Analyzing various equations concerning the possible applications of the Fluid Mechanics and Hydrodynamic interactions (magma dynamics). Mathematical connections with MRB Constant and some parameters of Number Theory and String Theory

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Abstract

In this paper, we analyze various equations concerning the possible applications and connections of the Fluid Mechanics and Hydrodynamic interactions (magma dynamics). We obtain mathematical connections with the MRB constant and some other parameters of Number Theory and String Theory

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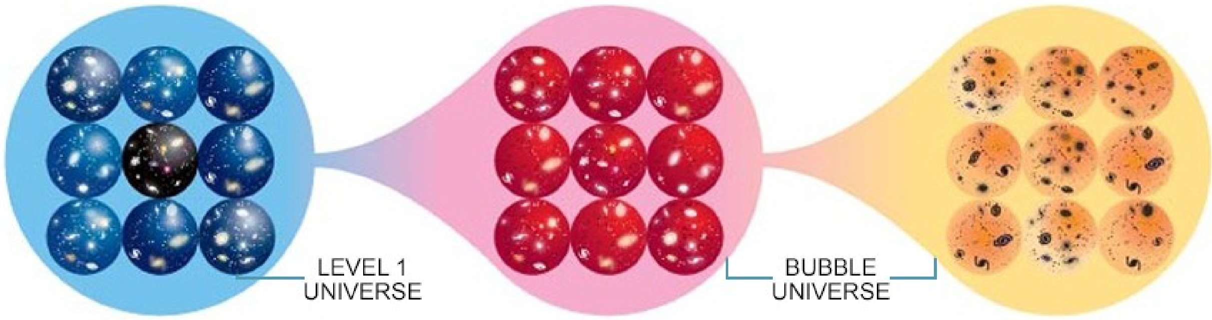
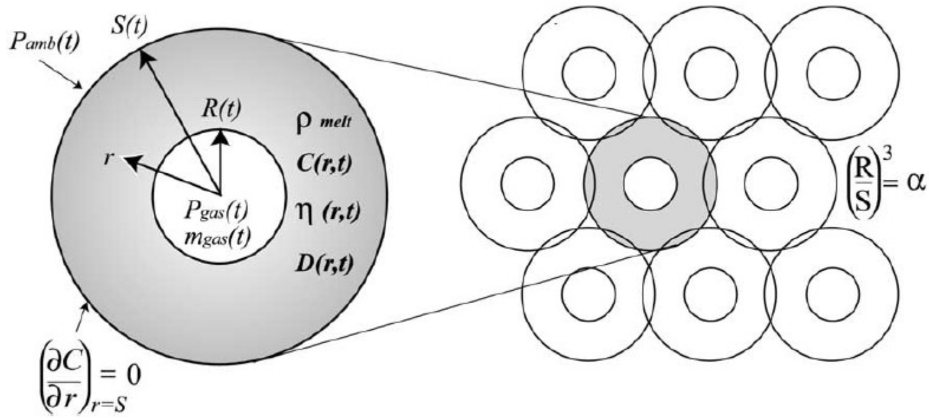
Possible mathematical connections between the Bubbles universes and gas bubbles



The multiverse as a whole is expanding and will continue doing so forever, but some regions of space stop expanding and form **distinct bubbles, like gas pockets in a “Swiss cheese” – in which bubbles of normal universe are continually forming out of a surrounding and exponentially expanding inflationary state**. One of those bubbles would be our universe. (http://julianbevan.com/the-multiverse-theory/)



The physical model. The magma is regarded as a pack of **spherical cells, each composed of a gas bubble with radius R** centered in a spherical melt shell with outer radius S. The cells are arranged in a 3-D lattice with some overlap, so that gas volume fraction is $\alpha = (R/S)^3$. (Modified after Proussevitch et al., 1993).
(Bubble growth during decompression of magma: experimental and theoretical investigation - N.G. Lensky, O. Navon, V. Lyakhovsky - 2004)

From

https://www.esa.int/kids/it/imparare/L_Universo/Storia_dell_Universo/Il_Big_Bang

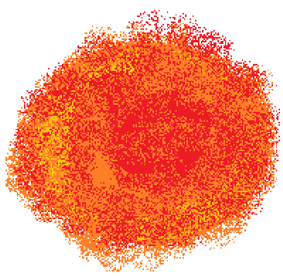
https://www.lemiescienze.net/pianeta_terra/elementari/origini_universo.htm

https://www.esquire.com/it/cultura/a40988726/big-bang-la-teoria-dellorigine-delluniverso/

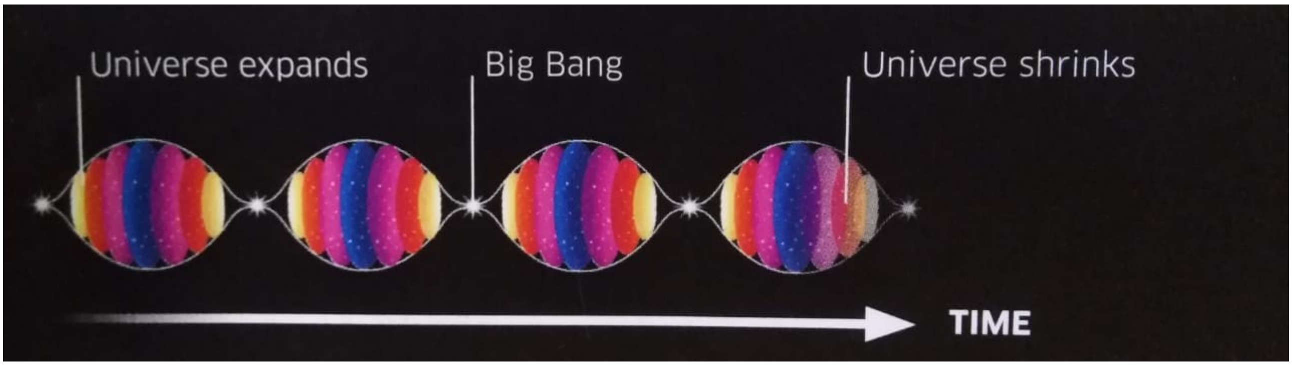
Many cosmologists believe that the universe began with the so-called Big Bang about 14 billion years ago. Back then the entire universe was contained in a bubble thousands of times smaller than a pinhead, but hotter and denser than anything we can imagine.

Then, suddenly, this bubble burst and the universe as we know it was born. Time, space and matter all began with the Big Bang. In a fraction of a second, the universe grew from smaller than a single atom to surpass the size of an entire galaxy and continued to grow at an incredible rate. The expansion continues today.

Immediately after the Big Bang explosion, matter and energy were thrown into space. Due to the effect of gravitational forces, the particles dispersed in space began to thicken giving rise to celestial bodies. The Sun formed about 5 billion years ago. The Earth originated about 4.6 billion years ago. In the beginning, the Earth was like a ball of fire that has cooled over time. As the earth's surface cooled, it hardened and the earth's crust formed, but inside the planet there was still very hot material called magma.



There is an infinite cycle where a universe collapses towards a very small point and then explodes in a Big Bang which, in turn, collapses and then explodes according to a cyclical process, or a “loop” in fact, which goes on forever. Since that time, the LQG theory has also been referred to as the Big Bounce term instead of the Big Bang term. In their study, Gambini and Pullin applied LQG to the simplest case of a black hole. Their experiment demonstrates that any object that is attracted to the black hole is not compressed to singularity, rather the object is reduced to a small but finite size and then ejected entirely into another part of the Universe or even. in another universe.



Today we therefore know with certainty that the Universe is expanding: the theory of the "Big Bang", the most accredited among those proposed so far, explains this fact by admitting that all matter and energy were initially enclosed in an incredibly dense agglomeration and heat that, about 13 and a half billion years ago, "exploded" giving rise to space, time and the expansion still in progress.

About 15 billion years ago a huge explosion started the expansion of the universe. This explosion is known as the Big Bang. What existed prior to this event is completely unknown and is still subject to pure speculation. The big bang was not a conventional explosion, but rather an event that filled all space with particles of the embryonic universe moving away from each other. The universe was initially homogeneous, isotropic, with an extremely high energy density, very high temperatures and pressures and was expanding and cooling very rapidly. Approximately 10^{-37} seconds after the initial instant, a phase transition caused cosmic inflation, during which the universe increased its size exponentially.

The first 10^{-43} seconds are called the Planck period and is so called because it can only be measured in Planck time (Planck time is the time it takes a photon traveling at the speed of light to travel a distance equal to the length Planck's and is the shortest measurable time interval). Due to the extreme heat and the density of matter, the state of the universe was highly unstable; thus began to expand and cool, leading to the manifestation of the fundamental forces of physics.

With the creation of the first fundamental forces of the universe, cosmic inflation began, which lasted from 10^{-32} seconds in Planck's time to an unknown point. Most cosmological models suggest that the Universe at this point was homogeneously filled with a high energy density and that the incredibly high temperatures and pressures gave rise to rapid expansion and cooling.

On some equations concerning the Fluid Mechanics and Hydrodynamic interactions (magma dynamics) [1]

We have that:

where:

$$\Delta H_{\text{mix}} = T\left[X_{\text{w}}^{\text{m}} \left(\frac{\partial \tilde{S}_{\text{w}}^{\text{m}}}{\partial X_{\text{w}}^{\text{m}}} \right)_{P,T} - X_{\text{a}}^{\text{m}} \left(\frac{\partial \tilde{S}_{\text{a}}^{\text{m}}}{\partial X_{\text{a}}^{\text{m}}} \right)_{P,T} \right]$$

For the following equation:

$$\mu_{\text{w}}^{\text{g}} - \mu_{\text{w}}^{\text{m}} = RT \ln \frac{f_{\text{w}}^{\text{g}}}{f_{\text{w}}^{\text{m}}} = -RT \ln a_{\text{w}}^{\text{m}} \qquad (17)$$

and ΔH_{mix} = T*[X*(-S/(X^2))-X*(-S/(X^2))]

from

$$\begin{aligned} &\left(X_{\text{w}}^{\text{g}} c_P^{\text{g}} + X_{\text{w}}^{\text{m}} (c_{\text{w}}^{\text{m}})_P + X_{\text{a}}^{\text{m}} (c_{\text{a}}^{\text{m}})_P \right) \mathrm{d}T \\ &\quad - T\left[X_{\text{w}}^{\text{m}} \left(\frac{\partial \tilde{V}_{\text{w}}^{\text{m}}}{\partial T} \right)_{P,X} + X_{\text{a}}^{\text{m}} \left(\frac{\partial \tilde{V}_{\text{a}}^{\text{m}}}{\partial T} \right)_{P,X} \right] \mathrm{d}P \\ &\quad + \Delta H_{\text{mix}}\, \mathrm{d}X_{\text{w}}^{\text{m}} + \left(\mu_{\text{w}}^{\text{g}} - \mu_{\text{w}}^{\text{m}} + TS_{\text{w}}^{\text{g}} - TS_{\text{w}}^{\text{m}} \right) \mathrm{d}X_{\text{w}}^{\text{g}} \\ &\quad - X_{\text{w}}^{\text{g}}\ \tilde{V}_{\text{w}}^{\text{g}}\, \mathrm{d}P = 0 \qquad (16) \end{aligned}$$

we obtain:

(X*c+X(c)+X(c))d*T - T[X(-V/(T^2))+X(-V/(T^2))]*d*P+T*[X*(-S/(X^2))-X*(-S/(X^2))]*d*X+((-R*T*ln(a))+T*S-T*S)*d*X-X-V*d*P

Input

$$(X\,c + X\,c + X\,c)\,d\,T - T\left(X\left(-\frac{V}{T^2}\right) + X\left(-\frac{V}{T^2}\right)\right)d\,P + T\left(X\left(-\frac{S}{X^2}\right) - X\left(-\frac{S}{X^2}\right)\right)d\,X + (-R\,(T\log(a)) + T\,S - T\,S)\,d\,X - X - V\,d\,P$$

$\log(x)$ is the natural logarithm

Result

$$-d\,R\,T\,X\log(a) + 3\,c\,d\,T\,X + \frac{2\,d\,P\,V\,X}{T} - d\,P\,V - X$$

Alternate forms

$$X\,(d\,T\,(3\,c - R\log(a)) - 1) + d\,P\,V\left(\frac{2\,X}{T} - 1\right)$$

$$\frac{3\,c\,d\,T^2\,X - d\,P\,T\,V + 2\,d\,P\,V\,X - T\,X}{T} - d\,R\,T\,X\log(a)$$

$$\frac{-d\,R\,T^2\,X\log(a) + 3\,c\,d\,T^2\,X - d\,P\,T\,V + 2\,d\,P\,V\,X - T\,X}{T}$$

Roots

$$d\,(3\,c - R\log(a)) \neq 0\,, \quad P = 0\,, \quad T = \frac{1}{d\,(3\,c - R\log(a))}$$

$$-d\,R\,T^2\log(a) + 3\,c\,d\,T^2 + 2\,d\,P\,V - T \neq 0\,, \quad T \neq 0\,, \quad X = \frac{d\,P\,T\,V}{-d\,R\,T^2\log(a) + 3\,c\,d\,T^2 + 2\,d\,P\,V - T}$$

$$d\,(3\,c - R\log(a)) \neq 0\,, \quad P \neq 0\,, \quad T = \frac{1}{d\,(3\,c - R\log(a))}\,, \quad V = 0$$

Derivative

$$\frac{\partial}{\partial a}\left((X\,c + X\,c + X\,c)\,d\,T - T\left(\frac{X\,(-V)}{T^2} + \frac{X\,(-V)}{T^2}\right)d\,P + T\left(\frac{X\,(-S)}{X^2} - \frac{X\,(-S)}{X^2}\right)d\,X + (-R\,(T\log(a)) + T\,S - T\,S)\,d\,X - X - V\,d\,P\right) = -\frac{d\,R\,T\,X}{a}$$

Indefinite integral

$$\int\left(-d\,P\,V - X + 3\,c\,d\,T\,X + \frac{2\,d\,P\,V\,X}{T} - d\,R\,T\,X\log(a)\right)da = a\left(-d\,R\,T\,X\log(a) + d\,T\,X\,(3\,c + R) - \frac{d\,P\,V\,(T - 2\,X)}{T} - X\right) + \text{constant}$$

(assuming a complex-valued logarithm)

From the result

$$-d\,R\,T\,X\log(a) + 3\,c\,d\,T\,X + \frac{2\,d\,P\,V\,X}{T} - d\,P\,V - X$$

-d R T X log(a) + 3 c d T X + (2 d P V X)/T - d P V – X

-d (8.314462618) (1.416784*10^32) X log(a) + 3 (1.380649*10^-23) d (1.416784*10^32) X + (2 d (4.632947e+113) (4.222111e-105) X)/(1.416784*10^32) - d (4.632947e+113) (4.222111e-105) – X

we obtain:

-(8.314462618) (1.416784*10^32) log(a) + 3(1.380649*10^-23) (1.416784*10^32) + (2 (4.632947e+113) (4.222111e-105))/(1.416784*10^32) - (4.632947e+113) (4.222111e-105) – 1

Input interpretation

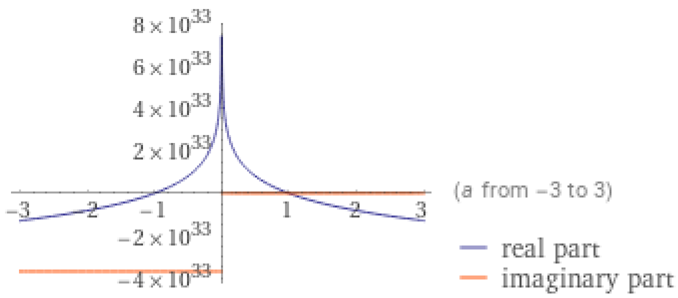
$$-8.314462618\times 1.416784\times 10^{32}\log(a)+3\times 1.380649\times 10^{-23}\times 1.416784\times 10^{32}+\frac{2\left(4.632947\times 10^{113}\right)\times \frac{4.222111}{10^{105}}}{1.416784\times 10^{32}}-\left(4.632947\times 10^{113}\right)\times \frac{4.222111}{10^{105}}-1$$

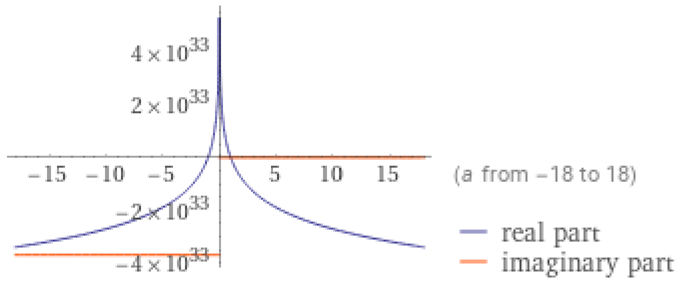
$\log(x)$ is the natural logarithm

Result

$$3.91216\times 10^{9}-1.17798\times 10^{33}\log(a)$$

Plots (figures that can be related to the open strings)





Root

$a=1$

Integer root

$a=1$

Derivative

$$\frac{d}{da}\left(3.91216\times 10^{9} - 1\,177\,979\,760\,578\,051\,215\,219\,589\,583\,470\,592 \log(a)\right) = -\frac{1\,177\,979\,760\,578\,051\,215\,219\,589\,583\,470\,592}{a}$$

Indefinite integral

$$\int\left(3.91216\times 10^{9} - 1.17798\times 10^{33}\log(a)\right)da = a\left(1.17798\times 10^{33} - 1.17798\times 10^{33}\log(a)\right) + \text{constant}$$

(assuming a complex-valued logarithm)

From the result

$$3.91216\times 10^{9} - 1.17798\times 10^{33}\log(a)$$

for a = 18 :

3.91216×10^9 - 1.17798×10^33 log(18)

Input interpretation

$$3.91216\times 10^{9} - 1.17798\times 10^{33}\log(18)$$

log(x) is the natural logarithm

Result

$-3.40480\ldots\times 10^{33}$

$-3.4048\ldots*10^{33}$

From the indefinite integral result

$$\int\left(-d\,P\,V - X + 3\,c\,d\,T\,X + \frac{2\,d\,P\,V\,X}{T} - d\,R\,T\,X\log(a)\right)da = a\left(-d\,R\,T\,X\log(a) + d\,T\,X\,(3\,c + R) - \frac{d\,P\,V\,(T - 2\,X)}{T} - X\right) + \text{constant}$$

(assuming a complex-valued logarithm)

we obtain:

a (-(d P V (T - 2 X))/T - X + d (3 c + R) T X - d R T X log(a))

Input

$$a\left(-\frac{d\,P\,V\,(T - 2\,X)}{T} - X + d\,(3\,c + R)\,T\,X - d\,R\,T\,X\log(a)\right)$$

$\log(x)$ is the natural logarithm

Alternate forms

$$-\frac{a\left(d\,R\,T^2\,X\log(a) - 3\,c\,d\,T^2\,X + d\,P\,T\,V - 2\,d\,P\,V\,X - d\,R\,T^2\,X + T\,X\right)}{T}$$

$$-\frac{a\left(-3\,c\,d\,T^2\,X + d\,P\,T\,V - 2\,d\,P\,V\,X - d\,R\,T^2\,X + T\,X\right)}{T} - a\,d\,R\,T\,X\log(a)$$

$$a\left(X\,(d\,T\,(3\,c - R\log(a)) - 1) + d\left(P\,V\left(\frac{2\,X}{T} - 1\right) + R\,T\,X\right)\right)$$

Alternate form assuming a, c, d, P, R, T, V, and X are positive

$$a\,d\,T\,X\,(3\,c + R) - \frac{a\,d\,P\,V\,(T - 2\,X)}{T} - a\,d\,R\,T\,X\log(a) - a\,X$$

Expanded form

$$3\,a\,c\,d\,T\,X + \frac{2\,a\,d\,P\,V\,X}{T} - a\,d\,P\,V + a\,d\,R\,T\,X - a\,d\,R\,T\,X\log(a) - a\,X$$

Roots

$T \neq 0, \quad a = 0$

$d(-R\log(a) + 3c + R) \neq 0, \quad P = 0, \quad T = \dfrac{1}{d(-R\log(a) + 3c + R)}$

$$-d R T^2 \log(a) + 3 c d T^2 + 2 d P V + d R T^2 - T \neq 0, \\ T \neq 0, \quad X = \frac{d P T V}{-d R T^2 \log(a) + 3 c d T^2 + 2 d P V + d R T^2 - T}$$

$d(-R\log(a) + 3c + R) \neq 0, \quad P \neq 0, \quad T = \dfrac{1}{d(-R\log(a) + 3c + R)}, \quad V = 0$

Derivative

$$\frac{\partial}{\partial a}\left(a\left(-\frac{d P V (T - 2X)}{T} - X + d(3c + R) T X - d R T X \log(a)\right)\right) = \\ -d R T X \log(a) + d\left(3 c T X + \frac{2 P V X}{T} - P V\right) - X$$

Indefinite integral

$$\int a\left(-\frac{d P V (T - 2X)}{T} - X + d(3c + R) T X - d R T X \log(a)\right) da = \\ \frac{a^2\left(-2 d R T^2 X \log(a) + 3 d T^2 X (2c + R) - 2 d P V (T - 2X) - 2 T X\right)}{4T} + \text{constant}$$

(assuming a complex-valued logarithm)

And again, from the above indefinite integral result

$$\int a\left(-\frac{d\,P\,V\,(T-2\,X)}{T}-X+d\,(3\,c+R)\,T\,X-d\,R\,T\,X\log(a)\right)da = \frac{a^2\left(-2\,d\,R\,T^2\,X\log(a)+3\,d\,T^2\,X\,(2\,c+R)-2\,d\,P\,V\,(T-2\,X)-2\,T\,X\right)}{4\,T} + \text{constant}$$

(assuming a complex-valued logarithm)

we obtain:

(a^2 (-2 d P V (T - 2 X) - 2 T X + 3 d (2 c + R) T^2 X - 2 d R T^2 X log(a)))/(4 T)

Input

$$\frac{a^2\left(-2\,d\,P\,V\,(T-2\,X)-2\,T\,X+3\,d\,(2\,c+R)\,T^2\,X-2\,d\,R\,T^2\,X\log(a)\right)}{4\,T}$$

$\log(x)$ is the natural logarithm

Result

$$\frac{a^2\left(-2\,d\,R\,T^2\,X\log(a)+3\,d\,T^2\,X\,(2\,c+R)-2\,d\,P\,V\,(T-2\,X)-2\,T\,X\right)}{4\,T}$$

Alternate forms

$$\frac{a^2\left(-2\,d\,R\,T^2\,X\log(a)+6\,c\,d\,T^2\,X-2\,d\,P\,T\,V+4\,d\,P\,V\,X+3\,d\,R\,T^2\,X-2\,T\,X\right)}{4\,T}$$

$$\frac{a^2\left(6\,c\,d\,T^2\,X-2\,d\,P\,T\,V+4\,d\,P\,V\,X+3\,d\,R\,T^2\,X-2\,T\,X\right)}{4\,T}-\frac{1}{2}\,a^2\,d\,R\,T\,X\log(a)$$

$$a^2\left(X\left(d\,T\left(\frac{3\,c}{2}-\frac{1}{2}\,R\log(a)\right)-\frac{1}{2}\right)+d\left(P\,V\left(\frac{X}{T}-\frac{1}{2}\right)+\frac{3\,R\,T\,X}{4}\right)\right)$$

Expanded form

$$\frac{3}{2} a^2 c\, d\, T\, X + \frac{a^2 d\, P\, V\, X}{T} - \frac{1}{2} a^2 d\, P\, V + \frac{3}{4} a^2 d\, R\, T\, X - \frac{1}{2} a^2 d\, R\, T\, X \log(a) - \frac{a^2 X}{2}$$

Roots

$$T \neq 0\,, \quad a = 0$$

$$d\,(-2\,R \log(a) + 6\,c + 3\,R) \neq 0\,, \quad P = 0\,, \quad T = \frac{2}{d\,(-2\,R \log(a) + 6\,c + 3\,R)}$$

$$-2\,d\,R\,T^2 \log(a) + 6\,c\,d\,T^2 + 4\,d\,P\,V + 3\,d\,R\,T^2 - 2\,T \neq 0\,,$$
$$T \neq 0\,, \quad X = \frac{2\,d\,P\,T\,V}{-2\,d\,R\,T^2 \log(a) + 6\,c\,d\,T^2 + 4\,d\,P\,V + 3\,d\,R\,T^2 - 2\,T}$$

$$d\,(-2\,R \log(a) + 6\,c + 3\,R) \neq 0\,, \quad P \neq 0\,, \quad T = \frac{2}{d\,(-2\,R \log(a) + 6\,c + 3\,R)}\,, \quad V = 0$$

Derivative

$$\frac{\partial}{\partial a}\left(\frac{a^2\left(-2\,d\,P\,V\,(T - 2\,X) - 2\,T\,X + 3\,d\,(2\,c + R)\,T^2\,X - 2\,d\,R\,T^2\,X \log(a)\right)}{4\,T}\right) =$$
$$a\left(-d\,R\,T\,X \log(a) + d\,T\,X\,(3\,c + R) - \frac{d\,P\,V\,(T - 2\,X)}{T} - X\right)$$

Indefinite integral

$$\int \frac{a^2\left(-2\,d\,P\,V\,(T - 2\,X) - 2\,T\,X + 3\,d\,(2\,c + R)\,T^2\,X - 2\,d\,R\,T^2\,X \log(a)\right)}{4\,T}\,da =$$
$$\frac{a^3\left(-6\,d\,R\,T^2\,X \log(a) + d\,T^2\,X\,(18\,c + 11\,R) - 6\,d\,P\,V\,(T - 2\,X) - 6\,T\,X\right)}{36\,T} + \text{constant}$$

(assuming a complex-valued logarithm)

Again, from the indefinite integral result

$$\int \frac{a^2 \left(-2\, d\, P\, V\, (T - 2\, X) - 2\, T\, X + 3\, d\, (2\, c + R)\, T^2\, X - 2\, d\, R\, T^2\, X \log(a)\right)}{4\, T}\, da = \frac{a^3 \left(-6\, d\, R\, T^2\, X \log(a) + d\, T^2\, X\, (18\, c + 11\, R) - 6\, d\, P\, V\, (T - 2\, X) - 6\, T\, X\right)}{36\, T} + \text{constant}$$

(assuming a complex-valued logarithm)

we obtain:

(a^3 (-6 d P V (T - 2 X) - 6 T X + d (18 c + 11 R) T^2 X - 6 d R T^2 X log(a)))/(36 T)

Input

$$\frac{a^3 \left(-6\, d\, P\, V\, (T - 2\, X) - 6\, T\, X + d\, (18\, c + 11\, R)\, T^2\, X - 6\, d\, R\, T^2\, X \log(a)\right)}{36\, T}$$

$\log(x)$ is the natural logarithm

Result

$$\frac{a^3 \left(-6\, d\, R\, T^2\, X \log(a) + d\, T^2\, X\, (18\, c + 11\, R) - 6\, d\, P\, V\, (T - 2\, X) - 6\, T\, X\right)}{36\, T}$$

Alternate forms

$$\frac{a^3 \left(-6\, d\, R\, T^2\, X \log(a) + 18\, c\, d\, T^2\, X - 6\, d\, P\, T\, V + 12\, d\, P\, V\, X + 11\, d\, R\, T^2\, X - 6\, T\, X\right)}{36\, T}$$

$$\frac{a^3 \left(18\, c\, d\, T^2\, X - 6\, d\, P\, T\, V + 12\, d\, P\, V\, X + 11\, d\, R\, T^2\, X - 6\, T\, X\right)}{36\, T} - \frac{1}{6}\, a^3\, d\, R\, T\, X \log(a)$$

$$a^3 \left(X \left(d\, T \left(\frac{c}{2} - \frac{1}{6}\, R \log(a)\right) - \frac{1}{6}\right) + d \left(P\, V \left(\frac{X}{3\, T} - \frac{1}{6}\right) + \frac{11\, R\, T\, X}{36}\right)\right)$$

Expanded form

$$\frac{1}{2} a^3 c\, d\, T\, X + \frac{a^3 d\, P\, V\, X}{3\, T} - \frac{1}{6} a^3 d\, P\, V + \frac{11}{36} a^3 d\, R\, T\, X - \frac{1}{6} a^3 d\, R\, T\, X \log(a) - \frac{a^3 X}{6}$$

Roots

$T \neq 0, \quad a = 0$

$d(-6 R \log(a) + 18 c + 11 R) \neq 0, \quad P = 0, \quad T = \dfrac{6}{d(-6 R \log(a) + 18 c + 11 R)}$

$-6 d R T^2 \log(a) + 18 c d T^2 + 12 d P V + 11 d R T^2 - 6 T \neq 0,$
$\quad T \neq 0, \quad X = \dfrac{6 d P T V}{-6 d R T^2 \log(a) + 18 c d T^2 + 12 d P V + 11 d R T^2 - 6 T}$

$d(-6 R \log(a) + 18 c + 11 R) \neq 0,$
$\quad P \neq 0, \quad T = \dfrac{6}{d(-6 R \log(a) + 18 c + 11 R)}, \quad V = 0$

Derivative

$$\frac{\partial}{\partial a}\left(\frac{a^3 \left(-6 d P V (T - 2 X) - 6 T X + d (18 c + 11 R) T^2 X - 6 d R T^2 X \log(a)\right)}{36 T}\right) = \frac{a^2 \left(-2 d R T^2 X \log(a) + 3 d T^2 X (2 c + R) - 2 d P V (T - 2 X) - 2 T X\right)}{4 T}$$

Indefinite integral

$$\int \frac{a^3 \left(-6 d P V (T - 2 X) - 6 T X + d (18 c + 11 R) T^2 X - 6 d R T^2 X \log(a)\right)}{36 T}\, da = \frac{a^4 \left(-12 d R T^2 X \log(a) + d T^2 X (36 c + 25 R) - 12 d P V (T - 2 X) - 12 T X\right)}{288 T} + \text{constant}$$

(assuming a complex-valued logarithm)

Now, from the indefinite integral result

$$\int \frac{a^3 \left(-6\, d\, P\, V\, (T - 2\, X) - 6\, T\, X + d\, (18\, c + 11\, R)\, T^2\, X - 6\, d\, R\, T^2\, X \log(a)\right)}{36\, T}\, da = \frac{a^4 \left(-12\, d\, R\, T^2\, X \log(a) + d\, T^2\, X\, (36\, c + 25\, R) - 12\, d\, P\, V\, (T - 2\, X) - 12\, T\, X\right)}{288\, T} + \text{constant}$$

(assuming a complex-valued logarithm)

we obtain:

(a^4 (-12 d P V (T - 2 X) - 12 T X + d (36 c + 25 R) T^2 X - 12 d R T^2 X log(a)))/(288 T)

Input

$$\frac{a^4 \left(-12\, d\, P\, V\, (T - 2\, X) - 12\, T\, X + d\, (36\, c + 25\, R)\, T^2\, X - 12\, d\, R\, T^2\, X \log(a)\right)}{288\, T}$$

$\log(x)$ is the natural logarithm

Result

$$\frac{a^4 \left(-12\, d\, R\, T^2\, X \log(a) + d\, T^2\, X\, (36\, c + 25\, R) - 12\, d\, P\, V\, (T - 2\, X) - 12\, T\, X\right)}{288\, T}$$

Alternate forms

$$\frac{1}{288\, T} a^4 \left(-12\, d\, R\, T^2\, X \log(a) + 36\, c\, d\, T^2\, X - 12\, d\, P\, T\, V + 24\, d\, P\, V\, X + 25\, d\, R\, T^2\, X - 12\, T\, X\right)$$

$$\frac{a^4 \left(36\, c\, d\, T^2\, X - 12\, d\, P\, T\, V + 24\, d\, P\, V\, X + 25\, d\, R\, T^2\, X - 12\, T\, X\right)}{288\, T} - \frac{1}{24}\, a^4\, d\, R\, T\, X \log(a)$$

$$a^4 \left(X \left(d\, T \left(\frac{c}{8} - \frac{1}{24}\, R \log(a)\right) - \frac{1}{24}\right) + d \left(P\, V \left(\frac{X}{12\, T} - \frac{1}{24}\right) + \frac{25\, R\, T\, X}{288}\right)\right)$$

Expanded form

$$\frac{1}{8} a^4 c\, d\, T\, X + \frac{a^4 d\, P\, V\, X}{12\, T} - \frac{1}{24} a^4 d\, P\, V + \frac{25}{288} a^4 d\, R\, T\, X - \frac{1}{24} a^4 d\, R\, T\, X \log(a) - \frac{a^4 X}{24}$$

Roots

$$T \neq 0, \quad a = 0$$

$$d\,(-12\, R \log(a) + 36\, c + 25\, R) \neq 0, \quad P = 0, \quad T = \frac{12}{d\,(-12\, R \log(a) + 36\, c + 25\, R)}$$

$$-12\, d\, R\, T^2 \log(a) + 36\, c\, d\, T^2 + 24\, d\, P\, V + 25\, d\, R\, T^2 - 12\, T \neq 0, \quad T \neq 0, \quad X = \frac{12\, d\, P\, T\, V}{-12\, d\, R\, T^2 \log(a) + 36\, c\, d\, T^2 + 24\, d\, P\, V + 25\, d\, R\, T^2 - 12\, T}$$

$$d\,(-12\, R \log(a) + 36\, c + 25\, R) \neq 0, \quad P \neq 0, \quad T = \frac{12}{d\,(-12\, R \log(a) + 36\, c + 25\, R)}, \quad V = 0$$

Derivative

$$\frac{\partial}{\partial a}\left(\frac{a^4 \left(-12\, d\, P\, V\,(T - 2\, X) - 12\, T\, X + d\,(36\, c + 25\, R)\, T^2 X - 12\, d\, R\, T^2 X \log(a)\right)}{288\, T}\right) = \frac{a^3 \left(-6\, d\, R\, T^2 X \log(a) + d\, T^2 X\,(18\, c + 11\, R) - 6\, d\, P\, V\,(T - 2\, X) - 6\, T\, X\right)}{36\, T}$$

Indefinite integral

$$\int \frac{a^4 \left(-12\, d\, P\, V\, (T - 2\, X) - 12\, T\, X + d\, (36\, c + 25\, R)\, T^2\, X - 12\, d\, R\, T^2\, X \log(a)\right)}{288\, T}\, da = \frac{a^5 \left(-60\, d\, R\, T^2\, X \log(a) + d\, T^2\, X\, (180\, c + 137\, R) - 60\, d\, P\, V\, (T - 2\, X) - 60\, T\, X\right)}{7200\, T} + \text{constant}$$

(assuming a complex-valued logarithm)

From the result

$$\frac{a^4 \left(-12\, d\, R\, T^2\, X \log(a) + d\, T^2\, X\, (36\, c + 25\, R) - 12\, d\, P\, V\, (T - 2\, X) - 12\, T\, X\right)}{288\, T}$$

(a^4 (-12 d P V (T - 2 X) - 12 T X + d (36 c + 25 R) T^2 X - 12 d R T^2 X log(a)))/(288 T)

for a = 18, d =1 and X = 11 :

(18^4(-12(4.632947e+113)(4.222111e-105)((1.416784e+32)-2*11)-12(1.416784e+32)*11+(36*1.380649e-23+25(8.314462))(1.416784e+32)^2*11-12(8.314462)(1.416784e+32)^2*11 log(18)))/(288(1.416784e+32))

Input interpretation

$$\left(18^4 \left(-12 \left(4.632947 \times 10^{113}\right) \times \frac{4.222111}{10^{105}} \left(1.416784 \times 10^{32} - 2 \times 11\right) - 12 \times 1.416784 \times 10^{32} \times 11 + \left(36 \times 1.380649 \times 10^{-23} + 25 \times 8.314462\right) \left(1.416784 \times 10^{32}\right)^2 \times 11 - \left(12 \times 8.314462 \left(\left(1.416784 \times 10^{32}\right)^2 \times 11\right)\right) \log(18)\right)\right) \Big/ \left(288 \times 1.416784 \times 10^{32}\right)$$

$\log(x)$ is the natural logarithm

Result

$-4.57408... \times 10^{37}$

-4.57408...*10^{37}

Dividing

$$\left(18^4 \left(-12 \left(4.632947 \times 10^{113}\right) \times \frac{4.222111}{10^{105}} \left(1.416784 \times 10^{32} - 2 \times 11\right) - 12 \times 1.416784 \times 10^{32} \times 11 + \left(36 \times 1.380649 \times 10^{-23} + 25 \times 8.314462\right) \left(1.416784 \times 10^{32}\right)^2 \times 11 - \left(12 \times 8.314462 \left(\left(1.416784 \times 10^{32}\right)^2 \times 11\right)\right) \log(18)\right)\right) / \left(288 \times 1.416784 \times 10^{32}\right)$$

$= -4.57408... \times 10^{37}$

by

$3.91216 \times 10^9 - 1.17798 \times 10^{33} \log(18)$

log(x) is the natural logarithm

$= -3.40480... \times 10^{33}$

we obtain:

(-4.57408*10^37)/((3.91216×10^9 - 1.17798×10^33 log(18)))

Input interpretation

$$-\frac{4.57408 \times 10^{37}}{3.91216 \times 10^9 - 1.17798 \times 10^{33} \log(18)}$$

log(x) is the natural logarithm

Result

13434.2...

13434.2….

From

$$(a_w^m) = 0.25 k_w^{ma} \exp\left[\left(6.52 - \frac{2667}{T}\right)(X_w^m - 0.5)\right]$$
$$\text{for } X_w^m > 0.5 \qquad (25b)$$

for $k^{ma}_w = 7.1*10^4$; $X^m_w = 0.61803398$, we obtain:

0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5))

Input interpretation

$$0.25 \times 7.1 \times 10^4 \exp\left(\left(6.52 - \frac{2667}{1.4167847 \times 10^{32}}\right)(\Phi - 0.5)\right)$$

Φ is the golden ratio conjugate

Result

38319.8…

38319.8….

Multiplying the previous expression

$$-\frac{4.57408 \times 10^{37}}{3.91216 \times 10^9 - 1.17798 \times 10^{33} \log(18)}$$

$= 13434.2\ldots$

by

$$0.25 \times 7.1 \times 10^4 \exp\left(\left(6.52 - \frac{2667}{1.4167847 \times 10^{32}}\right)(\Phi - 0.5)\right)$$

$= 38319.8\ldots$

after some calculations, we obtain:

(π^4/(10 (3*10)^(2/3)))*((((-4.57408*10^37)/((3.91216×10^9 - 1.17798×10^33 log(18)))))*γ*((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5)))))

where

$$\frac{\pi^4}{10\times 30^{2/3}} \approx 1.008908980$$

Input interpretation

$$\frac{\pi^4}{10\,(3\times 10)^{2/3}}\left(-\frac{4.57408\times 10^{37}}{3.91216\times 10^9 - 1.17798\times 10^{33}\log(18)}\right.$$
$$\left.\gamma\left(0.25\times 7.1\times 10^4 \exp\left(\left(6.52-\frac{2667}{1.4167847\times 10^{32}}\right)(\Phi-0.5)\right)\right)\right)$$

log(x) is the natural logarithm
γ is the Euler-Mascheroni constant
Φ is the golden ratio conjugate

Result

$2.99796\ldots\times 10^8$

$2.99796...*10^8 \approx$ c = speed of light

Furthermore, we obtain also, multiplying the two expressions and after some calculations:

89ln(((((-4.57408*10^37)/((3.91216×10^9 - 1.17798×10^33 log(18)))))*((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5))))))-55-2Φ

Input interpretation

$$89 \log\left(-\frac{4.57408\times 10^{37}}{3.91216\times 10^{9} - 1.17798\times 10^{33}\log(18)} \left(0.25\times 7.1\times 10^{4} \exp\left(\left(6.52 - \frac{2667}{1.4167847\times 10^{32}}\right)(\Phi - 0.5)\right)\right)\right) - 55 - 2\,\Phi$$

log(x) is the natural logarithm
Φ is the golden ratio conjugate

Result
1729.04…

1729.04…

This result is very near to the mass of candidate glueball $f_0(1710)$ scalar meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve ($1728 = 8^2 * 3^3$). The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(89ln(((((-4.57408*10^37)/((3.91216×10^9 - 1.17798×10^33 log(18)))))*((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5))))))-55-2Φ)^1/15+(MRB const)^(1-1/(4π)+π)

Input interpretation

$$\left(89 \log\left(-\frac{4.57408\times 10^{37}}{3.91216\times 10^{9} - 1.17798\times 10^{33}\log(18)} \left(0.25\times 7.1\times 10^{4} \exp\left(\left(6.52 - \frac{2667}{1.4167847\times 10^{32}}\right)(\Phi - 0.5)\right)\right)\right) - 55 - 2\,\Phi\right) \,\hat{}\,(1/15) + C_{MRB}{}^{1-1/(4\pi)+\pi}$$

log(x) is the natural logarithm
Φ is the golden ratio conjugate
C_{MRB} is the MRB constant

Result

1.6449405619796600956826364809584989209219560366377959373025111009
…

1.64494056197966…. ≈ ζ(2) = $\pi^2/6$ = 1.644934 (trace of the instanton shape)

(1/27((89ln(((((-4.57408*10^37)/((3.91216×10^9 - 1.17798×10^33 log(18)))))*((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5))))))-55-2Φ)-1))^2-MRB const

Input interpretation

$$\left(\frac{1}{27}\left(\left(89\log\left(-\frac{4.57408\times10^{37}}{3.91216\times10^{9}-1.17798\times10^{33}\log(18)}\left(0.25\times7.1\times10^{4}\exp\left(\left(6.52-\frac{2667}{1.4167847\times10^{32}}\right)(\Phi-0.5)\right)\right)\right)-55-2\Phi\right)-1\right)\right)^{2}-C_{\mathrm{MRB}}$$

$\log(x)$ is the natural logarithm
Φ is the golden ratio conjugate
C_{MRB} is the MRB constant

Result

4096.00…

4096 ≈ 4096 = 64^2 , that multiplied by 2 give 8192, indeed:

The total amplitude vanishes for gauge group SO(8192), while the vacuum energy is negative and independent of the gauge group.
The vacuum energy and dilaton tadpole to lowest non-trivial order for the open bosonic string. While the vacuum energy is non-zero and independent of the gauge group, the dilaton tadpole is zero for a unique choice of gauge group, SO(2^{13}) i.e. SO(8192). (From: "Dilaton Tadpole for the Open Bosonic String " Michael R. Douglas and Benjamin Grinstein - September 2,1986)

We analyze the following equation:

$$\left(S_{\mathrm{w}}^{\mathrm{m}}\right)_{P,T',X_{\mathrm{w}}^{\mathrm{m}}}-\left(S_{\mathrm{w}}^{\mathrm{m}}\right)_{P^0,T',X_{\mathrm{w}}^{0\mathrm{m}}}=\int_{P^0}^{P}\left(\frac{\partial S_{\mathrm{w}}^{\mathrm{m}}}{\partial P}\right)_{T',X_{\mathrm{w}}^{0\mathrm{m}}}\mathrm{d}P+\int_{X_{\mathrm{w}}^{0\mathrm{m}}}^{X_{\mathrm{w}}^{\mathrm{m}}}\left(\frac{\partial S_{\mathrm{w}}^{\mathrm{m}}}{\partial X}\right)_{P^0,T'}\mathrm{d}X_{\mathrm{w}}^{\mathrm{m}} \quad (28)$$

The first integral in Eq. (28) can be written as

$$\left(S_{\mathrm{w}}^{\mathrm{m}}\right)_{P,T',X_{\mathrm{w}}^{0\mathrm{m}}}-\left(S_{\mathrm{w}}^{\mathrm{m}}\right)_{P=0,T',X_{\mathrm{w}}^{0\mathrm{m}}}=-P(3.689\times10^{-3}+2.336\times10^{-5}T-5.987\times10^{-9}T^2)-P^2(1.171\times10^{-5}+1.283\times10^{-7}T)+3.814\times10^{-9}P^3 \quad (29)$$

Thence, we obtain:

-P(3.689*10^-3+2.336*10^-5*T-5.987*10^-9*T^2)-P^2(1.171*10^-5+1.283*10^-7*T)+3.814*10^-9*P^3

Input interpretation

$$-P(3.689\times10^{-3}+2.336\times10^{-5}\,T-5.987\times10^{-9}\,T^2)-P^2\,(1.171\times10^{-5}+1.283\times10^{-7}\,T)+3.814\times10^{-9}\,P^3$$

Alternate forms

$$P^2\left(3.814\times10^{-9}\,P - 1.283\times10^{-7}\,T - 0.00001171\right) - P\left(T\left(0.00002336 - 5.987\times 10^{-9}\,T\right) + 0.003689\right)$$

$$3.814\times10^{-9}\,P^3 + P^2\left(-1.283\times10^{-7}\,T - 0.00001171\right) - P\left(-5.987\times10^{-9}\,(T - 4053.79)\,(T + 151.998)\right)$$

$$P^2\left(3.814\times10^{-9}\,P - 1.283\times10^{-7}\,T - 0.00001171\right) - P\left(-5.987\times10^{-9}\,T^2 + 0.00002336\,T + 0.003689\right)$$

Expanded form

$$3.814\times10^{-9}\,P^3 - 1.283\times10^{-7}\,P^2\,T - 0.00001171\,P^2 - P\left(-5.987\times10^{-9}\,T^2 + 0.00002336\,T + 0.003689\right)$$

Indefinite integral

$$\int\left(-P\left(3.689\times10^{-3} + 2.336\times10^{-5}\,T - 5.987\times10^{-9}\,T^2\right) - P^2\left(1.171\times10^{-5} + 1.283\times10^{-7}\,T\right) + 3.814\times10^{-9}\,P^3\right)dP = 9.535\times10^{-10}\,P^4 - 4.27667\times10^{-8}\,P^3\,T - 3.90333\times10^{-6}\,P^3 - P\,P\left(-5.987\times10^{-9}\,T^2 + 0.00002336\,T + 0.003689\right) + \text{constant}$$

From the alternate form

$$3.814\times10^{-9}\,P^3 + P^2\left(-1.283\times10^{-7}\,T - 0.00001171\right) - P\left(-5.987\times10^{-9}\,(T - 4053.79)\,(T + 151.998)\right)$$

we obtain:

3.814×10^-9 (4.632947*10^113)^3 + (4.632947*10^113)^2 (-0.00001171 - 1.283×10^-7 (1.416784*10^32)) - (4.632947*10^113)(-5.987×10^-9 (-4053.79 + (1.416784*10^32)) (151.998 + (1.416784*10^32)))

Input interpretation

$$3.814\times 10^{-9}\,(4.632947\times 10^{113})^3 + (4.632947\times 10^{113})^2\,(-0.00001171 - 1.283\times 10^{-7}\times 1.416784\times 10^{32}) - (4.632947\times 10^{113})\,(-5.987\times 10^{-9}\,(-4053.79 + 1.416784\times 10^{32})\,(151.998 + 1.416784\times 10^{32}))$$

Result

$3.792736617819332\times 10^{332}$

$3.792736617819332\times 10^{332}$

The second integral in Eq. (28) can be found from

$$\left(\frac{\mathrm{d}\tilde{S}_{\mathrm{w}}^{\mathrm{m}}}{\mathrm{d}X_{\mathrm{w}}^{\mathrm{m}}}\right)_{X_{\mathrm{w}}^{\mathrm{m}}\leq 0.5} = \frac{2R}{X_{\mathrm{w}}^{\mathrm{m}}} \tag{30a}$$

$$\left(\frac{\mathrm{d}\tilde{S}_{\mathrm{w}}^{\mathrm{m}}}{\mathrm{d}X_{\mathrm{w}}^{\mathrm{m}}}\right)_{X_{\mathrm{w}}^{\mathrm{m}}> 0.5} = -54.26\,(\mathrm{J\,mole^{-1}\,K^{-1}}) \tag{30b}$$

Thence, we obtain:

3.792736617819332×10^332+((2*8.314462618)/11)-54.26

Input interpretation

$$3.792736617819332\times 10^{332} + \frac{2\times 8.314462618}{11} - 54.26$$

Result

$3.792736617819331999999999999999999999999999999999999999999\ldots \times 10^{332}$

$3.792736617...*10^{332}$

From the above expression

$$3.792736617819332\times 10^{332}+\frac{2\times 8.314462618}{11}-54.26$$

by

3.91216×10^9 - 1.17798×10^33 log(18)

$$3.91216\times 10^{9}-1.17798\times 10^{33}\log(18)$$

log(x) is the natural logarithm

$= -3.40480\ldots \times 10^{33}$

and

0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5))

$$0.25\times 7.1\times 10^{4}\exp\left(\left(6.52-\frac{2667}{1.4167847\times 10^{32}}\right)(\Phi-0.5)\right)$$

$= 38319.8\ldots$

we obtain, after some calculations:

((3.792736617819332×10^332+((2*8.314462618)/11)-54.26))*1/((3.91216×10^9 - 1.17798×10^33 log(18)))*1/((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5))))

Input interpretation

$$\frac{\left(3.792736617819332\times 10^{332}+\frac{2\times 8.314462618}{11}-54.26\right)\left(3.91216\times 10^{9}-1.17798\times 10^{33}\log(18)\right)\times 1}{0.25\times 7.1\times 10^{4}\exp\left(\left(6.52-\frac{2667}{1.4167847\times 10^{32}}\right)(\Phi-0.5)\right)}$$

$\log(x)$ is the natural logarithm
Φ is the golden ratio conjugate

Result

$-3.36993\ldots\times 10^{361}$

$-3.36993\ldots*10^{361}$

From which, after some calculations, we obtain:

(-((3.792736617819332×10^332+((2*8.314462618)/11)-54.26))*((3.91216×10^9 - 1.17798×10^33 log(18)))*1/((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5)))))^1/3 * (10*0.7885305659115+3)

where

$$\sum_{k=2}^{\infty}\frac{1}{k}\ln\left(\frac{k}{k-1}\right)$$ = 0.7885305659115 (is the Alladi-Grinstead Constant)

Input interpretation

$$\left(-\left(3.792736617819332\times 10^{332}+\frac{2\times 8.314462618}{11}-54.26\right)\left(\left(3.91216\times 10^{9}-1.17798\times 10^{33}\log(18)\right)\times\frac{1}{0.25\times 7.1\times 10^{4}\exp\left(\left(6.52-\frac{2667}{1.4167847\times 10^{32}}\right)(\Phi-0.5)\right)}\right)\right)^{\wedge}(1/3)\,(10\times 0.7885305659115+3)$$

$\log(x)$ is the natural logarithm

Φ is the golden ratio conjugate

Result

$3.51599\ldots \times 10^{121}$

$3.51599...*10^{121} \approx \Lambda_Q$

The observed value of ρ_Λ or Λ today is precisely the classical dual of its quantum precursor values ρ_Q , Λ_Q in the quantum very early precursor vacuum U_Q as determined by our dual equations. With regard the Cosmological constant, fundamental are the following results: $\Lambda = 2.846 * 10^{-122}$ and $\Lambda_Q = 0.3516 * 10^{122}$

(**New Quantum Structure of the Space-Time -** *Norma G. SANCHEZ* - arXiv:1910.13382v1 [physics.gen-ph] 28 Oct 2019)

Furthermore, we obtain also:

(1/4(ln((-((3.792736617819332×10^332+((2*8.314462618)/11)-54.26))*((3.91216×10^9 - 1.17798×10^33 log(18)))*1/((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))*(Φ – 0.5)))))^1/3)-21-1/2))^2+Φ

Input interpretation

$$\left(\frac{1}{4}\left(\log\left(\left(-\left(3.792736617819332\times 10^{332}+\frac{2\times 8.314462618}{11}-54.26\right)\left(\left(3.91216\times 10^{9}-1.17798\times 10^{33}\log(18)\right)\times \frac{1}{0.25\times 7.1\times 10^{4}\exp\left(\left(6.52-\frac{2667}{1.4167847\times 10^{32}}\right)(\Phi-0.5)\right)}\right)\right)^{\wedge}(1/3)\right)-21-\frac{1}{2}\right)\right)^{2}+\Phi$$

log(x) is the natural logarithm

Φ is the golden ratio conjugate

Result

4096.065…

4096.065… ≈ $4096 = 64^2$, that multiplied by 2 give 8192, indeed:

The total amplitude vanishes for gauge group SO(8192), while the vacuum energy is negative and independent of the gauge group.
The vacuum energy and dilaton tadpole to lowest non-trivial order for the open bosonic string. While the vacuum energy is non-zero and independent of the gauge group, the dilaton tadpole is zero for a unique choice of gauge group, $SO(2^{13})$ i.e. SO(8192). (From: “Dilaton Tadpole for the Open Bosonic String “ Michael R. Douglas and Benjamin Grinstein - September 2,1986)

27sqrt((1/4(ln((-((3.792736617819332×10^332+((2*8.314462618)/11)-54.26))*((3.91216e+9-1.17798e+33 ln(18)))*1/((0.25*(7.1*10^4) exp(((6.52-(2667/(1.4167847*10^32))))(Φ-0.5)))))^1/3)-21-1/2))^2+Φ)+1

Input interpretation

$$27 \sqrt{\left(\left(\frac{1}{4}\left(\log\left(\left(-\left(3.792736617819332\times 10^{332}+\frac{2\times 8.314462618}{11}-54.26\right)\left(\left(3.91216\times 10^{9}-1.17798\times 10^{33}\log(18)\right)\times 1\Big/\left(0.25\times 7.1\times 10^{4}\exp\left(\left(6.52-\frac{2667}{1.4167847\times 10^{32}}\right)(\Phi-0.5)\right)\right)\right)\right)^{\wedge}(1/3)\right)-21-\frac{1}{2}\right)\right)^{2}+\Phi\right)}+1$$

$\log(x)$ is the natural logarithm
Φ is the golden ratio conjugate

Result
1729.0136…

1729.0136….

This result is very near to the mass of candidate glueball $f_0(1710)$ scalar meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve ($1728 = 8^2 * 3^3$). The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(27√((1/4(ln((-((3.792736e+332+((2*8.314462)/11)-54.26))((3.91216e+9-1.17798e+33 ln(18)))1/((0.25(7.1e+4) e^(((6.52-(2667/(1.41678e+32))))(Φ-0.5)))))^1/3)-21-1/2))^2+Φ)+1)^1/15+(MRB cons)^(1-1/(4π)+π)

Input interpretation

$$\left(27\sqrt{\left(\left(\frac{1}{4}\left(\log\left(\left(-\left(3.792736\times10^{332}+\frac{2\times8.314462}{11}-54.26\right)\left(3.91216\times10^{9}-1.17798\times10^{33}\log(18)\right)\times 1\Big/\left(0.25\times7.1\times10^{4}\exp\left(\left(6.52-\frac{2667}{1.41678\times10^{32}}\right)(\Phi-0.5)\right)\right)\right)\wedge(1/3)\right)-21-\frac{1}{2}\right)\right)^{2}+\Phi\right)+1}\right)\wedge(1/15)+C_{\mathrm{MRB}}{}^{1-1/(4\pi)+\pi}$$

$\log(x)$ is the natural logarithm
Φ is the golden ratio conjugate
C_{MRB} is the MRB constant

Result

1.6449388873229134141308410715177698144984318173505541340987179856...

1.6449388873… ≈ $\zeta(2) = \pi^2/6 = 1.644934$ (trace of the instanton shape)

From the previous indefinite integral result

$$\int\left(-P\left(3.689\times10^{-3}+2.336\times10^{-5}\,T-5.987\times10^{-9}\,T^{2}\right)-P^{2}\left(1.171\times10^{-5}+1.283\times10^{-7}\,T\right)+3.814\times10^{-9}\,P^{3}\right)dP = 9.535\times10^{-10}\,P^{4}-4.27667\times10^{-8}\,P^{3}\,T-3.90333\times10^{-6}\,P^{3}-P\,P\left(-5.987\times10^{-9}\,T^{2}+0.00002336\,T+0.003689\right)+\text{constant}$$

9.535×10^-10 P^4 - 4.27667×10^-8 P^3 T - 3.90333×10^-6 P^3 - P P(-5.987×10^-9 T^2 + 0.00002336 T + 0.003689)

we obtain:

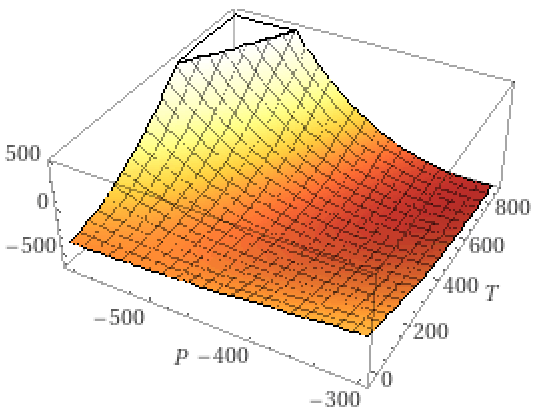
Input interpretation

$$9.535\times10^{-10}\,P^4-4.27667\times10^{-8}\,P^3\,T-3.90333\times10^{-6}\,P^3-P\left(P\left(-5.987\times10^{-9}\,T^2+0.00002336\,T+0.003689\right)\right)$$

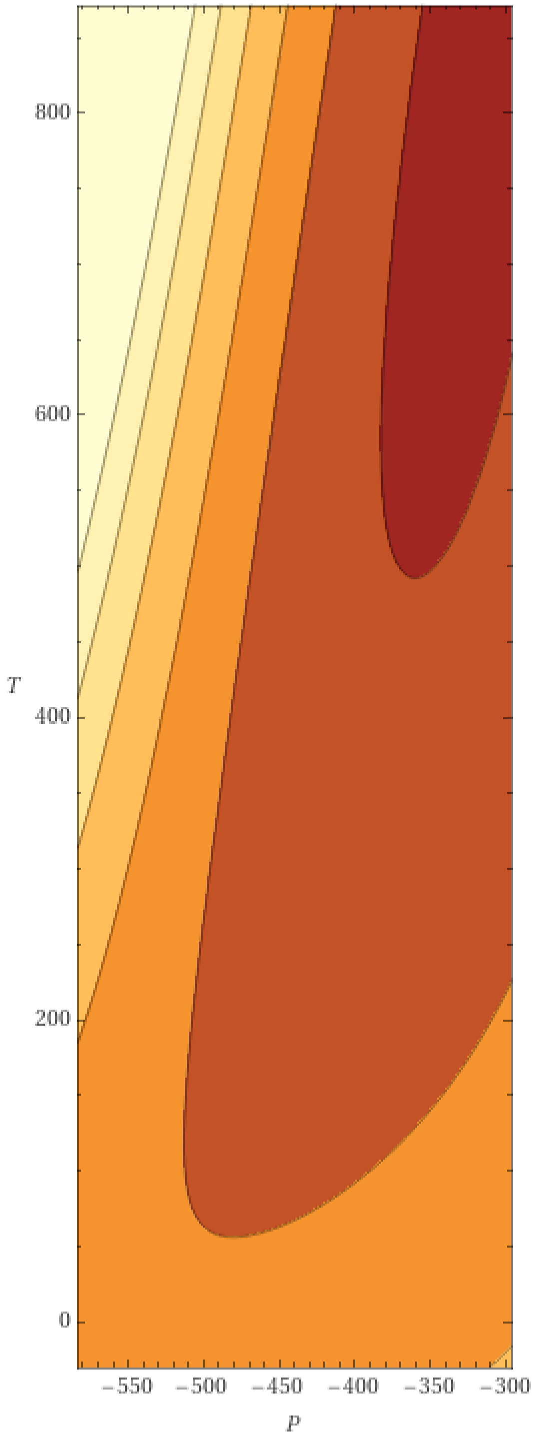
Result

$$9.535\times10^{-10}\,P^4-4.27667\times10^{-8}\,P^3\,T-3.90333\times10^{-6}\,P^3-P^2\left(-5.987\times10^{-9}\,T^2+0.00002336\,T+0.003689\right)$$

3D plot **(figure that can be related to a D-brane/Instanton)**



Contour plot



Geometric figure

line

Alternate forms

$$9.535\times 10^{-10}\, P^4 + P^3 \left(-4.27667\times 10^{-8}\, T - 3.90333\times 10^{-6}\right) + P^2 \left(5.987\times 10^{-9}\, T^2 - 0.00002336\, T - 0.003689\right)$$

$$T\left(5.987\times10^{-9}\,P^2\,T+\left(-4.27667\times10^{-8}\,P-0.00002336\right)P^2\right)+\left(\left(9.535\times10^{-10}\,P-3.90333\times10^{-6}\right)P-0.003689\right)P^2$$

$$2.97935\times10^{-35}\,P^2\left(3.20037\times10^{25}\,P^2-1.43544\times10^{27}\,P\,T-1.31013\times10^{29}\,P+2.0095\times10^{26}\,T^2-7.84064\times10^{29}\,T-1.23819\times10^{32}\right)$$

Expanded form

$$9.535\times10^{-10}\,P^4-4.27667\times10^{-8}\,P^3\,T-3.90333\times10^{-6}\,P^3+5.987\times10^{-9}\,P^2\,T^2-0.00002336\,P^2\,T-0.003689\,P^2$$

Real root

$P=0$

Roots

$$T\approx 4.21328\times10^{-23}\left(-32\,313.6\sqrt{\left(6\,796\,167\,494\,045\,617\,450\,933\,803\,927\,384\,096\,768\,P^2+7\,869\,993\,108\,761\,422\,480\,980\,080\,203\,943\,253\,114\,880\,P+2\,385\,729\,254\,985\,221\,091\,283\,054\,716\,703\,481\,146\,638\,336\right)}+84\,770\,684\,538\,478\,225\,522\,688\,P+46\,303\,390\,039\,887\,376\,583\,491\,584\right)$$

$$T\approx 4.21328\times10^{-23}\left(32\,313.6\sqrt{\left(6\,796\,167\,494\,045\,617\,450\,933\,803\,927\,384\,096\,768\,P^2+7\,869\,993\,108\,761\,422\,480\,980\,080\,203\,943\,253\,114\,880\,P+2\,385\,729\,254\,985\,221\,091\,283\,054\,716\,703\,481\,146\,638\,336\right)}+84\,770\,684\,538\,478\,225\,522\,688\,P+46\,303\,390\,039\,887\,376\,583\,491\,584\right)$$

Polynomial discriminant

$\Delta=0$

Roots for the variable T

$$T \approx 4.97636\times 10^{-27} \left(-305\,701.\sqrt{(5\,443\,266\,992\,620\,956\,787\,326\,812\,893\,944\,753\,011\,294\,208\,P^2 + 6\,303\,328\,127\,008\,033\,273\,682\,671\,687\,784\,659\,647\,171\,919\,872\,P + 1\,910\,806\,541\,829\,481\,947\,007\,786\,571\,292\,286\,168\,611\,881\,484\,288)} + 717\,719\,239\,726\,079\,951\,861\,972\,992\,P + 392\,032\,152\,118\,382\,490\,121\,949\,675\,520\right)$$

$$T \approx 4.97636\times 10^{-27} \left(305\,701.\sqrt{(5\,443\,266\,992\,620\,956\,787\,326\,812\,893\,944\,753\,011\,294\,208\,P^2 + 6\,303\,328\,127\,008\,033\,273\,682\,671\,687\,784\,659\,647\,171\,919\,872\,P + 1\,910\,806\,541\,829\,481\,947\,007\,786\,571\,292\,286\,168\,611\,881\,484\,288)} + 717\,719\,239\,726\,079\,951\,861\,972\,992\,P + 392\,032\,152\,118\,382\,490\,121\,949\,675\,520\right)$$

Derivative

$$\frac{\partial}{\partial P}\left(9.535\times 10^{-10}\,P^4 - 4.27667\times 10^{-8}\,P^3\,T - 3.90333\times 10^{-6}\,P^3 - P^2\left(-5.987\times 10^{-9}\,T^2 + 0.00002336\,T + 0.003689\right)\right) = P\left(3.814\times 10^{-9}\,P^2 + P\left(-1.283\times 10^{-7}\,T - 0.00001171\right) + 1.1974\times 10^{-8}\,T^2 - 0.00004672\,T - 0.007378\right)$$

Indefinite integral

$$\int\left(-3.90333\times 10^{-6}\,P^3 + 9.535\times 10^{-10}\,P^4 - 4.27667\times 10^{-8}\,P^3\,T - P^2\left(0.003689 + 0.00002336\,T - 5.987\times 10^{-9}\,T^2\right)\right)dP = 1.907\times 10^{-10}\,P^5 - 1.06917\times 10^{-8}\,P^4\,T - 9.75833\times 10^{-7}\,P^4 + 1.99567\times 10^{-9}\,P^3\,T^2 - 7.78667\times 10^{-6}\,P^3\,T - 0.00122967\,P^3 + \text{constant}$$

Local minimum

$$\min\{9.535\times10^{-10}\,P^4 - 4.27667\times10^{-8}\,P^3\,T - 3.90333\times10^{-6}\,P^3 - P^2\left(-5.987\times10^{-9}\,T^2 + 0.00002336\,T + 0.003689\right)\} \approx -640.074 \text{ at } (P,\,T) \approx (-319.996,\,807.986)$$

Again, from the indefinite integral result

$$\int\left(-3.90333\times10^{-6}\,P^3 + 9.535\times10^{-10}\,P^4 - 4.27667\times10^{-8}\,P^3\,T - P^2\left(0.003689 + 0.00002336\,T - 5.987\times10^{-9}\,T^2\right)\right)dP = 1.907\times10^{-10}\,P^5 - 1.06917\times10^{-8}\,P^4\,T - 9.75833\times10^{-7}\,P^4 + 1.99567\times10^{-9}\,P^3\,T^2 - 7.78667\times10^{-6}\,P^3\,T - 0.00122967\,P^3 + \text{constant}$$

1.907×10^-10 P^5 - 1.06917×10^-8 P^4 T - 9.75832×10^-7 P^4 + 1.99567×10^-9 P^3 T^2 - 7.78667×10^-6 P^3 T - 0.00122967 P^3

we obtain:

Input interpretation

$$1.907\times10^{-10}\,P^5 - 1.06917\times10^{-8}\,P^4\,T - 9.75832\times10^{-7}\,P^4 + 1.99567\times10^{-9}\,P^3\,T^2 - 7.78667\times10^{-6}\,P^3\,T + P^3\times(-0.00122967)$$

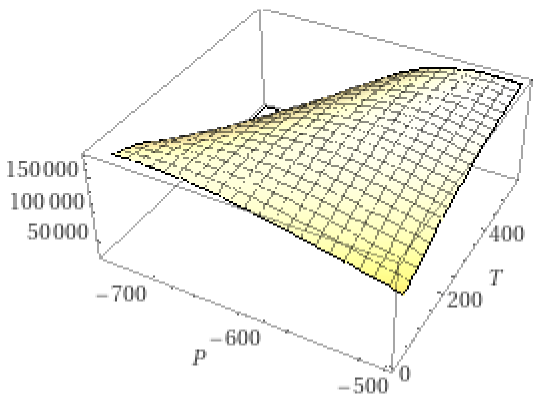
Result

$$1.907\times10^{-10}\,P^5 - 1.06917\times10^{-8}\,P^4\,T - 9.75832\times10^{-7}\,P^4 + 1.99567\times10^{-9}\,P^3\,T^2 - 7.78667\times10^{-6}\,P^3\,T - 0.00122967\,P^3$$

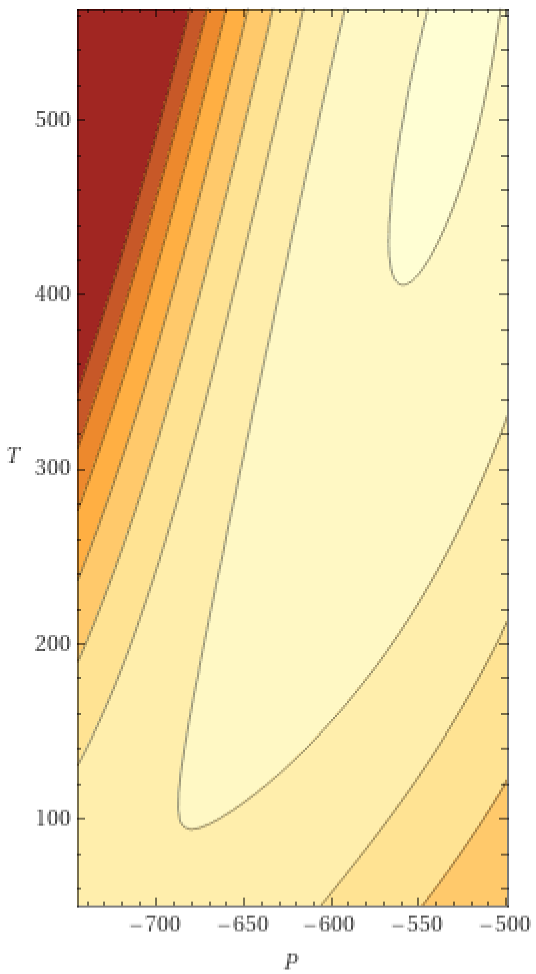
Geometric figure

line

3D plot **(figure that can be related to a D-brane/Instanton)**



Contour plot



Alternate forms

$$P^3 \left(P \left(1.907\times 10^{-10}\, P - 1.06917\times 10^{-8}\, T - 9.75832\times 10^{-7}\right) + \left(1.99567\times 10^{-9}\, T - 7.78667\times 10^{-6}\right) T - 0.00122967\right)$$

$$1.907\times 10^{-10}\, P^3 \left(P^2 - 56.0655\, P\, T - 5117.11\, P + 10.465\, T^2 - 40\,832.\, T - 6.44819\times 10^6\right)$$

$$P^3 \left(1.907\times 10^{-10}\, P^2 + P \left(-1.06917\times 10^{-8}\, T - 9.75832\times 10^{-7}\right) + \left(1.99567\times 10^{-9}\, T - 7.78667\times 10^{-6}\right) T - 0.00122967\right)$$

Real root

$P = 0$

Roots

$$T \approx 5.28036\times 10^{-21} \left(-8105.38 \sqrt{\left(3\,865\,089\,358\,063\,780\,911\,541\,113\,359\,171\,584\, P^2 + 5\,972\,743\,566\,250\,779\,246\,175\,279\,061\,865\,070\,592\, P + 2\,414\,119\,837\,309\,654\,471\,823\,740\,423\,661\,502\,332\,928\right)} + 507\,299\,610\,355\,153\,108\,992\, P + 369\,461\,793\,443\,901\,402\,513\,408\right)$$

$$T \approx 5.28036\times 10^{-21} \left(8105.38 \sqrt{\left(3\,865\,089\,358\,063\,780\,911\,541\,113\,359\,171\,584\, P^2 + 5\,972\,743\,566\,250\,779\,246\,175\,279\,061\,865\,070\,592\, P + 2\,414\,119\,837\,309\,654\,471\,823\,740\,423\,661\,502\,332\,928\right)} + 507\,299\,610\,355\,153\,108\,992\, P + 369\,461\,793\,443\,901\,402\,513\,408\right)$$

Polynomial discriminant

$\Delta = 0$

Roots for the variable T

$$T \approx 9.34275\times 10^{-54} \Big(-415\,343\,421\,254\,554\,944 \sqrt{(470\,185\,429\,272\,669\,111\,880\,911\,044\,335\,739\,251\,188\,110\,430\,335\,143\,612\,918\,450\,141\,475\,635\,200\, P^2 + 726\,580\,096\,207\,662\,793\,043\,603\,669\,408\,509\,927\,604\,494\,780\,696\,314\,698\,216\,557\,777\,389\,172\,555\,776\, P + 293\,675\,997\,335\,732\,279\,017\,362\,261\,005\,081\,222\,409\,702\,545\,300\,399\,538\,613\,435\,758\,170\,912\,422\,100\,992)} + 286\,716\,768\,304\,227\,521\,891\,761\,644\,088\,076\,730\,707\,660\,910\,861\,746\,176\, P + 208\,813\,271\,813\,788\,234\,957\,864\,032\,428\,255\,366\,785\,378\,914\,625\,659\,076\,608\Big)$$

$$T \approx 9.34275\times 10^{-54} \Big(415\,343\,421\,254\,554\,944 \sqrt{(470\,185\,429\,272\,669\,111\,880\,911\,044\,335\,739\,251\,188\,110\,430\,335\,143\,612\,918\,450\,141\,475\,635\,200\, P^2 + 726\,580\,096\,207\,662\,793\,043\,603\,669\,408\,509\,927\,604\,494\,780\,696\,314\,698\,216\,557\,777\,389\,172\,555\,776\, P + 293\,675\,997\,335\,732\,279\,017\,362\,261\,005\,081\,222\,409\,702\,545\,300\,399\,538\,613\,435\,758\,170\,912\,422\,100\,992)} + 286\,716\,768\,304\,227\,521\,891\,761\,644\,088\,076\,730\,707\,660\,910\,861\,746\,176\, P + 208\,813\,271\,813\,788\,234\,957\,864\,032\,428\,255\,366\,785\,378\,914\,625\,659\,076\,608\Big)$$

Derivative

$$\frac{\partial}{\partial P}\left(1.907\times 10^{-10} P^5 - 1.06917\times 10^{-8} P^4 T - 9.75832\times 10^{-7} P^4 + 1.99567\times 10^{-9} P^3 T^2 - 7.78667\times 10^{-6} P^3 T - 0.00122967 P^3\right) = P^2\left(9.535\times 10^{-10} P^2 + P\left(-4.27668\times 10^{-8} T - 3.90333\times 10^{-6}\right) + 5.98701\times 10^{-9} T^2 - 0.00002336 T - 0.00368901\right)$$

Indefinite integral

$$\int \left(-0.00122967\,P^3 - 9.75832\times 10^{-7}\,P^4 + 1.907\times 10^{-10}\,P^5 - 7.78667\times 10^{-6}\,P^3\,T - 1.06917\times 10^{-8}\,P^4\,T + 1.99567\times 10^{-9}\,P^3\,T^2\right) dP = 3.17833\times 10^{-11}\,P^6 - 2.13834\times 10^{-9}\,P^5\,T - 1.95166\times 10^{-7}\,P^5 + 4.98918\times 10^{-10}\,P^4\,T^2 - 1.94667\times 10^{-6}\,P^4\,T - 0.000307418\,P^4 + \text{constant}$$

Local maximum

$$\max\left\{1.907\times 10^{-10}\,P^5 - 1.06917\times 10^{-8}\,P^4\,T - 9.75832\times 10^{-7}\,P^4 + 1.99567\times 10^{-9}\,P^3\,T^2 - 7.78667\times 10^{-6}\,P^3\,T - 0.00122967\,P^3\right\} \approx 181934.\ \text{at}\ (P, T) \approx (-532.581, 524.254)$$

Definite integral over a square of edge length 2 L

$$\int_{-L}^{L}\int_{-L}^{L}\left(-0.00122967\,P^3 - 9.75832\times 10^{-7}\,P^4 + 1.907\times 10^{-10}\,P^5 - 7.78667\times 10^{-6}\,P^3\,T - 1.06917\times 10^{-8}\,P^4\,T + 1.99567\times 10^{-9}\,P^3\,T^2\right) dT\,dP = \frac{2}{5}\left(0 - 1.95166\times 10^{-6}\,L\right)L^5 + 0$$

And again from the indefinite integral result

$$\int \left(-0.00122967\,P^3 - 9.75832\times 10^{-7}\,P^4 + 1.907\times 10^{-10}\,P^5 - 7.78667\times 10^{-6}\,P^3\,T - 1.06917\times 10^{-8}\,P^4\,T + 1.99567\times 10^{-9}\,P^3\,T^2\right) dP = 3.17833\times 10^{-11}\,P^6 - 2.13834\times 10^{-9}\,P^5\,T - 1.95166\times 10^{-7}\,P^5 + 4.98918\times 10^{-10}\,P^4\,T^2 - 1.94667\times 10^{-6}\,P^4\,T - 0.000307418\,P^4 + \text{constant}$$

3.17833×10^-11 P^6 - 2.13834×10^-9 P^5 T - 1.95166×10^-7 P^5 + 4.98918×10^-10 P^4 T^2 - 1.94667×10^-6 P^4 T - 0.000307418 P^4

we obtain:

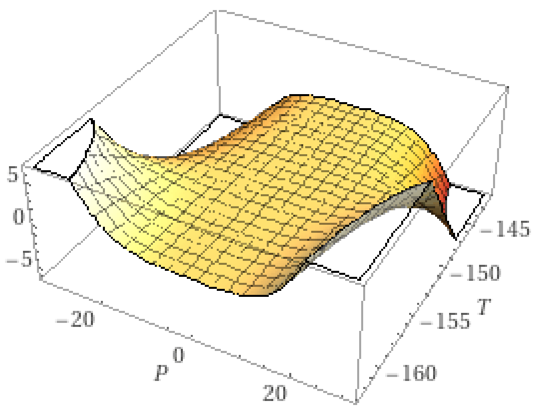
Input interpretation

$$3.17833\times10^{-11}\,P^6 - 2.13834\times10^{-9}\,P^5\,T - 1.95166\times10^{-7}\,P^5 + 4.98918\times10^{-10}\,P^4\,T^2 - 1.94667\times10^{-6}\,P^4\,T + P^4\times(-0.000307418)$$

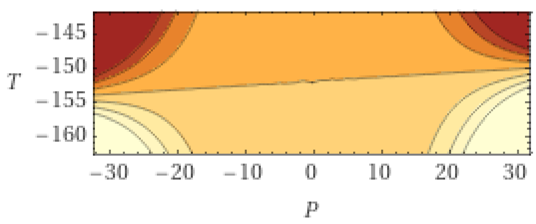
Result

$$3.17833\times10^{-11}\,P^6 - 2.13834\times10^{-9}\,P^5\,T - 1.95166\times10^{-7}\,P^5 + 4.98918\times10^{-10}\,P^4\,T^2 - 1.94667\times10^{-6}\,P^4\,T - 0.000307418\,P^4$$

3D plot **(figure that can be related to a D-brane/Instanton)**



Contour plot



Geometric figure

line

Alternate forms

$$P^4 \left(P \left(3.17833\times 10^{-11}\, P - 2.13834\times 10^{-9}\, T - 1.95166\times 10^{-7}\right) + \left(4.98918\times 10^{-10}\, T - 1.94667\times 10^{-6}\right) T - 0.000307418\right)$$

$$3.17833\times 10^{-11}\, P^4 \left(P^2 - 67.2787\, P\, T - 6140.52\, P + 15.6975\, T^2 - 61\,248.2\, T - 9.67231\times 10^{6}\right)$$

$$P^4 \left(3.17833\times 10^{-11}\, P^2 + P \left(-2.13834\times 10^{-9}\, T - 1.95166\times 10^{-7}\right) + \left(4.98918\times 10^{-10}\, T - 1.94667\times 10^{-6}\right) T - 0.000307418\right)$$

Real root

$P = 0$

Roots

$$T \approx 1.32508\times 10^{-19} \left(-275\,011.\, \sqrt{\left(3\,410\,251\,023\,747\,104\,476\,386\,820\,096\, P^2 + 6\,591\,063\,615\,452\,842\,988\,825\,844\,121\,600\, P + 3\,330\,052\,486\,009\,425\,281\,399\,346\,654\,347\,264\right)} + 16\,172\,465\,565\,844\,158\,464\, P + 14\,722\,847\,415\,781\,329\,731\,584\right)$$

$$T \approx 1.32508\times 10^{-19} \left(275\,011.\, \sqrt{\left(3\,410\,251\,023\,747\,104\,476\,386\,820\,096\, P^2 + 6\,591\,063\,615\,452\,842\,988\,825\,844\,121\,600\, P + 3\,330\,052\,486\,009\,425\,281\,399\,346\,654\,347\,264\right)} + 16\,172\,465\,565\,844\,158\,464\, P + 14\,722\,847\,415\,781\,329\,731\,584\right)$$

Polynomial discriminant

$\Delta = 0$

Roots for the variable T

$$
\begin{aligned}
T \approx 4.05971\times 10^{-51} \Big(&-697\,760\,412\,213\,091\,840 \\
&\quad\sqrt{(564\,371\,157\,181\,675\,912\,093\,494\,051\,457\,075\,206\,019\,593\,255\,377 \ddots} \\
&\qquad\quad 157\,129\,974\,394\,650\,624\; P^2 + \\
&\qquad 1\,090\,771\,961\,890\,337\,981\,221\,526\,855\,115\,872\,333\,941\,198\,770 \ddots \\
&\qquad\quad 566\,648\,816\,255\,292\,493\,791\,232\; P + \\
&\qquad 551\,098\,896\,215\,514\,168\,051\,131\,677\,853\,215\,828\,321\,529\,010\,474 \ddots \\
&\qquad\quad 319\,767\,039\,096\,398\,624\,587\,776) + \\
&527\,864\,012\,569\,904\,011\,417\,635\,322\,161\,169\,330\,496\,690\,863\,472\,640\; P + \\
&480\,548\,947\,945\,347\,847\,173\,422\,673\,364\,257\,180\,708\,424\,908\,732\,891\,136\Big)
\end{aligned}
$$

$$
\begin{aligned}
T \approx 4.05971\times 10^{-51} \Big(&697\,760\,412\,213\,091\,840 \\
&\quad\sqrt{(564\,371\,157\,181\,675\,912\,093\,494\,051\,457\,075\,206\,019\,593\,255\,377\,157 \ddots} \\
&\qquad\quad 129\,974\,394\,650\,624\; P^2 + \\
&\qquad 1\,090\,771\,961\,890\,337\,981\,221\,526\,855\,115\,872\,333\,941\,198\,770\,566 \ddots \\
&\qquad\quad 648\,816\,255\,292\,493\,791\,232\; P + \\
&\qquad 551\,098\,896\,215\,514\,168\,051\,131\,677\,853\,215\,828\,321\,529\,010\,474 \ddots \\
&\qquad\quad 319\,767\,039\,096\,398\,624\,587\,776) + \\
&527\,864\,012\,569\,904\,011\,417\,635\,322\,161\,169\,330\,496\,690\,863\,472\,640\; P + \\
&480\,548\,947\,945\,347\,847\,173\,422\,673\,364\,257\,180\,708\,424\,908\,732\,891\,136\Big)
\end{aligned}
$$

Derivative

$$
\begin{aligned}
&\frac{\partial}{\partial P}\big(3.17833\times 10^{-11}\, P^6 - 2.13834\times 10^{-9}\, P^5\, T - 1.95166\times 10^{-7}\, P^5 + \\
&\qquad 4.98918\times 10^{-10}\, P^4\, T^2 - 1.94667\times 10^{-6}\, P^4\, T - 0.000307418\, P^4\big) = \\
&\quad P^3\left(1.907\times 10^{-10}\, P^2 + P\left(-1.06917\times 10^{-8}\, T - 9.7583\times 10^{-7}\right) + \right. \\
&\qquad \left. 1.99567\times 10^{-9}\, T^2 - 7.78668\times 10^{-6}\, T - 0.00122967\right)
\end{aligned}
$$

Indefinite integral

$$\int\left(-0.000307418\,P^4 - 1.95166\times10^{-7}\,P^5 + 3.17833\times10^{-11}\,P^6 - 1.94667\times10^{-6}\,P^4\,T - 2.13834\times10^{-9}\,P^5\,T + 4.98918\times10^{-10}\,P^4\,T^2\right)dP = 4.54047\times10^{-12}\,P^7 - 3.5639\times10^{-10}\,P^6\,T - 3.25277\times10^{-8}\,P^6 + 9.97836\times10^{-11}\,P^5\,T^2 - 3.89334\times10^{-7}\,P^5\,T - 0.0000614836\,P^5 + \text{constant}$$

Definite integral over a square of edge length 2 L

$$\int_{-L}^{L}\int_{-L}^{L}\left(-0.000307418\,P^4 - 1.95166\times10^{-7}\,P^5 + 3.17833\times10^{-11}\,P^6 - 1.94667\times10^{-6}\,P^4\,T - 2.13834\times10^{-9}\,P^5\,T + 4.98918\times10^{-10}\,P^4\,T^2\right)dT\,dP = 1.81619\times10^{-11}\,L^8 + \frac{2}{5}\left(3.32612\times10^{-10}\,L^3 - 0.000614836\,L + 0\right)L^5$$

From the indefinite integral result, in conclusion

$$\int\left(-0.000307418\,P^4 - 1.95166\times10^{-7}\,P^5 + 3.17833\times10^{-11}\,P^6 - 1.94667\times10^{-6}\,P^4\,T - 2.13834\times10^{-9}\,P^5\,T + 4.98918\times10^{-10}\,P^4\,T^2\right)dP = 4.54047\times10^{-12}\,P^7 - 3.5639\times10^{-10}\,P^6\,T - 3.25277\times10^{-8}\,P^6 + 9.97836\times10^{-11}\,P^5\,T^2 - 3.89334\times10^{-7}\,P^5\,T - 0.0000614836\,P^5 + \text{constant}$$

4.54047×10^-12 P^7 - 3.5639×10^-10 P^6 T - 3.25277×10^-8 P^6 + 9.97836×10^-11 P^5 T^2 - 3.89334×10^-7 P^5 T - 0.0000614836 P^5

we obtain:

4.54047e-12 (4.632947e+113)^7 - 3.5639e-10 (4.632947e+113)^6 (1.416784e+32) - 3.25277e-8 (4.632947e+113)^6

Input interpretation

$$4.54047\times 10^{-12}\,(4.632947\times 10^{113})^7 - 3.5639\times 10^{-10}\,(4.632947\times 10^{113})^6\times 1.416784\times 10^{32} - 3.25277\times 10^{-8}\,(4.632947\times 10^{113})^6$$

Result

$2.080185833672094\times 10^{784}$

$2.080185833672094\times10^{784}$

2.080185833672094×10^784+9.97836e-11 (4.632947e+113)^5 (1.416784e+32)^2 - 3.89334e-7 (4.632947e+113)^5 (1.416784e+32) - 0.0000614836 (4.632947e+113)^5

Input interpretation

$$2.080185833672094\times 10^{784} + 9.97836\times 10^{-11}\,(4.632947\times 10^{113})^5\,(1.416784\times 10^{32})^2 - 3.89334\times 10^{-7}\,(4.632947\times 10^{113})^5\times 1.416784\times 10^{32} + (4.632947\times 10^{113})^5\times(-0.0000614836)$$

Result

$2.080185833672094\times 10^{784}$

$2.080185833672094\times10^{784}$

Dividing the above expression

$$2.080185833672094\times 10^{784} + 9.97836\times 10^{-11}\,(4.632947\times 10^{113})^5\,(1.416784\times 10^{32})^2 - 3.89334\times 10^{-7}\,(4.632947\times 10^{113})^5\times 1.416784\times 10^{32} + (4.632947\times 10^{113})^5\times(-0.0000614836)$$

$$= 2.080185833672094\times 10^{784}$$

by

$$3.814 \times 10^{-9} (4.632947 \times 10^{113})^3 + (4.632947 \times 10^{113})^2 (-0.00001171 - 1.283 \times 10^{-7} \times 1.416784 \times 10^{32}) - (4.632947 \times 10^{113}) (-5.987 \times 10^{-9} (-4053.79 + 1.416784 \times 10^{32}) (151.998 + 1.416784 \times 10^{32}))$$

$$= 3.792736617819332 \times 10^{332}$$

after some calculations, we obtain:

((7/2)^(2/3)/π)*3.516e+121*1/((((2.0801858e+784+9.97836e-11(4.632947e+113)^5(1.416784e+32)^2-3.89334e-7(4.632947e+113)^5(1.416784e+32)-0.0000614836(4.632947e+113)^5))/((3.792736e+332)))^(1/4))

where

$$\frac{\left(\frac{7}{2}\right)^{2/3}}{\pi} \approx 0.733773725$$

Input interpretation

$$\frac{\left(\frac{7}{2}\right)^{2/3}}{\pi} (3.516 \times 10^{121}) \times 1 \Big/ \left(\left(\frac{1}{3.792736 \times 10^{332}} (2.0801858 \times 10^{784} + 9.97836 \times 10^{-11} (4.632947 \times 10^{113})^5 (1.416784 \times 10^{32})^2 - (3.89334 \times 10^{-7} (4.632947 \times 10^{113})^5) \times 1.416784 \times 10^{32} + (4.632947 \times 10^{113})^5 \times (-0.0000614836))\right) \wedge (1/4)\right)$$

Result

$2.99794\ldots \times 10^8$

$2.99794...*10^8 \approx$ c = speed of light

From the previous expression, we obtain also, after some calculations:

ln(2.080185833672094×10^784+9.97836e-11 (4.632947e+113)^5 (1.416784e+32)^2 - 3.89334e-7 (4.632947e+113)^5 (1.416784e+32) - 0.0000614836 (4.632947e+113)^5)-7*11

Input interpretation

$$\log\big(2.080185833672094\times10^{784} + 9.97836\times10^{-11}\,(4.632947\times10^{113})^5\,(1.416784\times10^{32})^2 - 3.89334\times10^{-7}\,(4.632947\times10^{113})^5\times1.416784\times10^{32} + (4.632947\times10^{113})^5\times(-0.0000614836)\big) - 7\times11$$

log(x) is the natural logarithm

Result

1728.959170140165768…

1728.95917014….

This result is very near to the mass of candidate glueball $f_0(1710)$ scalar meson. Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve ($1728 = 8^2 * 3^3$). The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(ln(2.08018583×10^784+9.97836e-11 (4.632947e+113)^5 (1.416784e+32)^2 - 3.89334e-7 (4.632947e+113)^5 (1.416784e+32) - 0.0000614836 (4.632947e+113)^5)-7*11)^1/15+(MRB const)^(1-1/(4π)+π)

Input interpretation

$$\big(\log\big(2.08018583\times10^{784} + 9.97836\times10^{-11}\,(4.632947\times10^{113})^5\,(1.416784\times10^{32})^2 - 3.89334\times10^{-7}\,(4.632947\times10^{113})^5\times1.416784\times10^{32} + (4.632947\times10^{113})^5\times(-0.0000614836)\big) - 7\times11\big)\ \hat{}\ (1/15) + C_{\mathrm{MRB}}^{\,1-1/(4\pi)+\pi}$$

log(x) is the natural logarithm

C_{MRB} is the MRB constant

Result

1.644935436218637486168078762950538788301396320850057056375036099 1

...

1.64493543621…. ≈ ζ(2) = $\pi^2/6$ = 1.644934 (trace of the instanton shape)

(1/27((ln(2.08018583×10^784+9.97836e-11 (4.632947e+113)^5 (1.416784e+32)^2 - 3.89334e-7 (4.632947e+113)^5 (1.416784e+32) - 0.0000614836 (4.632947e+113)^5)-7*11)-1))^2 +MRB const

Input interpretation

$$\left(\frac{1}{27}\left(\left(\log\left(2.08018583\times 10^{784}+9.97836\times 10^{-11}\left(4.632947\times 10^{113}\right)^5 \left(1.416784\times 10^{32}\right)^2-3.89334\times 10^{-7}\left(4.632947\times 10^{113}\right)^5\times 1.416784\times 10^{32}+\left(4.632947\times 10^{113}\right)^5\times(-0.0000614836)\right)-7\times 11\right)-1\right)\right)^2+C_{\mathrm{MRB}}$$

$\log(x)$ is the natural logarithm
C_{MRB} is the MRB constant

Result

4095.99429814…

4095.99429814…. ≈ 4096 = 64^2 , that multiplied by 2 give 8192, indeed:

The total amplitude vanishes for gauge group SO(8192), while the vacuum energy is negative and independent of the gauge group.
The vacuum energy and dilaton tadpole to lowest non-trivial order for the open bosonic string. While the vacuum energy is non-zero and independent of the gauge group, the dilaton tadpole is zero for a unique choice of gauge group, SO(2^{13}) i.e. SO(8192). (From: "Dilaton Tadpole for the Open Bosonic String " Michael R. Douglas and Benjamin Grinstein - September 2,1986)

Used data

H_0 = 2.336*10^-18   φ = 0.9991104684 ; Δ_{mix} = [X*(-S/(X^2))-X*(-S/(X^2))]

λ_s = 2.94956296772069422×10^-19 GeV or 5.2580735879994576×10^-43 grams

λ_P = 8.1* 10^-33 cm ; e^{φ} = 2.715864906

M_s = 3.3903327745288330 24 × 10^18 ;   H = 2.336*10^-18

$c_{0,1}$ = 1.380649*10^-23 ; χ = 1.388923*10^122 ; ΔH_{ev} = 2.023*10^5

y* = 7.2678290909...*10^{102} (y*)’ = -6.751847104*10^{-205} ; m = 2.176434*10^-8

(y*)’’ = 1.172173670*10^{-304} a_j = 2.30217414*10^{11} ; J = 1.388923*10^122

y_{sign} = 7.2678290909*10^102 R_0 = -3.232510106418*10^-35

R_{sign} = 27794.1290204825…. Y_1 = 0.00626236346329…   s = 2.612280*10^-70

Φ_{sign} = -1.08139779363519*10^181 Y_2 = 1.39686594152993*10^-40

Y_3 = 2.00000006584247275 79…. Y_4 = 4.000000547919670648164173 2889….

$P_{g\ sign}$ = 1.000071957644…. Y_5 = 9.625951...*10^50   c = 1.11188×10^-9

$R^3{}_{sign}$ = -2.1471387257471648*10^13 R_{sign} = 27794.15… W = 9.803346*10^89

Y_1 = 0.00626236346329 ; Φ = -1.08139779363519*10^181 ;
y = 7.2678290909*10^102 ; R = 27794.1290204825 ;

v_R is the bubble growth rate   = 2.262*10^-18

K_h = 2*10^-12 ; B = 8.314462618 ; M = 9.383*10^55 ; P_f = 4.632947*10^113 ;

S_0 = 8.78687*10^-35 ; R_0 = 1.616255*10^-35 ; P_g = -5.4*10^-10

Φ = 9.803346*10^89 ; R = 4.49224*10^-31

η = 2.497736*10^70 ; ρ = 5.154849*10^96 ; ν_R = 2.262*10^-18 ;

S = 8.78687*10^-35 ; σ = 7.488024*10^78 ; R = 1.616255*10^-35 ;

t = 5.391247*10^-44 ; c = 1.11188×10^-9

ν_R = 2.262*10^-18 s ; R = 1.616255*10^-35 ;
γ = 7.488024*10^78 ; a_0 = 1.616255*10^-35 ; n_0 = 0.05 ; D = 4.845411*10^-27
Ω = 4.222111e-105 ; k_B = $1.380649*10^{-23}$; T = $1.416784*10^{32}$; φ = 0.61803398...

P_n = P_0 = p_m = 4.632947*10^113 ; P_m = P_1 = p_g = -5.4*10^-10 ; ψ = 0.5 ; c_w = 0.4
m = 9.383*10^55 ; N_m = N_1 = ρ = 5.154849*10^96 ; p_g = -5.4 * 10^-10 ;
Rgas/Bgas Constant = 8.314462618 ; σ = 7.488024*10^78 ; f = 15.6250188442….
Re = 1.02412985349 ; f_0 = 0.002; d ≈ 100 ; q = 4.036978*10^35
k_1 = 4.845411*10^-27 ; k_2 = 2.93942 × 10^-35 ; μ = 2.497736*10^70

V = $4.222111*10^{-105}$; a_0 = $1.616255*10^{-35}$; σ = $7.488024*10^{78}$; k_B = $1.380649*10^{-23}$
T = $1.416784*10^{32}$;P_M = 4.632947*10^113 ; P^*_B = -5.4 * 10^-10 ; φ = 1

m = 2.1 , f_0 = 10 , k_{10} = $1.88167*10^{-590}$, k_{20} = $6.01897*10^{-777}$, σ = $1.584471*10^{55}$

U_0 = $3.7474055271879*10^{7}$; P_a = 4.632947*10^113 ; P_g = -5.4 * 10^-10 ;
S = 8.78687*10^-35 ; ρ = 5.154849*10^96 ; R = 1.616255*10^-35 ;
η = 2.497736*10^70 ; K = 5.154849*10^96 ; λ(t) = $4.29165*10^{-123}$;

$\gamma_{dilat.}$ = 7.058238*10^-33 ; ρ = 5.154849*10^96 ; c_0 = 0.04 ; n = $1*10^{12}$ – $1 * 10^{14}$;
C_i = 0.046 ; ω = 1.854858*10^43 , v = 299792458 ; C_0 = (5*10^27) ; D = (1*10^-12); Q = $1.25507996792216*10^{150}$

References

[1] Thermal effects of magma degassing - *D.L. Sahagian, A.A. Proussevitch* - Journal of Volcanology and Geothermal Research 74 (1996) 19-38

See also:

The Geometry of the MRB constant *by Marvin Ray Burns*

https://www.academia.edu/22271085/The_Geometry_of_the_MRB_constant

(See also Page 29 the applications of the CMRB in various sectors of Theoretical Physics (String Theory) and Cosmology)

http://xoom.virgilio.it/source_filemanager/na/ar/nardelli/michele%20and%20antonio%20papers/Try%20to%20beat%20these%20MRB%20constant%20records!%20-%20Online%20Technical%20Discussion%20Groups%E2%80%94Wolfram%20Community%20b.pdf