60} \times 0.312 \coth(0.312)$$

$\coth(x)$ is the hyperbolic cotangent function

Result:

$0.9655920\ldots$

0.9655920…. result very near to the spectral index n_s and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}} - \varphi + 1} = 1 - \cfrac{e^{-\pi}}{1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-3\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \ldots}}}} \approx 0.9568666373$$

Alternative representations:

$$1 - \frac{2}{60}(0.312 \coth(0.312)) = 1 - \frac{1}{60} \times 0.624 \left(1 + \frac{2}{-1 + e^{0.624}}\right)$$

$$1 - \frac{2}{60}(0.312 \coth(0.312)) = 1 - \frac{1}{60} \times 0.624\, i \cot(0.312\, i)$$

$$1 - \frac{2}{60}(0.312 \coth(0.312)) = 1 + \frac{1}{60} \times 0.624\, i \cot(-0.312\, i)$$

Series representations:

$$1 - \frac{2}{60}(0.312 \coth(0.312)) = 1.0104 + 0.0208 \sum_{k=1}^{\infty} q^{2k} \quad \text{for } q = 1.36615$$

$$1-\frac{2}{60}(0.312\coth(0.312)) = 0.966667 - 0.0064896\sum_{k=1}^{\infty}\frac{1}{0.097344+k^2\pi^2}$$

$$1-\frac{2}{60}(0.312\coth(0.312)) = 1 - 0.0032448\sum_{k=-\infty}^{\infty}\frac{1}{0.097344+k^2\pi^2}$$

Integral representation:

$$1-\frac{2}{60}(0.312\coth(0.312)) = 1 + 0.0104\int_{\frac{i\pi}{2}}^{0.312}\operatorname{csch}^2(t)\,dt$$

If we put 0.9568666373 as result of the above equation, we obtain a different value of X. Indeed:

1-(2/60*x coth(x)) = 0.9568666373

Input interpretation:

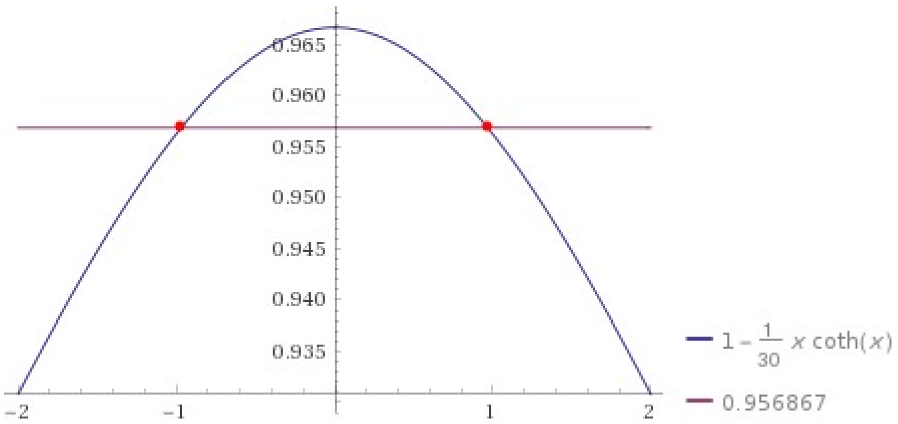
$$1-\frac{2}{60}x\coth(x) = 0.9568666373$$

$\coth(x)$ is the hyperbolic cotangent function

Result:

$$1-\frac{1}{30}x\coth(x) = 0.956867$$

Plot:



Alternate forms:

$$\frac{1}{30}(30 - x\coth(x)) = 0.956867$$

$$1-\frac{x\cosh(x)}{30\sinh(x)} = 0.956867$$

$$-\frac{1}{30}\operatorname{csch}(x)\,(x\cosh(x) - 30\sinh(x)) = 0.956867$$

Alternate form assuming x is positive:

$$x\coth(x) = 1.294$$

Alternate form assuming x is real:

$$\frac{x\sinh(2x)}{30(1-\cosh(2x))} + 1 = 0.956867$$

Solutions:

$x = -0.967266$

$x = 0.967266$

0.967266 a result very different from the previous value of X. We note that:

From:

The ω and ω_3 trajectories were also fitted simultaneously. Here again the higher spin trajectory alone resulted in an optimal linear fit, with $\alpha' = 0.86$ GeV^{-2}. The two fitted simultaneously are best fitted with a high mass, $m_{u/d} = 340$, and high slope, $\alpha' = 1.09$ GeV^{-2}. Excluding the ground state $\omega(782)$ from the fits eliminates the need for a mass and the linear fit with $\alpha' = 0.97$ GeV^{-2} is then optimal. The mass of the ground state from the resulting fit is 950 MeV. This is odd, since we have no reason to expect the $\omega(782)$ to have an abnormally low mass, especially since it fits in perfectly with its trajectory in the (J, M^2) plane.

ω/ω_3	$5+3$	$m_{u/d} = 255 - 390$	$0.988 - 1.18$
ω/ω_3	$5+3$	$m_{u/d} = 240 - 345$	$0.937 - 1.000$

The average between the following value (0.988+0.937)/2 is equal to 0.9625, very near to the above indicated value α’ = 0.97 and to the result that we have obtained for X. Also here, can be that this last value, i.e. the Rogers-Ramanujan continued fraction, provides a value more real from physical point of view.

Now:

$$1 + w = \frac{16\gamma^2}{3}$$

$\gamma < 1/(2\sqrt{2})$

$\gamma < 0.3535....$ $\gamma = 0.25$; $1+w = (16*0.25^2)/3 = 1/3$

From which we obtain $F(\Omega_{DE})$:

0.312*4x=3*60*1/3

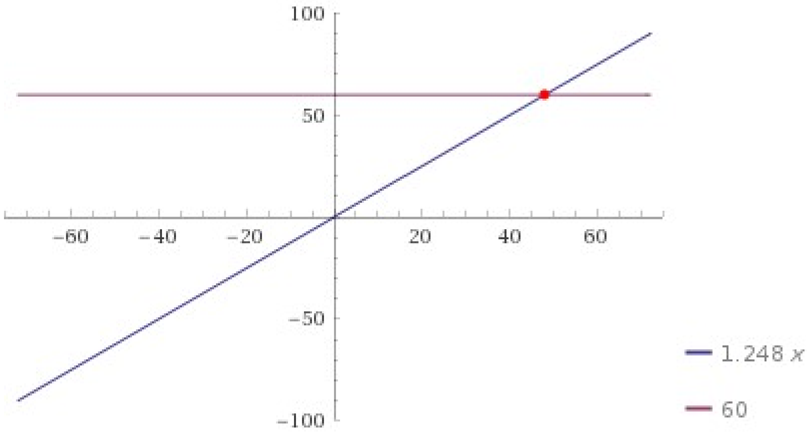
Input:

$0.312\times 4\, x = 3\times 60\times \frac{1}{3}$

Result:

$1.248\, x = 60$

Plot:



Alternate form:

$1.248\, x - 60 = 0$

Alternate form assuming x is real:

$1.248\, x + 0 = 60$

Solution:

$x \approx 48.0769$

$48.0769 = F(\Omega_{DE})$

If:

$$F(\Omega_{\rm DE}) = \left[\frac{1}{\sqrt{\Omega_{\rm DE}}} - \Delta \tanh^{-1}\sqrt{\Omega_{\rm DE}}\right]^2$$

and

$$\Delta \equiv \frac{1-\Omega_{\mathrm{DE}}}{\Omega_{\mathrm{DE}}}$$

we have that:

48.0769 = [1/x-(1-sqrt(x))/sqrt(x)*tanh^-1 x]^2

Input interpretation:

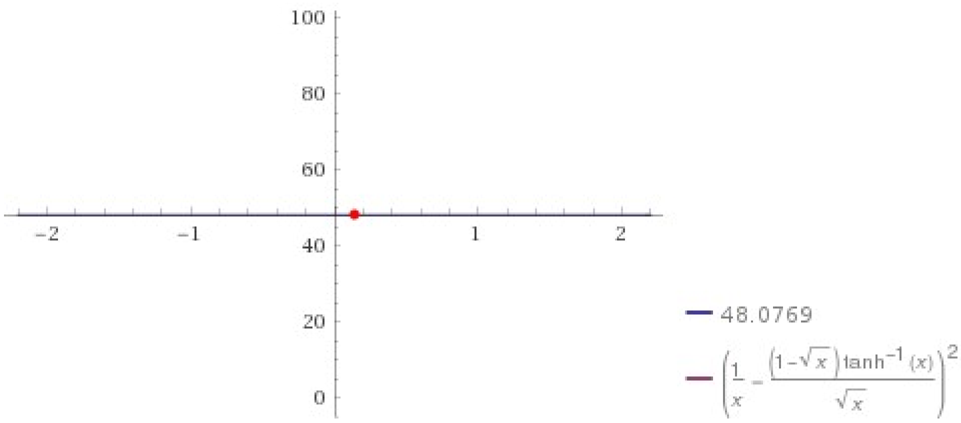
$$48.0769 = \left(\frac{1}{x} - \frac{1-\sqrt{x}}{\sqrt{x}} \tanh^{-1}(x)\right)^2$$

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

Result:

$$48.0769 = \left(\frac{1}{x} - \frac{(1-\sqrt{x})\tanh^{-1}(x)}{\sqrt{x}}\right)^2$$

Plot:



Numerical solution:

$x \approx 0.139484062721383...$

0.1394840…..

Indeed:

[1/0.139484-(1-sqrt(0.139484))/sqrt(0.139484)*tanh^-1 0.139484]^2

Input interpretation:

$$\left(\frac{1}{0.139484} - \frac{1-\sqrt{0.139484}}{\sqrt{0.139484}} \tanh^{-1}(0.139484)\right)^2$$

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

Result:

48.0769...

48.0769…

Thence :

Input interpretation:

0.139484062721383^2

Result:

0.019455803753262706715885432689

0.019455803…

Repeating decimal:

0.01945580375326270671588543268900

0.01945580375...

$\Omega_{DE} = 0.019455786256$

We obtain:

(0.0194558037532627)^1/4096

Input interpretation:

$\sqrt[4096]{0.0194558037532627}$

Result:

0.9990386435859919748...

0.9990386435859..... result practically equal to the value of the following Rogers-Ramanujan continued fraction:

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

From 48.0769 = $F(\Omega_{DE})$, we obtain, multiplying by 36, the following interesting result:

36*[1/0.139484-(1-sqrt(0.139484))/sqrt(0.139484)*tanh^-1 0.139484]^2

Input interpretation:

$$36\left(\frac{1}{0.139484}-\frac{1-\sqrt{0.139484}}{\sqrt{0.139484}}\tanh^{-1}(0.139484)\right)^2$$

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

Result:

1730.770020787909535328594395065643391166319277625646442926...

1730.7700207…

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

Alternative representations:

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 = 36\left(\frac{1}{0.139484}-\frac{\text{sn}^{-1}(0.139484\,|\,1)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2$$

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 = 36\left(\frac{1}{0.139484}-\frac{\coth^{-1}\left(\frac{1}{0.139484}\right)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2$$

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 = 36\left(\frac{1}{0.139484}-\frac{(-\log(0.860516)+\log(1.13948))\left(1-\sqrt{0.139484}\right)}{2\sqrt{0.139484}}\right)^2$$

Series representations:

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 = 36\left(7.16928+\left(\sum_{k=0}^{\infty}\frac{0.139484^{1+2k}}{1+2k}\right)\left(1-\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k(-0.860516)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)\right)^2$$

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 = 36\left(7.16928+\frac{\left(\log(1.13948)-\log(2)+\sum_{k=1}^{\infty}\frac{0.569742^k}{k}\right)\left(-1+\sum_{k=0}^{\infty}\frac{(-1)^k(-0.860516)^k\left(-\frac{1}{2}\right)_k}{k!}\right)}{2\sum_{k=0}^{\infty}\frac{(-1)^k(-0.860516)^k\left(-\frac{1}{2}\right)_k}{k!}}\right)^2$$

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 = 36\left(7.16928-\left(\left(\log(1.13948)-\log(2)+\sum_{k=1}^{\infty}\frac{0.569742^k}{k}\right)\left(1-\exp\left(i\pi\left\lfloor\frac{\arg(0.139484-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(0.139484-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(2\exp\left(i\pi\left\lfloor\frac{\arg(0.139484-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(0.139484-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)^2 \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

Integral representations:

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 = 36\left(7.16928+0.139484-\frac{0.139484}{\sqrt{0.139484}}\int_0^1\frac{1}{1-0.0194558\,t^2}\,dt\right)^2$$

$$36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2 =$$

$$36\left(7.16928-\frac{0.034871\, i\left(-1+\sqrt{0.139484}\right)}{\pi^{3/2}\sqrt{0.139484}}\int_{-i\infty+\gamma}^{i\infty+\gamma} e^{0.0196475\, s}\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds\right)^2 \quad \text{for } 0<\gamma<\frac{1}{2}$$

From this result divided with the previous one very similar, ie 1730.0931..., we obtain the following very interesting expression:

1/((((((36*[1/0.139484-(1-sqrt(0.139484))/sqrt(0.139484)*tanh^-1 0.139484]^2)))
*1/((((35((((47.2991/(((1-8*0.0013 coth(4*0.0013*47.2991))))))))))))))

Input interpretation:

$$\frac{1}{\left(36\left(\frac{1}{0.139484}-\frac{1-\sqrt{0.139484}}{\sqrt{0.139484}}\tanh^{-1}(0.139484)\right)^2\right)\times\frac{1}{35\times\frac{47.2991}{1-(8\times0.0013)\coth(4\times0.0013\times47.2991)}}}$$

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

$\coth(x)$ is the hyperbolic cotangent function

Result:

0.999608935393724802580084555829004238392945534965615462022...

0.999608935… result practically equal to the value of the following Rogers-Ramanujan continued fraction:

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

Alternative representations:

$$\frac{1}{\frac{36\left(\frac{1}{0.139484}-\frac{\left(1-\sqrt{0.139484}\right)\tanh^{-1}(0.139484)}{\sqrt{0.139484}}\right)^2}{\frac{35\times47.2991}{1-(8\times0.0013)\coth(4\times0.0013\times47.2991)}}}=\frac{1}{\frac{36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2}{\frac{1655.47}{1+0.0104\, i\cot(-0.245955\, i)}}}$$

$$\frac{1}{\frac{36\left(\frac{1}{0.139484}-\frac{\left(1-\sqrt{0.139484}\right)\tanh^{-1}(0.139484)}{\sqrt{0.139484}}\right)^2}{\frac{35\times 47.2991}{1-(8\times 0.0013)\coth(4\times 0.0013\times 47.2991)}}} = \frac{1}{\frac{36\left(\frac{1}{0.139484}-\frac{\tanh^{-1}(0.139484)\left(1-\sqrt{0.139484}\right)}{\sqrt{0.139484}}\right)^2}{\frac{1655.47}{1-0.0104\left(1+\frac{2}{-1+e^{0.491911}}\right)}}}$$

$$\frac{1}{\frac{36\left(\frac{1}{0.139484}-\frac{\left(1-\sqrt{0.139484}\right)\tanh^{-1}(0.139484)}{\sqrt{0.139484}}\right)^2}{\frac{35\times 47.2991}{1-(8\times 0.0013)\coth(4\times 0.0013\times 47.2991)}}} = \frac{1}{\frac{36\left(\frac{1}{0.139484}-\frac{(-\log(0.860516)+\log(1.13948))\left(1-\sqrt{0.139484}\right)}{2\sqrt{0.139484}}\right)^2}{\frac{1655.47}{1+0.0104\, i\cot(-0.245955\, i)}}}$$

Integral representation:

$$\frac{1}{\frac{36\left(\frac{1}{0.139484}-\frac{\left(1-\sqrt{0.139484}\right)\tanh^{-1}(0.139484)}{\sqrt{0.139484}}\right)^2}{\frac{35\times 47.2991}{1-(8\times 0.0013)\coth(4\times 0.0013\times 47.2991)}}} =$$

$$\left(3.63627\times 10^6\,\pi^3\sqrt{0.139484}^{\,2}\right)\Big/\left(\left(96.1538+\int_{\frac{i\pi}{2}}^{0.245955}\operatorname{csch}^2(t)\,dt\right)\left(-i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}e^{0.0196475\,s}\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds-205.594\,\pi^{3/2}\sqrt{0.139484}+i\sqrt{0.139484}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}e^{0.0196475\,s}\,\Gamma\left(\frac{1}{2}-s\right)\Gamma(1-s)\,\Gamma(s)^2\,ds\right)^2\right)\quad \text{for } 0<\gamma<\frac{1}{2}$$

From the eq. (28)

$$A_s=\frac{\lambda\sinh^2(4cN_*)}{1152\pi^2\xi_{\rm eff}^2\,c^2}.$$

that described the amplitude of the primordial spectrum of scalar perturbations, we obtain π and ζ(2)

sqrt((((((((((((sinh^2(4*0.0013*60)))) / (((2.09304e-9 * 50000^2*0.0013^2)))))) * 1/1152))))))

Input interpretation:

$$\sqrt{\frac{\sinh^2(4\times 0.0013\times 60)}{2.09304\times 10^{-9}\times 50\,000^2\times 0.0013^2}\times\frac{1}{1152}}$$

sinh(x) is the hyperbolic sine function

Result:

3.141589992664707710013184878441010454597412658806979785594...

3.14158999... ≈ π

And:

1/6((((((((((((sinh^2(4*0.0013*60)))) / (((2.09304e-9 * 50000^2*0.0013^2)))))) * 1/1152))))))

Input interpretation:

$$\frac{1}{6}\left(\frac{\sinh^2(4\times 0.0013\times 60)}{2.09304\times 10^{-9}\times 50\,000^2\times 0.0013^2}\times\frac{1}{1152}\right)$$

sinh(x) is the hyperbolic sine function

Result:

$$1.644931280335173040534525990677167048961947115957791868556\ldots \approx \zeta(2) = \frac{\pi^2}{6}$$

$$= 1.644934066848226436472415166646025189218949901206798437735\ldots$$

Property:

$\frac{\pi^2}{6}$ is a transcendental number

Alternative representations:

$\zeta(2) = \zeta(2, 1)$

$\zeta(2) = S_{1,1}(1)$

$$\zeta(2) = -\frac{\mathrm{Li}_2(-1)}{\frac{1}{2}}$$

Integral representations:

$$\zeta(2) = \frac{8}{3}\left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2$$

$$\zeta(2) = \frac{2}{3}\left(\int_0^\infty \frac{1}{1+t^2}\, dt\right)^2$$

$$\zeta(2) = \frac{2}{3}\left(\int_0^1 \frac{1}{\sqrt{1-t^2}}\, dt\right)^2$$

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Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

Yermek Aldabergenov, Auttakit Chatrabhuti, Sergei V. Ketov

Table 1 The predictions for the inflationary parameters (n_s, r), and the values of φ at the horizon crossing (φ_i) and at the end of inflation (φ_f), in the case $3 \leq \alpha \leq \alpha_*$ with both signs of ω_1. The α parameter is taken to be integer, except of the upper limit $\alpha_* \equiv (7+\sqrt{33})/2$

α	3	4		5	6		α_*
sgn(ω_1)	−	+	−	+/−	+	−	−
n_s	0.9650	0.9649	0.9640	0.9639	0.9634	0.9637	0.9632
r	0.0035	0.0010	0.0013	0.0007	0.0005	0.0004	0.0003
$-\kappa\varphi_i$	5.3529	3.5542	3.9899	3.2657	3.0215	2.7427	2.5674
$-\kappa\varphi_f$	0.9402	0.7426	0.8067	0.7163	0.6935	0.6488	0.6276

Table 2 The masses of inflaton, axion and gravitino, and the VEVs of F- and D-fields derived from our models by fixing the amplitude A_s according to PLANCK data – see Eq. (57). The value of $\langle F_T\rangle$ for a positive ω_1 is not fixed by A_s

α	3	4		5		6		7	
sgn(ω_1)	−	+	−	+	−	+	−	−	
m_φ	2.83	2.95	2.73	2.71	2.71	2.53	2.58	1.86	
$m_{t'}$	0	0.93	1.73	2.02	2.02	4.97	2.01	1.56	$\times\, 10^{13}$ GeV
$m_{3/2}$	≥ 1.41	2.80	0.86	2.56	0.64	3.91	0.49	0.29	
$\langle F_T\rangle$	any	$\neq 0$	0	$\neq 0$	0	$\neq 0$	0	0	$\times\, 10^{31}$ GeV^2
$\langle D\rangle$	8.31	4.48	5.08	3.76	3.76	3.25	2.87	1.73	

We take the following two values of axion mass: 0.93 and 1.73 . If we perform the following calculations, we obtain:

(1/0.93+1/1.73)

Input:

$$\frac{1}{0.93} + \frac{1}{1.73}$$

Result:

1.653303499285225930760146684069861395984834358878737025296...

1.653303499285..... is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164{,}2696$ i.e. 1,65578...

And the inverse:

1/(1/0.93+1/1.73)

Input:

$$\frac{1}{\frac{1}{0.93} + \frac{1}{1.73}}$$

Result:

0.604849624060150375939849624060150375939849624060150375939...

Repeating decimal:

$0.604\overline{849624060150375939}$ (period 18)

0.604849624...

If we put, instead of 0.93, the value of the Rogers-Ramanujan continued fraction,

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}} - \varphi + 1} = 1 - \cfrac{e^{-\pi}}{1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-3\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \ldots}}}} \approx 0.9568666373$$

we obtain:

(1/0.9568666373+1/1.73)

Input interpretation:

$$\frac{1}{0.9568666373} + \frac{1}{1.73}$$

Result:

1.623112398262680166441180693689879956488457189122659411750...

1.62311239826.... result that is a golden number

and the inverse:

1/(1/0.9568666373+1/1.73)

Input interpretation:

$$\frac{1}{\frac{1}{0.9568666373} + \frac{1}{1.73}}$$

Result:

0.616100278126372044628610417559558567227887473981699434010...

0.616100278126372......

values that tend more and more towards the golden ratio and its conjugate.

Thence, we have also:

(((1/(1/0.9568666373+1/1.73))))^1/8

Input interpretation:

$$\sqrt[8]{\frac{1}{\frac{1}{0.9568666373} + \frac{1}{1.73}}}$$

Result:

0.9412531...

0.9412531 result very near to the value 0.9402 (see above Table I)

The inflaton masses are:

m_φ	2.83	2.95	2.73	2.71	2.71	2.53	2.58	1.86

We have the following Rogers-Ramanujan continued fraction:

$$\sqrt{\frac{e\pi}{2}} = \sum_{n=0}^{\infty} \frac{1}{(2n+1)!!} + \cfrac{1}{1+\cfrac{1}{1+\cfrac{2}{1+\cfrac{3}{1+\cfrac{4}{1+\dots}}}}} \approx 2.0663656771$$

And

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

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

We observe that: 2.0663656771 + 0.5683000031 = 2.6346656802 and 2.0663656771 + 0.5269391135 = 2.5933047906, results very near to the above inflaton (dilaton) masses values 2.58 – 2.71

From the following masses:

m_φ	2.83	2.95	2.73	2.71	2.71	2.53	2.58	1.86

we obtain this average:

(2.83+2.95+2.73+2.71+2.71+2.53+2.58+1.86)/8

Input:

$$\frac{1}{8}(2.83+2.95+2.73+2.71+2.71+2.53+2.58+1.86)$$

Result:

2.6125

2.6125

The effective value is multiplied by 10^{13} GeV

We have also:

(1/(2.6125))^1/16

Input interpretation:

$$\sqrt[16]{\frac{1}{2.6125}}$$

Result:

0.941746...

0.941746....result very near to 0.9402 (Table I)

Now, we have that, multiplying the average 2.6125e+13 of the mass of inflaton (dilaton) by 9e+16, inverting and performing the 1920th (64*30) root, we obtain:

((1/(2.6125 * 10^13* 9e+16)))^1/(64*30)

Input interpretation:

$$\sqrt[64\times 30]{\frac{1}{2.6125\times 10^{13}\times 9\times 10^{16}}}$$

Result:

0.96423217...

0.96423217... result very near to the spectral tilt $n_s = 0.9649 \pm 0.0042$.

From the following masses (axions):

$m_{t'}$	0	0.93	1.73	2.02	2.02	4.97	2.01	1.56

we obtain the following average: 1.905

We note that, multiplying by 2 the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

we obtain: 1.9137332746, result very near to the above average and very near to the mean value $1.962 * 10^{19}$ of DM particle that has a Planck scale mass: $m \approx 10^{19}$ GeV.

From:

Received: June 28, 2018 - Accepted: September 10, 2018 - Published: September 17, 2018 - **Cosmological phase transitions in warped space: gravitational waves and collider signatures**
Eugenio Megias, Germano Nardini and Mariano Quiros

We have:

$\ell = 1{,}616252 \times 10^{-35}$ m

$g^{eff} = 106{,}75$

$a_h(T) << 1$

$$\kappa = (8\pi G_N)^{1/2} = \frac{(8\pi)^{1/2}}{M_P} = (2.43 \times 10^{18}\ \mathrm{GeV})^{-1}\,.$$

A parameter configuration leading to $T_R < T_{\mathcal{H}}$ is provided by scenario D_1. In this case the dilaton and EW phase transitions happen simultaneously at $T = T_n \simeq 112\,\mathrm{GeV}$, ending up with $T = T_R = 133.7\,\mathrm{GeV} < T_{\mathrm{EW}}$, so that both the radion and the Higgs acquire a VEV. Before and after the reheating, the bound of eq. (8.7) is fulfilled, and the condition of strong-enough first order phase transition for EW baryogenesis is satisfied.[22]

It follows that $g^{\rm eff} = g_B(T) + \frac{7}{8}g_F(T) = 106.75$ at $172\,{\rm GeV} \lesssim T \ll m_G$.

$$\alpha \simeq \frac{E_0}{3(\pi^4\ell^3/\kappa^2)a_h(T_n)T_n^4},$$

$$T_i \approx \left(\frac{30\kappa^2 E_0}{90\pi^4\ell^3 a_h + \pi^2\kappa^2 g_d^{\rm eff}}\right)^{1/4}$$

From this last expression, we obtain:

0.591 = [((((30*(((2.43e+18)^-1))^2*x))))/(((((90Pi^4*(1.616252e-35)^3*1/12+Pi^2*(((2.43e+18)^-1))^2*172)))))]^1/4

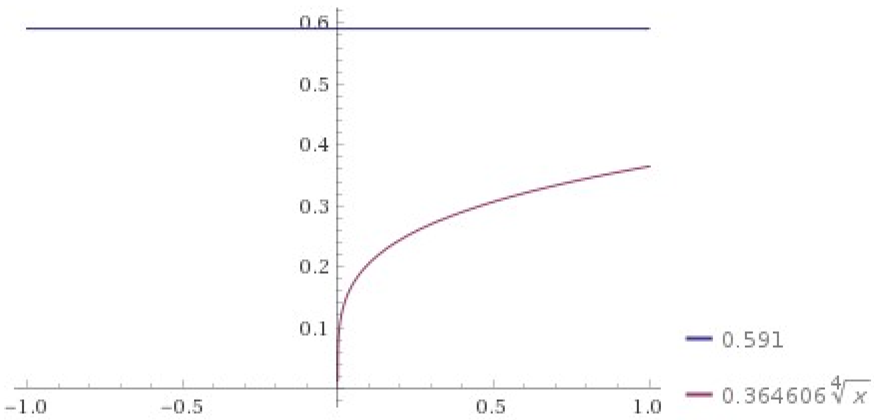
Input interpretation:

$$0.591 = \sqrt[4]{\frac{30\left(\frac{1}{2.43\times 10^{18}}\right)^2 x}{90\,\pi^4\,(1.616252\times 10^{-35})^3\times \frac{1}{12} + \pi^2\left(\frac{1}{2.43\times 10^{18}}\right)^2\times 172}}$$

Result:

$0.591 = 0.364606\sqrt[4]{x}$

Plot:



Alternate form assuming x is positive:

$\sqrt[4]{x} = 1.62093$

Solution:

$x \approx 6.9033$

$6.9033 \text{ GeV} = E_0$

convert 6.9033 GeV/k_B (gigaelectronvolts per Boltzmann constant)
to degrees Celsius

8.011×10^{13} °C (degrees Celsius)

8.011×10^{13} K (kelvins)

Indeed:

[((((30*(((2.43e+18)^-1))^2*6.9033))))/(((((90Pi^4*(1.616252e-35)^3*1/12+Pi^2*(((2.43e+18)^-1))^2*172)))))]^1/4

Input interpretation:

$$\sqrt[4]{\frac{30\left(\frac{1}{2.43\times 10^{18}}\right)^2 \times 6.9033}{90\,\pi^4\,(1.616252\times 10^{-35})^3 \times \frac{1}{12} + \pi^2\left(\frac{1}{2.43\times 10^{18}}\right)^2 \times 172}}$$

Result:

0.591000...

0.591

Or/and:

0.580 = [((((30*(((2.43e+18)^-1))^2*x))))/(((((90Pi^4*(1.616252e-35)^3*1/12+Pi^2*(((2.43e+18)^-1))^2*106.75)))))]^1/4

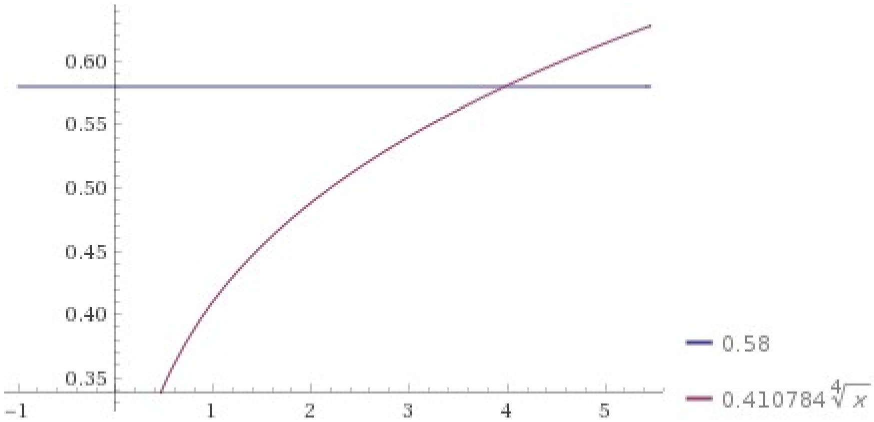
Input interpretation:

$$0.58 = \sqrt[4]{\frac{30\left(\frac{1}{2.43\times 10^{18}}\right)^2 x}{90\,\pi^4\,(1.616252\times 10^{-35})^3 \times \frac{1}{12} + \pi^2\left(\frac{1}{2.43\times 10^{18}}\right)^2 \times 106.75}}$$

Result:

$$0.58 = 0.410784\sqrt[4]{x}$$

Plot:



Alternate form assuming x is positive:

$\sqrt[4]{x} = 1.41193$

Solution:

$x \approx 3.97428$

3.97428 GeV = E_0 another value of the vacuum energy

convert 3.97428 GeV/k_B (gigaelectronvolts per Boltzmann constant)
to degrees Celsius

4.612×10^{13} °C (degrees Celsius)

4.612×10^{13} K (kelvins)

Indeed:

[((((30*(((2.43e+18)^-1))^2*3.97428))))/(((((90Pi^4*(1.616252e-35)^3*1/12+Pi^2*(((2.43e+18)^-1))^2*106.75)))))]^1/4

Input interpretation:

$$\sqrt[4]{\frac{30\left(\frac{1}{2.43\times10^{18}}\right)^2\times3.97428}{90\,\pi^4\,(1.616252\times10^{-35})^3\times\frac{1}{12}+\pi^2\left(\frac{1}{2.43\times10^{18}}\right)^2\times106.75}}$$

Result:

0.580000...

0.580

From

$$\alpha \simeq \frac{E_0}{3(\pi^4\ell^3/\kappa^2)a_h(T_n)T_n^4},$$

we obtain:

6.9033 / ((((3(((((Pi^4*(1.616252e-35)^3))/(((2.43e+18)^-1))^2))))) 0.00766*112^4))

Input interpretation:

$$\frac{6.9033}{\left(3\times\frac{\pi^4\left(1.616252\times10^{-35}\right)^3}{\left(\frac{1}{2.43\times10^{18}}\right)^2}\right)\times0.00766\times112^4}$$

Result:

$7.86132... \times 10^{59}$

$7.86132... * 10^{59} = \alpha$

and this another value of α

3.97428 / ((((3(((((Pi^4*(1.616252e-35)^3))/(((2.43e+18)^-1))^2))))) 0.002 * 112^4))

Input interpretation:

$$\frac{3.97428}{\left(3\times\frac{\pi^4\left(1.616252\times10^{-35}\right)^3}{\left(\frac{1}{2.43\times10^{18}}\right)^2}\right)\times0.002\times112^4}$$

Result:

$1.73339... \times 10^{60}$

Input interpretation:

$1.73339\times10^{60} = 17.3339\times10^{59}$

$17.3339 * 10^{59} = \alpha$

From

$$F_c(T) = -\frac{\pi^2}{90}g_c^{\mathrm{eff}}T^4\,, \qquad (7.2)$$

we obtain, dividing by c^2 , two masses:

((((-Pi^2)/90)*106.75*112^4)))/(9e+16)

Input interpretation:

$$\frac{-\frac{\pi^2}{90} \times 106.75 \times 112^4}{9 \times 10^{16}}$$

Result:

$-2.04670... \times 10^{-8}$

-2.04670... * 10^{-8}

and:

((((-Pi^2)/90)*106.75*133.7^4)))/(9e+16)

Input interpretation:

$$\frac{-\frac{\pi^2}{90} \times 106.75 \times 133.7^4}{9 \times 10^{16}}$$

Result:

$-4.15631... \times 10^{-8}$

-4.15631... * 10^{-8}

We note that:

((((-(((((-Pi^2)/90)*106.75*112^4)))/(9e+16)))))^1/(4096*5)

Input interpretation:

$$\sqrt[4096 \times 5]{-\frac{-\frac{\pi^2}{90} \times 106.75 \times 112^4}{9 \times 10^{16}}}$$

Result:

0.999135898...

0.999135898...

And:

((((-(((((-Pi^2)/90)*106.75*133.7^4)))/(9e+16))))^1/(4096*5)

Input interpretation:

$$\sqrt[4096\times 5]{-\frac{-\frac{\pi^2}{90}\times 106.75\times 133.7^4}{9\times 10^{16}}}$$

Result:

0.999170459...

0.999170459...

Note that, the two results 0.999135898... and 0.999170459... are practically equals to the value of the following Rogers-Ramanujan continued fraction:

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

From the Table 3

Scen.	$m_{\rm rad}/{\rm TeV}$	$m_G/{\rm TeV}$	c_γ	c_g	c_V	$c_{\mathcal{H}}$	c_f
B_2	0.915	4.80	0.472	0.164	0.0649	0.259	0.259
B_8	0.745	4.19	0.542	0.146	0.0744	0.298	0.298
C_1	0.890	3.08	0.532	0.179	0.0904	0.362	0.362
C_2	0.751	2.77	0.595	0.162	0.101	0.404	0.404
D_1	0.477	4.50	3.791	0.475	0.397	1.586	1.586
E_1	0.643	4.16	0.562	0.124	0.0746	0.298	0.298

Table 3. Masses of the radion and the $n = 1$ graviton mode, and coupling coefficients of the radion interactions with the SM fields, for the scenario B_2, B_8, C_1, C_2, D_1 and E_1.

we note that the mass of radion, for B_2 is equal to 0.915, value that is a good approximation to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

Now, we have that:

— *Small back-reaction (class A)*

$$\begin{aligned} &\gamma = 0.55\,\ell^{3/2}, && v_0 = -9.35\,\ell^{-3/2}, && v_1 = -6.79\,\ell^{-3/2}, && \gamma_1 \to \infty\,, \\ &\kappa^2 = \frac{1}{4}\ell^3 \ (N \simeq 18), && r_S = 47.1\,\ell, && \langle r_1 \rangle = 34.6\,\ell\,. && \end{aligned} \tag{4.12}$$

— *Large back-reaction (class B)*

$$\begin{aligned} &\gamma = 0.1\,\ell^{3/2}, && v_0 = -15\,\ell^{-3/2}, && v_1 = -3.3\,\ell^{-3/2}, && \gamma_1 \to \infty\,, \\ &\kappa^2 = \frac{1}{4}\ell^3 \ (N \simeq 18), && r_S = 37.3\,\ell, && \langle r_1 \rangle = 25.4\,\ell\,. && \end{aligned} \tag{4.13}$$

— *Large back-reaction & larger N (class C)*

$$\begin{aligned} &\gamma = 0.1\,\ell^{3/2}, && v_0 = -20\,\ell^{-3/2}, && v_1 = 0.7\,\ell^{-3/2}, && \gamma_1 \to \infty\,, \\ &\kappa^2 = \frac{1}{8}\ell^3 \ (N \simeq 25), && r_S = 30.8\,\ell, && \langle r_1 \rangle = 26.7\,\ell\,. && \end{aligned} \tag{4.14}$$

— *Large back-reaction & smaller N (class D)*

$$\begin{aligned} &\gamma = 0.1\,\ell^{3/2}, && v_0 = 2\,\ell^{-3/2}, && v_1 = 8.9\,\ell^{-3/2}, && \gamma_1 \to \infty \\ &\kappa^2 = \ell^3 \ (N \simeq 9), && r_S = 27.3\,\ell, && \langle r_1 \rangle = 13.6\,\ell\,. && \end{aligned} \tag{4.15}$$

— *Finite γ_1 (class E)*

$$\begin{aligned} &\gamma = 0.1\,\ell^{3/2}, && v_0 = -15\,\ell^{-3/2}, && v_1 = -2.6\,\ell^{-3/2}, && \gamma_1 = 10\,\ell^{-1}\,, \\ &\kappa^2 = \frac{1}{4}\ell^3 \ (N \simeq 18), && r_S = 37.3\,\ell, && \langle r_1 \rangle = 25.4\,\ell\,. && \end{aligned} \tag{4.16}$$

We have:

For the warp factor $A = A_0 + sA_1$, we can determine A_0 as

$$A_0(r) = \frac{r}{\ell} + \frac{\kappa^2}{3\gamma}\left(\phi_0(r) - v_0\right) = \frac{r}{\ell} - \frac{\kappa^2}{3\gamma^2}\log\left(1 - \frac{r}{r_S}\right)\,. \tag{4.9}$$

[7]The scale ρ_1 is $\mathcal{O}$(TeV) for $\ell^{-1} \simeq M_P = 2.4 \times 10^{18}$ GeV and $A(r_1) \simeq 35$. In the numerical calculations we will work in units where $\ell = 1$.

For

$$\gamma = 0.1\,\ell^{3/2}, \qquad v_0 = -\mathbf{15}\,\ell^{-3/2}, \qquad v_1 = -3.3\,\ell^{-3/2}, \qquad \gamma_1 \to \infty\,,$$
$$\kappa^2 = \frac{1}{4}\ell^3\ (N \simeq 18), \qquad r_S = 37.3\,\ell, \qquad \langle r_1 \rangle = 25.4\,\ell\,. \qquad (4.\mathbf{13})$$

ℓ = 1,616252 × 10^{-35} m

$$\frac{r}{\ell} - \frac{\kappa^2}{3\gamma^2}\log\left(1 - \frac{r}{r_S}\right)$$

we obtain:

1/((1.616252e-35))))-1/4*(((1.616252e-35)))^3*1/(3*((((0.1*(1.616252e-35)^(1.5))))))^2 ln(1-(25.4/37.3))

Input interpretation:

$$25.4 \times \frac{1}{1.616252 \times 10^{-35}} - \left(\frac{1}{4}(1.616252 \times 10^{-35})^3 \times \frac{1}{(3(0.1(1.616252 \times 10^{-35})^{1.5}))^2}\right)\log\left(1 - \frac{25.4}{37.3}\right)$$

log(x) is the natural logarithm

Result:

$1.571537111787023310721347908618210529749787127388379 8\ldots \times 10^{36}$

1.571537111787...*10^{36}

and, we obtain also:

(((1/(((((((25.4*1/((1.616252e-35))))-1/4*(((1.616252e-35)))^3*1/(3*((((0.1*(1.616252e-35)^(1.5))))))^2 ln(1-(25.4/37.3))))))))))^(1/2048)

Input interpretation:

$$\left(1 \Big/ \left(25.4 \times \frac{1}{1.616252 \times 10^{-35}} - \left(\frac{1}{4}(1.616252 \times 10^{-35})^3 \times \frac{1}{(3(0.1(1.616252 \times 10^{-35})^{1.5}))^2}\right)\log\left(1 - \frac{25.4}{37.3}\right)\right)\right)\text{^}(1/2048)$$

log(x) is the natural logarithm

Result:

0.960121098529740875383702751138442555799865933620178276080...

0.9601210985297.... result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}}\approx 0.9568666373$$

Now, we have that:

presence of a strong first order phase transition. This is a consequence of the cooling in the initial (BH) phase, which also triggers a (very brief) inflationary stage just before the onset of the phase transition.

The energy density $\rho = F - TdF/dT$ in the two phases is given by

$$\rho_d = E_0 + \frac{3\pi^4 \ell^3}{\kappa^2} a_h T^4 + \frac{\pi^2}{30} g_d^{\text{eff}} T^4 , \tag{7.15}$$

$$\rho_c = \frac{\pi^2}{30} g_c^{\text{eff}} T^4 . \tag{7.16}$$

3.97428+3*Pi^4*((((((1.616252e-35))))^3*0.002*112^4))/((((((2.43e+18)^-1))^2)))+(((Pi^2*172*112^4)))/30

Input interpretation:

$$3.97428 + 3\,\pi^4 \times \frac{(1.616252 \times 10^{-35})^3 \times 0.002 \times 112^4}{\left(\frac{1}{2.43 \times 10^{18}}\right)^2} + \frac{1}{30}\left(\pi^2 \times 172 \times 112^4\right)$$

Result:

$8.90387446834999... \times 10^9$

$8.903874... * 10^9$

((((Pi^2)*106.75*112^4)))/30

Input interpretation:

$$\frac{1}{30}\left(\pi^2 \times 106.75 \times 112^4\right)$$

Result:

$$5.52610\ldots \times 10^9$$

5.52610… * 10^9

Alternative representations:

$$\frac{1}{30}\pi^2\left(106.75 \times 112^4\right) = \frac{1}{30} \times 106.75 \times 112^4 \left(180\,°\right)^2$$

$$\frac{1}{30}\pi^2\left(106.75 \times 112^4\right) = \frac{1}{30} \times 106.75 \times 112^4 \left(-i \log(-1)\right)^2$$

$$\frac{1}{30}\pi^2\left(106.75 \times 112^4\right) = \frac{1}{30} \times 640.5 \times 112^4 \, \zeta(2)$$

Series representations:

$$\frac{1}{30}\pi^2\left(106.75 \times 112^4\right) = 8.95857 \times 10^9 \left(\sum_{k=0}^{\infty} \frac{(-1)^k}{1+2k}\right)^2$$

$$\frac{1}{30}\pi^2\left(106.75 \times 112^4\right) = 2.23964 \times 10^9 \left(-1 + \sum_{k=1}^{\infty} \frac{2^k}{\binom{2k}{k}}\right)^2$$

$$\frac{1}{30}\pi^2\left(106.75 \times 112^4\right) = 5.59911 \times 10^8 \left(\sum_{k=0}^{\infty} \frac{2^{-k}(-6+50k)}{\binom{3k}{k}}\right)^2$$

Integral representations:

$$\frac{1}{30}\pi^2\left(106.75 \times 112^4\right) = 2.23964 \times 10^9 \left(\int_0^{\infty} \frac{1}{1+t^2}\,dt\right)^2$$

$$\frac{1}{30}\pi^2(106.75\times 112^4) = 8.95857\times 10^9 \left(\int_0^1 \sqrt{1-t^2}\, dt\right)^2$$

$$\frac{1}{30}\pi^2(106.75\times 112^4) = 2.23964\times 10^9 \left(\int_0^\infty \frac{\sin(t)}{t}\, dt\right)^2$$

Now, from the ratio between the two above results concerning the density, we obtain:

(((((3.97428+3*Pi^4*((((((1.616252e-35))))^3*0.002*112^4))/((((((2.43e+18)^-1))^2)))+(((Pi^2*172*112^4)))/30))))) * 1/[(((((Pi^2)*106.75*112^4)))/30]

Input interpretation:

$$\left(3.97428 + 3\pi^4 \times \frac{(1.616252\times 10^{-35})^3 \times 0.002 \times 112^4}{\left(\frac{1}{2.43\times 10^{18}}\right)^2} + \frac{1}{30}(\pi^2 \times 172 \times 112^4)\right) \times \frac{1}{\frac{1}{30}(\pi^2 \times 106.75 \times 112^4)}$$

Result:

1.61124121851777813440124825329474753441482670191318098917...

1.6112412185... result that is a good approximation to the golden ratio

Now, from the hypothetical dilaton mass -2.04670... * 10^{-8} and inserting this value in the Hawking radiation calculator, we obtain:

Mass = -2.046700e-8

Radius = -3.039046e-35

Temperature = -5.996009e+30

Entropy = -4.825040

From the Ramanujan-Nardelli mock formula, we have:

sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(-2.046700e-8)* sqrt[[-(((((-5.996009e+30) * 4*Pi*(-3.039046e-35)^3-(-3.039046e-35)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$\sqrt{1 \Big/ \left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\left(-\frac{1}{2.046700\times 10^{-8}}\right)\sqrt{-\frac{-5.996009\times 10^{30}\times 4\pi(-3.039046\times 10^{-35})^3-(-3.039046\times 10^{-35})^2}{6.67\times 10^{-11}}}\right)}$$

Result:

1.618249138019705193058637242823571021209210251498133405186... i

1.618249138…i

Polar coordinates:

$r = 1.61825$ (radius), $\theta = 90°$ (angle)

And:

1/sqrt[[[[1/(((((((4*1.962364415e+19)/(5*0.0864055^2)))*1/(-2.046700e-8)* sqrt[[-(((((-5.996009e+30) * 4*Pi*(-3.039046e-35)^3-(-3.039046e-35)^2))))) / ((6.67*10^-11))]]]]]

Input interpretation:

$$1 \Big/ \left(\sqrt{1 \Big/ \left(\frac{4\times 1.962364415\times 10^{19}}{5\times 0.0864055^2}\left(-\frac{1}{2.046700\times 10^{-8}}\right)\sqrt{-\frac{1}{6.67\times 10^{-11}}\left(-5.996009\times 10^{30}\times 4\pi(-3.039046\times 10^{-35})^3-(-3.039046\times 10^{-35})^2\right)}\right)}\right)$$

Result:

$-0.617952...\, i$

-0.617952…i

Polar coordinates:

$r = 0.617952$ (radius), $\theta = -90°$ (angle)

Practically the values obtained, very near to the golden ratio and his conjugate, are imaginary. Further we note that, dividing the two results, we have:

(1.618249138019705193058637242823571021209210251498133 i) / (-0.617951819967428983167241809000239351305326715414476 i)

Input interpretation:

$$-\frac{1.618249138019705193058637242823571021209210251498133\, i}{0.617951819967428983167241809000239351305326715414 76\, i}$$

i is the imaginary unit

Result:

−2.61873027270151886736291489794135914768425940438548034971...

-2.61873027… result that is very near to the square of the golden ratio with minus sign.

Then, multiplying by i^2, dividing the value about equal to the golden ratio and the corresponding reciprocal and performing the square root, we obtain:

sqrt(i^2(1.618249138019705193058637242823571021209210251498133 i) / (-0.61795181996742898316724180900023935130532671541476 i))

Input interpretation:

$$\sqrt{i^2\left(-\frac{1.618249138019705193058637242823571021209210251498133\, i}{0.61795181996742898316724180900023935130532671541476\, i}\right)}$$

i is the imaginary unit

Result:

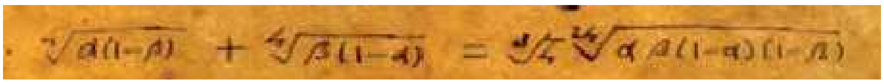
1.6182491380197051930586372428235710212092102514981...

1.618249138… a result practically about equal to the golden ratio

Now, we have that for

m = 10.326; α = 2((2+2)/(1+2*2))^3 = 1.024 β = 2^3*(2+2)/(1+2*2) = 6.4
1 – α = (1+2)((1-2)/(1+2*2))^3 = -0.024 1 – β = (1+2)^3*((1-2)/(1+2*2)) = -5.4

we obtain:



4^(1/3)*((((1.024*6.4(-0.024)(-5.4)))^1/24

Input:

$$\sqrt[3]{4}\ \sqrt[24]{1.024\times 6.4\times(-0.024)\times(-5.4)}$$

Result:

1.576637562905021964928635001344279037261094502770738445866...

1.5766375629…

And:

1+1/ ((((4^(1/3)*((((1.024*6.4(-0.024)(-5.4)))))^1/24))))

Input:

$$1+\frac{1}{\sqrt[3]{4}\ \sqrt[24]{1.024\times 6.4\times(-0.024)\times(-5.4)}}$$

Result:

1.634261...

$1.634261\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

(((((1/ ((((4^(1/3)*((((1.024*6.4(-0.024)(-5.4)))))^1/24)))))))))^1/64

Input:

$$\sqrt[64]{\frac{1}{\sqrt[3]{4}\ \sqrt[24]{1.024\times 6.4\times(-0.024)\times(-5.4)}}}$$

Result:

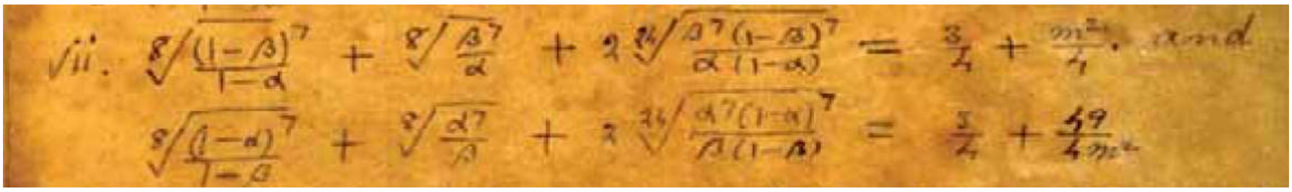
0.992911269...

0.992911269…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Now, we have that:



vii. $\sqrt[8]{\frac{(1-\beta)^7}{1-\alpha}} + \sqrt[8]{\frac{\beta^7}{\alpha}} + 2\sqrt[24]{\frac{\beta^7(1-\beta)^7}{\alpha(1-\alpha)}} = \frac{3}{4} + \frac{m^2}{4}$ and

$\sqrt[8]{\frac{(1-\alpha)^7}{1-\beta}} + \sqrt[8]{\frac{\alpha^7}{\beta}} + 2\sqrt[24]{\frac{\alpha^7(1-\alpha)^7}{\beta(1-\beta)}} = \frac{3}{4} + \frac{49}{4m^2}$

(((-5.4)^7 / (-0.024)))^1/8 + ((6.4^7/1.024))^1/8 + 2((((6.4^7*(-5.4)^7)))/(((1.024)(-0.024))))^1/24

Input:

$$\sqrt[8]{-\frac{(-5.4)^7}{0.024}} + \sqrt[8]{\frac{6.4^7}{1.024}} + 2\sqrt[24]{\frac{6.4^7\,(-5.4)^7}{1.024\times(-0.024)}}$$

Result:

18.5901…

18.5901…

(((-0.024^7/(-5.4)))^1/8 + ((1.024^7/6.4))^1/8 + 2((((1.024^7*(-0.024)^7)))/(((6.4)(-5.4))))^1/24

Input:

$$\sqrt[8]{\frac{-0.024^7}{-5.4}} + \sqrt[8]{\frac{1.024^7}{6.4}} + 2\sqrt[24]{\frac{1.024^7\,(-0.024)^7}{6.4\times(-5.4)}}$$

Result:

1.42598…

1.42598…

We obtain also:

(((((1/18.5901(((((((-0.024^7/(-5.4)))^1/8 + ((1.024^7/6.4))^1/8 + 2((((1.024^7*(-0.024)^7)))/(((6.4)(-5.4))))^1/24))))))))))^1/256

Input interpretation:

$$\sqrt[256]{\frac{1}{18.5901}\left(\sqrt[8]{\frac{-0.024^7}{-5.4}}+\sqrt[8]{\frac{1.024^7}{6.4}}+2\sqrt[24]{\frac{1.024^7\,(-0.024)^7}{6.4\times(-5.4)}}\right)}$$

Result:

0.99001977...

0.99001977…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

And:

(((((1/18.5901(((((((-0.024^7/(-5.4)))^1/8 + ((1.024^7/6.4))^1/8 + 2((((1.024^7*(-0.024)^7)))/(((6.4)(-5.4))))^1/24))))))))))^1/48

Input interpretation:

$$\sqrt[48]{\frac{1}{18.5901}\left(\sqrt[8]{\frac{-0.024^7}{-5.4}}+\sqrt[8]{\frac{1.024^7}{6.4}}+2\sqrt[24]{\frac{1.024^7\,(-0.024)^7}{6.4\times(-5.4)}}\right)}$$

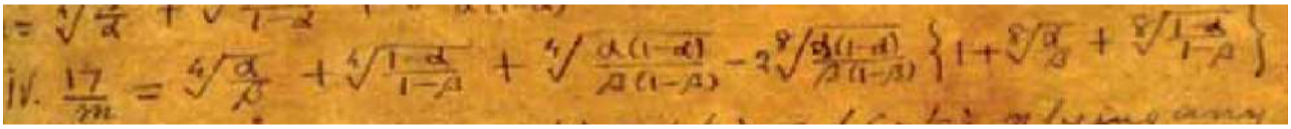
Result:

0.947910419044673998026989135739103499438017025774530098451...

0.9479104190446…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}-\varphi+1}} = 1 - \cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\dots}}}} \approx 0.9568666373$$

Now, we have that:


iv. $\frac{17}{m} = \sqrt[4]{\frac{\alpha}{\beta}} + \sqrt[4]{\frac{1-\alpha}{1-\beta}} + \sqrt[4]{\frac{\alpha(1-\alpha)}{\beta(1-\beta)}} - 2\sqrt[8]{\frac{\alpha(1-\alpha)}{\beta(1-\beta)}}\left\{1+\sqrt[8]{\frac{\alpha}{\beta}}+\sqrt[8]{\frac{1-\alpha}{1-\beta}}\right\}$

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

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

(1.024/6.4)^1/4+(((-0.024)/(-5.4)))^1/4+(((((1.024*(-0.024))/(6.4*(-5.4)))^1/4)))-2*(((((1.024*(-0.024))/(6.4*(-5.4)))^1/8)))*(1+(1.024/6.4)^1/8+(((-0.024)/(-5.4)))^1/8))

Input:

$$\sqrt[4]{\frac{1.024}{6.4}} + \sqrt[4]{\frac{-0.024}{-5.4}} + \sqrt[4]{\frac{1.024\times(-0.024)}{6.4\times(-5.4)}} - 2\sqrt[8]{\frac{1.024\times(-0.024)}{6.4\times(-5.4)}}\left(1+\sqrt[8]{\frac{1.024}{6.4}}+\sqrt[8]{\frac{-0.024}{-5.4}}\right)$$

Result:

−0.807671237492124934692120829892382246530839276086586642345...

-0.807671237492....

And:

-2*((((((((1.024/6.4)^1/4+(((-0.024)/(-5.4)))^1/4+(((((1.024*(-0.024))/(6.4*(-5.4)))^1/4)))-2*(((((1.024*(-0.024))/(6.4*(-5.4)))^1/8)))*(1+(1.024/6.4)^1/8+(((-0.024)/(-5.4)))^1/8))))))))

Input:

$$-2\left(\sqrt[4]{\frac{1.024}{6.4}}+\sqrt[4]{\frac{-0.024}{-5.4}}+\sqrt[4]{\frac{1.024\times(-0.024)}{6.4\times(-5.4)}}-2\sqrt[8]{\frac{1.024\times(-0.024)}{6.4\times(-5.4)}}\left(1+\sqrt[8]{\frac{1.024}{6.4}}+\sqrt[8]{\frac{-0.024}{-5.4}}\right)\right)$$

Result:

1.6153424749842498693842416597847644930616785521731728469 08...

1.61534247498....

This result is a good approximation to the value of the golden ratio 1,618033988749

((((((((((1.024/6.4)^1/4+(((-0.024)/(-5.4)))^1/4+(((((1.024*(-0.024))/(6.4*(-5.4)))^1/4)))-2*(((((1.024*(-0.024))/(6.4*(-5.4)))^1/8)))*(1+(1.024/6.4)^1/8+(((-0.024)/(-5.4)))^1/8)))))))))^1/5

Input:

$$\left(\sqrt[4]{\frac{1.024}{6.4}}+\sqrt[4]{\frac{-0.024}{-5.4}}+\sqrt[4]{\frac{1.024\times(-0.024)}{6.4\times(-5.4)}}-2\sqrt[8]{\frac{1.024\times(-0.024)}{6.4\times(-5.4)}}\left(1+\sqrt[8]{\frac{1.024}{6.4}}+\sqrt[8]{\frac{-0.024}{-5.4}}\right)\right)^{\wedge}(1/5)$$

Result:

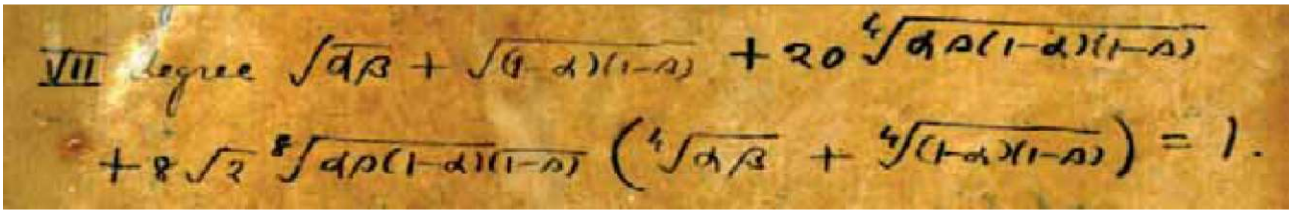
0.775184... +
0.563204... i

Polar coordinates:

$r = 0.95818$ (radius), $\theta = 36°$ (angle)

0.95818 result very near to the spectral index n_s and to the mesonic Regge slope (see Appendix) and to the inflaton value at the end of the inflation 0.9402

Now, we have that:



VII degree $\sqrt{\alpha\beta}+\sqrt{(1-\alpha)(1-\beta)}+20\sqrt[4]{\alpha\beta(1-\alpha)(1-\beta)}$
$+8\sqrt{2}\sqrt[8]{\alpha\beta(1-\alpha)(1-\beta)}\left(\sqrt[4]{\alpha\beta}+\sqrt[4]{(1-\alpha)(1-\beta)}\right)=1.$

1-sqrt(1.024*6.4)+sqrt((-0.024)(-5.4))+20(((1.024*6.4(-0.024)(-5.4))))^1/4+8*sqrt(2)* (((1.024*6.4(-0.024)(-5.4))))^1/8*((((1.024*6.4)^1/4+(-0.024*-5.4)^1/4)))

Input:

$$1-\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+20\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4\times(-0.024)\times(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024\times(-5.4)}\right)$$

Result:

42.387275370569792292866444488402682926554697973650159243 02...

42.387275370569…

((((((1-sqrt(1.024*6.4)+sqrt((-0.024)(-5.4))+20(((1.024*6.4(-0.024)(-5.4))))^1/4+8*sqrt(2)* (((1.024*6.4(-0.024)(-5.4))))^1/8*((((1.024*6.4)^1/4+(-0.024*-5.4)^1/4))))))))))^3-(4096-1729+17^2+8)

Where $17^2 = 289 = 322 - 29 - 4$ that are Lucas numbers and 1729 is the Hardy-Ramanujan number

Input:

$$\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+20\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4\times(-0.024)\times(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024\times(-5.4)}\right)\right)^3-\left(4096-1729+17^2+8\right)$$

Result:

73492.4...

73492.4…

Thence, we have the following mathematical connections:

$$\left(\frac{\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+20\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4\times(-0.024)\times(-5.4)}\right.}{\left.\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024\times(-5.4)}\right)\right)^{3}-(4096-1729+17^{2}+8)}\right) = 73492.4 \Rightarrow$$

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

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

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

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

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

$$= 73491.788325481187105491595720422205480251957265634133987 00...$$

$$= 73491.7883254... \Rightarrow$$

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

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

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

((((((1-sqrt(1.024*6.4)+sqrt((-0.024)(-5.4))+20(((1.024*6.4(-0.024)(-5.4))))^1/4+8*sqrt(2)* (((1.024*6.4(-0.024)(-5.4))))^1/8*((((1.024*6.4)^1/4+(-0.024*-5.4)^1/4)))))))))^2-(34*2)

Where 34 and 2 are Fibonacci numbers

Input:

$$\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+20\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4\times(-0.024)\times(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024\times(-5.4)}\right)\right)^2-34\times 2$$

Result:

1728.68…

1728.68…

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

Pi((((((1-sqrt(1.024*6.4)+sqrt((-0.024)(-5.4))+20(((1.024*6.4(-0.024)(-5.4))))^1/4+8*sqrt(2)* (((1.024*6.4(-0.024)(-5.4))))^1/8*((((1.024*6.4)^1/4+(-0.024*-5.4)^1/4)))))))))+1

Input:

$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+20\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4\times(-0.024)\times(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024\times(-5.4)}\right)\right)+1$$

Result:

134.164...

134.164… result very near to the rest mass of Pion meson 134.9766

Series representations:

$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024(-5.4)}+20\sqrt[4]{1.024\times 6.4(-0.024)(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4(-0.024)(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024(-5.4)}\right)\right)+1=1+20.2\pi+\sum_{k=0}^{\infty}\frac{(-1)^k\pi\left(-\frac{1}{2}\right)_k\sqrt{z_0}\left((0.1296-z_0)^k+17.2444(2-z_0)^k-(6.5536-z_0)^k\right)z_0^{-k}}{k!}$$

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

$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024(-5.4)}+20\sqrt[4]{1.024\times 6.4(-0.024)(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4(-0.024)(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024(-5.4)}\right)\right)+1=1+20.2\pi+\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\pi x^{-k}\left((0.1296-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(0.1296-x)}{2\pi}\right\rfloor\right)+17.2444(2-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)-(6.5536-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(6.5536-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}$$

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

$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024(-5.4)}+20\sqrt[4]{1.024\times 6.4(-0.024)(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4(-0.024)(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024(-5.4)}\right)\right)+1=1+20.2\pi+\sum_{k=0}^{\infty}\left(\frac{1}{k!}(-1)^k\pi\left(-\frac{1}{2}\right)_k(0.1296-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(0.1296-z_0)/(2\pi)\rfloor}z_0^{-k+1/2(1+\lfloor\arg(0.1296-z_0)/(2\pi)\rfloor)}+\frac{17.2444(-1)^k\pi\left(-\frac{1}{2}\right)_k(2-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(2-z_0)/(2\pi)\rfloor}z_0^{-k+1/2(1+\lfloor\arg(2-z_0)/(2\pi)\rfloor)}}{k!}+\frac{1}{k!}(-1)^{1+k}\pi\left(-\frac{1}{2}\right)_k(6.5536-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(6.5536-z_0)/(2\pi)\rfloor}z_0^{-k+1/2(1+\lfloor\arg(6.5536-z_0)/(2\pi)\rfloor)}\right)$$

Pi((((((1-sqrt(1.024*6.4)+sqrt((-0.024)(-5.4))+20(((1.024*6.4(-0.024)(-5.4))))^1/4+8*sqrt(2)* (((1.024*6.4(-0.024)(-5.4))))^1/8*((((1.024*6.4)^1/4+(-0.024*-5.4)^1/4))))))))+4

Where 4 is a Lucas number

Input:

$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+20\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4\times(-0.024)\times(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024\times(-5.4)}\right)\right)+4$$

Result:

137.164...

137.164… result very near to the mean of the rest masses of two Pion mesons 134.9766 and 139.57 that is 137.2733 and to the inverse of fine-structure constant 137,035

Series representations:

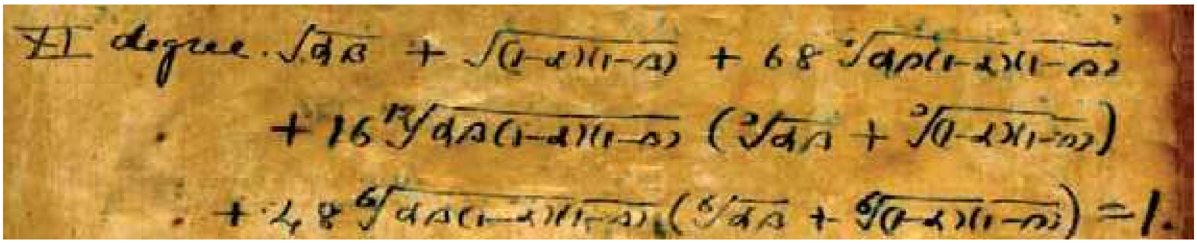
$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024(-5.4)}+20\sqrt[4]{1.024\times 6.4(-0.024)(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4(-0.024)(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024(-5.4)}\right)\right)+4=4+20.2\pi+\sum_{k=0}^{\infty}\frac{(-1)^k\pi\left(-\frac{1}{2}\right)_k\sqrt{z_0}\left((0.1296-z_0)^k+17.2444(2-z_0)^k-(6.5536-z_0)^k\right)z_0^{-k}}{k!}$$

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

$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024(-5.4)}+20\sqrt[4]{1.024\times 6.4(-0.024)(-5.4)}+8\sqrt{2}\sqrt[8]{1.024\times 6.4(-0.024)(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024(-5.4)}\right)\right)+4=4+20.2\pi+\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\pi x^{-k}\left((0.1296-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(0.1296-x)}{2\pi}\right\rfloor\right)+17.2444(2-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)-(6.5536-x)^k\exp\left(i\pi\left\lfloor\frac{\arg(6.5536-x)}{2\pi}\right\rfloor\right)\right)\left(-\frac{1}{2}\right)_k\sqrt{x}$$

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

$$\pi\left(1-\sqrt{1.024\times 6.4}+\sqrt{-0.024\,(-5.4)}+20\sqrt[4]{1.024\times 6.4\,(-0.024)\,(-5.4)}+\right.$$
$$8\sqrt{2}\,\sqrt[8]{1.024\times 6.4\,(-0.024)\,(-5.4)}\left(\sqrt[4]{1.024\times 6.4}+\sqrt[4]{-0.024\,(-5.4)}\right)\Bigg)+$$
$$4 = 4+20.2\,\pi+\sum_{k=0}^{\infty}\frac{1}{k!}\,(-1)^k\,\pi\left(-\frac{1}{2}\right)_k z_0^{1/2-k}$$
$$\left((0.1296-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\,\lfloor\arg(0.1296-z_0)/(2\pi)\rfloor} z_0^{1/2\,\lfloor\arg(0.1296-z_0)/(2\pi)\rfloor}+\right.$$
$$17.2444\,(2-z_0)^k\left(\frac{1}{z_0}\right)^{1/2\,\lfloor\arg(2-z_0)/(2\pi)\rfloor} z_0^{1/2\,\lfloor\arg(2-z_0)/(2\pi)\rfloor}-$$
$$\left.(6.5536-z_0)^k\left(\left(\frac{1}{z_0}\right)^{1/2\,\lfloor\arg(6.5536-z_0)/(2\pi)\rfloor} z_0^{1/2\,\lfloor\arg(6.5536-z_0)/(2\pi)\rfloor}\right)\right)$$



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

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

sqrt(1.024*6.4)+sqrt(-0.024*-5.4)+68*(1.024*6.4*-0.024*-5.4)^1/4+16*(1.024*6.4*-0.024*-5.4)^1/12*((((1.024*6.4)^1/3+(-0.024*-5.4)^1/3)))+48*(1.024*6.4*-0.024*-5.4)^1/6*((((1.024*6.4)^1/6+(-0.024*-5.4)^1/6)))

16*(1.024*6.4*-0.024*-5.4)^1/12*((((1.024*6.4)^1/3+(-0.024*-5.4)^1/3)))+48*(1.024*6.4*-0.024*-5.4)^1/6*((((1.024*6.4)^1/6+(-0.024*-5.4)^1/6)))

Input:

$$16\sqrt[12]{1.024\times 6.4\times(-0.024)\times(-5.4)}\left(\sqrt[3]{1.024\times 6.4}+\sqrt[3]{-0.024\times(-5.4)}\right)+$$
$$48\sqrt[6]{1.024\times 6.4\times(-0.024)\times(-5.4)}\left(\sqrt[6]{1.024\times 6.4}+\sqrt[6]{-0.024\times(-5.4)}\right)$$

Result:

134.65439822445221899679646313495888823864870247559167564 59...

134.6543982…. result very near to the rest mass of Pion meson 134.9766

sqrt(1.024*6.4)+sqrt(-0.024*-5.4)+68*(1.024*6.4*-0.024*-5.4)^1/4+134.654398224452218996796463134958888238648702475591 67

Input interpretation:

$$\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+68\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+134.65439822445221899679646313495888823864870247559167$$

Result:

Final result:

202.85439822445221899679646313495888823864870247559167

202.8543982…..

377(((((sqrt(1.024*6.4)+sqrt(-0.024*-5.4)+68*(1.024*6.4*-0.024*-5.4)^1/4+134.6543982244522189)))))-(2048+1024-64-24)

Where 377 is a Fibonacci number

Input interpretation:

$$377\left(\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+68\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+134.6543982244522189\right)-(2048+1024-64-24)$$

Result:

73492.1081306184865253

73492.10813….

Thence, we have the following mathematical connections:

$$\left(377\left(\sqrt{1.024\times 6.4}+\sqrt{-0.024\times(-5.4)}+68\sqrt[4]{1.024\times 6.4\times(-0.024)\times(-5.4)}+134.6543982244522189\right)-(2048+1024-64-24)\right)=73492.108\Rightarrow$$

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

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

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

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

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

$$= 73491.788325481187105491595720422205480251957265634133987 00...$$

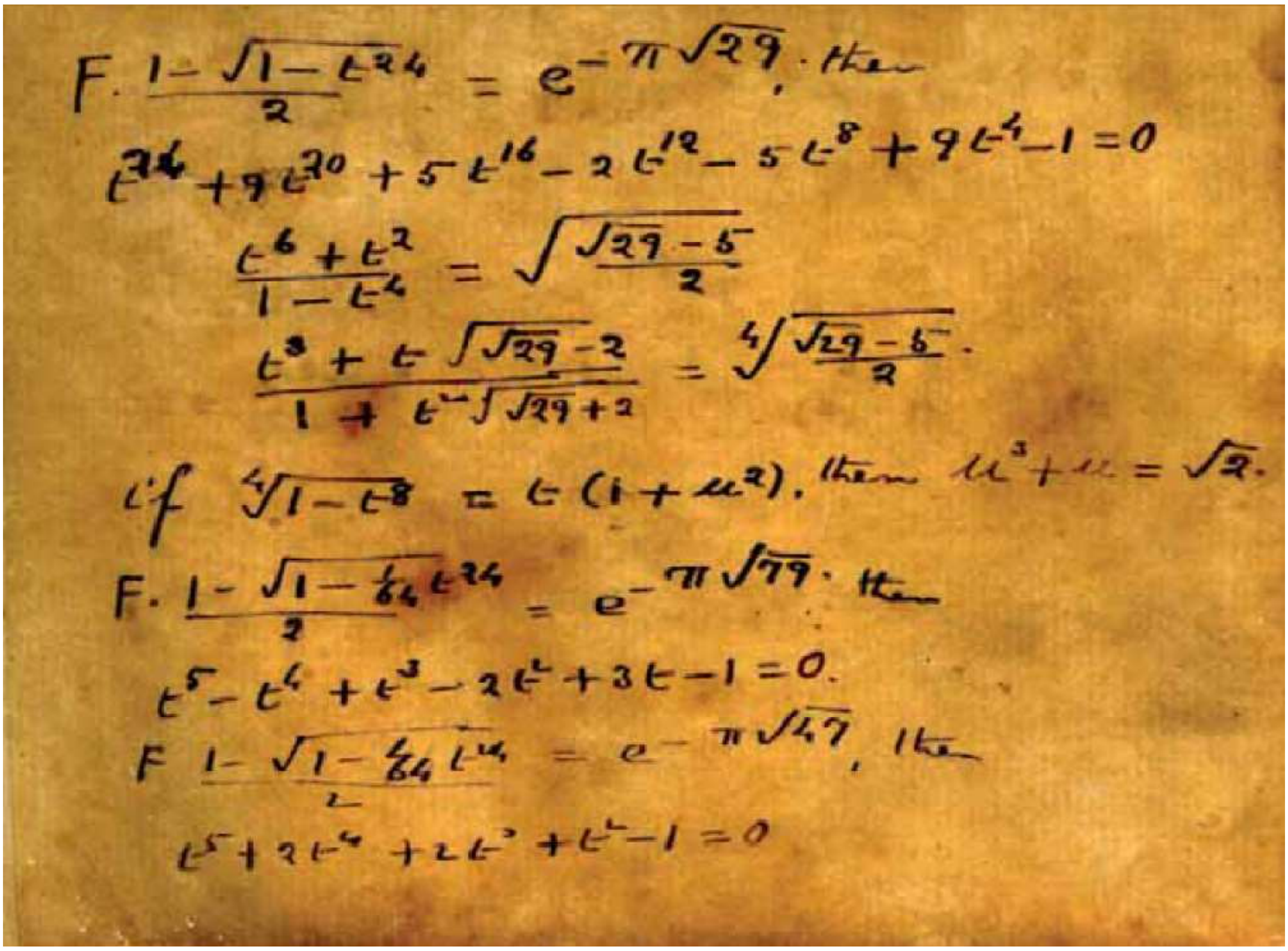
$$= 73491.7883254... \Rightarrow$$

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

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

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

Now, we have that:



F. $\frac{1-\sqrt{1-t^{24}}}{2} = e^{-\pi\sqrt{29}}$. then

$t^{24}+9t^{20}+5t^{16}-2t^{12}-5t^{8}+9t^{4}-1=0$

$\frac{t^6+t^2}{1-t^4} = \sqrt{\frac{\sqrt{29}-5}{2}}$

$\frac{t^3+t\sqrt{\sqrt{29}-2}}{1+t^2\sqrt{\sqrt{29}+2}} = \sqrt[4]{\frac{\sqrt{29}-5}{2}}$.

if $\sqrt[4]{1-t^8} = t(1+u^2)$, then $u^3+u=\sqrt{2}$.

F. $\frac{1-\sqrt{1-\frac{1}{64}t^{24}}}{2} = e^{-\pi\sqrt{79}}$. then

$t^5-t^4+t^3-2t^2+3t-1=0$.

F $\frac{1-\sqrt{1-\frac{1}{64}t^{24}}}{2} = e^{-\pi\sqrt{47}}$, then

$t^5+2t^4+2t^3+t^2-1=0$

We have the following interesting expressions:

exp(-Pi*sqrt(29))*sqrt(((((sqrt(29)-5))/2)))*(((((sqrt(29)-5))/2)))^1/4*(sqrt(2))*1/(exp(-Pi*sqrt(79)))*exp(-Pi*sqrt(47))

Input:

$$\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\times\frac{1}{\exp\left(-\pi\sqrt{79}\right)}\exp\left(-\pi\sqrt{47}\right)$$

Exact result:

$$\frac{\left(\sqrt{29}-5\right)^{3/4}e^{-\sqrt{29}\pi-\sqrt{47}\pi+\sqrt{79}\pi}}{\sqrt[4]{2}}$$

Decimal approximation:

0.000010958098248039814630288664252483569745480054423680146...

0.000010958098248…..

Property:

$$\frac{\left(-5+\sqrt{29}\right)^{3/4} e^{-\sqrt{29}\,\pi-\sqrt{47}\,\pi+\sqrt{79}\,\pi}}{\sqrt[4]{2}}$$ is a transcendental number

Alternate form:

$$\frac{\sqrt{2}\; e^{-\sqrt{29}\,\pi-\sqrt{47}\,\pi+\sqrt{79}\,\pi}}{\sqrt[4]{70+13\sqrt{29}}}$$

Series representations:

$$\frac{\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\right)\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\left(\sqrt{2}\,\exp\left(-\pi\sqrt{47}\right)\right)}{\exp\left(-\pi\sqrt{79}\right)} =$$

$$\left(\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}\right)\right.$$
$$\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(47-z_0)^k z_0^{-k}}{k!}\right)$$
$$\sqrt{z_0}^{\,2}\sqrt[4]{-5+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}\,2^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-5+\sqrt{29}-2z_0\right)^{k_2}(2-z_0)^{k_1} z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)$$
$$\Bigg/\left(\sqrt[4]{2}\,\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(79-z_0)^k z_0^{-k}}{k!}\right)\right)$$

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

$$\frac{\left(\exp(-\pi\sqrt{29})\sqrt{\frac{1}{2}(\sqrt{29}-5)}\right)\sqrt[4]{\frac{1}{2}(\sqrt{29}-5)}\,(\sqrt{2}\exp(-\pi\sqrt{47}))}{\exp(-\pi\sqrt{79})} =$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}(-5-2x+\sqrt{29})\right)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{x}^2\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}2^{-k_2}(2-x)^{k_1}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}(-5-2x+\sqrt{29})^{k_2}}{k_1!\,k_2!}\right)\Big/$$
$$\left(\sqrt[4]{2}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

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

$$\frac{\left(\exp(-\pi\sqrt{29})\sqrt{\frac{1}{2}(\sqrt{29}-5)}\right)\sqrt[4]{\frac{1}{2}(\sqrt{29}-5)}\,(\sqrt{2}\exp(-\pi\sqrt{47}))}{\exp(-\pi\sqrt{79})} =$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{1}{2}(-5+\sqrt{29})\right)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{x}^2\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(2-x)^{k_1}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-x+\frac{1}{2}(-5+\sqrt{29})\right)^{k_2}}{k_1!\,k_2!}\right)\Big/$$
$$\left(\sqrt[4]{2}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

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

((1/exp(-Pi*sqrt(29))))*sqrt(((((sqrt(29)-5))/2)))*(((((sqrt(29)-5))/2)))^1/4*(sqrt(2))*(exp(-Pi*sqrt(79)))*1/(((exp(-Pi*sqrt(47)))))

Input:

$$\frac{1}{\exp(-\pi\sqrt{29})}\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\times\frac{1}{\exp(-\pi\sqrt{47})}$$

Exact result:

$$\frac{\left(\sqrt{29}-5\right)^{3/4}e^{\sqrt{29}\,\pi+\sqrt{47}\,\pi-\sqrt{79}\,\pi}}{\sqrt[4]{2}}$$

Decimal approximation:

15424.80597391886041466350273291144812882808136437211734803...

15424.80597….

Property:

$$\frac{\left(-5+\sqrt{29}\right)^{3/4}e^{\sqrt{29}\,\pi+\sqrt{47}\,\pi-\sqrt{79}\,\pi}}{\sqrt[4]{2}}$$ is a transcendental number

Alternate form:

$$\frac{\sqrt{2}\,e^{\sqrt{29}\,\pi+\sqrt{47}\,\pi-\sqrt{79}\,\pi}}{\sqrt[4]{70+13\sqrt{29}}}$$

Series representations:

$$\frac{\left(\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\right)\sqrt{2}\exp\left(-\pi\sqrt{79}\right)}{\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)} =$$

$$\left(\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(79-z_0)^k z_0^{-k}}{k!}\right)\right.$$
$$\sqrt{z_0}^2\sqrt[4]{-5+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}2^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-5+\sqrt{29}-2z_0\right)^{k_2}(2-z_0)^{k_1}z_0^{-k_1-k_2}}{k_1!k_2!}\right)$$
$$\Bigg/\left(\sqrt[4]{2}\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}\right)\right.$$
$$\left.\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(47-z_0)^k z_0^{-k}}{k!}\right)\right)$$

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

$$\frac{\left(\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\right)\sqrt{2}\exp\left(-\pi\sqrt{79}\right)}{\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)} =$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-5-2x+\sqrt{29}\right)\right)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{x}^2\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}2^{-k_2}(2-x)^{k_1}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-5-2x+\sqrt{29}\right)^{k_2}}{k_1!k_2!}\right)\Bigg/$$
$$\left(\sqrt[4]{2}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$
$$\left.\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$
for $(x\in\mathbb{R}\text{ and }x<0)$

$$\frac{\left(\sqrt{\frac{1}{2}(\sqrt{29}-5)}\sqrt[4]{\frac{1}{2}(\sqrt{29}-5)}\right)\sqrt{2}\exp(-\pi\sqrt{79})}{\exp(-\pi\sqrt{29})\exp(-\pi\sqrt{47})} =$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{1}{2}(-5+\sqrt{29})\right)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{x}^2\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(2-x)^{k_1}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-x+\frac{1}{2}(-5+\sqrt{29})\right)^{k_2}}{k_1!k_2!}\right)\Bigg/$$
$$\left(\sqrt[4]{2}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right.$$
$$\left.\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

Or:

1/(((((exp(-Pi*sqrt(29))*sqrt(((((sqrt(29)-5))/2)))*(((((sqrt(29)-5))/2)))^1/4*(sqrt(2))*1/(exp(-Pi*sqrt(79)))*exp(-Pi*sqrt(47)))))))

Input:

$$\frac{1}{\exp(-\pi\sqrt{29})\sqrt{\frac{1}{2}(\sqrt{29}-5)}\sqrt[4]{\frac{1}{2}(\sqrt{29}-5)}\sqrt{2}\times\frac{1}{\exp(-\pi\sqrt{79})}\exp(-\pi\sqrt{47})}$$

Exact result:

$$\frac{\sqrt[4]{2}\,e^{\sqrt{29}\,\pi+\sqrt{47}\,\pi-\sqrt{79}\,\pi}}{(\sqrt{29}-5)^{3/4}}$$

Decimal approximation:

91256.71055001537962192684759646752167309120530505483189508...

91256.7105….

Property:

$$\frac{\sqrt[4]{2}\, e^{\sqrt{29}\,\pi+\sqrt{47}\,\pi-\sqrt{79}\,\pi}}{\left(-5+\sqrt{29}\right)^{3/4}} \text{ is a transcendental number}$$

Alternate form:

$$\sqrt[4]{\frac{35}{2}+\frac{13\sqrt{29}}{4}}\; e^{\sqrt{29}\,\pi+\sqrt{47}\,\pi-\sqrt{79}\,\pi}$$

Series representations:

$$\frac{1}{\frac{\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\right)\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\left(\sqrt{2}\exp\left(-\pi\sqrt{47}\right)\right)}{\exp\left(-\pi\sqrt{79}\right)}} =$$

$$\left(\sqrt[4]{2}\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(79-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/$$

$$\left(\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}\right)\right.$$

$$\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(47-z_0)^k z_0^{-k}}{k!}\right)\sqrt{z_0}^{\,2}$$

$$\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(-5+\sqrt{29}-2z_0\right)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$

$$\left.\sqrt[4]{-5+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}}\right)$$

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

$$\frac{1}{\frac{\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\right)\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\left(\sqrt{2}\exp\left(-\pi\sqrt{47}\right)\right)}{\exp\left(-\pi\sqrt{79}\right)}} =$$

$$\left(\sqrt[4]{2}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/$$

$$\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-5-2x+\sqrt{29}\right)\right)}{2\pi}\right\rfloor\right)\right.$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-5-2x+\sqrt{29}\right)^k}{k!}\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{1}{\frac{\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\right)\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\left(\sqrt{2}\exp\left(-\pi\sqrt{47}\right)\right)}{\exp\left(-\pi\sqrt{79}\right)}} =$$

$$\left(\sqrt[4]{2}\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) / \left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{1}{2}\left(-5+\sqrt{29}\right)\right)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+\frac{1}{2}\left(-5+\sqrt{29}\right)\right)^k}{k!}\right) \text{ for } (x\in\mathbb{R} \text{ and } x<0)$$

Or:

1/(((((exp(-Pi*sqrt(29))*sqrt(((((sqrt(29)-5))/2)))*(((((sqrt(29)-5))/2)))^1/4*(sqrt(2))*exp(-Pi*sqrt(79))*exp(-Pi*sqrt(47)))))))

Input:

$$\frac{1}{\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)}$$

Exact result:

$$\frac{\sqrt[4]{2}\,e^{\sqrt{29}\pi+\sqrt{47}\pi+\sqrt{79}\pi}}{\left(\sqrt{29}-5\right)^{3/4}}$$

Decimal approximation:

$1.6366257984354820364561326031128794782879798624822973\ldots \times 10^{29}$

$1.6366257984\ldots*10^{29}$

Property:

$$\frac{\sqrt[4]{2}\ e^{\sqrt{29}\ \pi+\sqrt{47}\ \pi+\sqrt{79}\ \pi}}{\left(-5+\sqrt{29}\right)^{3/4}} \text{ is a transcendental number}$$

Alternate form:

$$\sqrt[4]{\frac{35}{2}+\frac{13\sqrt{29}}{4}}\ e^{\sqrt{29}\ \pi+\sqrt{47}\ \pi+\sqrt{79}\ \pi}$$

Series representations:

$$\frac{1}{\exp(-\pi\sqrt{29})\sqrt{\frac{1}{2}(\sqrt{29}-5)}\ \sqrt[4]{\frac{1}{2}(\sqrt{29}-5)}\ \sqrt{2}\ \exp(-\pi\sqrt{79})\exp(-\pi\sqrt{47})} =$$

$$\left(\sqrt[4]{2}\right)\Big/\left(\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}\right)\right.$$
$$\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(47-z_0)^k z_0^{-k}}{k!}\right)$$
$$\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(79-z_0)^k z_0^{-k}}{k!}\right)\sqrt{z_0}^2$$
$$\left(\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k\left(-\frac{1}{2}\right)_k\left(-5+\sqrt{29}-2z_0\right)^k z_0^{-k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(2-z_0)^k z_0^{-k}}{k!}\right)$$
$$\left.\sqrt[4]{-5+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(29-z_0)^k z_0^{-k}}{k!}}\right)$$

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

$$\frac{1}{\exp(-\pi\sqrt{29})\sqrt{\frac{1}{2}(\sqrt{29}-5)}\sqrt[4]{\frac{1}{2}(\sqrt{29}-5)}\sqrt{2}\exp(-\pi\sqrt{79})\exp(-\pi\sqrt{47})} =$$

$$\left(\sqrt[4]{2}\right) \Big/ \left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-5-2x+\sqrt{29}\right)\right)}{2\pi}\right\rfloor\right)\right.$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-5-2x+\sqrt{29}\right)^k}{k!}\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\frac{1}{\exp(-\pi\sqrt{29})\sqrt{\frac{1}{2}(\sqrt{29}-5)}\sqrt[4]{\frac{1}{2}(\sqrt{29}-5)}\sqrt{2}\exp(-\pi\sqrt{79})\exp(-\pi\sqrt{47})} =$$

$$(\sqrt[4]{2})\Bigg/\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{1}{2}(-5+\sqrt{29})\right)}{2\pi}\right\rfloor\right)\right.$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{x}^2\left(\sum_{k=0}^{\infty}\frac{(-1)^k(2-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+\frac{1}{2}(-5+\sqrt{29})\right)^k}{k!}\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

Now, we have that:

(((((exp(-Pi*sqrt(29))*sqrt(((((sqrt(29)-5))/2)))*(((((sqrt(29)-5))/2)))^1/4*(sqrt(2))*exp(-Pi*sqrt(79))*exp(-Pi*sqrt(47)))))))))))^1/4096

Input:

$$\sqrt[4096]{\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)}$$

Exact result:

$$\frac{(\sqrt{29}-5)^{3/16384}\exp(-(\sqrt{29}\pi)/4096-(\sqrt{47}\pi)/4096-(\sqrt{79}\pi)/4096)}{\sqrt[16384]{2}}$$

Decimal approximation:

0.9837113632643988966458055364242396411428012257647136578 41...

0.98371136326….result near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Property:

$$\frac{(-5+\sqrt{29})^{3/16384}\, e^{-(\sqrt{29}\,\pi)/4096-(\sqrt{47}\,\pi)/4096-(\sqrt{79}\,\pi)/4096}}{\sqrt[16\,384]{2}}$$ is a transcendental number

Alternate form:

$$\frac{(\sqrt{29}-5)^{3/16384}\, e^{-((\sqrt{29}+\sqrt{47}+\sqrt{79})\pi)/4096}}{\sqrt[16\,384]{2}}$$

All 4096th roots of ((sqrt(29) - 5)^(3/4) e^(-sqrt(29) π - sqrt(47) π - sqrt(79) π))/2^(1/4):

- Polar form

$$\frac{(\sqrt{29}-5)^{3/16384}\, e^0 \exp(-(\sqrt{29}\,\pi)/4096-(\sqrt{47}\,\pi)/4096-(\sqrt{79}\,\pi)/4096)}{\sqrt[16\,384]{2}}$$

≈ 0.983711 (real, principal root)

$$\frac{(\sqrt{29}-5)^{3/16384}\, e^{(i\pi)/2048} \exp(-(\sqrt{29}\,\pi)/4096-(\sqrt{47}\,\pi)/4096-(\sqrt{79}\,\pi)/4096)}{\sqrt[16\,384]{2}}$$

$\approx 0.983710+0.0015090\, i$

$$\frac{(\sqrt{29}-5)^{3/16384}\, e^{(i\pi)/1024} \exp(-(\sqrt{29}\,\pi)/4096-(\sqrt{47}\,\pi)/4096-(\sqrt{79}\,\pi)/4096)}{\sqrt[16384]{2}}$$

$$\approx 0.983707+0.0030180\, i$$

$$\frac{(\sqrt{29}-5)^{3/16384}\, e^{(3i\pi)/2048} \exp(-(\sqrt{29}\,\pi)/4096-(\sqrt{47}\,\pi)/4096-(\sqrt{79}\,\pi)/4096)}{\sqrt[16384]{2}}$$

$$\approx 0.983701+0.0045270\, i$$

$$\frac{(\sqrt{29}-5)^{3/16384}\, e^{(i\pi)/512} \exp(-(\sqrt{29}\,\pi)/4096-(\sqrt{47}\,\pi)/4096-(\sqrt{79}\,\pi)/4096)}{\sqrt[16384]{2}}$$

$$\approx 0.983693+0.006036\, i$$

Series representations:

$$\sqrt[4096]{\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\,\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\,\sqrt{2}\,\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)}$$

$$= \frac{1}{\sqrt[16384]{2}}\left(\left(\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (29-z_0)^k z_0^{-k}}{k!}\right)\right.\right.$$
$$\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (47-z_0)^k z_0^{-k}}{k!}\right)$$
$$\exp\left(-\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (79-z_0)^k z_0^{-k}}{k!}\right)\sqrt{z_0}^{\,2}$$
$$\sqrt[4]{-5+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (29-z_0)^k z_0^{-k}}{k!}}\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}$$
$$\left.\frac{(-1)^{k_1+k_2}\, 2^{-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-5+\sqrt{29}-2z_0\right)^{k_2}(2-z_0)^{k_1} z_0^{-k_1-k_2}}{k_1!\,k_2!}\right)$$
$$\left.\wedge(1/4096)\right) \quad \text{for not } ((z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

$$\sqrt[4096]{\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)}$$

$$= \frac{1}{\sqrt[16384]{2}}\left(\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{1}{2}\left(-5-2x+\sqrt{29}\right)\right)}{2\pi}\right\rfloor\right)\right.\right.$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\sqrt{x}^2\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\left.\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}2^{-k_2}(2-x)^{k_1}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-5-2x+\sqrt{29}\right)^{k_2}}{k_1!\,k_2!}\right)$$

$$\left.\hat{}\,(1/4096)\right) \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\sqrt[4096]{\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)}$$

$$= \frac{1}{16384\sqrt[4]{2}}\left(\left(\exp\left(i\pi\left\lfloor\frac{\arg(2-x)}{2\pi}\right\rfloor\right)\exp\left(i\pi\left\lfloor\frac{\arg\left(-x+\frac{1}{2}\left(-5+\sqrt{29}\right)\right)}{2\pi}\right\rfloor\right)\right.\right.$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(47-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(47-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\exp\left(-\pi\exp\left(i\pi\left\lfloor\frac{\arg(79-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(79-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$
$$\sqrt{x}^2\sqrt[4]{-5+\exp\left(i\pi\left\lfloor\frac{\arg(29-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(29-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$
$$\sum_{k_1=0}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_1+k_2}(2-x)^{k_1}x^{-k_1-k_2}\left(-\frac{1}{2}\right)_{k_1}\left(-\frac{1}{2}\right)_{k_2}\left(-x+\frac{1}{2}\left(-5+\sqrt{29}\right)\right)^{k_2}}{k_1!\,k_2!}$$
$$\left.\right)\hat{}\,(1/4096)\Bigg) \quad \text{for } (x \in \mathbb{R} \text{ and } x < 0)$$

Integral representation:

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

$\Gamma(x)$ is the gamma function

We observe that:

[log base 0.98371136326439889(((((exp(-Pi*sqrt(29))*sqrt(((((sqrt(29)-5))/2)))*(((((sqrt(29)-5))/2)))^1/4*(sqrt(2))*exp(-Pi*sqrt(79))*exp(-Pi*sqrt(47))))))))]^1/2

Input interpretation:

$$\sqrt{\log_{0.98371136326439889}\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)\right)}$$

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

Result:

63.99999999999999...

63.99999.... = 64

Alternative representation:

$$\sqrt{\log_{0.983711}\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)\right)} = \sqrt{\left(\frac{1}{\log(0.983711)}\log\left(\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)\exp\left(-\pi\sqrt{79}\right)\sqrt[4]{\frac{1}{2}\left(-5+\sqrt{29}\right)}\sqrt{2}\sqrt{\frac{1}{2}\left(-5+\sqrt{29}\right)}\right)\right)}$$

$\log(x)$ is the natural logarithm

Series representations:

$$\sqrt{\log_{0.983711}\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)\right)} = \exp\left(i\pi\left\lfloor\frac{1}{2\pi}\arg\left(-x+\log_{0.983711}\left(\frac{1}{\sqrt[4]{2}}\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)\exp\left(-\pi\sqrt{79}\right)\sqrt{2}\sqrt[4]{-5+\sqrt{29}}\sqrt{\frac{1}{2}\left(-5+\sqrt{29}\right)}\right)\right)\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k x^{-k}\left(-x+\log_{0.983711}\left(\frac{1}{\sqrt[4]{2}}\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)\exp\left(-\pi\sqrt{79}\right)\sqrt{2}\sqrt[4]{-5+\sqrt{29}}\sqrt{\frac{1}{2}\left(-5+\sqrt{29}\right)}\right)\right)^k\left(-\frac{1}{2}\right)_k \quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$\sqrt{\log_{0.983711}\left(\exp\left(-\pi\sqrt{29}\right)\sqrt{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt[4]{\frac{1}{2}\left(\sqrt{29}-5\right)}\sqrt{2}\exp\left(-\pi\sqrt{79}\right)\exp\left(-\pi\sqrt{47}\right)\right)} =$$

$$\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\log_{0.983711}\left(\frac{\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)\exp\left(-\pi\sqrt{79}\right)\sqrt{2}\sqrt[4]{-5+\sqrt{29}}\sqrt{\frac{1}{2}\left(-5+\sqrt{29}\right)}}{\sqrt[4]{2}}\right)-z_0\right)/(2\pi)\right\rfloor}$$

$$z_0^{1/2\left(1+\left\lfloor\arg\left(\log_{0.983711}\left(\frac{\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)\exp\left(-\pi\sqrt{79}\right)\sqrt{2}\sqrt[4]{-5+\sqrt{29}}\sqrt{\frac{1}{2}\left(-5+\sqrt{29}\right)}}{\sqrt[4]{2}}\right)-z_0\right)/(2\pi)\right\rfloor\right)}$$

$$\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^k\left(-\frac{1}{2}\right)_k\left(\log_{0.983711}\left(\frac{1}{\sqrt[4]{2}}\exp\left(-\pi\sqrt{29}\right)\exp\left(-\pi\sqrt{47}\right)\exp\left(-\pi\sqrt{79}\right)\sqrt{2}\sqrt[4]{-5+\sqrt{29}}\sqrt{\frac{1}{2}\left(-5+\sqrt{29}\right)}\right)-z_0\right)^k z_0^{-k}$$

Appendix

Scen.	λ_1	ℓ^{-1}/M_P	$m_{\rm rad}/m_G$	ρ_1/TeV	$m_{\rm rad}/\text{TeV}$	$\langle\mu\rangle/\text{TeV}$	$\mu_0/\langle\mu\rangle$	$T_c/\langle\mu\rangle$	$T_n/\langle\mu\rangle$
A_1	1.250	0.501	0.0645	0.758	0.1998	0.750		0.305	
B_1	−3.000	0.554	0.1969	1.085	1.018	0.828	0.9995	0.903	0.609
B_2	−2.583	0.554	0.1905	1.007	0.915	0.767	0.989	0.825	0.428
B_3	−2.500	0.554	0.1888	0.989	0.890	0.752	0.974	0.806	0.367
B_4	−2.438	0.554	0.1874	0.973	0.870	0.741	0.937	0.790	0.297
B_5	−2.375	0.554	0.1859	0.957	0.849	0.728	0.982	0.774	0.193
B_6	−2.292	0.554	0.1836	0.934	0.818	0.710	0.971	0.750	0.149
B_7	2.208	0.554	0.1809	0.908	0.784	0.690	0.949	0.724	0.0990
B_8	−2.125	0.554	0.1776	0.879	0.745	0.667	0.890	0.694	0.0388
B_9	−2.096	0.554	0.1763	0.8675	0.7303	0.6585	0.827	0.682	0.0122
B_{10}	−2.092	0.554	0.1761	0.8658	0.7281	0.6572	0.808	0.680	0.0073
B_{11}	−2.090	0.554	0.1760	0.8650	0.7270	0.6565	0.793	0.679	0.0039
C_1	−3.125	0.377	0.289	0.554	0.890	0.378	0.989	1.123	0.601
C_2	−2.604	0.377	0.271	0.496	0.751	0.336	0.937	0.976	0.098
D_1	−3.462	1.49	0.106	0.468	0.477	0.250	0.9996	1.007	0.445
E_1	−2.429	0.554	0.155	0.877	0.643	0.667	0.895	0.694	0.142

Table 1. List of benchmark scenarios defined by the classes in eqs. (4.12)–(4.16) and the input values of λ_1 (second column). The outputs obtained in each scenario are presented from the third column on. The foreground red [blue] color on the value of λ_1 indicates that the corresponding phase transition is driven by $O(3)$ [$O(4)$] symmetric bounce solutions. In scenario A_1 there is no phase transition.

Scen.	$T_i/\langle\mu\rangle$	N_e	$T_R/\langle\mu\rangle$	T_R/GeV	α	$\log_{10}(\beta/H_\star)$
B_1	0.663	0.09	1.272	1053	1.60	2.36
B_2	0.605	0.35	1.071	821.8	4.61	1.99
B_3	0.591	0.48	1.024	770.4	7.86	1.79
B_4	0.580	0.67	0.986	730.6	17.1	1.48
B_5	0.568	1.08	0.953	694.0	90.1	1.97
B_6	0.551	1.31	0.921	654.2	228	1.86
B_7	0.531	1.68	0.887	612.0	1047	1.67
B_8	0.509	2.57	0.849	566.4	$4.0\cdot10^4$	1.23
B_9	0.5004	3.71	0.834	549.3	$4.1\cdot10^6$	0.64
B_{10}	0.4991	4.22	0.832	546.8	$3.3\cdot10^7$	0.34
B_{11}	0.4985	4.86	0.831	545.6	$4.5\cdot10^8$	-0.32
C_1	0.828	0.32	1.531	578.4	4.3	2.03
C_2	0.718	1.99	1.239	416.2	$5.0\cdot10^3$	1.45
D_1	–	–	0.535	133.7	5.0	1.05
E_1	0.509	1.28	0.850	567.2	203	1.89

Table 2. Some physical parameters for the cases B_i, C_i, D and E considered in the text.

Table of connection between the physical and mathematical constants and the very closed approximations to the dilaton value.

Table 1

Elementary charge = 1.602176	**$1 / (1{,}602176)^{1/64}$ = 0,992662013**
Golden ratio = 1.61803398	**$1 / (1{,}61803398)^{1/64}$ = 0,992509261**
ζ(2) = 1.644934	**$1 / (1{,}644934)^{1/64}$ = 0,992253592**
$\sqrt[14]{Q = (G_{505}/G_{101/5})^3}$ **= 1.65578**	**$1 / (1{,}65578)^{1/64}$ = 0,992151706**
Proton mass = 1.672621	**$1 / (1{,}672621)^{1/64}$ = 0,991994840**
Neutron mass = 1.674927	**$1 / (1{,}674927)^{1/64}$ = 0,991973486**

From:

Rotating strings confronting PDG mesons
Jacob Sonnenschein and Dorin Weissman - arXiv:1402.5603v1 [hep-ph] 23 Feb 2014

$c\bar{c}$. **The Ψ trajectory:** The left side of figure (15) depicts the Ψ trajectory. Here we use the states $J/\Psi(1S)(3097)1^{--}, \chi_{c1}(1P)(3510)1^{++}$, and $\Psi(3770)1^{--}$. Since no $J = 3$ state has been observed, we use three states with $J = 1$, but with increasing orbital angular momentum $(L = 0, 1, 2)$ and do the fit to L instead of J. To give an idea of the shifts in mass involved, the $J^{PC} = 2^{++}$ state χ_{c2} has a mass of 3556 MeV, and the $J^{PC} = 3^{--}$ state is expected to lie 30 − 60 MeV above the $\Psi(3770)$[23].

The best linear fit is

$$\alpha' = 0.418, a = -4.04$$

with $\chi_l^2 = 3.41 \times 10^{-4}$, but the optimal fit is far from the linear, with endpoint masses in the range of the constituent c quark mass:

$$m_c = 1500, \alpha' = 0.979, a = -0.09$$

with $\chi_m^2 = 5 \times 10^{-7}$ $(\chi_m^2/\chi_l^2 = 0.002)$. Aside from the improvement in χ^2, by adding the mass we also get a value for the slope (and to a lesser extent, the intercept) that is much closer to that obtained in fits for the light meson trajectories.

where α’ is the Regge slope (string tension)

We know also that:

ω	6	$m_{u/d} = 0 - 60$	0.910 – 0.918
ω/ω_3	5 + 3	$m_{u/d} = 255 - 390$	0.988 – 1.18
ω/ω_3	5 + 3	$m_{u/d} = 240 - 345$	0.937 – 1.000

The average of the various Regge slope of Omega mesons are:

1/7 * (0.979 + 0.910 + 0.918 + 0.988 + 0.937 + 1.18 +1) = 0.987428571

result very near to the value of dilaton and to the solution 0.987516007… of the above expression.

From:

Astronomy & Astrophysics manuscript no. ms c ESO 2019 - September 24, 2019
Planck 2018 results. VI. Cosmological parameters

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

from:

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

We have that:

Hence

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

so that

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

Hence

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

Again

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

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

so that

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

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

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

we obtain

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

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

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:

$$T\,e^{\gamma_E\,\phi} \;=\; -\,\frac{\beta_E^{(p)}\,h^2}{\gamma_E}\;e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

$$16\,k'\,e^{\;\;2C} \;=\; \frac{h^2\left(p\;+\;1\;-\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}}{(7\;-\;p)}$$

$$(A')^2 \;-\; k\,e^{-2\,A} \;+\; \frac{h^2}{16(p\;+\;1)}\;\left(7\;-\;p\;+\;\frac{2\,\beta_E^{(p)}}{\gamma_E}\right)\;e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

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 β_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 64^2, while -6C+ϕ 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:

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

Exact result:

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

Decimal approximation:

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

1.6272016… * 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:

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

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

from which:

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

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

Now:

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

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:

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

Result:

0.00666501785...

0.00666501785…

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:

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

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

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

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

–5.010882647757...

-5.010882647757…

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:

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

$$\log(0.006665017846190000) = 2 i \pi \left\lfloor \frac{\arg(0.006665017846190000 - x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.006665017846190000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

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

Integral representation:

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

In conclusion:

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

and for C = 1, we obtain:

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

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:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

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

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

Also performing the 512$^{\text{th}}$ 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:

0.99040073270864402755097375571330141546073279617855555168 4...

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

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

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Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

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Table 1 The predictions for the inflationary parameters (n_s, r), and the values of φ at the horizon crossing (φ_i) and at the end of inflation (φ_f), in the case $3 \leq \alpha \leq \alpha_*$ with both signs of ω_1. The α parameter is taken to be integer, except of the upper limit $\alpha_* \equiv (7+\sqrt{33})/2$

α	3	4		5	6		α_*
sgn(ω_1)	−	+	−	+/−	+	−	−
n_s	0.9650	0.9649	0.9640	0.9639	0.9634	0.9637	0.9632
r	0.0035	0.0010	0.0013	0.0007	0.0005	0.0004	0.0003
$-\kappa\varphi_i$	5.3529	3.5542	3.9899	3.2657	3.0215	2.7427	2.5674
$-\kappa\varphi_f$	0.9402	0.7426	0.8067	0.7163	0.6935	0.6488	0.6276

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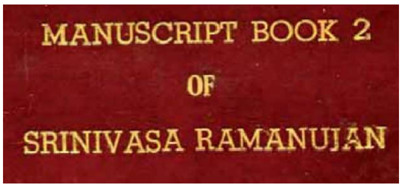

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