On various Ramanujan continued fractions: mathematical connections with some sectors of Particle physics concerning like-particle solutions and dilaton value.

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Abstract

In this research thesis, we have analyzed various Ramanujan continued fractions and described the new possible mathematical connections with some sectors of Particle physics concerning like-particle solutions and dilaton value.

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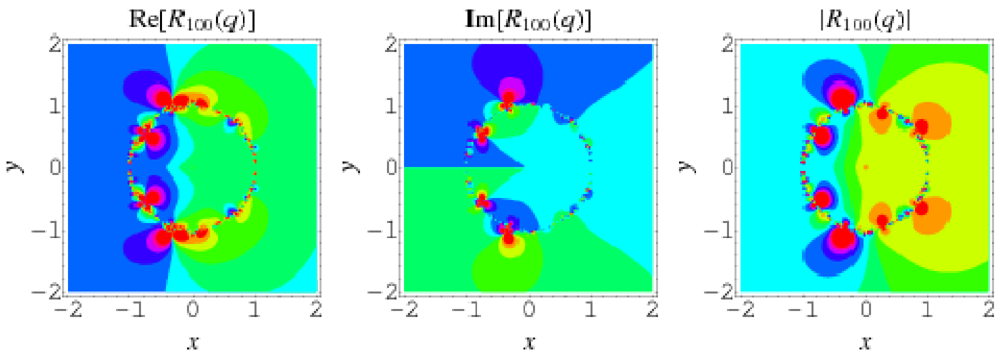

http://mathworld.wolfram.com/Rogers-RamanujanContinuedFraction.html

From:

A continued fraction of order twelve
Research Article
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Ramanujan has recorded several continued fractions in his notebooks. One of the fascinating continued fraction identities recorded by Ramanujan as Entry 12 in his second notebook [5], [2, Entry 12, p.24]:

$$\frac{(a^2q^3;q^4)_\infty(b^2q^3;q^4)_\infty}{(a^2q;q^4)_\infty(b^2q;q^4)_\infty} = \frac{1}{(1-ab)+}\,\frac{(a-bq)(b-aq)}{(1-ab)(1+q^2)+}\,\frac{(a-bq^3)(b-aq^3)}{(1-ab)(1+q^4)+\ldots}, \tag{8}$$

$|q|<1, |ab|<1$.

For a proof of (8), see C. Adiga, B. C. Berndt, S. Bhargava and G. N. Watson [1] and L. Jacobsen [4].

In the equation (8), replacing q by q^3, a by aq^2, b by q and then putting $a = 1$, we get

$$\frac{f(-q,-q^{11})}{f(-q^5,-q^7)} = \frac{1-q}{(1-q^3)+}\,\frac{q^3(1-q^2)(1-q^4)}{(1-q^3)(1+q^6)+}\,\frac{q^3(1-q^8)(1-q^{10})}{(1-q^3)(1+q^{12})+\ldots}. \tag{9}$$

Let

$$H(q) := \frac{q(1-q)}{(1-q^3)+}\,\frac{q^3(1-q^2)(1-q^4)}{(1-q^3)(1+q^6)+}\,\frac{q^3(1-q^8)(1-q^{10})}{(1-q^3)(1+q^{12})+\ldots} \tag{10}$$

and

$$V(q) := \quad H(\quad q).$$

In this paper, we obtain a modular relation between the continued fractions $H(q)$ and $H(q^n)$. We also establish several reciprocity theorems, integral representation and explicit evaluations of the continued fraction $H(q)$ which are analogous to the results of Rogers–Ramanujan continued fraction and Ramanujan's cubic continued fractions.

For $q = e^{-\sqrt{5}\,\pi}$, we obtain:

$$H(e^{-\sqrt{5}\pi}) = \frac{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}-1}{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}+1},$$

((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))-1)))) / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))+1))))

Input:

$$\frac{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}-1}{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}+1}$$

Decimal approximation:

0.000888741039339185484765724244179763954173425588579151719...

$$\frac{\sqrt{3}\ \left(\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377\right)-1}{\sqrt{3}\ \left(\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377\right)+1}$$

Minimal polynomial:

$$x^{16}-1136x^{15}+12216x^{14}-55888x^{13}+185564x^{12}-455280x^{11}+ 827656x^{10}-1167056x^9+1308870x^8-1167056x^7+827656x^6- 455280x^5+185564x^4-55888x^3+12216x^2-1136x+1$$

We obtain:

1 / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))-1)))) / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))+1))))

Input:

$$\frac{1}{\frac{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}-1}{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}+1}}$$

Result:

$$\frac{1+\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1}$$

Decimal approximation:

1125.187153215676867133369097155994031180688516860280820569...

1125.187... result very near to the rest mass of Lambda baryon 1115.68

$$\frac{\sqrt{3}\ \left(\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377\right)+1}{\sqrt{3}\ \left(\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377\right)-1}$$

$$\frac{1}{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1}+\frac{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1}$$

Minimal polynomial:

$$x^{16}-1136x^{15}+12216x^{14}-55888x^{13}+185564x^{12}-455280x^{11}+827656x^{10}-1167056x^{9}+1308870x^{8}-1167056x^{7}+827656x^{6}-455280x^{5}+185564x^{4}-55888x^{3}+12216x^{2}-1136x+1$$

1/9 * 1 / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))-1)))) / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))+1))))))))))

Input:

$$\frac{1}{9}\times\frac{1}{\frac{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}-1}{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}+1}}$$

Result:

$$\frac{1+\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{9\left(\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1\right)}$$

Decimal approximation:

125.02079480174187412592989968399933679785427965114231339 66...

125.02079….result practically equal to the boson Higgs mass 125.18

Alternate forms:

$$\frac{1+\sqrt{3}\sqrt[4]{-31-18\sqrt{3}+14\sqrt{5}+8\sqrt{15}}}{9\left(\sqrt{3}\sqrt[4]{-31-18\sqrt{3}+14\sqrt{5}+8\sqrt{15}}-1\right)}$$

$$\frac{\sqrt{3}\left(\text{root of } x^{16}+124x^{12}-58x^{8}-4x^{4}+1 \text{ near } x=0.578377\right)+1}{9\left(\sqrt{3}\left(\text{root of } x^{16}+124x^{12}-58x^{8}-4x^{4}+1 \text{ near } x=0.578377\right)-1\right)}$$

$$\frac{1}{9\left(\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1\right)}+\frac{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{9\left(\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1\right)}$$

1/8 * 1 / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))-1)))) / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))+1))))))))))

Input:

$$\frac{1}{8}\times\frac{1}{\frac{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}-1}{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}+1}}$$

Result:

$$\frac{1+\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{8\left(\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1\right)}$$

Decimal approximation:

140.6483941519596083916711371444992538975860646075351025711...

140.64839....value very near to the rest mass of Pion 139.570

(27*23)+ 1 / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))-1)))) / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))+1))))

Input:

$$27\times 23+\frac{1}{\frac{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}-1}{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}+1}}$$

Exact result:

$$621+\frac{1+\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1}$$

Decimal approximation:

1746.187153215676867133369097155994031180688516860280820569...

1746.187... result very near to the mass of scalar meson $f_0(1710)$ "candidate glueball"

(1746.187153215676867133369097155994031180688516860280820569)^1/15

Input interpretation:

$$\sqrt[15]{1746.1871532156768671333690971559940311806885168602808205 69}$$

Result:

1.6448995656274994193407932421192253240293851960106393 01047...

1.644899565627499419340793242119225324029385196010639301047

We have also that:

((((((((1 / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))-1)))) / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))+1))))))))))))^1/14

Input:

$$\sqrt[14]{\frac{1}{\frac{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}-1}{\sqrt[4]{126\sqrt{5}+72\sqrt{15}-162\sqrt{3}-279}+1}}}$$

Result:

$$\sqrt[14]{\frac{1+\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}-1}}$$

Decimal approximation:

1.6517511812643498073892647889231096193931217260242578 02947...

1.65175118.... result 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...

$$\sqrt[14]{\frac{\sqrt{3}\ \left(\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377\right)+1}{\sqrt{3}\ \left(\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377\right)-1}}$$

$$\left(\text{root of } x^{16}-1136x^{15}+12216x^{14}-55888x^{13}+185564x^{12}-455280x^{11}+827656x^{10}-1167056x^9+1308870x^8-1167056x^7+827656x^6-455280x^5+185564x^4-55888x^3+12216x^2-1136x+1 \text{ near } x=1125.19\right)\text{^}(1/14)$$

Minimal polynomial:

$$x^{224} - 1136\,x^{210} + 12\,216\,x^{196} - 55\,888\,x^{182} + 185\,564\,x^{168} - 455\,280\,x^{154} + 827\,656\,x^{140} - 1\,167\,056\,x^{126} + 1\,308\,870\,x^{112} - 1\,167\,056\,x^{98} + 827\,656\,x^{84} - 455\,280\,x^{70} + 185\,564\,x^{56} - 55\,888\,x^{42} + 12\,216\,x^{28} - 1136\,x^{14} + 1$$

We have also:

((((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))-1)))) / ((((((((((((126*sqrt(5)+72*sqrt(15)-162*sqrt(3)-279)))^1/4))))+1))))))))^1/4096

Input:

$$\sqrt[4096]{\frac{\sqrt[4]{126\sqrt{5} + 72\sqrt{15} - 162\sqrt{3} - 279} - 1}{\sqrt[4]{126\sqrt{5} + 72\sqrt{15} - 162\sqrt{3} - 279} + 1}}$$

Decimal approximation:

0.998286210291019421519656145508340707669843748913925655326...

0.99828621…. result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate forms:

$$\left(\frac{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}}{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}+1} - \frac{1}{\sqrt[4]{-279-162\sqrt{3}+126\sqrt{5}+72\sqrt{15}}+1}\right) \hat{}\ (1/4096)$$

$$\sqrt[4096]{\frac{\sqrt{3}\sqrt[4]{-31-18\sqrt{3}+14\sqrt{5}+8\sqrt{15}}-1}{1+\sqrt{3}\sqrt[4]{-31-18\sqrt{3}+14\sqrt{5}+8\sqrt{15}}}}$$

$$\sqrt[4096]{\frac{\sqrt{3}\ \boxed{\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377}-1}{\sqrt{3}\ \boxed{\text{root of } x^{16}+124x^{12}-58x^8-4x^4+1 \text{ near } x=0.578377}+1}}$$

For q = $e^{-\sqrt{7}\,\pi}$, we obtain:

$$H(e^{-\sqrt{7}\pi}) = \frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}}{\sqrt{12\sqrt{2}} + \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}},$$

Numerator:

((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4

Input:

$$\sqrt{12\sqrt{2}} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}$$

Result:

$$2\sqrt[4]{2}\sqrt{3} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{\sqrt{21}-3}+\sqrt{5+\sqrt{21}}\right)^3}$$

Decimal approximation:

0.002022387189147699537072259421845574314522368625485931442...

Denominator:

((((sqrt(12*sqrt(2)) + (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4

Input:

$$\sqrt{12\sqrt{2}} + \sqrt[4]{32 + \sqrt{5+\sqrt{21}} \left(\sqrt{5+\sqrt{21}} + \sqrt{\sqrt{21}-3}\right)^3}$$

Result:

$$2\sqrt[4]{2}\sqrt{3} + \sqrt[4]{32 + \sqrt{5+\sqrt{21}} \left(\sqrt{\sqrt{21}-3} + \sqrt{5+\sqrt{21}}\right)^3}$$

Decimal approximation:

8.237046188439323323784036761382197546096248607996130382946...

(((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393

Input interpretation:

$$\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32 + \sqrt{5+\sqrt{21}} \left(\sqrt{5+\sqrt{21}} + \sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393}$$

Result:

0.00024552335180372...

0.0002455233518...

We have that:

1 / (((((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393233))))))))

Input interpretation:

$$\frac{1}{\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32 + \sqrt{5+\sqrt{21}} \left(\sqrt{5+\sqrt{21}} + \sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393233}}$$

Result:

4072.9323408692504...

4072.9323…

And:

1/4((((((((1 / (((((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393233)))))))))))))))

Input interpretation:

$$\frac{1}{4}\times\frac{1}{\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393233}}$$

Result:

1018.2330852173126...

1018.233 result very near to the rest mass of Phi meson 1018.445

34+1/3((((((((1 / (((((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393233)))))))))))))))

Input interpretation:

$$34+\frac{1}{3}\times\frac{1}{\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393233}}$$

Result:

1391.6441136230835...

1391.644... result very near to the rest mass of Sigma baryon 1387.2

-288+1/2((((((((1 / (((((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393233)))))))))))))))

Input interpretation:

$$-288+\frac{1}{2}\times\frac{1}{\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393233}}$$

Result:

1748.4661704346252...

1748.466... result very near to the mass of scalar meson $f_0(1710)$ “candidate glueball”

(1748.4661704346252)^1/15

Input interpretation:

$$\sqrt[15]{1748.4661704346252}$$

Result:

1.64504260005197074...

1.64504260005197074…. ≈ ζ(2) = $\frac{\pi^2}{6} = 1.644934 \ldots$

((((((((1 / (((((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393233))))))))))))))))^1/17

Input interpretation:

$$\sqrt[17]{\frac{1}{\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393233}}}$$

Result:

1.63060016562066232...

1.63060016…

We obtain also:

1000[((((((((1 / (((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393233))))))))))))))))^1/17]

Input interpretation:

$$1000\sqrt[17]{\frac{1}{\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}+\sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393233}}}$$

Result:

1630.60016562066232...

(1630.60016562066232 + 21*2)

Input interpretation:

1630.60016562066232 + 21 × 2

Result:

1672.60016562066232

1672.6 result practically equal to the rest mass of Omega baryon 1672.45

We have also:

((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))+sqrt(sqrt(21)-3))^3)))))))^1/4)))))) / 8.2370461884393))))^1/4096

Input interpretation:

$$\sqrt[4096]{\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32 + \sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}} + \sqrt{\sqrt{21}-3}\right)^3}}{8.2370461884393}}$$

Result:

0.997972731884807330...

0.9979727318.... 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 $\mathbf{0.989117352243} = \boldsymbol{\phi}$

We have that:

$$H(e^{-\frac{\pi}{\sqrt{7}}}) = \frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32 + \sqrt{5+\sqrt{21}}(\sqrt{5+\sqrt{21}} - \sqrt{\sqrt{21}-3})^3}}{\sqrt{12\sqrt{2}} + \sqrt[4]{32 + \sqrt{5+\sqrt{21}}(\sqrt{5+\sqrt{21}} - \sqrt{\sqrt{21}-3})^3}},$$

Numerator:

((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3)))))))^1/4

Input:

$$\sqrt{12\sqrt{2}} - \sqrt[4]{32 + \sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}} - \sqrt{\sqrt{21}-3}\right)^3}$$

Result:

$$2\sqrt[4]{2}\sqrt{3} - \sqrt[4]{32 + \sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}} - \sqrt{\sqrt{21}-3}\right)^3}$$

Decimal approximation:

1.444474422940832231298382761337628199571471558632462055729...

Denominator:

((((sqrt(12*sqrt(2)) + (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3)))))))^1/4

Input:

$$\sqrt{12\sqrt{2}} + \sqrt[4]{32 + \sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}} - \sqrt{\sqrt{21}-3}\right)^3}$$

Result:

$$2\sqrt[4]{2}\sqrt{3} + \sqrt[4]{32 + \sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}} - \sqrt{\sqrt{21}-3}\right)^3}$$

Decimal approximation:

6.794594152687638792022726259466414920839299417989154258658...

(((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3)))))))^1/4))))) / 6.794594152687638792

Input interpretation:

$$\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.794594152687638792}$$

Result:

0.2125917148957988155...

0.2125917...

We obtain:

1/2 * exp (((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3)))))))^1/4))))) / 6.794594152687638792

Input interpretation:

$$\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.794594152687638792}\right)$$

Result:

0.61843977432114073210...

0.6184397743.... a result very near to the reciprocal of the golden ratio

Series representations:

$$\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}} - \sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right) =$$

$$\frac{1}{2}\exp\left(0.1471758250055957416485 8\left(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(12\sqrt{2}-z_0\right)^k z_0^{-k}}{k!} - \left(32+\sqrt{z_0}^{\,4}\left(\sum_{k=0}^{\infty}\frac{(-1)^{1+k}\left(-\frac{1}{2}\right)_k\left(\left(-3+\sqrt{21}-z_0\right)^k-\left(5+\sqrt{21}-z_0\right)^k\right)z_0^{-k}}{k!}\right)^3 \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5+\sqrt{21}-z_0\right)^k z_0^{-k}}{k!}\right)\hat{}\,(1/4)\right)\right)$$

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

$$\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right)=$$

$$\frac{1}{2}\exp\Bigg(0.14717582500559574164858\Bigg(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(12\sqrt{2}-z_0)^k z_0^{-k}}{k!}-\Bigg(32+\sqrt{z_0}\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}\left(-\frac{1}{2}\right)_k\sqrt{z_0}\left(\left(-3+\sqrt{21}-z_0\right)^k-\left(5+\sqrt{21}-z_0\right)^k\right)z_0^{-k}\right)^3\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(5+\sqrt{21}-z_0)^k z_0^{-k}}{k!}\Bigg)\wedge(1/4)\Bigg)\Bigg)$$

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

$$\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right)=$$

$$\frac{1}{2}\exp\Bigg(0.14717582500559574164858\Bigg(\exp\left(i\pi\left\lfloor\frac{\arg(-x+12\sqrt{2})}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k(-x+12\sqrt{2})^k}{k!}-\Bigg(32+\exp\left(i\pi\left\lfloor\frac{\arg(5-x+\sqrt{21})}{2\pi}\right\rfloor\right)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k(5-x+\sqrt{21})^k}{k!}\right)\Bigg(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}x^{-k}\left(-\frac{1}{2}\right)_k\left(\exp\left(i\pi\left\lfloor\frac{\arg(-3-x+\sqrt{21})}{2\pi}\right\rfloor\right)\left(-3-x+\sqrt{21}\right)^k-\exp\left(i\pi\left\lfloor\frac{\arg(5-x+\sqrt{21})}{2\pi}\right\rfloor\right)\left(5-x+\sqrt{21}\right)^k\right)\sqrt{x}\Bigg)^3\Bigg)\wedge(1/4)\Bigg)\Bigg)$$

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

Indeed, we obtain:

1 + 1/2 * exp (((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3))))))))^1/4))))) / 6.794594152687638792

Input interpretation:

$$1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.794594152687638792}\right)$$

Result:

1.6184397743211407321...

1.618439774321....

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

Series representations:

$$1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right)=$$

$$\frac{1}{2}\left(2+\exp\left(0.147175825005595741648 58\left(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(12\sqrt{2}-z_0\right)^k z_0^{-k}}{k!}-\left(32+\sqrt{z_0}^4\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}\left(-\frac{1}{2}\right)_k\left(\left(-3+\sqrt{21}-z_0\right)^k-\left(5+\sqrt{21}-z_0\right)^k\right)z_0^{-k}\right)^3\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5+\sqrt{21}-z_0\right)^k z_0^{-k}}{k!}\right)\hat{}\,(1/4)\right)\right)\right)$$

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

$$1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right)=$$

$$\frac{1}{2}\left(2+\exp\left(0.14717582500559574164858\left(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(12\sqrt{2}-z_0\right)^k z_0^{-k}}{k!}-\left(32+\sqrt{z_0}\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}\left(-\frac{1}{2}\right)_k\sqrt{z_0}\left(\left(-3+\sqrt{21}-z_0\right)^k-\left(5+\sqrt{21}-z_0\right)^k\right)z_0^{-k}\right)^3\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5+\sqrt{21}-z_0\right)^k z_0^{-k}}{k!}\right)^{\wedge}(1/4)\right)\right)\right)$$

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

$$1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right)=$$

$$\frac{1}{2}\left(2+\exp\left(0.14717582500559574164858\left(\exp\left(i\pi\left\lfloor\frac{\arg(-x+12\sqrt{2})}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(-x+12\sqrt{2}\right)^k}{k!}-\left(32+\exp\left(i\pi\left\lfloor\frac{\arg(5-x+\sqrt{21})}{2\pi}\right\rfloor\right)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k x^{-k}\left(-\frac{1}{2}\right)_k\left(5-x+\sqrt{21}\right)^k}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}x^{-k}\left(-\frac{1}{2}\right)_k\left(\exp\left(i\pi\left\lfloor\frac{\arg(-3-x+\sqrt{21})}{2\pi}\right\rfloor\right)\left(-3-x+\sqrt{21}\right)^k-\exp\left(i\pi\left\lfloor\frac{\arg(5-x+\sqrt{21})}{2\pi}\right\rfloor\right)\left(5-x+\sqrt{21}\right)^k\right)\sqrt{x}\right)^3\right)^{\wedge}(1/4)\right)\right)\right)$$

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

We have also that:

(729+108)+10^3((((1 + 1/2 * exp (((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3)))))))^1/4))))) / 6.794594152687638792))))

where $729 = 27^2 = 9^3$ and $108 = 27 * 4$

Input interpretation:

$$(729+108)+10^3\left(1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.794594152687638792}\right)\right)$$

Result:

2455.4397743211407321...

2455.4397… result very near to the rest mass of charmed Sigma baryon 2453.98

And:

108+10^3((((1 + 1/2 * exp (((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3)))))))^1/4))))) / 6.794594152687638792))))

Input interpretation:

$$108+10^3\left(1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.794594152687638792}\right)\right)$$

Result:

1726.4397743211407321...

1726.43977…result very near to the mass of scalar meson $f_0(1710)$ “candidate glueball”

Series representations:

$$108+10^3\left(1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right)\right)=$$

$$4\left(277+125\exp\left(0.14717582500559574164858\left(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(12\sqrt{2}-z_0\right)^k z_0^{-k}}{k!}-\left(32+\sqrt{z_0}^{\,4}\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}\left(-\frac{1}{2}\right)_k\left(\left(-3+\sqrt{21}-z_0\right)^k-\left(5+\sqrt{21}-z_0\right)^k\right)z_0^{-k}\right)^3\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5+\sqrt{21}-z_0\right)^k z_0^{-k}}{k!}\right)\hat{}\,(1/4)\right)\right)\right)$$

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

$$108+10^3\left(1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^3}}{6.7945941526876387920000}\right)\right)=$$

$$4\left(277+125\exp\left(0.14717582500559574164858\left(\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(12\sqrt{2}-z_0\right)^k z_0^{-k}}{k!}-\left(32+\sqrt{z_0}\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}\left(-\frac{1}{2}\right)_k\sqrt{z_0}\left(\left(-3+\sqrt{21}-z_0\right)^k-\left(5+\sqrt{21}-z_0\right)^k\right)z_0^{-k}\right)^3\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(5+\sqrt{21}-z_0\right)^k z_0^{-k}}{k!}\right)\hat{}\,(1/4)\right)\right)\right)$$

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

$$108+10^{3}\left(1+\frac{1}{2}\exp\left(\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^{3}}}{6.794594152687638792000}\right)\right)=$$

$$4\left(277+125\exp\left(0.14717582500559574164858\left(\exp\left(i\pi\left\lfloor\frac{\arg(-x+12\sqrt{2})}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^{k}x^{-k}\left(-\frac{1}{2}\right)_{k}(-x+12\sqrt{2})^{k}}{k!}-\left(32+\exp\left(i\pi\left\lfloor\frac{\arg(5-x+\sqrt{21})}{2\pi}\right\rfloor\right)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^{k}x^{-k}\left(-\frac{1}{2}\right)_{k}(5-x+\sqrt{21})^{k}}{k!}\right)\left(\sum_{k=0}^{\infty}\frac{1}{k!}(-1)^{1+k}x^{-k}\left(-\frac{1}{2}\right)_{k}\left(\exp\left(i\pi\left\lfloor\frac{\arg(-3-x+\sqrt{21})}{2\pi}\right\rfloor\right)(-3-x+\sqrt{21})^{k}-\exp\left(i\pi\left\lfloor\frac{\arg(5-x+\sqrt{21})}{2\pi}\right\rfloor\right)(5-x+\sqrt{21})^{k}\right)\sqrt{x}\right)^{3}\right)^{\wedge}(1/4)\right)\right)\right)\quad\text{for } (x\in\mathbb{R}\text{ and } x<0)$$

We have also that:

((((((((((((((sqrt(12*sqrt(2)) - (((((32+((sqrt(5+sqrt(21))*((sqrt(5+sqrt(21))-sqrt(sqrt(21)-3))^3)))))))^1/4))))) / 6.794594152687638792)))))^1/256

Input interpretation:

$$\sqrt[256]{\frac{\sqrt{12\sqrt{2}}-\sqrt[4]{32+\sqrt{5+\sqrt{21}}\left(\sqrt{5+\sqrt{21}}-\sqrt{\sqrt{21}-3}\right)^{3}}}{6.794594152687638792}}$$

Result:

0.993969888201172753631...

0.9939698882... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Now, we have that:

$$H(e^{-\pi\sqrt{\frac{11}{3}}})=\frac{\sqrt[4]{18}-\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}{\sqrt[4]{18}+\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}.$$

(((((18)^1/4 – (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4)))) / (((((18)^1/4 + (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4))))

Input:

$$\frac{\sqrt[4]{18}-\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}{\sqrt[4]{18}+\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}$$

Result:

$$\frac{\sqrt[4]{2}\sqrt{3}-\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}}{\sqrt[4]{2}\sqrt{3}+\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}}$$

Decimal approximation:

0.002434204968175911613449619811575564415044145807636374010...

Alternate forms:

$$\frac{\sqrt[4]{2}\sqrt{3}-\sqrt[4]{-198+120\sqrt{3}-60\sqrt{11}+36\sqrt{33}}}{\sqrt[4]{-198+120\sqrt{3}-60\sqrt{11}+36\sqrt{33}}+\sqrt[4]{2}\sqrt{3}}$$

$$\frac{\sqrt[4]{3} - \sqrt[4]{-33 + 20\sqrt{3} - 10\sqrt{11} + 6\sqrt{33}}}{\sqrt[4]{3} + \sqrt[4]{-33 + 20\sqrt{3} - 10\sqrt{11} + 6\sqrt{33}}}$$

$$-\frac{\left(\text{root of } x^{16} + 132x^{12} - 442x^8 + 132x^4 + 1 \text{ near } x = 1.30968\right) - \sqrt[4]{3}}{\left(\text{root of } x^{16} + 132x^{12} - 442x^8 + 132x^4 + 1 \text{ near } x = 1.30968\right) + \sqrt[4]{3}}$$

3 / (((((18)^1/4 – (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4)))) / (((((18)^1/4 + (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4))))

Input:

$$\frac{3}{\frac{\sqrt[4]{18} - \sqrt[4]{2 + (\sqrt{11}+3)^2 (\sqrt{3}-1)^3}}{\sqrt[4]{18} + \sqrt[4]{2 + (\sqrt{11}+3)^2 (\sqrt{3}-1)^3}}}$$

Result:

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

Decimal approximation:

1232.435246505996091334470692810017998960475171020930664651...

1232.4352…result practically equal to the rest mass of Delta baryon 1232

((((((3 / (((((18)^1/4 – (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4)))) / (((((18)^1/4 + (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4))))))))))^1/14

Input:

$$\sqrt[14]{\frac{3}{\frac{\sqrt[4]{18} - \sqrt[4]{2 + (\sqrt{11}+3)^2 (\sqrt{3}-1)^3}}{\sqrt[4]{18} + \sqrt[4]{2 + (\sqrt{11}+3)^2 (\sqrt{3}-1)^3}}}}$$

Result:

$$\sqrt[14]{\frac{3\left(\sqrt[4]{2}\sqrt{3}+\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}\right)}{\sqrt[4]{2}\sqrt{3}-\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}}}$$

Decimal approximation:

1.6625276044426556688861792184316313042089557259247931681 07...

1.662527604....result that 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...

From this last result, we obtain:

2((((((((6((((((3 / (((((18)^1/4 – (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4)))) / (((((18)^1/4 + (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4))))))))))^1/14))))))))^0.5

Input:

$$2\sqrt{6\sqrt[14]{\frac{\frac{3}{\sqrt[4]{18}-\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}}{\sqrt[4]{18}+\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}}}$$

Exact result:

$$2\sqrt{2}\,3^{15/28}\sqrt[28]{\frac{\sqrt[4]{2}\sqrt{3}+\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}}{\sqrt[4]{2}\sqrt{3}-\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}}}$$

Decimal approximation:

6.3166971200639132791967882366268548187912254553585856400 53...

6.316697120063913279196788236626854818791225455358585640053

6.316697120063913279196788236626854818791225455358585640053 / (2Pi)

Input interpretation:

$$\frac{6.316697120063913279196788236626854818791225455358585640053}{2\pi}$$

Result:

1.005333570672511277106122303545219817342890266139202648976...

1.0053335706... that can be considered the radius of the circle of length 6.316697...

We have also that:

((((((((18)^1/4 – (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4)))) / (((((18)^1/4 + (((2+((sqrt(11)+3)^2*((sqrt(3)-1)^3)))^1/4))))))))))^1/4096

Input:

$$\sqrt[4096]{\frac{\sqrt[4]{18}-\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}{\sqrt[4]{18}+\sqrt[4]{2+(\sqrt{11}+3)^2(\sqrt{3}-1)^3}}}$$

Result:

$$\sqrt[4096]{\frac{\sqrt[4]{2}\sqrt{3}-\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}}{\sqrt[4]{2}\sqrt{3}+\sqrt[4]{2+(\sqrt{3}-1)^3(3+\sqrt{11})^2}}}$$

Decimal approximation:

0.998531807591412866868622083091664083633502260817869360313...

0.9985318075914…… result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Alternate forms:

$$\sqrt[4096]{\frac{\sqrt[4]{2}\sqrt{3}-\sqrt[4]{-198+120\sqrt{3}-60\sqrt{11}+36\sqrt{33}}}{\sqrt[4]{-198+120\sqrt{3}-60\sqrt{11}+36\sqrt{33}}+\sqrt[4]{2}\sqrt{3}}}$$

$$\sqrt[4096]{\frac{\sqrt[4]{3}-\sqrt[4]{-33+20\sqrt{3}-10\sqrt{11}+6\sqrt{33}}}{\sqrt[4]{3}+\sqrt[4]{-33+20\sqrt{3}-10\sqrt{11}+6\sqrt{33}}}}$$

$$\sqrt[4096]{-\frac{\left(\text{root of } x^{16}+132x^{12}-442x^8+132x^4+1 \text{ near } x=1.30968\right)-\sqrt[4]{3}}{\left(\text{root of } x^{16}+132x^{12}-442x^8+132x^4+1 \text{ near } x=1.30968\right)+\sqrt[4]{3}}}$$

From:

New Properties for The Ramanujan'S Continued Fraction of Order 12
Chandrashekar Adiga, M. S. Surekha, A. Vanitha* Department of Studies in Mathematics, University of Mysore, Manasagangotri, Mysore 570 006, INDIA *Corresponding author: c_adiga@hotmail.com*Received May 07, 2014; Revised June 24, 2014; Accepted July 03, 2014*

Similarly, by Jacobi's triple product identity, we have

$$\begin{aligned}\psi(-q^3) &= (q^3:q^{12})_\infty(q^9:q^{12})_\infty(q^{12}:q^{12})_\infty \\ &= \prod_{n=0}^{\infty}(1-q^{12n+3})(1-q^{12n+9})(1-q^{12n+12}) \\ &= \prod_{n=0}^{\infty}(1-q^{12n+3}(1+q^9+q^6-q^{12n+9} \\ &\quad (1+q^9+q^3)+q^{24n+21})).\end{aligned} \tag{83}$$

For q = 0.5 and n = 2, we obtain:

((1-(0.5)^27))*((((1+0.5^9+0.5^6-0.5^33*(1+0.5^9+0.5^3)+0.5^69)))

Input:

$$(1-0.5^{27})\left(1+0.5^9+0.5^6-0.5^{33}(1+0.5^9+0.5^3)+0.5^{69}\right)$$

Result:

1.0175781172872575562692953974343394077138196218990784510 86...

1.01757811…

((1-(0.5)^27))*((((1+0.5^9+0.5^6-0.5^33*(1+0.5^9+0.5^3)+0.5^69)))^29

Input:

$$(1-0.5^{27})\left(1+0.5^9+0.5^6-0.5^{33}\left(1+0.5^9+0.5^3\right)+0.5^{69}\right)^{29}$$

Result:

1.6575441405329769931724135017604336699929850957874158927 24...

1.65754414….. result that 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...

Note that:

2sqrt((((6(((1-(0.5)^27))*((((1+0.5^9+0.5^6-0.5^33*(1+0.5^9+0.5^3)+0.5^69)))^29))))))

Input:

$$2\sqrt{6\left((1-0.5^{27})\left(1+0.5^9+0.5^6-0.5^{33}\left(1+0.5^9+0.5^3\right)+0.5^{69}\right)^{29}\right)}$$

Open code

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Result:

6.30722...

6.30722…result that is a length of a circle with radius equal to 1.00383

We have also that:

1/(((((1-(0.5)^27))*((((1+0.5^9+0.5^6-0.5^33*(1+0.5^9+0.5^3)+0.5^69)))))))^1/8

Input:

$$\frac{1}{\sqrt[8]{(1-0.5^{27})\left(1+0.5^9+0.5^6-0.5^{33}\left(1+0.5^9+0.5^3\right)+0.5^{69}\right)}}$$

Result:

0.99782419...

0.99782419.... result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Since $1-(\zeta^{11}+\zeta)=1-\sqrt{3}$ and $\zeta^{12}=1$, we have

$$\frac{f(\zeta,\zeta^{11}q^{1/3})}{(1+\zeta)}$$
$$=\prod_{n=1}^{\infty}(1+(1-\sqrt{3})((q^{1/3})^{2n}-(q^{1/3})^{n})-q^{n}) \qquad (82)$$
$$=\prod_{n=1}^{\infty}(1+(\alpha-1)((q^{1/3})^{2n}-(q^{1/3})^{n})-q^{n}).$$

((((((1+(0.0864055-1)((0.5^(1/3))))^4-((0.5^(1/3))^2))))-0.5^2))))))

Input interpretation:

$$\left(\left(1+(0.0864055-1)\sqrt[3]{0.5}\right)^4-\sqrt[3]{0.5}^2\right)-0.5^2$$

Enlarge Data Customize A Plaintext Interactive

Result:

-0.874251...

-0.874251…

sqrt((((-3 ((((((1+(0.0864055-1)((0.5^(1/3))))^4-((0.5^(1/3))^2))))-0.5^2)))))))))

Input interpretation:

$$\sqrt{-3\left(\left(\left(1+(0.0864055-1)\sqrt[3]{0.5}\right)^4-\sqrt[3]{0.5}^2\right)-0.5^2\right)}$$

Result:

1.61949...

1.61949… result that is very near to the golden ratio

27*2 + 10^3 sqrt((((-3 ((((((1+(0.0864055-1)((0.5^(1/3))))^4-((0.5^(1/3))^2))))-0.5^2)))))))))

Input interpretation:

$$27\times 2+10^3\sqrt{-3\left(\left(\left(1+(0.0864055-1)\sqrt[3]{0.5}\right)^4-\sqrt[3]{0.5}^{\,2}\right)-0.5^2\right)}$$

Open code

Enlarge Data Customize A Plaintext Interactive

Result:

1673.49...

1673.49... result that is very near to the rest mass of Omega baryon 1672.45

We have also that:

-((((((1+(0.0864055-1)((0.5^(1/3))))^4-((0.5^(1/3))^2))))-0.5^2))^1/64

Input interpretation:

$$-\sqrt[64]{\left(\left(1+(0.0864055-1)\sqrt[3]{0.5}\right)^4-\sqrt[3]{0.5}^{\,2}\right)-0.5^2}$$

Result:

$-0.99670038\ldots -$
$0.048964750\ldots i$

Polar coordinates:

$r = 0.997902$ (radius), $\theta = -177.188°$ (angle)

0.997902 result very near to the value of the following Rogers-Ramanujan continued fraction:

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

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

Appendix

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

$$\omega/\omega_3 \mid 5+3 \mid m_{u/d} = 255 - 390 \mid 0.988 - 1.18$$

$$\omega/\omega_3 \mid 5+3 \mid m_{u/d} = 240 - 345 \mid 0.937 - 1.000$$

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

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

so that

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

Hence

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

Again

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

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

so that

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

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

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

we obtain

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

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:

$$T\, e^{\gamma_E \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\, e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\;\;2C} \;=\; \frac{h^2 \left(p \,+\, 1 \,-\, \frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}}{(7 \,-\, p)}$$

$$(A')^2 \;-\; k\, e^{-2A} \;+\; \frac{h^2}{16(p\,+\,1)} \left(7 \,-\, p \,+\, \frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

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

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

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

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

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

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:

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

$1.6272016\ldots * 10^{-6}$

Property:

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

Series representations:

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

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

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

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:

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

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

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

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:

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

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^{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:

0.990400732708644027550973755713301415460732796178555551684...

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

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

From:

Eur. Phys. J. C (2019) 79:713 - https://doi.org/10.1140/epjc/s10052-019-7225-2-Regular Article - Theoretical Physics

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_*
$\mathrm{sgn}(\omega_1)$	−	+	−	+/−	+	−	−
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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New Properties for The Ramanujan'S Continued Fraction of Order 12 *Chandrashekar Adiga*, M. S. Surekha, A. Vanitha* Department of Studies in Mathematics, University of Mysore, Manasagangotri, Mysore 570 006, INDIA *Corresponding author: c_adiga@hotmail.com*Received May 07, 2014; Revised June 24, 2014; Accepted July 03, 2014*

A continued fraction of order twelve
Research Article
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