A possible Theory of Mathematical Connections between various Ramanujan's formulas and the equations of Inflationary Cosmology and the Standard Model concerning the scalar field ϕ, the Inflaton mass, the Higgs boson mass and the Pion meson $\pi^{\pm}$ mass. II

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https://www.britannica.com/biography/Srinivasa-Ramanujan
https://biografieonline.it/foto-enrico-fermi

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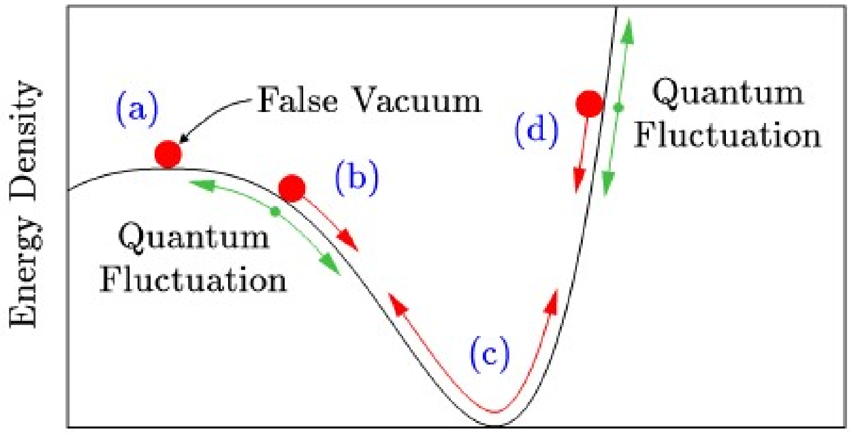
Proposal and discussion

We calculate the 4096th ($4096 = 64^2$) root of the value of scalar field and from it, we obtain 64

Inflationary Cosmology: Exploring the Universe from the Smallest to the Largest Scales



ϕ $\varphi = 50\ M_P = 1.2175 \times 10^{20}$ GeV

$$\sqrt[4096]{\frac{1}{1.2175 \times 10^{20}}} = 0.98877237\ldots$$

$$\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175 \times 10^{20}}\right)} = 64.0000\ldots$$

$$64^2 = 4096$$

where ϕ is the scalar field.

Thence, we obtain:

$$\sqrt[4096]{\frac{1}{\phi}} = 0.98877237\ ; \quad \sqrt{\log_{0.98877237}\left(\frac{1}{\phi}\right)} = 64\ ; \quad 64^2 = 4096$$

Now, we calculate the 4096th root of the value of inflaton mass and from it we obtain, also here, 64

Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

Table 2 The masses of inflaton, axion and gravitino, and the VEVs of F- and D-fields derived from our models by fixing the amplitude A_s according to PLANCK data – see Eq. (57). The value of $\langle F_T \rangle$ for a positive ω_1 is not fixed by A_s

α	3	4		5		6		7	
$\mathrm{sgn}(\omega_1)$	$-$	$+$	$-$	$+$	$-$	$+$	$-$	$-$	
m_φ	2.83	2.95	2.73	2.71	2.71	2.53	2.58	1.86	$\times 10^{13}$ GeV
$m_{t'}$	0	0.93	1.73	2.02	2.02	4.97	2.01	1.56	$\times 10^{13}$ GeV
$m_{3/2}$	≥ 1.41	2.80	0.86	2.56	0.64	3.91	0.49	0.29	$\times 10^{13}$ GeV
$\langle F_T \rangle$	any	$\neq 0$	0	$\neq 0$	0	$\neq 0$	0	0	$\times 10^{31}$ GeV^2
$\langle D \rangle$	8.31	4.48	5.08	3.76	3.76	3.25	2.87	1.73	$\times 10^{31}$ GeV^2

$m_\varphi = 2.542 - 2.33 * 10^{13}$ GeV with an average of $2.636 * 10^{13}$ GeV

$$\sqrt[4096]{\frac{1}{2.83 \times 10^{13}}} = 0.99246653672537976 4\ldots$$

$$\sqrt{\log_{0.99246653}\left(\frac{1}{2.83 \times 10^{13}}\right)} = 64.0000\ldots$$

$$64^2 = 4096$$

where m_φ is the inflaton mass.

Thence we obtain:

$$\sqrt[4096]{\frac{1}{m_\varphi}} = 0.99246653 \; ; \quad \sqrt{\log_{0.99246653}\left(\frac{1}{m_\varphi}\right)} = 64 \; ; \quad 64^2 = 4096$$

We have the following mathematical connections:

$$\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times10^{20}}\right)} = 64; \quad \sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times10^{13}}\right)} = 64$$

$$\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times10^{20}}\right)} = \sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times10^{13}}\right)} = 64$$

From Ramanujan collected papers

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

Hence

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

so that

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

Hence

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

Again

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

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

so that

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

Hence

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

Similarly, from

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

we obtain

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

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From the following expression (see above part of paper), we obtain:

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

(((exp(Pi*sqrt37)+24+(4096+276)exp-(Pi*sqrt37))) / ((((6+sqrt37)^6+(6- sqrt37)^6)))

$$\frac{\exp(\pi\sqrt{37}) + 24 + (4096+276)\exp(-(\pi\sqrt{37}))}{(6+\sqrt{37})^6 + (6-\sqrt{37})^6} = \frac{24 + 4372\,e^{-\sqrt{37}\,\pi} + e^{\sqrt{37}\,\pi}}{(6-\sqrt{37})^6 + (6+\sqrt{37})^6} =$$

$$= \frac{24 + 4372\,e^{-\sqrt{37}\,\pi} + e^{\sqrt{37}\,\pi}}{(6-\sqrt{37})^6 + (6+\sqrt{37})^6} \text{ is a transcendental number } =$$

$$= 64.000000000000000000779965901541408776562042740155278984 30\ldots \sim 64$$

From which:

(((exp(Pi*sqrt37)+24+(x+276)exp-(Pi*sqrt37)))/((((6+sqrt37)^6+(6-sqrt37)^6))) = 64

$$\frac{\exp(\pi\sqrt{37}) + 24 + (x+276)\exp(-(\pi\sqrt{37}))}{(6+\sqrt{37})^6 + (6-\sqrt{37})^6} = 64$$

Exact result:

$$\frac{e^{-\sqrt{37}\,\pi}(x+276) + e^{\sqrt{37}\,\pi} + 24}{(6-\sqrt{37})^6 + (6+\sqrt{37})^6} = 64$$

Alternate forms:

$$\frac{e^{-\sqrt{37}\,\pi}\,(x+276)}{3\,111\,698}+\frac{e^{\sqrt{37}\,\pi}}{3\,111\,698}+\frac{12}{1\,555\,849}=64$$

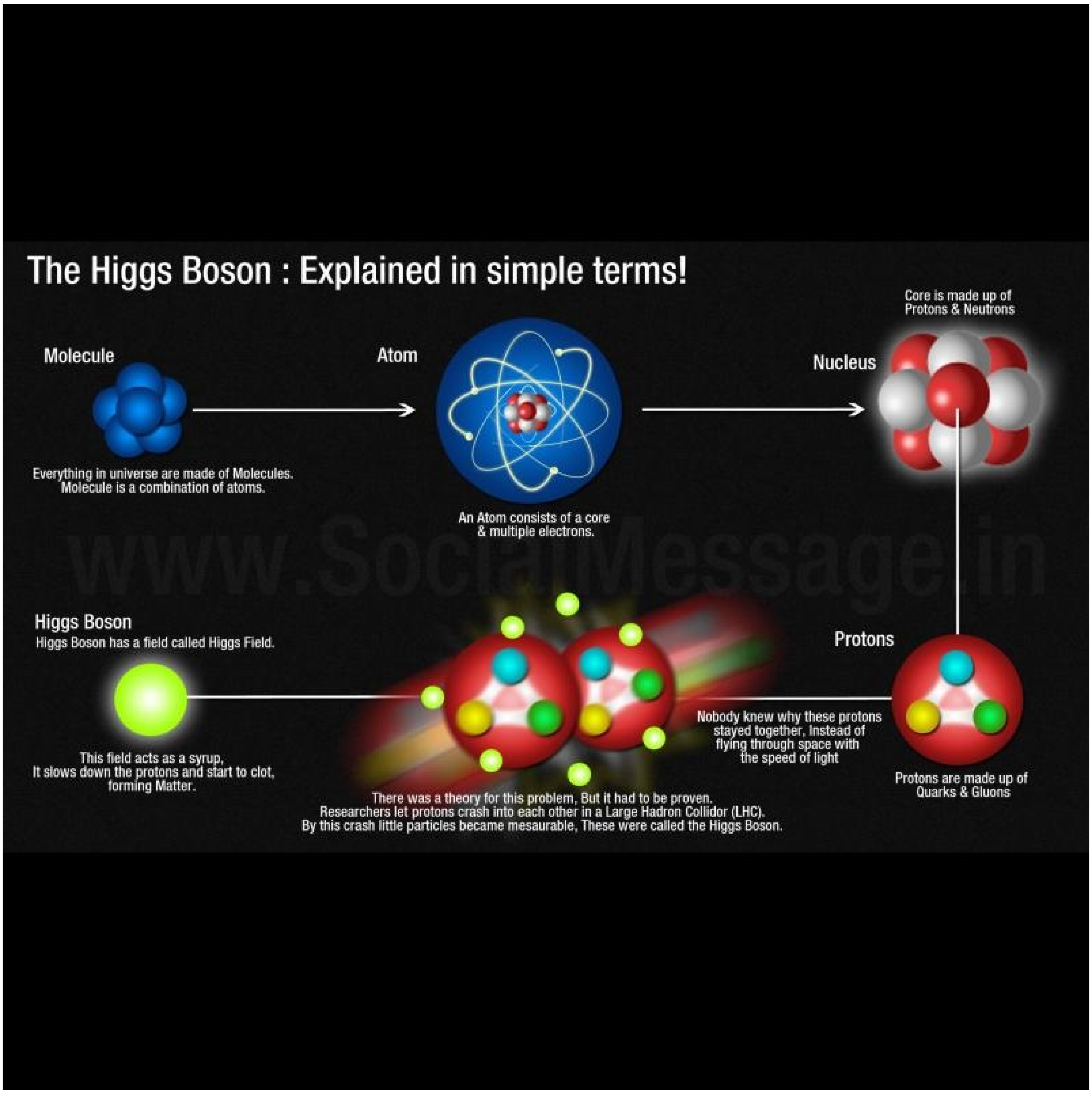
$$\frac{e^{-\sqrt{37}\,\pi}\left(x+e^{2\sqrt{37}\,\pi}+24\,e^{\sqrt{37}\,\pi}+276\right)}{3\,111\,698}=64$$

$$\frac{e^{-\sqrt{37}\,\pi}\,x}{(6-\sqrt{37})^6+(6+\sqrt{37})^6}+\frac{e^{\sqrt{37}\,\pi}}{(6-\sqrt{37})^6+(6+\sqrt{37})^6}+\frac{276\,e^{-\sqrt{37}\,\pi}}{(6-\sqrt{37})^6+(6+\sqrt{37})^6}+\frac{24}{(6-\sqrt{37})^6+(6+\sqrt{37})^6}-64=0$$

$$x=-276+199\,148\,648\,e^{\sqrt{37}\,\pi}-e^{2\sqrt{37}\,\pi}$$

$$x\approx 4096.0$$

Higgs Boson



http://therealmrscience.net/exactly-what-does-the-higgs-boson-do.html

From the above values of scalar field ϕ, and of the inflaton mass m_{φ} , we obtain results that are in the range of the Higgs boson mass:

$$2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times 10^{20}}\right)}-\pi+\frac{1}{\phi}$$

125.476...

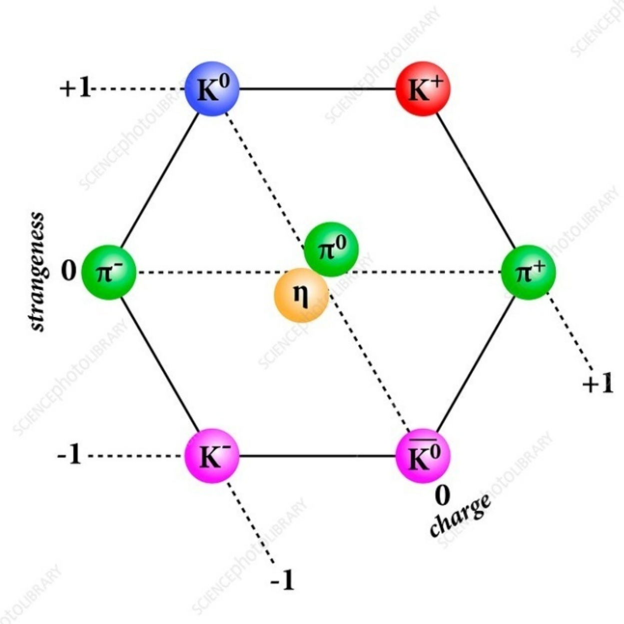
and

$$2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times 10^{13}}\right)}-\pi+\frac{1}{\phi}$$

125.476...

Pion mesons

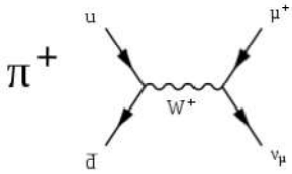
https://www.sciencephoto.com/media/476068/view/meson-octet-diagram



Meson octet. Diagram organising mesons into an octet according to their charge and strangeness. Particles along the same diagonal line share the same charge; positive (+1), neutral (0), or negative (-1). Particles along the same horizontal line share the same strangeness. Strangeness is a quantum property that is conserved in strong and electromagnetic interactions, between particles, but not in weak interactions. Mesons are made up of one quark and one antiquark. Particles with a strangeness of +1, such as the kaons (blue and red) in the top line, contain one strange antiquark. Particles with a strangeness of 0, such as the pion mesons (green) and eta meson (yellow) in the middle line, contain no strange quarks. Particles with a strangeness of -1, such as the antiparticle kaons (pink) in the bottom line, contain one strange quark

The $\pi^{\pm}$ mesons have a mass of 139.6 MeV/c^2 and a mean lifetime of 2.6033×10^{-8} s. They decay due to the weak interaction. The primary decay mode of a pion, with a branching fraction of 0.999877, is a leptonic decay into a muon and a muon neutrino:

$$\pi^+ \to \mu^+ + \nu_\mu$$
$$\pi^- \to \mu^- + \bar{\nu}_\mu$$

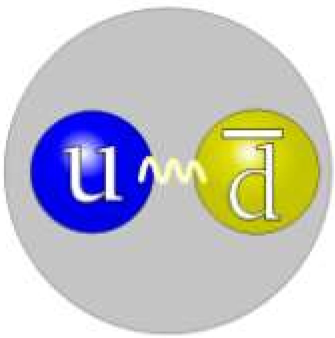


Feynman diagram of the dominant leptonic pion decay.

The second most common decay mode of a pion, with a branching fraction of 0.000123, is also a leptonic decay into an electron and the corresponding electron antineutrino. This "electronic mode" was discovered at CERN in 1958:[6]

$$\pi^+ \to e^+ + \nu_e$$
$$\pi^- \to e^- + \bar{\nu}_e$$

Pion



The quark structure of the pion.

Composition	π^+: $u\bar{d}$ π^0: $u\bar{u}$ or $d\bar{d}$ π^-: $d\bar{u}$
Statistics	Bosonic
Interactions	Strong, Weak, Electromagnetic and Gravity
Symbol	π^+, π^0, and π^-
Theorized	Hideki Yukawa (1935)
Discovered	César Lattes, Giuseppe Occhialini (1947) and Cecil Powell
Types	3
Mass	$\pi^{\pm}$: 139.570 18(35) MeV/c^2 π^0: 134.9766(6) MeV/c^2

From the above values of scalar field ϕ, and the inflaton mass m_{φ} , we obtain also the value of Pion meson $\pi^{\pm} = 139.57018$ MeV/c^2

$$2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times 10^{20}}\right)}+11+\frac{1}{\phi}$$

139.618...

and

$$2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times 10^{13}}\right)}+11+\frac{1}{\phi}$$

139.618...

The $\pi^{\pm}$ mesons have a mass of 139.6 MeV/c^2 and a mean lifetime of 2.6033×10^{-8} s. They decay due to the weak interaction. The primary decay mode of a pion, with a branching fraction of 0.999877, is a leptonic decay into a muon and a muon neutrino.

Note that the value 0.999877 is very closed to the following Rogers-Ramanujan continued fraction (http://www.bitman.name/math/article/102/109/):

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

We observe that also the results of 4096$^{\text{th}}$ root of the values of scalar field ϕ, and the inflaton mass m_{φ}:

$$\sqrt[4096]{\frac{1}{\phi}} = 0.98877237\ ; \quad \sqrt[4096]{\frac{1}{m_\varphi}} = 0.99246653$$

are very closed to the above continued fraction.

Furthermore, from the results concerning the scalar field ϕ (0.98877237, 1.2175e+20), and the inflaton mass m_φ (0.99246653, 2.83e+13), we obtain, performing the 10th root:

((((2sqrt (((log base 0.98877237 ((1/1.2175e+20)))))-Pi))))^1/10

Input interpretation:

$$\sqrt[10]{2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times 10^{20}}\right)} - \pi}$$

Result:

1.620472942364990195996419034511458317811826267744760835367...

And:

1/10^27 [(47+4)/10^3+((((2sqrt (((log base 0.98877237 ((1/1.2175e+20)))))-Pi))))^1/10]

where 47 and 4 are Lucas numbers

$$\frac{1}{10^{27}}\left(\frac{47+4}{10^3}+\sqrt[10]{2\sqrt{\log_{0.98877237}\left(\frac{1}{1.2175\times 10^{20}}\right)} - \pi}\right)$$

Result:

$1.671473... \times 10^{-27}$

$1.671473...*10^{-27}$ result practically equal to the proton mass

We have also:

((((2sqrt (((log base 0.99246653 ((1/2.83e+13)))))-Pi))))^1/10

$$\sqrt[10]{2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times 10^{13}}\right)-\pi}}$$

Result:

1.6204728501614154392895862048865871624444052827097014473 26...

And:

1/10^27 [(47+4)/10^3+((((2sqrt (((log base 0.99246653 ((1/2.83e+13)))))-Pi))))^1/10]

$$\frac{1}{10^{27}}\left(\frac{47+4}{10^3}+\sqrt[10]{2\sqrt{\log_{0.99246653}\left(\frac{1}{2.83\times 10^{13}}\right)-\pi}}\right)$$

Result:

$1.671473\ldots\times 10^{-27}$

$1.671473\ldots{*}10^{-27}$ result that is practically equal to the proton mass as the previous

Trascendental numbers

From the paper of S. Ramanujan "*Modular equations and approximations to π*" have the following expression:

$$\frac{3}{\pi} = 1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1} + \cdots\right)$$

1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))]

$$1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1}\right)$$

Decimal approximation:

0.9549296597216129006047243618330456719775743763702212773 42...

0.954929659…

Property:

$1 - 24\left(\frac{1}{-1+e^{2\pi}} + \frac{2}{-1+e^{4\pi}} + \frac{3}{-1+e^{6\pi}}\right)$ is a transcendental number

Series representations:

$$1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1}\right) = 1 - \frac{24}{-1+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{48}{-1+e^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{72}{-1+e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1}\right) = 1 - \frac{24}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{48}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}} - \frac{72}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}-\frac{48}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}-\frac{72}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}-\frac{48}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}-\frac{72}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}$$

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+e^{4\int_0^{\infty}\sin(t)/t\,dt}}-\frac{48}{-1+e^{8\int_0^{\infty}\sin(t)/t\,dt}}-\frac{72}{-1+e^{12\int_0^{\infty}\sin(t)/t\,dt}}$$

$$1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)=1-\frac{24}{-1+e^{8\int_0^{1}\sqrt{1-t^2}\,dt}}-\frac{48}{-1+e^{16\int_0^{1}\sqrt{1-t^2}\,dt}}-\frac{72}{-1+e^{24\int_0^{1}\sqrt{1-t^2}\,dt}}$$

Note that the value of the following Rogers-Ramanujan continued fraction is practically equal to the result of the previous expression. Indeed:

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

$$\cong \left(1 - 24\left(\frac{1}{e^{2\pi}-1} + \frac{2}{e^{4\pi}-1} + \frac{3}{e^{6\pi}-1}\right)\right) = 0.954929659\ldots$$

We know that:

ω	6	$m_{u/d} = 0 - 60$	$0.910 - 0.918$
ω/ω_3	$5+3$	$m_{u/d} = 255 - 390$	$0.988 - 1.18$
ω/ω_3	$5+3$	$m_{u/d} = 240 - 345$	$0.937 - 1.000$

that are the various Regge slope of Omega mesons

From the paper:

Generalized dilaton–axion models of inflation, de Sitter vacua and spontaneous SUSY breaking in supergravity

Table 1 The predictions for the inflationary parameters (n_s, r), and the values of φ at the horizon crossing (φ_i) and at the end of inflation (φ_f), in the case $3 \le \alpha \le \alpha_*$ with both signs of ω_1. The α parameter is taken to be integer, except of the upper limit $\alpha_* \equiv (7+\sqrt{33})/2$

α	3	4		5	6		α_*
$\mathrm{sgn}(\omega_1)$	$-$	$+$	$-$	$+/-$	$+$	$-$	$-$
n_s	0.9650	0.9649	0.9640	0.9639	0.9634	0.9637	0.9632
r	0.0035	0.0010	0.0013	0.0007	0.0005	0.0004	0.0003
$-\kappa\varphi_i$	5.3529	3.5542	3.9899	3.2657	3.0215	2.7427	2.5674
$-\kappa\varphi_f$	0.9402	0.7426	0.8067	0.7163	0.6935	0.6488	0.6276

We note that the value of inflationary parameter n_s (spectral index) for $\alpha = 3$ is equal to 0.9650 and that the range of Regge slope of the following Omega meson is:

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

the values 0.954929659... and 0.9568666373 are very near to the above Regge slope, to the spectral index n_s and to the dilaton value 0.989117352243 = ϕ

We observe that 0.954929659 has the following property:

$$1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right) \text{ is a transcendental number}$$

= 0.9549296597216129 the result is a transcendental number

We have also that, performing the 128th root, we obtain:

((((1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))]))))^1/128

Input:

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)}$$

Decimal approximation:

0.999639771179582593534832998563472389939029398477483191618...

0.9996397711… is also a transcendental number

This result is connected to the primary decay mode of a pion, with a branching fraction of 0.999877, that is a leptonic decay into a muon and a muon neutrino.

Property:

$$\sqrt[128]{1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right)} \text{ is a transcendental number}$$

Series representations:

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \left(1-24\left(\frac{1}{-1+e^{8\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{2}{-1+e^{16\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{3}{-1+e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}\right)\right)\char`^(1/128)$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{2\pi}}+\frac{2}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{4\pi}}+\frac{3}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{6\pi}}\right)}$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{2\pi}}+\frac{2}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{4\pi}}+\frac{3}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{6\pi}}\right)}$$

Integral representations:

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+e^{4\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{2}{-1+e^{8\int_0^{\infty}1/(1+t^2)\,dt}}+\frac{3}{-1+e^{12\int_0^{\infty}1/(1+t^2)\,dt}}\right)}$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} = \sqrt[128]{1-24\left(\frac{1}{-1+e^{4\int_0^{\infty}\sin(t)/t\,dt}}+\frac{2}{-1+e^{8\int_0^{\infty}\sin(t)/t\,dt}}+\frac{3}{-1+e^{12\int_0^{\infty}\sin(t)/t\,dt}}\right)}$$

$$\sqrt[128]{1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)} =$$

$$\sqrt[128]{1-24\left(\frac{1}{-1+e^{8\int_0^1\sqrt{1-t^2}\,dt}}+\frac{2}{-1+e^{16\int_0^1\sqrt{1-t^2}\,dt}}+\frac{3}{-1+e^{24\int_0^1\sqrt{1-t^2}\,dt}}\right)}$$

Performing:

log base 0.999639771179((((1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))])))))-Pi+1/golden ratio

we obtain:

Input interpretation:

$$\log_{0.999639771179}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)-\pi+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

125.476441...

125.476441…. result 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

Series representations:

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)-\pi+\frac{1}{\phi} =$$

$$\frac{1}{\phi}-\pi-\frac{\sum_{k=1}^{\infty}\frac{(-24)^k\left(\frac{1}{1-e^{2\pi}}-\frac{2}{-1+e^{4\pi}}-\frac{3}{-1+e^{6\pi}}\right)^k}{k}}{\log(0.9996397711790000)}$$

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)-\pi+\frac{1}{\phi}=$$

$$\frac{1.000000000000}{\phi}-1.000000000000\,\pi+$$
$$\log\left(1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right)\right)$$
$$\left(-2775.513305165-1.000000000000\sum_{k=0}^{\infty}(-0.0003602288210000)^k\,G(k)\right)$$

$$\text{for }\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2\,(1+k)\,(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

And:

log base 0.999639771179((((1-24[(1/(e^(2Pi)-1)) + (2/(e^(4Pi)-1)) + (3/(e^(6Pi)-1))]))))+11+1/golden ratio

where 11 is a Lucas number

Input interpretation:

$$\log_{0.999639771179}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)+11+\frac{1}{\phi}$$

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

ϕ is the golden ratio

Result:

139.618034...

139.618034…. result practically equal to the rest mass of Pion meson 139.57

Series representations:

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)+11+\frac{1}{\phi}=$$
$$11+\frac{1}{\phi}-\frac{\sum_{k=1}^{\infty}\frac{(-24)^k\left(\frac{1}{1-e^{2\pi}}-\frac{2}{-1+e^{4\pi}}-\frac{3}{-1+e^{6\pi}}\right)^k}{k}}{\log(0.9996397711790000)}$$

$$\log_{0.9996397711790000}\left(1-24\left(\frac{1}{e^{2\pi}-1}+\frac{2}{e^{4\pi}-1}+\frac{3}{e^{6\pi}-1}\right)\right)+11+\frac{1}{\phi}=$$

$$11.00000000000+\frac{1.000000000000}{\phi}+$$

$$\log\left(1-24\left(\frac{1}{-1+e^{2\pi}}+\frac{2}{-1+e^{4\pi}}+\frac{3}{-1+e^{6\pi}}\right)\right)$$

$$\left(-2775.513305165-1.000000000000\sum_{k=0}^{\infty}(-0.0003602288210000)^k\, G(k)\right)$$

$$\text{for }\left(G(0)=0\text{ and }G(k)=\frac{(-1)^{1+k}\,k}{2\,(1+k)\,(2+k)}+\sum_{j=1}^{k}\frac{(-1)^{1+j}\,G(-j+k)}{1+j}\right)$$

In conclusion, we have shown a possible theoretical connection between some parameters of inflationary cosmology, of particle masses (Higgs boson and Pion meson $\pi\pm$) and some fundamental equations of Ramanujan's mathematics.

Further, we note that π, ϕ, 1/ϕ and 11, that is a Lucas number (often in developing Ramanujan's equations we use Fibonacci and Lucas numbers), play a fundamental role in the development, and therefore, in the final results of Ramanujan's equations. This fact can be explained by admitting that π, ϕ, 1/ϕ and 11, and other numbers connected with Fibonacci and Lucas sequences, are not only mathematical constants and / or simple numbers, but "data", which inserted in the right place, and in the most various possible and always logical combinations, lead precisely to the solutions discussed so far: masses of particles and other physical and cosmological parameters.