On some Ramanujan expressions: mathematical connections with ϕ and various equations regarding the String Theory, in particular Open strings.

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Abstract

In this paper we have described some Ramanujan equations and obtained some mathematical connections with ϕ and various expressions inherent the String Theory, in particular Open strings.

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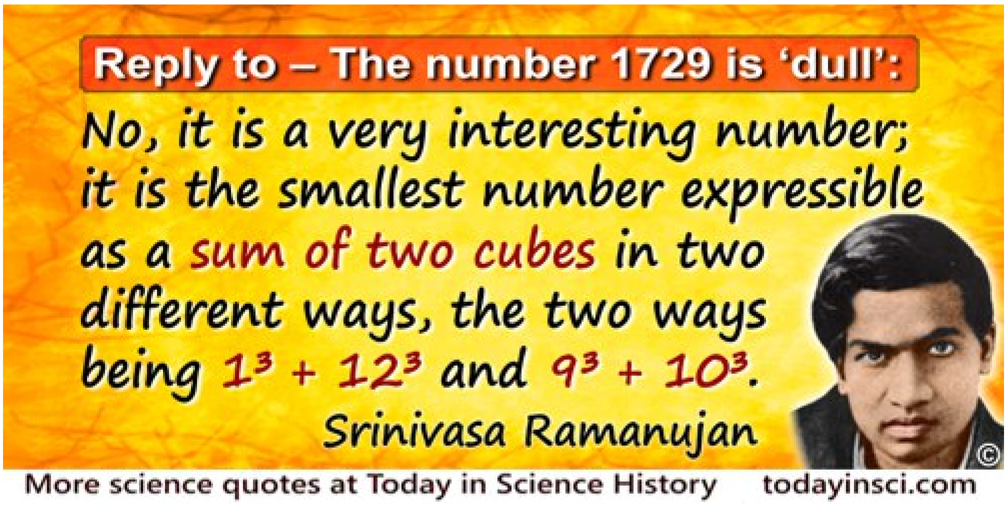
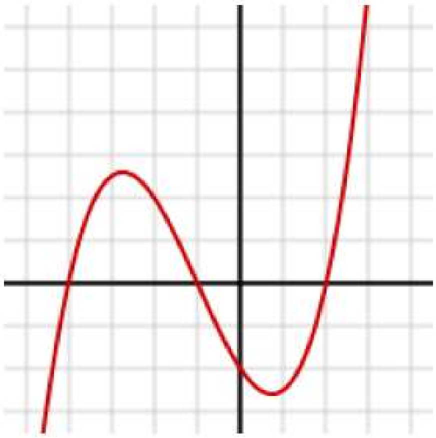
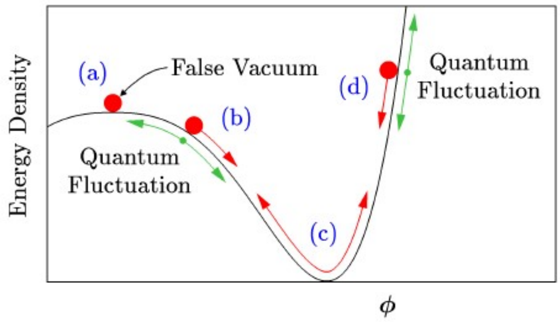


https://todayinsci.com/R/Ramanujan_Srinivasa/RamanujanSrinivasa-Quotations.htm





From

SPIN-1 EFFECTIVE ACTIONS FROM OPEN STRINGS

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We have that:

F = constant field strength = 1 volt per meter

$\beta = -7 / 48$

p and q are the charges on the ends of the string, and Q = p + q

- $N = \tilde{N} = 0$ with $n = \pm 2$ and $m = 0$. These are KK modes of the tachyon field. They are scalars in spacetime with charges $(\pm 2, 0)$ under the $U(1) \times U(1)$ gauge symmetry.

n = 2; p = 5; q = – 3; n = – 2; p = – 5 ; q = 3.

Indeed: Q = 5+(-3) = 2 and Q = -5+3 = - 2

Now, we consider:

1 volt per meter = F

Result:

1 V/m (volt per meter)

Additional conversions:

1000 V/km (volts per kilometer)

0.01 V/cm (volts per centimeter)

0.001 kV/m (kilovolts per meter)

Interpretations:

electric field strength

Corresponding quantity:

Distance r from a single electron that results in this field strength from $E = e/((4\pi\epsilon_0)r^2)$:

3.8×10^{-5} meters

$F = 3.8 * 10^{-5}$ m

From:

$$-\frac{i}{6}\mathscr{S}_3 + i\beta\mathscr{S}_4 - \frac{1}{48}\mathscr{S}_5 - \frac{1}{24}\mathscr{S}_6 + \frac{1}{32}\mathscr{S}_7 - \frac{1}{64}\mathscr{S}_8$$
$$= \left(1 - \frac{1}{12}(24\beta Q^2 + 5p^2 + 7pq + 5q^2)(F^2)\right)\mathscr{L}_C \ .$$

For n = 2; p = 5; q = – 3; Q = 5+(-3) = 2; F = 1 , we obtain:

(((1-1/12(((24*(-7/48)*4 + 5*25 + 7*5*(-3) + 5*9))))))

Input:

$$1-\frac{1}{12}\left(24\left(-\frac{7}{48}\right)\times4+5\times25+7\times5\times(-3)+5\times9\right)$$

Exact result:

$$-\frac{13}{4}$$

Decimal form:

-3.25

For $\mathscr{L}_C$ = -1/2 , we obtain:

[1-1/12(((24*(-7/48)*4 + 5*25 + 7*5*(-3) + 5*9)))](-1/2)

Input:

$$\frac{1}{2}\left(1-\frac{1}{12}\left(24\left(-\frac{7}{48}\right)\times4+5\times25+7\times5\times(-3)+5\times9\right)\right)\times(-1)$$

Exact result:

$$\frac{13}{8}$$

Decimal form:

1.625

1.625

From which:

[1-1/12(((24*(-7/48)*4 + 5*25 + 7*5*(-3) + 5*9)))] (-1/2) - 7/10^3

Input:

$$\frac{1}{2}\left(1-\frac{1}{12}\left(24\left(-\frac{7}{48}\right)\times 4+5\times 25+7\times 5\times(-3)+5\times 9\right)\right)\times(-1)-\frac{7}{10^3}$$

Exact result:

$$\frac{809}{500}$$

Decimal form:

1.618

1.618

[1-1/12(((24*(-7/48)*4 + 5*25 + 7*5*(-3) + 5*9)))] (-1/2) - (7-21-5)1/10^3

Input:

$$\frac{1}{2}\left(1-\frac{1}{12}\left(24\left(-\frac{7}{48}\right)\times 4+5\times 25+7\times 5\times(-3)+5\times 9\right)\right)\times(-1)-(7-21-5)\times\frac{1}{10^3}$$

Exact result:

$$\frac{411}{250}$$

Decimal form:

1.644

1.644

And again:

(((([1-1/12(((24*(-7/48)*4 + 5*25 + 7*5*(-3) + 5*9)))] (-1/2)))))^10-Pi

Input:

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(24\left(-\frac{7}{48}\right)\times 4+5\times 25+7\times 5\times(-3)+5\times 9\right)\right)\times(-1)\right)^{10}-\pi$$

Result:

$$\frac{137858491849}{1073741824}-\pi$$

Decimal approximation:

125.2491329078278460170610382573454971158028306006248941790...

125.2491329…

Property:

$\frac{137858491849}{1073741824}-\pi$ is a transcendental number

Alternate form:

$$\frac{137858491849-1073741824\,\pi}{1073741824}$$

Alternative representations:

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = -180\,°+\left(\frac{1}{2}\left(-1+\frac{1}{12}\left(65-\frac{672}{48}\right)\right)\right)^{10}$$

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = i\log(-1)+\left(\frac{1}{2}\left(-1+\frac{1}{12}\left(65-\frac{672}{48}\right)\right)\right)^{10}$$

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = -\cos^{-1}(-1)+\left(\frac{1}{2}\left(-1+\frac{1}{12}\left(65-\frac{672}{48}\right)\right)\right)^{10}$$

Series representations:

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = \frac{137858491849}{1073741824}-4\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = \frac{137858491849}{1073741824}+\sum_{k=0}^{\infty}\frac{4\,(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}$$

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = \frac{137858491849}{1073741824}-\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)$$

Integral representations:

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = \frac{137858491849}{1073741824}-4\int_0^1\sqrt{1-t^2}\,dt$$

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = \frac{137858491849}{1073741824}-2\int_0^1\frac{1}{\sqrt{1-t^2}}\,dt$$

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(\frac{24}{48}(-7)\,4+5\times 25+7\times 5\,(-3)+5\times 9\right)\right)(-1)\right)^{10}-\pi = \frac{137858491849}{1073741824}-2\int_0^\infty\frac{1}{1+t^2}\,dt$$

(((([1-1/12(((24*(-7/48)*4 + 5*25 + 7*5*(-3) + 5*9)))] (-1/2)))))^10+11

Input:

$$\left(\frac{1}{2}\left(1-\frac{1}{12}\left(24\left(-\frac{7}{48}\right)\times 4+5\times 25+7\times 5\times(-3)+5\times 9\right)\right)\times(-1)\right)^{10}+11$$

Exact result:

$$\frac{149669651913}{1073741824}$$

Decimal form:

139.390725561417639255523681640625

139.39072556…

27*1/2[(((([1-1/12(((24*(-7/48)*4 + 5*25 + 7*5*(-3) + 5*9)))] (-1/2)))))^10]-4

Input:

$$27\times\frac{1}{2}\left(\frac{1}{2}\left(1-\frac{1}{12}\left(24\left(-\frac{7}{48}\right)\times4+5\times25+7\times5\times(-3)+5\times9\right)\right)\times(-1)\right)^{10}-4$$

Exact result:

$$\frac{3713589345331}{2147483648}$$

Decimal form:

1729.274795079138129949569702148437 5

1729.2747950791381299…

Now, from:

$$-\frac{i}{6}\mathscr{S}_3+i\beta\mathscr{S}_4-\frac{1}{48}\mathscr{S}_5-\frac{1}{24}\mathscr{S}_6+\frac{1}{32}\mathscr{S}_7-\frac{1}{64}\mathscr{S}_8$$

$$=\left(1-\frac{1}{12}(24\beta Q^2+5p^2+7pq+5q^2)(F^2)\right)\mathscr{L}_C\ .$$

We know that the right-hand side is equal to 1.625 , placing $\mathscr{L}_3$, $\mathscr{L}_4$, $\mathscr{L}_5$, $\mathscr{L}_6$, $\mathscr{L}_7$, and $\mathscr{L}_8$ equal to 1, we obtain:

-i/6 + i*(-7/48) – 1/48 – 1/24 + 1/32 – 1/64

Input:

$$-\frac{i}{6}+i\left(-\frac{7}{48}\right)-\frac{1}{48}-\frac{1}{24}+\frac{1}{32}-\frac{1}{64}$$

i is the imaginary unit

Result:

$$-\frac{3}{64}-\frac{5i}{16}$$

Decimal form:

$-0.046875-0.3125\,i$

Polar coordinates:

$r \approx 0.315996$ (radius), $\theta \approx -98.5308°$ (angle)

0.315996

Alternate form:

$-\frac{1}{64}(3 + 20 i)$

Minimal polynomial:

$4096 x^2 + 384 x + 409$

We have:

(((-i/6 + i*(-7/48) – 1/48 – 1/24 + 1/32 – 1/64)))x = 1.625

Input:

$\left(-\frac{i}{6} + i\left(-\frac{7}{48}\right) - \frac{1}{48} - \frac{1}{24} + \frac{1}{32} - \frac{1}{64}\right) x = 1.625$

i is the imaginary unit

Result:

$\left(-\frac{3}{64} - \frac{5 i}{16}\right) x = 1.625$

Alternate form:

$-1.625 + \left(-\frac{3}{64} - \frac{5 i}{16}\right) x = 0$

Complex solution:

$x = -0.762836 + 5.08557 i$

Input interpretation:

$-0.762836 + 5.08557 i$

i is the imaginary unit

Result:

$-0.762836\ldots +$
$5.08557\ldots i$

Polar coordinates:

$r = 5.14246$ (radius), $\theta = 98.5308°$ (angle)

5.14246

Indeed:

(((-i/6 + i*(-7/48) – 1/48 – 1/24 + 1/32 – 1/64)))5.14246

Input interpretation:

$$\left(-\frac{i}{6}+i\left(-\frac{7}{48}\right)-\frac{1}{48}-\frac{1}{24}+\frac{1}{32}-\frac{1}{64}\right)\times 5.14246$$

i is the imaginary unit

Result:

$-0.241053... - 1.60702... i$

Polar coordinates:

$r = 1.625$ (radius), $\theta = -98.5308°$ (angle)

1.625

We have also:

2*sqrt7*(((-i/6 + i*(-7/48) – 1/48 – 1/24 + 1/32 – 1/64)))

Input:

$$2\sqrt{7}\left(-\frac{i}{6}+i\left(-\frac{7}{48}\right)-\frac{1}{48}-\frac{1}{24}+\frac{1}{32}-\frac{1}{64}\right)$$

i is the imaginary unit

Result:

$$\left(-\frac{3}{32}-\frac{5i}{8}\right)\sqrt{7}$$

Decimal approximation:

$-0.24803918541230536785952647690368066491033679841397970 44... - 1.6535945694153691190635098460245377660689119894265313 62... i$

Polar coordinates:

$r \approx 1.67209$ (radius), $\theta \approx -98.5308°$ (angle)

1.67209

Minimal polynomial:

$1048576 x^4 + 5605376 x^2 + 8196769$

Alternate form:

$$-\frac{1}{32}(3 + 20 i)\sqrt{7}$$

And:

2*sqrt7*(((-i/6 + i*(-7/48) – 1/48 – 1/24 + 1/32 – 1/64))) + (47+7)i1/10^3

Input:

$$2\sqrt{7}\left(-\frac{i}{6} + i\left(-\frac{7}{48}\right) - \frac{1}{48} - \frac{1}{24} + \frac{1}{32} - \frac{1}{64}\right) + (47 + 7) i \times \frac{1}{10^3}$$

i is the imaginary unit

Result:

$$\frac{27 i}{500} - \left(\frac{3}{32} + \frac{5 i}{8}\right)\sqrt{7}$$

Decimal approximation:

$-0.248039185412305367859526476903680664910336798413979704 4\ldots - 1.599594569415369119063509846024537766068911989426531362\ldots i$

Polar coordinates:

$r \approx 1.61871$ (radius), $\theta \approx -98.8143°$ (angle)

1.61871

Alternate forms:

$$\frac{216 i - (375 + 2500 i)\sqrt{7}}{4000}$$

$$-\frac{i\left(-216+(2500-375\,i)\sqrt{7}\right)}{4000}$$

$$-\frac{3\sqrt{7}}{32}+i\left(\frac{27}{500}-\frac{5\sqrt{7}}{8}\right)$$

Minimal polynomial:

$256\,000\,000\,000\,000\,x^4 + 1\,369\,992\,992\,000\,000\,x^2 + 45\,360\,000\,000\,000\,x +$
$1\,997\,175\,937\,422\,961$

From:

String Theory and The Velo–Zwanziger Problem
Massimo Porrati, Rakibur Rahman, Augusto Sagnotti - arXiv:1011.6411v2 [hep-th] 31 Jan 2011

We have that:

$$\begin{aligned} X^\mu(\tau,\sigma) \;&=\; x^\mu + \left[\left(\frac{e^{-G_0}}{2}\cdot\frac{e^{G(\tau-\sigma)}-M_+}{G} \;+\; \frac{e^{+G_0}}{2}\cdot\frac{e^{G(\tau-\sigma)}-M_-}{G}\right)\alpha_0\right]^\mu \\ &+\frac{i}{2}\sum_{m\neq 0}\left[\left(\tfrac{1}{m\mathbf{1}+iG}\right)\left\{e^{-i(m\mathbf{1}+iG)(\tau+\sigma)-G_0}+e^{-i(m\mathbf{1}+iG)(\tau-\sigma)+G_0}\right\}\alpha_m\right]^\mu, \quad (2.8) \end{aligned}$$

mode function matrices. This is readily seen to be the case for the "oscillator" modes in the second line of Eq. (2.8), since G_0 and G tend to zero in this limit. On the other hand, the

Naively, one would expect that α_0^μ play the role of a covariant momentum, since after all it reduces to the string momentum $\bar{\alpha}_0^\mu = p^\mu$ when F vanishes. Furthermore, the string

$$\mathcal{D}^\mu \;\equiv\; \left(\sqrt{G/eF}\right)^{\mu\nu} D_\nu \;=\; i\,\alpha_0^\mu\ ,$$

$$\Phi_{\mu\nu\rho} \equiv (\sqrt{1+iG})_\mu^{\ \alpha}(\sqrt{1+iG})_\nu^{\ \beta}(\sqrt{1+iG})_\rho^{\ \gamma}\,\phi_{\alpha\beta\gamma}\ , \quad (4.34)$$

$$\mathcal{A}_{\mu\nu} \equiv (\sqrt{1+iG})_\mu^{\ \alpha}(\sqrt{1+iG})_\nu^{\ \beta}\,A_{\alpha\beta}\ , \quad (4.35)$$

Eqs. (4.1)–(4.3) give

$$\left(\mathcal{D}^2 - 4 - \tfrac{1}{2}\,\mathrm{Tr}G^2\right)\Phi_{\mu\nu\rho} + 2\,i\,G^\alpha{}_{(\mu}\Phi_{\nu\rho)\alpha} = 0\ , \quad (4.36)$$

$$\left(\mathcal{D}^2 - 4 - \tfrac{1}{2}\,\mathrm{Tr}G^2\right)\mathcal{A}_{\mu\nu} - 2\,i\,(G_\mu^{\ \alpha}\mathcal{A}_{\alpha\nu} - \mathcal{A}_\mu^{\ \alpha}G_{\alpha\nu}) = 0\ , \quad (4.37)$$

$$\left(\mathcal{D}^2 - 4 - \tfrac{1}{2}\,\mathrm{Tr}G^2\right)h = 0\ , \quad (4.38)$$

$$3\mathcal{D}^\mu\Phi_{\mu\nu\rho} = \tfrac{1}{2}\left[\left\{\sqrt{(1+\tfrac{i}{2}G)(1+iG)}\right\}_\nu^{\ \alpha}\{\mathcal{A}_{\alpha\rho} + (\sqrt{1+G^2})_{\alpha\rho}\,h\} + (\nu\leftrightarrow\rho)\right]\ , \quad (4.39)$$

$$\mathcal{D}^\mu\mathcal{A}_{\mu\nu} = \mathcal{D}^\mu\left[(\sqrt{1+G^2})_{\mu\nu}\,h\right]\ , \quad (4.40)$$

$$3\Phi^\mu{}_{\mu\nu} + \mathcal{D}_\mu\left[\left(\sqrt{\frac{1+\frac{i}{2}G}{1+iG}}\right)^{\mu\rho}\{\mathcal{A}_{\rho\nu} + (\sqrt{1+G^2})_{\rho\nu}\,h\}\right] = 0\ . \quad (4.41)$$

We consider:

(((6.626*10^-34)J*s)) / ((2.4*10^-17)m)

Input interpretation:

$\frac{6.626\times10^{-34}\text{ J s (joule seconds)}}{2.4\times10^{-17}\text{ meters}}$

Result:

2.761×10^{-17} J s/m (joule seconds per meter)

2.761×10^{-17} kg m/s (kilogram meters per second)

2.761×10^{-17} N s (newton seconds)

Interpretations:

momentum

Basic unit dimensions:

[mass] [length] [time]$^{-1}$

Relativistic energy E of a photon from $E = pc$:

52 GeV (gigaelectronvolts)

Relativistic frequency ν of a photon from $\nu = pc/h$:

1.249×10^{25} Hz (hertz)

Wavelength λ of a photon from $\lambda = h/p$:

2.4×10^{-17} meters

Input interpretation:

$$\frac{52 \text{ GeV (gigaelectronvolts)}}{3 \times 10^{8} \text{ meters}}$$

Result:

2.777×10^{-17} kg m/s^2 (kilogram meters per second squared)

2.777×10^{-17} N (newtons)

p = 2.761×10^-17 joule seconds per meter

and:

((sqrt((1+i/12))))^3   (4.34)

Input:

$$\sqrt{1 + \frac{i}{12}}^{3}$$

i is the imaginary unit

Result:

$$\frac{(12 + i)^{3/2}}{24 \sqrt{3}}$$

Decimal approximation:

0.997396961331663112639520615000500524513487992011895328 01... +
0.125036122008675619706821949574186843173985321987920040 56... i

Polar coordinates:

$r \approx 1.0052$ (radius), $\theta \approx 7.14546°$ (angle)

1.0052

Alternate forms:

$$\frac{1}{72}\sqrt{5076+1293\,i}$$

$$\frac{1}{24}\sqrt{564+\frac{431\,i}{3}}$$

$$\frac{145^{3/4}\cos\left(\frac{3}{2}\tan^{-1}\left(\frac{1}{12}\right)\right)}{24\sqrt{3}}+\frac{i\,145^{3/4}\sin\left(\frac{3}{2}\tan^{-1}\left(\frac{1}{12}\right)\right)}{24\sqrt{3}}$$

$\tan^{-1}(x)$ is the inverse tangent function

Minimal polynomial:

$$2\,985\,984\,x^4-5\,847\,552\,x^2+3\,048\,625$$

((sqrt((1+i/12))))^2 (4.35)

Input:

$$\sqrt{1+\frac{i}{12}}^{\,2}$$

i is the imaginary unit

Result:

$$1+\frac{i}{12}$$

Decimal approximation:

1 +
0.0833333333333333333333333333333333333333333333333333333... i

Polar coordinates:

$r \approx 1.00347$ (radius), $\theta \approx 4.76364°$ (angle)

1.00347

3((2.761×10^-17)) ((sqrt((1+i/12))))^3 (4.39)

Input interpretation:

$$3\times 2.761\times 10^{-17}\sqrt{1+\frac{i}{12}}^{3}$$

i is the imaginary unit

Result:

$8.26144... \times 10^{-17} +$
$1.03567... \times 10^{-17}\, i$

Polar coordinates:

$r = 8.3261\times 10^{-17}$ (radius), $\theta = 7.14546°$ (angle)

$8.3261 * 10^{-17}$

From which:

[1/(((3((2.761×10^-17)) ((sqrt((1+i/12))))^3)))]^1/8 + 29+4 + golden ratio^3

Input interpretation:

$$\sqrt[8]{\frac{1}{3\times 2.761\times 10^{-17}\sqrt{1+\frac{i}{12}}^{3}}}+29+4+\phi^3$$

i is the imaginary unit

ϕ is the golden ratio

Result:

$139.5399... -$
$1.594942...\, i$

Polar coordinates:

$r = 139.549$ (radius), $\theta = -0.654863°$ (angle)

139.549

[1/(((3((2.761×10^-17)) ((sqrt((1+i/12))))^3)))]^1/8 + 21 + 2

Input interpretation:

$$\sqrt[8]{\frac{1}{3\times 2.761\times 10^{-17}\sqrt{1+\frac{i}{12}}^{3}}}+21+2$$

i is the imaginary unit

Result:

125.3039... −
1.594942... i

Polar coordinates:

$r = 125.314$ (radius), $\theta = -0.729255°$ (angle)

125.314

27*1/2((([1/(((3((2.761×10^-17)) ((sqrt((1+i/12))))^3)))]^1/8 + 21 + 5)))-Pi

Input interpretation:

$$27\times\frac{1}{2}\left(\sqrt[8]{\frac{1}{3\times 2.761\times 10^{-17}\sqrt{1+\frac{i}{12}}^{3}}}+21+5\right)-\pi$$

i is the imaginary unit

Result:

1728.960... −
21.53172... i

Polar coordinates:

$r = 1729.09$ (radius), $\theta = -0.7135°$ (angle)

1729.09

[27*1/2((([1/(((3((2.761×10^-17)) ((sqrt((1+i/12))))^3)))]^1/8 + 21 + 5)))-Pi]^1/15 - (21+5)1/10^3

Input interpretation:

$$\sqrt[15]{27\times\frac{1}{2}\left(\sqrt[8]{\frac{1}{3\times 2.761\times 10^{-17}\sqrt{1+\frac{i}{12}}^{3}}}+21+5\right)-\pi}-(21+5)\times\frac{1}{10^3}$$

i is the imaginary unit

Result:

1.6178207... −
0.0013646914... i

Polar coordinates:

$r = 1.61782$ (radius), $\theta = -0.0483311°$ (angle)

1.61782

((2.761×10^-17)) ((sqrt((1+i/12))))^2 (4.40)

Input interpretation:

$$2.761\times 10^{-17}\sqrt{1+\frac{i}{12}}^{2}$$

i is the imaginary unit

Result:

2.761×10^{-17} +
$2.30083...\times 10^{-18}\,i$

Polar coordinates:

$r = 2.77057\times 10^{-17}$ (radius), $\theta = 4.76364°$ (angle)

$2.77057 * 10^{-17}$

From which:

((((1/(((((2.761×10^-17)) ((sqrt((1+i/12))))^2)))))))^1/76 - (29+4)1/10^3

Input interpretation:

$$\sqrt[76]{\frac{1}{2.761\times 10^{-17}\sqrt{1+\frac{i}{12}}^{\,2}}}-(29+4)\times\frac{1}{10^3}$$

i is the imaginary unit

Result:

1.618432... −
0.001806607... i

Polar coordinates:

$r = 1.61843$ (radius), $\theta = -0.0639575°$ (angle)

1.61843

From:

On tadpoles and vacuum redefinitions in String Theory
E. Dudas, M. Nicolosi, G. Pradisi and A. Sagnotti - arXiv:hep-th/0410101v4 13 Dec 2004

We have:

for $|x| < 1/2$

$$z = -1 \mp \frac{1}{\sqrt{1-2x}} \ ,$$

x = 1/4 z = -1+1/(sqrt(1-2*1/4)) ; -1-1/(sqrt(1-2*1/4))

$$-1+\frac{1}{\sqrt{1-2\times\frac{1}{4}}}$$

$$\sqrt{2}-1$$

0.4142135623730950488016887242096980785696718753769480731766...

z = 0.414213562373…..

Or:

$$-1-\frac{1}{\sqrt{1-2\times\frac{1}{4}}}$$

$$-1-\sqrt{2}$$

-2.414213562373095048801688724209698078569671875376948073177...

z = -2.414213562373……

Now, we have that:

$$f(x) = -\frac{\sqrt{\pi}}{2}\sum_{n=0}^{\infty}\frac{(-1)^n\ 2^{n+1}}{(n-1)!\ \Gamma(1/2-n)}\ x^n\ , \qquad (2.36)$$

-(sqrtPi)/2 sum (((-1)^n 2^(n+1)))/(((n+1)! gamma (1/2-n))))*(1/4)^n, n = 0..infinity

Input interpretation:

$$-\frac{\sqrt{\pi}}{2}\sum_{n=0}^{\infty}\frac{(-1)^n\times 2^{n+1}}{(n+1)!\,\Gamma\left(\frac{1}{2}-n\right)}\left(\frac{1}{4}\right)^n$$

$n!$ is the factorial function

$\Gamma(x)$ is the gamma function

Result:

$$-2\sqrt{2}\left(\sqrt{2}-1\right)\approx -1.17157$$

-1.17157

Alternate forms:

$2\sqrt{2}-4$

$\sqrt{2}\left(2-2\sqrt{2}\right)$

That is equal to:

$$f(x) = -\frac{1}{x} + \frac{\sqrt{1-2x}}{x} .$$

Indeed:

-1/0.25 + (sqrt(1-2*0.25))/0.25

Input:

$$-\frac{1}{0.25}+\frac{\sqrt{1-2\times 0.25}}{0.25}$$

Result:

−1.17157...

-1.17157…

From:

$$h(x) = -\frac{\sqrt{\pi}}{4}\sum_{n=0}^{\infty}\frac{(-1)^n\, 2^{n+2}}{(n+2)!\,\Gamma(1/2-n)}\, x^n$$

we obtain:

-(sqrtPi)/4 sum (((-1)^n 2^(n+2)))/(((n+2)! gamma (1/2-n))))*(1/4)^n, n = 0..infinity

Input interpretation:

$$-\frac{\sqrt{\pi}}{4}\sum_{n=0}^{\infty}\frac{(-1)^n\times 2^{n+2}}{(n+2)!\,\Gamma\left(\frac{1}{2}-n\right)}\left(\frac{1}{4}\right)^n$$

$n!$ is the factorial function

$\Gamma(x)$ is the gamma function

Result:

$\frac{2}{3}\sqrt{2}\left(\sqrt{2}-2\right)\approx -0.552285$

-0.552285

Alternate forms:

$\frac{4}{3}-\frac{4\sqrt{2}}{3}$

$\frac{1}{3}\left(4-4\sqrt{2}\right)$

$\sqrt{2}\left(\frac{2\sqrt{2}}{3}-\frac{4}{3}\right)$

That is equal to

$$h(x) = \frac{1}{3x^2}\left[1-3x-(1-2x)^{3/2}\right]$$

Indeed:

1/(3*1/16)*(((1-3*1/4-(1-2*1/4)^1.5)))

Input:

$\frac{1}{3\times\frac{1}{16}}\left(1-3\times\frac{1}{4}-\left(1-2\times\frac{1}{4}\right)^{1.5}\right)$

Result:

$-0.552285\ldots$

-0.552285…

Now:

$$\begin{aligned} y_1 &= 6\,\frac{z(z-1)}{(3z-1)^2}\,, \\ y_2 &= 6\,\frac{z(z-1)^2}{(3z-1)^3}\,. \end{aligned}$$

6*(((0.414213562373*(0.414213562373-1))))/(((3*0.414213562373-1)^2))

Input interpretation:

$$6\times\frac{0.414213562373\,(0.414213562373-1)}{(3\times 0.414213562373-1)^2}$$

Result:

−24.72792206141431298724830318116522609132490642098723648 81...

-24.727922……

6*(((0.414213562373*(0.414213562373-1)^2)))/(((3*0.414213562373-1)^3))

Input interpretation:

$$6\times\frac{0.414213562373\,(0.414213562373-1)^2}{(3\times 0.414213562373-1)^3}$$

Result:

59.698484810051139633122200076253854267454500090259660780 20...

59.698484….

From:

$$z = \frac{\lambda\phi_0}{m^2} \, .$$

$$\lambda = \frac{1}{R} \, ,$$

$$(y = \pi R) \quad \phi_0 \;=\; a/\sqrt{5},$$

$$V' \;=\; 3\,\phi_0\,V'' \, .$$

we obtain:

V’ = 3*1/(sqrt5) V’’ y_1 = -24.727922; y_2 = 59.698484,

From:

$$\begin{aligned}\langle\phi\rangle &= \phi_0+\frac{V'}{V''}\left[-1-\frac{1}{2}\left(y_1-\frac{y_2}{3}\right)-\frac{1}{2}\left(y_1-\frac{y_2}{3}\right)\left(y_1-\frac{y_2}{2}\right)\right.\\ &- \frac{5}{8}\left(y_1-\frac{y_2}{3}\right)\left(y_1-\frac{2y_2}{3}\right)\left(y_1-\frac{2y_2}{5}\right)\\ &- \frac{7}{8}\left(y_1-\frac{y_2}{3}\right)\left(y_1^3-\frac{5}{3}y_1^2y_2+\frac{55}{63}y_1y_2^2-\frac{55}{378}y_2^3\right)\\ &- \left.\frac{21}{16}\left(y_1-\frac{y_2}{3}\right)\left(y_1^4-\frac{16}{7}y_1^3y_2+\frac{13}{7}y_1^2y_2^2-\frac{52}{81}y_1y_2^3+\frac{13}{162}y_2^4\right)+\cdots\right]\end{aligned}$$

we obtain:

(((((-1-1/2*(-24.727922-59.698484/3)-1/2(-24.727922-59.698484/3) (-24.727922-59.698484/2)-5/8*(-24.727922-59.698484/3)(-24.727922-(2*59.698484)/3) (-24.727922-(2*59.698484)/5))))))

Input interpretation:

$$-1-\frac{1}{2}\left(-24.727922-\frac{59.698484}{3}\right)-\left(\frac{1}{2}\left(-24.727922-\frac{59.698484}{3}\right)\right)\left(-24.727922-\frac{59.698484}{2}\right)-\left(\frac{5}{8}\left(-24.727922-\frac{59.698484}{3}\right)\left(-24.727922-\frac{2\times 59.698484}{3}\right)\right)\left(-24.727922-\frac{2\times 59.698484}{5}\right)$$

Result:

86286.618115329067726763888888888888888888888888888888888...

86286.618115329…

Repeating decimal:

$86286.6181153290677267638\overline{8}$ (period 1)

-7/8*(-24.727922-59.698484/3)(15120.385-5/3*611.47*59.698484+55/63*-24.727922*3563.9-55/378*212759.96)

Input interpretation:

$$-\frac{7}{8}\left(-24.727922-\frac{59.698484}{3}\right)\left(15\,120.385+\frac{5}{3}\times 59.698484\times(-611.47)+\frac{55}{63}\times(-24.727922)\times 3563.9+\frac{55}{378}\times(-212\,759.96)\right)$$

Result:

$$-5.99845103559320257438271604938271604938271604938271 60\ldots\times 10^6$$

-5.998451035593…*10^6

-21/16*(-24.727922-59.698484/3)(-373895.715-16/7*15120.385*59.698484+13/7*611.47*3563.9-52/81*-24.727922*-212759.96+13/162*12701447.3)

Input interpretation:

$$-\frac{21}{16}\left(-24.727922-\frac{59.698484}{3}\right)\left(-373\,895.715+\frac{16}{7}\times 59.698484\times(-15\,120.385)+\frac{13}{7}\times 611.47\times 3563.9-\frac{52}{81}\times(-24.727922)\times(-212\,759.96)+\frac{13}{162}\times 1.27014473\times 10^7\right)$$

Result:

$$-4.38282363633477080125925925925925925925925925925925 92\ldots\times 10^7$$

-4.38282363633477…*10^7

Thence, we obtain:

1/(sqrt5)+3/(sqrt5)*[86286.6181153290677267638-5.9984510355932 × 10^6-4.3828236363347 × 10^7]

Input interpretation:

$$\frac{1}{\sqrt{5}}+\frac{3}{\sqrt{5}}\left(86\,286.6181153290677267638-5.9984510355932\times 10^6-4.3828236363347\times 10^7\right)$$

Result:

$$-6.6733749977191\ldots\times 10^7$$

-6.6733749977191…*10^7

From:

$$\Lambda_0 = V(\phi_0) + \frac{(V')^2}{V''}\left[-\frac{1}{2} - \frac{1}{6}\left(y_1 - \frac{y_2}{4}\right) - \frac{1}{8}\left(y_1 - \frac{y_2}{3}\right)^2 - \frac{1}{8}\left(y_1 - \frac{y_2}{3}\right)^2\left(y_1 - \frac{1}{2}y_2\right)\right.$$
$$- \frac{7}{48}\left(y_1 - \frac{y_2}{3}\right)^2\left(y_1^2 - \frac{22}{21}y_1y_2 + \frac{11}{42}y_2^2\right)$$
$$\left. - \frac{3}{16}\left(y_1 - \frac{y_2}{3}\right)^2\left(y_1^3 - \frac{13}{8}y_1^2y_2 + \frac{91}{108}y_1y_2^2 - \frac{91}{648}y_2^3\right) + \cdots\right] , \qquad (2.51)$$

we obtain, for $y_1 = -24.727922$; $y_2 = 59.698484$, :

((-1/2-1/6*(-24.727922-59.698484/4)-1/8*(-24.727922-59.698484/3)^2-1/8*(-24.727922-59.698484/3)^2 * (-24.727922-1/2*59.698484))

Input interpretation:

$$-\frac{1}{2} - \frac{1}{6}\left(-24.727922 - \frac{59.698484}{4}\right) - \frac{1}{8}\left(-24.727922 - \frac{59.698484}{3}\right)^2 - \frac{1}{8}\left(-24.727922 - \frac{59.698484}{3}\right)^2\left(-24.727922 + \frac{1}{2}\times(-59.698484)\right)$$

Result:

13344.186049810825454861111111111111111111111111111111...

13344.1860498108…

-7/48*(-24.727922-59.698484/3)^2*(-24.727922^2-22/21*-24.727922*59.698484+11/42*59.698484^2)

Input interpretation:

$$-\frac{7}{48}\left(-24.727922 - \frac{59.698484}{3}\right)^2\left(-24.727922^2 + \frac{22}{21}\times(-24.727922)\times(-59.698484) + \frac{11}{42}\times 59.698484^2\right)$$

Result:

-542677.52051247640803041136670524691358024691358024691358 0...

-542677.520512476…

-3/16(-24.727922-59.698484/3)^2*(-24.727922^3-13/8*-24.727922^2*59.698484+91/108*-24.727922*59.698484^2-91/648*59.698484^3)

Input interpretation:

$$-\frac{3}{16}\left(-24.727922-\frac{59.698484}{3}\right)^2\left(-24.727922^3+\frac{13}{8}\times(-1)\times 24.727922^2\times(-59.698484)+\frac{91}{108}\times(-24.727922)\times 59.698484^2-\frac{91}{648}\times 59.698484^3\right)$$

Result:

$2.2381682312354810146938065679561006526491769547325 1028\ldots \times 10^7$

$2.2381682312\ldots*10^7$

Now we calculate V, which we put as an incognita x of the following equation:

x/(sqrt5)+((3*1/(sqrt5)))^2 *[13344.186049810825454861-542677.520512476408+2.2381682312354810146938e+7] = y

Input interpretation:

$$\frac{x}{\sqrt{5}}+\left(3\times\frac{1}{\sqrt{5}}\right)^2(13\,344.186049810825454861-542\,677.520512476408+2.2381682312354810146938\times 10^7)=y$$

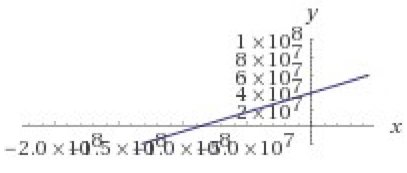
Result:

$$\frac{x}{\sqrt{5}}+3.9334228160205860216\times 10^7=y$$

Geometric figure:

line

Implicit plot:



Alternate forms:

$$0.4472135954999579393\,x+3.933422816020586022\times 10^7=y$$

$$x=2.2360679774997896964\,y-8.795400800870679171\times 10^7$$

$$\frac{x}{\sqrt{5}}-y+3.9334228160205860216\times 10^7=0$$

Real solution:

$$y\approx 0.4472135954999579393\,x+3.933422816020586022\times 10^7$$

Solution:

$y \approx 0.44721359549995793930\, x + 3.933422816020586022\times 10^{7}$

Partial derivatives:

$$\frac{\partial}{\partial x}\left(\frac{x}{\sqrt{5}} + 3.9334228160205860216\times 10^{7}\right) = \frac{1}{\sqrt{5}}$$

$$\frac{\partial}{\partial y}\left(\frac{x}{\sqrt{5}} + 3.9334228160205860216\times 10^{7}\right) = 0$$

From which:

3.933422816020586022×10^7 + 0.44721359549995793930 x

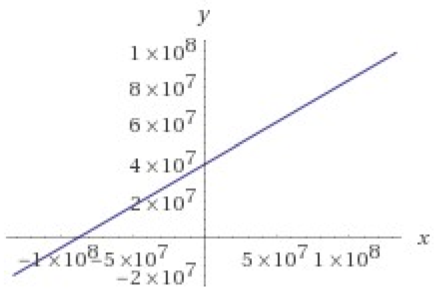
Input interpretation:

$3.933422816020586022\times 10^{7} + 0.44721359549995793930\, x$

Result:

$0.44721359549995793930\, x + 3.933422816020586022\times 10^{7}$

Plot:



(x from -1.3×10^{8} to 1.3×10^{8})

Geometric figure:

line

Alternate forms:

$2.55916\times 10^{-15}\,(1.7475\times 10^{14}\, x + 1.53699\times 10^{22})$

$0.44721359549995793930\,(1.0000000000000000000\, x + 8.795400800870679170\times 10^{7})$

Root:

$x \approx -8.795400800870679170\times 10^{7}$

-8.7954008008…*10^{7}

Properties as a real function:

Domain

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

Range

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

Bijectivity

bijective from its domain to $\mathbb{R}$

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

Derivative:

$$\frac{d}{dx}(0.44721359549995793\,93\,x + 3.933422816020586022\times 10^7) = 0.4472135954999579393$$

Indefinite integral:

$$\int (3.933422816020586022\times 10^7 + 0.4472135954999579393\,x)\,dx = 0.2236067977499789697\,x^2 + 3.933422816020586022\times 10^7\,x + \text{constant}$$

For x = -8.7954008008×10^7, we obtain:

-8.7954008008×10^7/(sqrt5)+((3*1/(sqrt5)))^2 *[13344.186049810825454861-542677.520512476408+2.2381682312354810146938e+7]

Input interpretation:

$$-\frac{8.7954008008\times 10^7}{\sqrt{5}} + \left(3\times\frac{1}{\sqrt{5}}\right)^2 (13\,344.186049810825454861 - 542\,677.520512476408 + 2.2381682312354810146938\times 10^7)$$

Result:

0.00031608686064947985914931815759915187805120853567590074 3...

0.000316086860649…

Note that:

$$-\frac{8.7954008008\times 10^7}{\sqrt{5}}$$

$-3.9334228160...\times 10^7$

-3.9334228160...*10^7

and:

$$\left(3\times\frac{1}{\sqrt{5}}\right)^2 (13\,344.186049810825454861 - 542\,677.520512476408 + 2.2381682312354810146938\times10^7)$$

$3.933422816020586021590714 98\times10^7$

3.9334228160...*10^7

From the inverse of the final result, we obtain:

1/(((-8.7954008008×10^7/(sqrt5)+((3*1/(sqrt5)))^2 *[13344.186049810825454861-542677.520512476408+2.2381682312354810146938e+7])))

Input interpretation:

$$1\bigg/\left(-\frac{8.7954008008\times10^7}{\sqrt{5}}+\left(3\times\frac{1}{\sqrt{5}}\right)^2 (13\,344.186049810825454861 - 542\,677.520512476408 + 2.2381682312354810146938\times10^7)\right)$$

Result:

$\tilde{\infty}$

$\tilde{\infty}$ is complex infinity

Decimal approximation:

3163.6873419706494308065253342658164784560472874451310655 05...

3163.6873419706...

From which:

1/(((-8.7954008008×10^7/(sqrt5)+((3*1/(sqrt5)))^2 *[13344.186049810825454861-542677.520512476408+2.2381682312354810146938e+7])))-64-sqrt(sqrt64)

Input interpretation:

$$1\bigg/\left(-\frac{8.7954008008\times10^7}{\sqrt{5}}+\left(3\times\frac{1}{\sqrt{5}}\right)^2 (13\,344.186049810825454861 - 542\,677.520512476408 + 2.2381682312354810146938\times10^7)\right)-64-\sqrt{\sqrt{64}}$$

Result:

$\tilde{\infty}$

$\tilde{\infty}$ is complex infinity

Decimal approximation:

3096.858914845903240708921956817397082298907943694377169359...

3096.858914845... result practically equal to the rest mass of J/Psi meson 3096.916

From the two solutions, we obtain:

(((1/(sqrt5)+3/(sqrt5)*[86286.6181153290677267638-5.9984510355932 × 10^6-4.3828236363347 × 10^7])))/ (3.9334228160205860215907149 8 × 10^7)

Input interpretation:

$$\left(\frac{1}{\sqrt{5}} + \frac{3}{\sqrt{5}}\left(86\,286.6181153290677267638 - 5.9984510355932 \times 10^6 - 4.3828236363347 \times 10^7\right)\right) / \left(3.93342281602058602159071498 \times 10^7\right)$$

Result:

−1.6965821651664...

-1.6965821651664…

From which:

1-2*(((1/(sqrt5)+3/(sqrt5)*[86286.6181153290677267638-5.9984510355932 × 10^6-4.3828236363347 × 10^7])))/ (3.93342281602058602159071498 × 10^7)-e-(55+2)1/10^3

Input interpretation:

$$1 - 2 \times \left(\frac{1}{\sqrt{5}} + \frac{3}{\sqrt{5}}\left(86\,286.6181153290677267638 - 5.9984510355932 \times 10^6 - 4.3828236363347 \times 10^7\right)\right) / \left(3.93342281602058602159071498 \times 10^7\right) - e - (55 + 2) \times \frac{1}{10^3}$$

Result:

1.6178825018738...

1.6178825018738…

and:

1-2*(((1/(sqrt5)+3/(sqrt5)*[86286.6181153290677267638-5.9984510355932 × 10^6-4.3828236363347 × 10^7])))/ (3.9334228160205860215907149 8 × 10^7)-e

Input interpretation:

$$1-2\times\left(\frac{1}{\sqrt{5}}+\frac{3}{\sqrt{5}}\left(86\,286.6181153290677267638-5.9984510355932\times 10^{6}-4.3828236363347\times 10^{7}\right)\right)/\left(3.93342281602058602159071498\times 10^{7}\right)-e$$

Result:

1.6748825018738...

1.6748825018738…

1-((1+sqrt(3)/log(6)))*(((1/(sqrt5)+3/(sqrt5)*[86286.6181153290677267638-5.9984510355932 × 10^6-4.3828236363347 × 10^7])))/ (3.93342281602058602159071498 × 10^7)-e

Input interpretation:

$$1-\left(1+\frac{\sqrt{3}}{\log(6)}\right)\times\left(\frac{1}{\sqrt{5}}+\frac{3}{\sqrt{5}}\left(86\,286.6181153290677267638-5.9984510355932\times 10^{6}-4.3828236363347\times 10^{7}\right)\right)/\left(3.93342281602058602159071498\times 10^{7}\right)-e$$

log(x) is the natural logarithm

Result:

1.6183455323660...

1.6183455323660...

From:

ON THE CHOWLA AND TWIN PRIMES CONJECTURES OVER F_q[T] - *WILL SAWIN AND MARK SHUSTERMAN* - arXiv:1808.04001v2 [math.NT] 7 Sep 2019

6.3. Hardy-Littlewood.

Theorem 6.3. *For every odd prime number p, and power q of p with*

$$q > 685090p^2, \tag{6.17}$$

there exists $\lambda > 0$ such that the following holds. For nonnegative integers $d > \ell$, and $a \in \mathcal{M}_\ell$ we have

$$\sum_{f \in \mathcal{M}_d} \Lambda(f)\Lambda(f+a) - \mathfrak{S}_q(a)q^d + O\left(q^{(1-\lambda)d}\right) \tag{6.18}$$

as $d \to \infty$, with the implied constant depending only on q.

Proof. Using Eq. (5.7) our sum becomes

$$-\sum_{k=0}^{d} k \sum_{M \in \mathcal{M}_k} \mu(M) \sum_{N \in \mathcal{M}_{d-k}} \Lambda(a+NM). \tag{6.19}$$

The appearance of the factor $\mu(M)$ allows us to consider only squarefree M, so by Corollary 5.3, the contribution of the range $0 \le k \le d/(2-\omega)$ is

$$-q^d \sum_{k=0}^{d/(2-\omega)} k \sum_{\substack{M \in \mathcal{M}_k \\ (a,M)=1}} \frac{\mu(M)}{\varphi(M)} + O\left(dq^{\frac{d}{2-\omega}} E_q\right) \tag{6.20}$$

which equals by Proposition 6.2 to

$$q^d \mathfrak{S}_q(a) + O\left(dq^{\frac{d}{2-\omega}} E_q + q^d E_q'\left(\frac{d}{2-\omega}\right)\right). \tag{6.21}$$

The error term is of power savings size.

In the other range, we need to prove a power savings bound for

$$\sum_{k>d/(2-\omega)}^{d} k \sum_{N \in \mathcal{M}_{d-k}} \sum_{M \in \mathcal{M}_k} \Lambda(a+MN)\mu(M) \tag{6.22}$$

and this is done by applying Corollary 6.1 to the innermost sum with

$$n = 1, \quad \tilde{\varepsilon} = \infty, \quad \tilde{\delta} = \infty, \quad \alpha = 1 - \omega > \frac{d-k}{k} \tag{6.23}$$

and $\beta > 0$ but very small. This requires

$$q > \left(2pe\left(1 + \frac{2+2-2\omega}{\omega}\right)\right)^2 = \left(2pe\left(\frac{4}{\omega} - 1\right)\right)^2 \tag{6.24}$$

and Corollary 5.3 requires

$$q > p^2 e^2 \left(1 + \frac{50}{1-32\omega}\right)^2 \tag{6.25}$$

so the optimal bound is obtained by solving

$$2\left(\frac{4}{\omega} - 1\right) = 1 + \frac{50}{1-32\omega} \tag{6.26}$$

whose solution is

$$\omega = \frac{103 - \sqrt{\frac{30803}{3}}}{64} = .0261\ldots \tag{6.27}$$

which satisfies

$$\left(2e\left(\frac{4}{\omega} - 1\right)\right)^2 < 685090. \tag{6.28}$$

□

We have from (6.27-6.28) that:

1/64[103-sqrt(30803/3)]

Input:

$$\frac{1}{64}\left(103 - \sqrt{\frac{30803}{3}}\right)$$

Decimal approximation:

0.026101632166236850818098275465734984373946172234102468867...

0.02610163216…

Alternate forms:

$$\frac{1}{192}\left(309 - \sqrt{92409}\right)$$

$$\frac{103}{64} - \frac{\sqrt{\frac{30803}{3}}}{64}$$

$$\frac{103}{64} - \frac{\sqrt{92409}}{192}$$

Minimal polynomial:

$$96x^2 - 309x + 8$$

(2e((4/0.0261016321662)-1))^2

Input interpretation:

$$\left(2 e \left(\frac{4}{0.0261016321662} - 1\right)\right)^2$$

Result:

685089.224281...

685089.224281…

From which:

[(2e((4/0.0261016321662)-1))^2]^1/27

Input interpretation:

$$\sqrt[27]{\left(2 e \left(\frac{4}{0.0261016321662} - 1\right)\right)^2}$$

Result:

1.644897281445...

1.644897281445…

and:

[(2e((4/0.0261016321662)-1))^2]^1/27 -(29-2)1/10^3

Input interpretation:

$$\sqrt[27]{\left(2 e \left(\frac{4}{0.0261016321662} - 1\right)\right)^2} - (29 - 2) \times \frac{1}{10^3}$$

Result:

1.617897281445...

1.617897281445…

Alternative representation:

$$\sqrt[27]{\left(2 e\left(\frac{4}{0.02610163216620000}-1\right)\right)^2}-\frac{29-2}{10^3}=$$

$$\sqrt[27]{\left(2 \exp(z)\left(\frac{4}{0.02610163216620000}-1\right)\right)^2}-\frac{29-2}{10^3} \quad \text{for } z=1$$

Series representations:

$$\sqrt[27]{\left(2 e\left(\frac{4}{0.02610163216620000}-1\right)\right)^2}-\frac{29-2}{10^3}=$$

$$-0.02700000000000000+1.527456395445889 \sqrt[27]{\sum_{k=0}^{\infty} \frac{2^k}{k!}}$$

$$\sqrt[27]{\left(2 e\left(\frac{4}{0.02610163216620000}-1\right)\right)^2}-\frac{29-2}{10^3}=$$

$$-0.02700000000000000+1.527456395445889 \sqrt[27]{\left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^2}$$

$$\sqrt[27]{\left(2 e\left(\frac{4}{0.02610163216620000}-1\right)\right)^2}-\frac{29-2}{10^3}=$$

$$-0.02700000000000000+1.527456395445889 \sqrt[27]{\frac{1}{\left(\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}\right)^2}}$$

From:

TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY
Volume 293, Number 1. January 1986
THE FIFTH AND SEVENTH ORDER MOCK THETA FUNCTIONS
BY GEORGE E. ANDREWS

We are now prepared to derive the Bailey pairs for the seventh order mock theta functions.

Define

$$\mathscr{B}_n(0) = \frac{1}{(q^{n+1})_n}, \tag{7.13}$$

$$\mathscr{B}_n(1) = \frac{1}{(q^n)_n}, \quad n > 0, \qquad \mathscr{B}_0(1) = 0, \tag{7.14}$$

$$\mathscr{B}_n(2) = \frac{1}{(q^{n+1})_{n+1}}, \tag{7.15}$$

and

$$\mathscr{A}_{2n}(0) = q^{3n^2+n} \sum_{|j| \le n} q^{-j^2} - q^{3n^2-n} \sum_{|j|<n} q^{-j^2}, \tag{7.16}$$

$$\mathscr{A}_{2n+1}(0) = -2q^{3n^2+4n+1} \sum_{j=0}^{n} q^{-j^2-j} + 2q^{3n^2+2n} \sum_{j=0}^{n-1} q^{-j^2-j}, \tag{7.17}$$

$$\mathscr{A}_{2n}(1) = -2q^{3n^2-2n}(1-q^{4n}) \sum_{j=0}^{n-1} q^{-j^2-j}, \tag{7.18}$$

$$\mathscr{A}_{2n+1}(1) = q^{3n^2+n}(1-q^{4n+2}) \sum_{|j| \le n} q^{-j^2}, \tag{7.19}$$

$$\mathscr{A}_{2n}(2) = \frac{1}{1-q}\left(q^{3n^2+n} \sum_{|j| \le n} q^{-j^2} + 2q^{3n^2+2n} \sum_{j=0}^{n-1} q^{-j^2-j}\right), \tag{7.20}$$

$$\mathscr{A}_{2n+1}(2) = \frac{-1}{1-q}\left(2q^{3n^2+4n+1} \sum_{j=0}^{n} q^{-j^2-j} + q^{3n^2+5n+2} \sum_{|j| \le n} q^{-j^2}\right). \tag{7.21}$$

For q = 0.5; j = 2; n = 3, we obtain:

$$\mathscr{A}_{2n}(0) = q^{3n^2+n} \sum_{|j| \le n} q^{-j^2} - q^{3n^2-n} \sum_{|j|<n} q^{-j^2}$$

0.5^30 * (0.5^-4) – 0.5^24 * (0.5^-4)

Input:

$$\frac{0.5^{30}}{0.5^4} - \frac{0.5^{24}}{0.5^4}$$

Result:

$-9.387731552124023437 5 \times 10^{-7}$

-9.3877315521240234375*10^-7

From which:

1/8(((-1/(((0.5^30 * (0.5^-4) – 0.5^24 * (0.5^-4)))))))^1/2+11-1/golden ratio

Input:

$$\frac{1}{8}\sqrt{-\frac{1}{\frac{0.5^{30}}{0.5^4} - \frac{0.5^{24}}{0.5^4}}} + 11 - \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.394...

139.394...

and:

1/8(((-1/(((0.5^30 * (0.5^-4) – 0.5^24 * (0.5^-4)))))))^1/2-3-1/golden ratio

Input:

$$\frac{1}{8}\sqrt{-\frac{1}{\frac{0.5^{30}}{0.5^4} - \frac{0.5^{24}}{0.5^4}}} - 3 - \frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.394...

125.394...

27*1/2(((1/8(((-1/(((0.5^30*(0.5^-4) – 0.5^24 * (0.5^-4)))))))^1/2-1/golden ratio)))-4

Input:

$$27 \times \frac{1}{2}\left(\frac{1}{8}\sqrt{-\frac{1}{\frac{0.5^{30}}{0.5^{4}}-\frac{0.5^{24}}{0.5^{4}}}}-\frac{1}{\phi}\right)-4$$

ϕ is the golden ratio

Result:

1729.32...

1729.32...

With regard 27 (From Wikipedia):

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

With regard the Rossler attractor

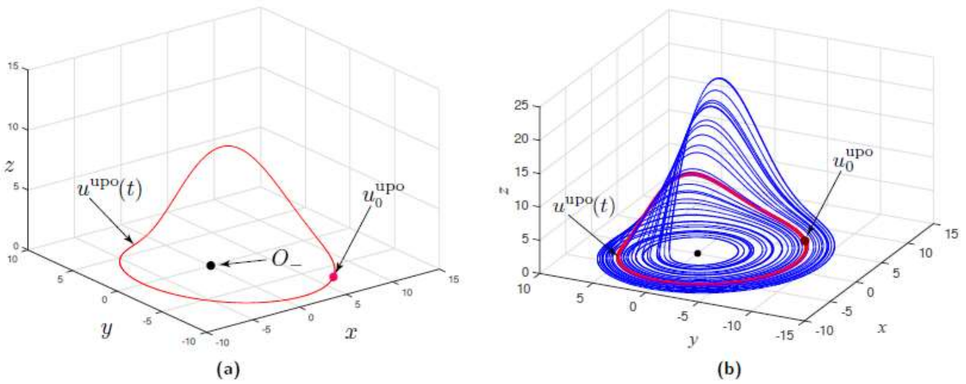


Figure 1: Period-1 (red, period $\tau = 5.8811$) UPO in system (1) with parameters $a = 0.2$, $b = 0.2$, $c = 5.7$, stabilized using TDFC method.

fined as

$$\dim_L(t, \mathcal{A}) = \sup_{u \in \mathcal{A}} \dim_L(t, u). \qquad (6)$$

The *Douady–Oesterlé theorem* [14] implies that for any fixed $t > 0$ the finite-time Lyapunov dimension, defined by (6), is an upper estimate of the Hausdorff dimension: $\dim_H \mathcal{A} \leq \dim_L(t, \mathcal{A})$. The best estimation is called the *Lyapunov dimension* [12]

The period-1 UPO u^{upo} with period $\tau = 5.8811$ has the following multipliers: $\rho_1 = -2.40398$, $\rho_2 = 1$, $\rho_3 = -1.2946 \cdot 10^{-14}$. Thus, for the local Lyapunov dimension of the UPO $u^{upo}(t)$ we obtain $\dim_L u^{upo} = d_L^{KY}(\{\frac{1}{\tau} \log \rho_j\}_{j=1}^3) = 2.0274 \lessapprox 2.0283 = \dim_L(500, u^{upo})$.

III. CONCLUSION

the Hausdorff dimension is equal to 2.01

We have that:

2.01*((-(0.5^30 * (0.5^-4) – 0.5^24 * (0.5^-4))))^1/64

Input:

$$2.01 \sqrt[64]{-\left(\frac{0.5^{30}}{0.5^4} - \frac{0.5^{24}}{0.5^4}\right)}$$

Result:

1.61814...

1.61814…

or, considering the calculations of the Hausdorff dimension:

(((((((((ln(((((-1.2946e-14)(-2.40398)))^3))*1/5.8811)))^1/3))-(0.58811+0.02)i))))*((-(0.5^30 * (0.5^-4) – 0.5^24 * (0.5^-4))))^1/64

Input interpretation:

$$\left(\sqrt[3]{\log\left((-1.2946\times 10^{-14}\times(-2.40398))^3\right)\times\frac{1}{5.8811}}-(0.58811+0.02)\,i\right)\sqrt[64]{-\left(\frac{0.5^{30}}{0.5^4}-\frac{0.5^{24}}{0.5^4}\right)}$$

log(x) is the natural logarithm

i is the imaginary unit

Result:

1.01143... +
1.26229... i

Polar coordinates:

$r = 1.61752$ (radius), $\theta = 51.296°$ (angle)

1.61752

But, we have also:

2*((-(0.5^30 * (0.5^-4) – 0.5^24 * (0.5^-4))))^1/64

Input:

$$2\sqrt[64]{-\left(\frac{0.5^{30}}{0.5^4}-\frac{0.5^{24}}{0.5^4}\right)}$$

Result:

1.610094090442426687662493813897758343576358962584077287812...

1.6100940904424…

From which:

2((-(0.5^30 * (0.5^-4) – 0.5^24 * (0.5^-4))))^1/64 + 8/10^3

Input:

$$2\sqrt[64]{-\left(\frac{0.5^{30}}{0.5^4} - \frac{0.5^{24}}{0.5^4}\right)} + \frac{8}{10^3}$$

Result:

1.618094090442426687662493813897758343576358962584077287812...

1.6180940904424...

For q = 0.5; j = 2; n = 3, we obtain:

$$\mathscr{A}_{2n+1}(0) = -2q^{3n^2+4n+1}\sum_{j=0}^{n} q^{-j^2-j} + 2q^{3n^2+2n}\sum_{j=0}^{n-1} q^{-j^2-j}$$

-2*0.5^40*0.5^(-6) + 2*0.5^33*0.5^(-6)

Input:

$$-\frac{2\times 0.5^{40}}{0.5^6} + \frac{2\times 0.5^{33}}{0.5^6}$$

Result:

$1.4784745872020721435546875\times 10^{-8}$

$1.4784745872020721435546875*10^{-8}$

From which:

1/Pi(((1/(((-2*0.5^40*0.5^(-6) + 2*0.5^33*0.5^(-6)))))))^1/3+8+golden ratio

Input:

$$\frac{1}{\pi}\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}+8+\phi$$

ϕ is the golden ratio

Result:

139.310...

139.310…

Alternative representations:

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}+8+\phi=8-2\cos(216\,°)+\frac{\sqrt[3]{\frac{1}{\frac{2\times 0.5^{33}}{0.5^6}-\frac{2\times 0.5^{40}}{0.5^6}}}}{\pi}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}+8+\phi=8+2\cos\left(\frac{\pi}{5}\right)+\frac{\sqrt[3]{\frac{1}{\frac{2\times 0.5^{33}}{0.5^6}-\frac{2\times 0.5^{40}}{0.5^6}}}}{\pi}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}+8+\phi=8-2\cos(216\,°)+\frac{\sqrt[3]{\frac{1}{\frac{2\times 0.5^{33}}{0.5^6}-\frac{2\times 0.5^{40}}{0.5^6}}}}{180\,°}$$

Series representations:

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}+8+\phi=8+\phi+\frac{101.86}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}+8+\phi=8+\phi+\frac{203.719}{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times0.5^{40}}{0.5^{6}}+\frac{2\times0.5^{33}}{0.5^{6}}}}}{\pi}+8+\phi=8+\phi+\frac{407.438}{\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times0.5^{40}}{0.5^{6}}+\frac{2\times0.5^{33}}{0.5^{6}}}}}{\pi}+8+\phi=8+\phi+\frac{203.719}{\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times0.5^{40}}{0.5^{6}}+\frac{2\times0.5^{33}}{0.5^{6}}}}}{\pi}+8+\phi=8+\phi+\frac{101.86}{\int_0^{1}\sqrt{1-t^2}\,dt}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times0.5^{40}}{0.5^{6}}+\frac{2\times0.5^{33}}{0.5^{6}}}}}{\pi}+8+\phi=8+\phi+\frac{203.719}{\int_0^{\infty}\frac{\sin(t)}{t}\,dt}$$

1/Pi(((1/(((-2*0.5^40*0.5^(-6) + 2*0.5^33*0.5^(-6)))))))^1/3-4-1/golden ratio

Input:

$$\frac{1}{\pi}\sqrt[3]{\frac{1}{-\frac{2\times0.5^{40}}{0.5^{6}}+\frac{2\times0.5^{33}}{0.5^{6}}}}-4-\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.074…

125.074…

Alternative representations:

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4--\frac{1}{2\cos(216\,°)}+\frac{\sqrt[3]{\frac{1}{\frac{2\times 0.5^{33}}{0.5^6}-\frac{2\times 0.5^{40}}{0.5^6}}}}{\pi}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4-\frac{1}{2\cos\left(\frac{\pi}{5}\right)}+\frac{\sqrt[3]{\frac{1}{\frac{2\times 0.5^{33}}{0.5^6}-\frac{2\times 0.5^{40}}{0.5^6}}}}{\pi}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4--\frac{1}{2\cos(216\,°)}+\frac{\sqrt[3]{\frac{1}{\frac{2\times 0.5^{33}}{0.5^6}-\frac{2\times 0.5^{40}}{0.5^6}}}}{180\,°}$$

Series representations:

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4-\frac{1}{\phi}+\frac{101.86}{\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4-\frac{1}{\phi}+\frac{203.719}{-1+\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4-\frac{1}{\phi}+\frac{407.438}{\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}}$$

Integral representations:

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times 0.5^{40}}{0.5^6}+\frac{2\times 0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4-\frac{1}{\phi}+\frac{203.719}{\int_0^{\infty}\frac{1}{1+t^2}\,dt}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times0.5^{40}}{0.5^6}+\frac{2\times0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4-\frac{1}{\phi}+\frac{101.86}{\int_0^1\sqrt{1-t^2}\,dt}$$

$$\frac{\sqrt[3]{\frac{1}{-\frac{2\times0.5^{40}}{0.5^6}+\frac{2\times0.5^{33}}{0.5^6}}}}{\pi}-4-\frac{1}{\phi}=-4-\frac{1}{\phi}+\frac{203.719}{\int_0^\infty\frac{\sin(t)}{t}\,dt}$$

1+(((-2*0.5^40*0.5^(-6) + 2*0.5^33*0.5^(-6))))^1/37 + 4/10^3

Input:

$$1+\sqrt[37]{-\frac{2\times0.5^{40}}{0.5^6}+\frac{2\times0.5^{33}}{0.5^6}}+\frac{4}{10^3}$$

Result:

1.6182898616106138393516376351211048911061671728837604447 85...

1.6182898616106…

For q = 0.5; j = 2; n = 3, we obtain:

$$\mathscr{A}_{2n}(1)=-2q^{3n^2-2n}(1-q^{4n})\sum_{j=0}^{n-1}q^{-j^2-j}$$

-2*0.5^21 (1-0.5^12) * 0.5^(-6)

Input:

$$-2\times0.5^{21}\times\frac{1-0.5^{12}}{0.5^6}$$

Result:

$-0.000061020255088806152343 75$

-0.00006102025508880615234375

Repeating decimal:

$-0.0000610202550888061523437500000$

From which:

(((-0.25/(((-2*0.5^21 (1-0.5^12) * 0.5^(-6)))))))^1/2

Input:

$$\sqrt{\frac{-0.25}{-2\times 0.5^{21}\times \frac{1-0.5^{12}}{0.5^{6}}}}$$

Result:

$64.0078\ldots$

64.0078…

2(((-0.25/(((-2*0.5^21 (1-0.5^12) * 0.5^(-6)))))))^1/2 - Pi + 1/golden ratio

Input:

$$2\sqrt{\frac{-0.25}{-2\times 0.5^{21}\times \frac{1-0.5^{12}}{0.5^{6}}}}-\pi+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

$125.492\ldots$

125.492…

Series representations:

$$2\sqrt{\frac{-0.25}{-\frac{(2\times 0.5^{21})(1-0.5^{12})}{0.5^{6}}}}-\pi+\frac{1}{\phi}=128.016+\frac{1}{\phi}-4\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$2\sqrt{\frac{-0.25}{-\frac{(2\times 0.5^{21})(1-0.5^{12})}{0.5^{6}}}}-\pi+\frac{1}{\phi}=130.016+\frac{1}{\phi}-2\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$2\sqrt{\frac{-0.25}{-\frac{(2\times 0.5^{21})(1-0.5^{12})}{0.5^{6}}}}-\pi+\frac{1}{\phi}=128.016+\frac{1}{\phi}-\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$2\sqrt{\frac{-0.25}{-\frac{(2\times 0.5^{21})(1-0.5^{12})}{0.5^{6}}}}-\pi+\frac{1}{\phi}=128.016+\frac{1}{\phi}-2\int_{0}^{\infty}\frac{1}{1+t^2}\,dt$$

$$2\sqrt{\frac{-0.25}{-\frac{(2\times 0.5^{21})(1-0.5^{12})}{0.5^{6}}}}-\pi+\frac{1}{\phi}=128.016+\frac{1}{\phi}-4\int_{0}^{1}\sqrt{1-t^2}\,dt$$

$$2\sqrt{\frac{-0.25}{-\frac{(2\times 0.5^{21})(1-0.5^{12})}{0.5^{6}}}}-\pi+\frac{1}{\phi}=128.016+\frac{1}{\phi}-2\int_{0}^{\infty}\frac{\sin(t)}{t}\,dt$$

2(((-0.25/(((-2*0.5^21 (1-0.5^12) * 0.5^(-6)))))))^1/2 +11+ 1/golden ratio

Input:

$$2\sqrt{\frac{-0.25}{-2\times 0.5^{21}\times\frac{1-0.5^{12}}{0.5^{6}}}}+11+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.634...

139.634…

27*(((-0.25/(((-2*0.5^21 (1-0.5^12) * 0.5^(-6)))))))^1/2+1

Input:

$$27\sqrt{\frac{-0.25}{-2\times 0.5^{21}\times \frac{1-0.5^{12}}{0.5^{6}}}}+1$$

Result:

1729.21...

1729.21…

(((27*(((-0.25/(((-2*0.5^21 (1-0.5^12) * 0.5^(-6)))))))^1/2+1)))^1/15 - (21+5)1/10^3

Input:

$$\sqrt[15]{27\sqrt{\frac{-0.25}{-2\times 0.5^{21}\times \frac{1-0.5^{12}}{0.5^{6}}}}+1}-(21+5)\times\frac{1}{10^{3}}$$

Result:

1.617828600101391149416442500569341480229989085835527490574...

1.6178286001013911…

For q = 0.5; j = 2; n = 3, we obtain:

$$\mathscr{A}_{2n+1}(1) = q^{3n^2+n}\left(1 - q^{4n+2}\right)\sum_{|j|\leq n} q^{-j^2}$$

0.5^30 (1-0.5^14) 0.5^(-4)

Input:

$$\frac{0.5^{30}\left(1-0.5^{14}\right)}{0.5^{4}}$$

Result:

$1.4900251699145883321762084960937 5 \times 10^{-8}$

1.490025169914…*10^-8

(((1/(((0.5^30 (1-0.5^14) 0.5^(-4)))))))^1/4 + 47+ golden ratio

Input:

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+47+\phi$$

ϕ is the golden ratio

Result:

139.129…

139.129…

Alternative representations:

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+47+\phi=47+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}+2\sin(54\,°)$$

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+47+\phi=47-2\cos(216\,°)+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}$$

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+47+\phi=47+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}-2\sin(666\,°)$$

(((1/(((0.5^30 (1-0.5^14) 0.5^(-4)))))))^1/4 + 29+4+ golden ratio

Input:

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+4+\phi$$

ϕ is the golden ratio

Result:

125.129...

125.129…

Alternative representations:

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+4+\phi = 33+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}+2\sin(54°)$$

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+4+\phi = 33-2\cos(216°)+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}$$

$$\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+4+\phi = 33+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}-2\sin(666°)$$

27*1/2((((((1/(((0.5^30 (1-0.5^14) 0.5^(-4)))))))^1/4 + 29+7+ golden ratio)))-1/golden ratio

Input:

$$27\times\frac{1}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

1729.12...

1729.12…

Alternative representations:

$$\frac{27}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}\,(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}=$$
$$-\frac{1}{2\sin(54\,°)}+\frac{27}{2}\left(36+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})\,0.5^{30}}{0.5^4}}}+2\sin(54\,°)\right)$$

$$\frac{27}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}\,(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}=$$
$$\frac{-1}{-2\cos(216\,°)}+\frac{27}{2}\left(36-2\cos(216\,°)+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})\,0.5^{30}}{0.5^4}}}\right)$$

$$\frac{27}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}\,(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}=$$
$$\frac{-1}{-2\sin(666\,°)}+\frac{27}{2}\left(36+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})\,0.5^{30}}{0.5^4}}}-2\sin(666\,°)\right)$$

((((27*1/2((((((1/(((0.5^30 (1-0.5^14) 0.5^(-4)))))))^1/4 + 29+7+ golden ratio)))-1/golden ratio))))^1/15-(21+5)1/10^3

Input:

$$\sqrt[15]{27\times\frac{1}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}\,(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}}-(21+5)\times\frac{1}{10^3}$$

ϕ is the golden ratio

Result:

1.61782...

1.61782…

Alternative representations:

$$\sqrt[15]{\frac{27}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}}-\frac{21+5}{10^3}=$$

$$-\frac{26}{10^3}+\sqrt[15]{-\frac{1}{2\sin(54°)}+\frac{27}{2}\left(36+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}+2\sin(54°)\right)}$$

$$\sqrt[15]{\frac{27}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}}-\frac{21+5}{10^3}=$$

$$-\frac{26}{10^3}+\sqrt[15]{\frac{-1}{-2\cos(216°)}+\frac{27}{2}\left(36-2\cos(216°)+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}\right)}$$

$$\sqrt[15]{\frac{27}{2}\left(\sqrt[4]{\frac{1}{\frac{0.5^{30}(1-0.5^{14})}{0.5^4}}}+29+7+\phi\right)-\frac{1}{\phi}}-\frac{21+5}{10^3}=$$

$$-\frac{26}{10^3}+\sqrt[15]{\frac{-1}{-2\sin(666°)}+\frac{27}{2}\left(36+\sqrt[4]{\frac{1}{\frac{(1-0.5^{14})0.5^{30}}{0.5^4}}}-2\sin(666°)\right)}$$

For q = 0.5; j = 2; n = 3, we obtain:

$$\mathscr{A}_{2n}(2)=\frac{1}{1-q}\left(q^{3n^2+n}\sum_{|j|\leq n}q^{-j^2}+2q^{3n^2+2n}\sum_{j=0}^{n-1}q^{-j^2-j}\right)$$

1/(1-0.5) ((((0.5^30 * 0.5^(-4) + 2*0.5^33 * 0.5^(-6))))

Input:

$$\frac{1}{1-0.5}\left(\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}\right)$$

Result:

$5.9604644775390625 \times 10^{-8}$

$5.9604644775390625*10^{-8}$

From which:

4(((1/((((1/(1-0.5) ((((0.5^30 * 0.5^(-4) + 2*0.5^33 * 0.5^(-6)))))))))))^1/6

Input:

$$4\sqrt[6]{\frac{1}{\frac{1}{1-0.5}\left(\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}\right)}}$$

Result:

64

64

8(((1/((((1/(1-0.5) ((((0.5^30 * 0.5^(-4) + 2*0.5^33 * 0.5^(-6)))))))))))^1/6 - Pi + 1/golden ratio

Input:

$$8\sqrt[6]{\frac{1}{\frac{1}{1-0.5}\left(\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}\right)}}-\pi+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.476…

125.476…

Alternative representations:

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=-\pi+-\frac{1}{2\cos(216\,°)}+8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{0.5}}}$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=-180\,°+-\frac{1}{2\cos(216\,°)}+8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{0.5}}}$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=-\pi+\frac{1}{2\cos\left(\frac{\pi}{5}\right)}+8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{0.5}}}$$

Series representations:

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=128.+\frac{1}{\phi}-4\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=130+\frac{1}{\phi}-2\sum_{k=1}^{\infty}\frac{2^k}{\binom{2k}{k}}$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=128.+\frac{1}{\phi}-\sum_{k=0}^{\infty}\frac{2^{-k}(-6+50k)}{\binom{3k}{k}}$$

Integral representations:

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=128.+\frac{1}{\phi}-2\int_0^{\infty}\frac{1}{1+t^2}\,dt$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=128.+\frac{1}{\phi}-4\int_0^{1}\sqrt{1-t^2}\,dt$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}}{1-0.5}}}-\pi+\frac{1}{\phi}=128.+\frac{1}{\phi}-2\int_0^{\infty}\frac{\sin(t)}{t}\,dt$$

8(((1/((((1/(1-0.5) ((((0.5^30 * 0.5^(-4) + 2*0.5^33 * 0.5^(-6))))))))))^1/6 +11 + 1/golden ratio

Input:

$$8\sqrt[6]{\frac{1}{\frac{1}{1-0.5}\left(\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}\right)}}+11+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.618...

139.618…

Alternative representations:

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}}{1-0.5}}}+11+\frac{1}{\phi}=11+8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}}{0.5}}}+\frac{1}{2\sin(54°)}$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}}{1-0.5}}}+11+\frac{1}{\phi}=11+-\frac{1}{2\cos(216°)}+8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}}{0.5}}}$$

$$8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}}{1-0.5}}}+11+\frac{1}{\phi}=11+8\sqrt[6]{\frac{1}{\frac{\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}}{0.5}}}+-\frac{1}{2\sin(666°)}$$

27*[4(((1/((((1/(1-0.5) ((((0.5^30 * 0.5^(-4) + 2*0.5^33 * 0.5^(-6))))))))))^1/6]+1

Input:

$$27\left(4\sqrt[6]{\frac{1}{\frac{1}{1-0.5}\left(\frac{0.5^{30}}{0.5^4}+\frac{2\times0.5^{33}}{0.5^6}\right)}}\right)+1$$

Result:

1729

1729

(((27*[4(((1/((((1/(1-0.5) ((((0.5^30 * 0.5^(-4) + 2*0.5^33 * 0.5^(-6)))))))))))^1/6]+1)))^1/15-(21+5)1/10^3

Input:

$$\sqrt[15]{27\left(4\sqrt[6]{\frac{1}{\frac{1}{1-0.5}\left(\frac{0.5^{30}}{0.5^4}+\frac{2\times 0.5^{33}}{0.5^6}\right)}}\right)+1}-(21+5)\times\frac{1}{10^3}$$

Result:

1.6178152287487281305800880313247695143292831436999401726 45...

1.617815228748…

For q = 0.5; j = 2; n = 3, we obtain:

$$\mathscr{A}_{2n+1}(2) = \frac{-1}{1-q}\left(2q^{3n^2+4n+1}\sum_{j=0}^{n} q^{-j^2-j} + q^{3n^2+5n+2}\sum_{|j|\leq n} q^{-j^2}\right)$$

-1/(1-0.5) ((((2*0.5^40* 0.5^(-6) + 0.5^44 * 0.5^(-4)))))

Input:

$$-\frac{\frac{2\times 0.5^{40}}{0.5^6}+\frac{0.5^{44}}{0.5^4}}{1-0.5}$$

Result:

$-2.346496330574154853820800781 25\times 10^{-10}$

$2.3464963305741\ldots*10^{-10}$

4sqrt((([-1/(((-1/(1-0.5) ((((2*0.5^40* 0.5^(-6) + 0.5^44 * 0.5^(-4))))))))]^1/4+1/2)))

Input:

$$4\sqrt{\sqrt[4]{\frac{-1}{-\frac{\frac{2\times 0.5^{40}}{0.5^6}+\frac{0.5^{44}}{0.5^4}}{1-0.5}}}+\frac{1}{2}}$$

Result:

64.0003...

64.0003...

8sqrt((([-1/(((-1/(1-0.5) ((((2*0.5^40* 0.5^(-6) + 0.5^44 * 0.5^(-4))))))))]^1/4+1/2)))-Pi+1/golden ratio

Input:

$$8\sqrt{\sqrt[4]{\frac{-1}{-\frac{\frac{2\times 0.5^{40}}{0.5^6}+\frac{0.5^{44}}{0.5^4}}{1-0.5}}}+\frac{1}{2}}-\pi+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

125.477...

125.477…

Series representations:

$$8\sqrt{\sqrt[4]{-\frac{1}{\frac{\left(\frac{2\times 0.5^{40}}{0.5^6}+\frac{0.5^{44}}{0.5^4}\right)(-1)}{1-0.5}}}+\frac{1}{2}}-\pi+\frac{1}{\phi}=\frac{1}{\phi}-\pi+8\sqrt{255.002}\sum_{k=0}^{\infty}e^{-5.54127k}\binom{\frac{1}{2}}{k}$$

$$8\sqrt{\sqrt[4]{-\frac{1}{\frac{\left(\frac{2\times 0.5^{40}}{0.5^6}+\frac{0.5^{44}}{0.5^4}\right)(-1)}{1-0.5}}}+\frac{1}{2}}-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+8\sqrt{255.002}\sum_{k=0}^{\infty}\frac{(-0.00392153)^k\left(-\frac{1}{2}\right)_k}{k!}$$

$$8\sqrt{\sqrt[4]{-\frac{1}{\frac{\left(\frac{2\times 0.5^{40}}{0.5^6}+\frac{0.5^{44}}{0.5^4}\right)(-1)}{1-0.5}}}+\frac{1}{2}}-\pi+\frac{1}{\phi}=$$
$$\frac{1}{\phi}-\pi+\frac{4\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}e^{-5.54127s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

8sqrt((([-1/(((-1/(1-0.5) ((((2*0.5^40* 0.5^(-6) + 0.5^44 * 0.5^(-4))))))))]^1/4+1/2)))+11+1/golden ratio

Input:

$$8\sqrt{\sqrt[4]{\frac{-1}{-\frac{\frac{2\times 0.5^{40}}{0.5^{6}}+\frac{0.5^{44}}{0.5^{4}}}{1-0.5}}}+\frac{1}{2}}+11+\frac{1}{\phi}$$

ϕ is the golden ratio

Result:

139.619...

139.619…

Series representations:

$$8\sqrt{\sqrt[4]{-\frac{1}{\frac{\left(\frac{2\times 0.5^{40}}{0.5^{6}}+\frac{0.5^{44}}{0.5^{4}}\right)(-1)}{1-0.5}}}+\frac{1}{2}}+11+\frac{1}{\phi}=11+\frac{1}{\phi}+8\sqrt{255.002}\sum_{k=0}^{\infty}e^{-5.54127k}\binom{\frac{1}{2}}{k}$$

$$8\sqrt{\sqrt[4]{-\frac{1}{\frac{\left(\frac{2\times 0.5^{40}}{0.5^{6}}+\frac{0.5^{44}}{0.5^{4}}\right)(-1)}{1-0.5}}}+\frac{1}{2}}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+8\sqrt{255.002}\sum_{k=0}^{\infty}\frac{(-0.00392153)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}$$

$$8\sqrt{\sqrt[4]{-\frac{1}{\frac{\left(\frac{2\times 0.5^{40}}{0.5^{6}}+\frac{0.5^{44}}{0.5^{4}}\right)(-1)}{1-0.5}}}+\frac{1}{2}}+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}+\frac{4\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}e^{-5.54127s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{\sqrt{\pi}}$$

27(((4sqrt((([-1/(((-1/(1-0.5) ((((2*0.5^40* 0.5^(-6) + 0.5^44 * 0.5^(-4)))))))]^1/4+1/2))))))+1

Input:

$$27\left(4\sqrt{\sqrt[4]{\frac{-1}{-\frac{\frac{2\times 0.5^{40}}{0.5^{6}}+\frac{0.5^{44}}{0.5^{4}}}{1-0.5}}}+\frac{1}{2}}\right)+1$$

Result:

1729.01...

1729.01

(((27(((4sqrt((([-1/(((-1/(1-0.5) ((((2*0.5^40* 0.5^(-6) + 0.5^44 * 0.5^(-4)))))))]^1/4+1/2))))))+1)))^1/15-(21+5)1/10^3

Input:

$$\sqrt[15]{27\left(4\sqrt{\sqrt[4]{\frac{-1}{-\frac{\frac{2\times 0.5^{40}}{0.5^{6}}+\frac{0.5^{44}}{0.5^{4}}}{1-0.5}}}+\frac{1}{2}}\right)+1}-(21+5)\times\frac{1}{10^{3}}$$

Result:

1.617815747958130773115110563726074077500722839631827596309...

1.617815747958…

Observations

Figs.

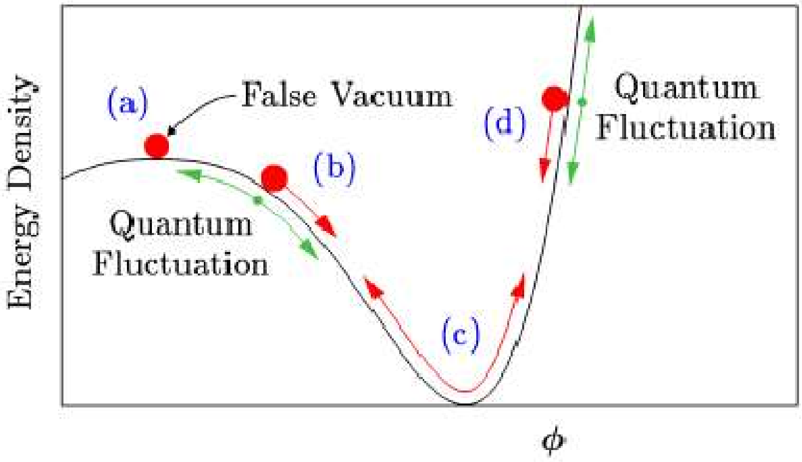
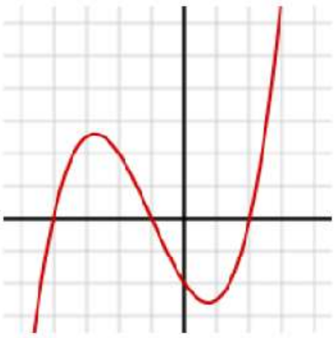


FIG. 1: In simple inflationary models, the universe at early times is dominated by the potential energy density of a scalar field, ϕ. Red arrows show the classical motion of ϕ. When ϕ is near region (a), the energy density will remain nearly constant, $\rho \cong \rho_f$, even as the universe expands. Moreover, cosmic expansion acts like a frictional drag, slowing the motion of ϕ: Even near regions (b) and (d), ϕ behaves more like a marble moving in a bowl of molasses, slowly creeping down the side of its potential, rather than like a marble sliding down the inside of a polished bowl. During this period of "slow roll," ρ remains nearly constant. Only after ϕ has slid most of the way down its potential will it begin to oscillate around its minimum, as in region (c), ending inflation.



Graph of a cubic function with 3 real roots (where the curve crosses the horizontal axis at $y = 0$). The case shown has two critical points. Here the function is $f(x) = (x^3 + 3x^2 - 6x - 8)/4$.

The ratio between M_0 and q

$$M_0 = \sqrt{3q^2 - \Sigma^2},$$

$$q = \frac{(3\sqrt{3})\, M_s}{2}.$$

i.e. the gravitating mass M_0 and the Wheelerian mass q of the wormhole, is equal to:

$$\frac{\sqrt{3(2.17049 \times 10^{37})^2 - 0.001^2}}{\frac{1}{2}((3\sqrt{3})(4.2 \times 10^6 \times 1.9891 \times 10^{30}))}$$

1.732050787905194420703947625671018160083566548802082460520...

1.7320507879

$1.7320507879 \approx \sqrt{3}$ that is the ratio between the gravitating mass M_0 and the Wheelerian mass q of the wormhole

We note that:

$$\left(-\frac{1}{2} + \frac{i}{2}\sqrt{3}\right) - \left(-\frac{1}{2} - \frac{i}{2}\sqrt{3}\right)$$

i is the imaginary unit

$i\sqrt{3}$

1.732050807568877293527446341505872366942805253810380628055... i

$r \approx 1.73205$ (radius), $\theta = 90°$ (angle)

1.73205

This result is very near to the ratio between M_0 and q, that is equal to 1.7320507879 $\approx \sqrt{3}$

With regard $\sqrt{3}$, we note that is a fundamental value of the formula structure that we need to calculate a Cubic Equation

We have that the previous result

$$\left(-\frac{1}{2}+\frac{i}{2}\sqrt{3}\right)-\left(-\frac{1}{2}-\frac{i}{2}\sqrt{3}\right) = i\sqrt{3} =$$

$$= 1.732050807568877293527446341505872366942805253810380628055\ldots i$$

$r \approx 1.73205$ (radius), $\theta = 90°$ (angle)

can be related with:

$$u^2(-u)\left(\frac{1}{2}\pm\frac{i\sqrt{3}}{2}\right)+v^2(-v)\left(\frac{1}{2}\pm\frac{i\sqrt{3}}{2}\right)=q$$

Considering:

$$(-1)\left(\frac{1}{2}-\frac{i\sqrt{3}}{2}\right)-(-1)\left(\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)=q$$

$$= i\sqrt{3} = 1.732050807568877293527446341505872366942805253810380628055\ldots i$$

$r \approx 1.73205$ (radius), $\theta = 90°$ (angle)

Thence:

$$\left(-\frac{1}{2}+\frac{i}{2}\sqrt{3}\right)-\left(-\frac{1}{2}-\frac{i}{2}\sqrt{3}\right) \Rightarrow$$

$$\Rightarrow (-1)\left(\frac{1}{2}-\frac{i\sqrt{3}}{2}\right)-(-1)\left(\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)=q=1.73205\approx\sqrt{3}$$

We observe how the graph above, concerning the cubic function, is very similar to the graph that represent the scalar field (in red). It is possible to hypothesize that cubic functions and cubic equations, with their roots, are connected to the scalar field.

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

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

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

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

From Wikipedia

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

Can be this the motivation that from the development of the Ramanujan's equations we obtain results very near to the dilaton mass calculated as a type of Higgs boson: 125 GeV for T = 0 and to the Higgs boson mass 125.18 GeV and practically equal to the rest mass of Pion meson 139.57 MeV

Note that:

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

Hence

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

so that

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

Hence

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

Thence:

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

And

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

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

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

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

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

Fibonacci numbers are also closely related to Lucas numbers ,in that the Fibonacci and Lucas numbers form a complementary pair of Lucas sequences

The beginning of the sequence is thus:

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

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

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

The sequence of Lucas numbers is:

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

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

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

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

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

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

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

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

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