Analytical method of determining the values of fundamental physical constants

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Abstract: the article presents the author developed an original analytical method for determining the values of the fundamental physical constants (FPC). Given a finite formulas and the exact results of theoretical calculations 26 constants, including the fine-structure constant, the electron mass, Newton's gravitational constant and the Boltzmann constant. Presents a table comparing the results of calculations with the data CODATA 2010.

Keywords: anomaly of the magnetic moment, electron, muon, Planck length.

1. Introduction

Pi-Theory of the fundamental physical constants (Pi-Theory) assumes that physical reality is a single parametric spatio-temporal is the Medium.

If in the text of the article the name of the parameter has a subscript " π " it is, firstly, means that this is parameter Pi-Theory, and secondly that this parameter has a theoretical value that can be used instead of the true parameter value. A scalar parameter - it is a numeric parameter. Pi-Theory has only one free parameter is a scalar parameter of the Medium $\mathrm{p_{fr}}$.

All resulting in Pi-Theory results - this is are solutions of algebraic equations.

2. Final formulas

Table 1. Presents formulas for determining the values of the numerical parameters.

N	The name of the parameter and the formula Pi-Theory
1	Scalar parameter of the Medium $\mathrm{p_{fr}}$ (free parameter): $\mathrm{p_{fr}} = \pi$.
2	Scalar parameter of the elementary charge $\alpha_{\pi 0}$. Is the real root of the equation $$\varphi_{\pi 0}^3 \cdot \pi^2 \cdot \alpha_{\pi 0} \cdot \overline{\beta}_\pi = (1+\vartriangle y_{\pi 0} \cdot \alpha_{\pi 0})^3,$$ where: $\varphi_{\pi 0} = \sqrt{2} \cdot \pi$; $\vartriangle y_{\pi 0} = \sqrt[4]{2 \cdot \pi}$; $\overline{\beta}_\pi = 1 + \overline{\beta}_{\pi 0}$; $\overline{\beta}_{\pi 0} = \alpha_{\pi 0} / \varphi_{\pi 0}$.
3	Scalar structure parameter of space – time $\mathrm{f}_{\pi s0}$: $$\mathrm{f}_{\pi s0} = \alpha_{\pi 0} \cdot \overline{\beta}_\pi .$$
4	Constant parametric bias $\vartriangle y_{\pi e}$: $$\vartriangle y_{\pi e} = \frac{\Delta_{\pi x}}{\vartriangle y_{\pi 0}^3} .$$
5	Coefficient $\Delta_{\pi x}$. Is determined from the equation $\frac{1}{\varphi_{\pi 0}} \cdot \alpha_{\pi x1,2}^2 + \alpha_{\pi x1,2} - \overline{\beta}_\pi = 0$ in the form $\Delta_{\pi x} = \frac{\alpha_{\pi x1}}{\alpha_{\pi x2}}$.
6	Constant parametric connection $\beta_{\pi e}$: $$\beta_{\pi e} = 1 + \beta_{\pi 0e};\ \beta_{\pi 0e} = \frac{\overline{\beta}_{\pi 0}}{\overline{\beta}_\pi^3} .$$
7	Scalar parameter of the elementary charge $\alpha_{\pi e}$. The real root of the equation $$\varphi_{\pi 0}^3 \cdot \pi^2 \cdot \alpha_{\pi e} \cdot \beta_{\pi e} = (1+\vartriangle y_{\pi e} \cdot \alpha_{\pi e})^3 .$$
8	Scalar structure parameter of space – time $\mathrm{f}_{\pi se}$: $$\mathrm{f}_{\pi se} = \alpha_{\pi e} \cdot \beta_{\pi e} .$$

N	The name of the parameter and the formula Pi-Theory
9	Scalar structure parameter of space – time $\overleftrightarrow{\mathrm{f}}_{\pi s}$: $$\overleftrightarrow{\mathrm{f}}_{\pi s} = \sqrt[4]{\mathrm{f}_{\pi s0} \cdot \mathrm{f}_{\pi se}{}^{3}}\,.$$
10	Scalar structure parameter of space – time $\mathrm{f}_{\pi s}$: $$\mathrm{f}_{\pi s} = \sqrt[3]{\frac{f_{\pi se}{}^{4}}{f_{\pi s0}}}\,.$$
11	Coefficient of skewness k_{π}: $$\mathrm{k}_{\pi} = \sqrt[4]{\frac{\overleftrightarrow{\mathrm{f}}_{\pi s}}{\mathrm{f}_{\pi s}}}\,.$$
12	Coefficient of absolute stability $k_{\pi st}$: $$k_{\pi st} = \mathrm{k}_{\pi}^{9}\,.$$
13	Scalar parameter of the elementary charge α_{π}: $$\alpha_{\pi} = \frac{\alpha_{\pi e}}{\mathrm{k}_{\pi}}\,.$$
14	Constant parametric connection β_{π}: $$\beta_{\pi} = \frac{\mathrm{f}_{\pi s}}{\alpha_{\pi}}\,.$$
15	Constant scale invariance ψ_{π}: $$\psi_{\pi} = k_{\pi\psi} \cdot \psi_{\pi 0}\,;\; k_{\pi\psi} = \frac{2 \cdot \alpha_{\pi}^{6}}{\sqrt{\pi} \cdot \mathrm{f}_{\pi s}^{6}}\,,\; \psi_{\pi 0} = 4 \cdot \pi^{6} \cdot \mathrm{f}_{\pi s}^{9}\,.$$
16	Constant parametric bias $\vartriangle y_{\pi}$. Determined by direct calculation from the equation $$\varphi_{\pi 0}^{3} \cdot \pi^{2} \cdot \mathrm{f}_{\pi s} = (1 + \vartriangle y_{\pi} \cdot \alpha_{\pi})^{3}\,.$$
17	Constant of the strong interaction $\alpha_{\pi s}$. The real root of the equation $$\varphi_{\pi 0}^{3} \cdot \pi^{2} \cdot \alpha_{\pi s} \cdot \beta_{\pi} = (1 + \vartriangle y_{\pi} \cdot \alpha_{\pi s})^{3}\,.$$
18	Coefficient of the charge asymmetry $k_{\pi q}$: $$k_{\pi q} = \frac{\alpha_{\pi x}}{\alpha_{\pi y}}\,,$$ where the coefficients $\alpha_{\pi x}$ and $\alpha_{\pi y}$ are real roots of the equations $$\varphi_{\pi 0}^{3} \cdot \pi^{2} \cdot \alpha_{\pi x} \cdot \overline{\beta}_{\pi} = (1 + \vartriangle y_{\pi 0} \cdot \alpha_{\pi x})^{3} \text{ and } \varphi_{\pi 0}^{3} \cdot \pi^{2} \cdot \alpha_{\pi y} \cdot \beta_{\pi e} = (1 + \vartriangle y_{\pi e} \cdot \alpha_{\pi y})^{3} \text{ respectively.}$$
19	Anomaly of the magnetic moment $a_{\pi ex}$. Determined by direct calculation from the equation $$(1 + \vartriangle y_{\pi e} \cdot \alpha_{\pi e})^{3} = k_{\pi q}^{4} \cdot (1 + \vartriangle y_{\pi e} \cdot a_{\pi ex})^{3}\,.$$
20	Electromagnetic the constant of asymmetry $\Delta_{\pi a}$: $$\Delta_{\pi a} = \alpha_{\pi e} - a_{\pi ex}\,.$$
21	Anomaly of the magnetic moment of the electron $a_{\pi \mathrm{e}}$: $$a_{\pi \mathrm{e}} = \alpha_{\pi} - \Delta_{\pi a}\,.$$
22	Anomaly of the magnetic moment $a_{\pi\mu x}$: $$a_{\pi\mu x} = \frac{\mathrm{f}_{\pi se}^{3}}{a_{\pi ex}^{2}}\,.$$

N	The name of the parameter and the formula Pi-Theory
23	Anomaly of the magnetic moment of the muon $a_{\pi\mu}$: $$a_{\pi\mu} = a_{\pi\mu x} \cdot \left(\sqrt[4]{\left(1 + \vartriangle y_{\pi} \cdot \alpha_{\pi}\right)^3} \right)^3 \cdot \mathrm{k}_{\pi}^4 .$$
24	Coefficient electroweak of asymmetry $k_{\pi w}$: $$k_{\pi w} = \mathrm{k}_{\pi} \cdot \left(\frac{1+\mathrm{f}_{\pi se}}{1+\mathrm{f}_{\pi s}} \right)^2 \cdot \left[1 + \left(-\frac{(\pi-1)^2}{\pi} \right)^4 \cdot \frac{4}{\varphi_{\pi 0}} \cdot \mathrm{f}_{\pi s}^4 \right].$$
25	Scalar parameter weak interaction $\alpha_{\pi \mathrm{w}}$: $$\alpha_{\pi w} = k_{\pi w}^3 - 1 .$$
26	Electron-proton mass ratio $r_{\pi \mathrm{ep}}$: $$r_{\pi \mathrm{ep}} = \frac{m_{\pi \mathrm{e}}}{m_{\pi \mathrm{p}}} = \left[\frac{\mathrm{f}_{\pi s} \cdot (1 + \vartriangle y_{\pi} \cdot \alpha_{\pi})^3}{\sqrt[3]{\pi^2}} \right] \cdot \left(1 - \frac{\alpha_{\pi}}{\alpha_{\pi s}} \right) \cdot k_{\pi st} .$$
27	Electron-neutron mass ratio $r_{\pi \mathrm{en}}$: $$r_{\pi \mathrm{en}} = \frac{m_{\pi \mathrm{e}}}{m_{\pi \mathrm{n}}} = \left[\frac{\mathrm{f}_{\pi s} \cdot (1 + \vartriangle y_{\pi} \cdot \alpha_{\pi})^3}{\sqrt[3]{\pi^2}} \right] \cdot \left(\frac{a_{\pi \mathrm{e}} + \alpha_{\pi \mathrm{w}}}{a_{\pi \mathrm{e}} + \Delta_{\pi a}} \right).$$
28	Neutron-proton mass ratio $r_{\pi \mathrm{np}}$: $$r_{\pi \mathrm{np}} = \frac{m_{\pi \mathrm{n}}}{m_{\pi \mathrm{p}}} = \left(1 - \frac{\alpha_{\pi}}{\alpha_{\pi s}} \right) \cdot \left(\frac{a_{\pi \mathrm{e}} + \Delta_{\pi a}}{a_{\pi \mathrm{e}} + \alpha_{\pi w}} \right) \cdot k_{\pi st} .$$
29	Proton-neutron magnetic moment ratio $r_{\pi\mu,\mathrm{pn}}$: $$r_{\pi\mu,\mathrm{pn}} = \frac{\mu_{\pi \mathrm{p}}}{\mu_{\pi \mathrm{n}}} = \left[-\frac{(\pi-1)^2}{\pi} \right] \cdot \frac{(1+\alpha_{\pi w})^2}{(1+\Delta_{\pi a})^2} .$$
30	Muon-nuclear magneton magnetic moment ratio $r_{\pi\mu\mathrm{N}}$: $$r_{\pi\mu\mathrm{N}} = \frac{\mu_{\pi\mu}}{\mu_{\pi \mathrm{N}}} = \left(-\frac{(2\cdot\pi-1)^2}{\pi} \right) \cdot \left(\sqrt[4]{\frac{\mathrm{f}_{\pi se}}{\mathrm{f}_{\pi s}}} \right)^9 \cdot \left(1 - \frac{\alpha_{\pi}}{\alpha_{\pi s}} \right)^9 .$$
31	Muon-proton mass ratio $r_{\pi\mu\mathrm{p}}$: $$r_{\pi\mu\mathrm{p}} = \frac{m_{\pi\mu}}{m_{\pi \mathrm{p}}} = (1 + a_{\pi\mu}) \cdot \frac{\mu_{\pi \mathrm{N}}}{\lvert \mu_{\pi\mu} \rvert} .$$

Table 2. Formulas are presented for determining the values of FPC.

N	The name of the parameter	Symbol	Formula	Unit SGS
1	Compton wavelength	$\lambda_{\pi C0}$	$\lambda_{\pi C0} = 2 \cdot \sqrt{\frac{\psi_{\pi}}{\mathrm{f}_{\pi s}}} \cdot u_{\pi l}$	sm
2	Rydberg constant	$R_{\pi\infty 0}$	$R_{\pi\infty 0} = \frac{2\cdot\pi^2\cdot\alpha_{\pi}^2}{\lambda_{\pi C0}}$	sm^{-1}
3	The matching coefficient constants $R_{\pi\infty 0}$ (Pi-Theory) and R_{∞} (CODATA)	$\kappa_{\pi R}$	$\kappa_{\pi R} = \frac{R_{\pi\infty 0}}{R_{\infty}}$	-

N	The name of the parameter	Symbol	Formula	Unit SGS
4	Rydberg constant	$R_{\pi\infty}$	$R_{\pi\infty} = \frac{R_{\pi\infty 0}}{\kappa_{\pi R}}$	sm^{-1}
5	Compton wavelength	$\lambda_{\pi C}$	$\lambda_{\pi C} = \frac{2 \cdot \pi^2 \cdot \alpha_\pi^2}{R_{\pi\infty}}$	sm
6	Bohr radius	$a_{\pi 0}$	$a_{\pi 0} = \frac{\alpha_\pi}{2 \cdot R_{\pi\infty}}$	sm
7	Electron mass*	$m_{\pi e}$	$m_{\pi e} = \pi^2 \cdot f_{\pi s}^3 \cdot \rho_{\pi Se} \cdot \lambda_{\pi C}^2$	g
8	Quantum of circulation	$q_{\pi c}$	$q_{\pi c} = \lambda_{\pi C} \cdot c$	$sm^2\ s^{-1}$
9	Planck constant	h_π	$h_\pi = m_{\pi e} \cdot q_{\pi c}$	$g\ sm^2\ s^{-1}$
10	Elementary charge	e_π	$e_\pi = (\pm\sqrt{\alpha_\pi}) \cdot \sqrt{h_\pi \cdot c}$	$g^{1/2}\ sm^{3/2}\ s^{-1}$
11	Electron charge to mass quotient	$k_{\pi e/m}$	$k_{\pi e/m} = \frac{\lvert e_\pi \rvert}{m_{\pi e}}$	$g^{-1/2}\ sm^{3/2}\ s^{-1}$
12	Constant for Rydberg atom of protium	$R_{\pi H}$	$R_{\pi H} = \frac{R_{\pi\infty}}{1 + r_{\pi ep}}$	sm^{-1}
13	Proton mass	$m_{\pi p}$	$m_{\pi p} = \frac{m_{\pi e}}{r_{ep}}$	g
14	Proton Compton wavelength	$\lambda_{\pi C,p}$	$\lambda_{\pi C,p} = r_{ep} \cdot \lambda_{\pi C}$	sm
15	Muon mass	$m_{\pi\mu}$	$r_{\pi\mu p} \cdot m_{\pi p}$	g
16	Muon Compton wavelength	$\lambda_{\pi C,\mu}$	$\lambda_{\pi C,\mu} = \frac{\lambda_{\pi C,p}}{r_{\pi\mu p}}$	sm
17	Neutron mass	$m_{\pi n}$	$m_{\pi n} = \frac{m_{\pi e}}{r_{en}}$	g
18	Neutron Compton wavelength	$\lambda_{\pi C,n}$	$\lambda_{\pi C,n} = r_{en} \cdot \lambda_{\pi C}$	sm
19	Atomic mass constant	$m_{\pi u}$	$m_{\pi u} = \frac{r_{\pi\mu,pn}^2}{\sqrt[3]{\pi^2}} \cdot \left(\frac{1 + r_{\pi ep}}{r_{\pi pn}}\right) \cdot \left(\frac{f_{\pi s0}}{f_{\pi s}}\right)^4 \cdot m_{\pi p}$	g
20	Molar Planck constant	$h_{\pi M}$	$h_{\pi M} = \frac{h_\pi}{m_{\pi u}}$	$sm^2\ s^{-1}$
21	Faraday constant	F_π	$F_\pi = \frac{\lvert e_\pi \rvert}{m_{\pi u}}$	$g^{-1/2}\ sm^{3/2}\ s^{-1}$
22	Josephson constant	$K_{\pi J}$	$K_{\pi J} = \frac{2 \cdot \lvert e_\pi \rvert}{h_\pi}$	$g^{-1/2}\ sm^{-1/2}$
23	von Klitzing constant	$R_{\pi K}$	$R_{\pi K} = \frac{h_\pi}{e_\pi^2}$	$sm^{-1}\ s$
24	Planck length	$l_{\pi P}$	$l_{\pi P} = \psi_\pi \cdot \lambda_{\pi C}$	sm
25	Planck time	$t_{\pi P}$	$t_{\pi P} = \frac{l_{\pi P}}{c}$	s
26	Planck mass	$m_{\pi P}$	$m_{\pi P} = \frac{m_{\pi e}}{\psi_\pi}$	g

N	The name of the parameter	Symbol	Formula	Unit SGS
27	Newtonian constant of gravitation	G_π	$G_\pi = \dfrac{h_\pi \cdot c}{m_{\pi P}^2}$	g $^{-1}$ sm ^{3} s $^{-2}$
28	The matching coefficient temperature $u_{\pi T} = 1{,}0\ [\mathrm{K}]$, $T_0 = 273{,}16\left[\mathrm{K}\right]$	$k_{\pi T}$	$k_{\pi T} = \dfrac{T_0}{u_{\pi T}}$	-
29	Boltzmann constant	$k_{\pi B}$	$k_{\pi B} = \sqrt{\dfrac{\psi_\pi^3}{2 \cdot \pi^2 \cdot \mathrm{f}_{\pi s}^3} \cdot \dfrac{2 \cdot m_{\pi P} \cdot c^2}{k_{\pi T} \cdot u_{\pi T}}}$	g sm ^{2} s $^{-2}$ K $^{-1}$

***** – the surface density of the mass of the electron $\rho_{\pi Se}$ is a equal to the surface density $\rho_{\pi Se}$ of the Unitary of system of units PI-Theory: $u_{\pi l} = 1.0[\mathrm{sm}]$, $u_{\pi m} = 1.0[\mathrm{g}]$, $u_{\pi t} = 1.0[\mathrm{s}]$, $u_{\pi T} = 1.0\left[\mathrm{K}\right]$; $\rho_{\pi Se} = u_{\pi\rho S} = \dfrac{u_{\pi m}}{u_{\pi l}^2}$.

3. The results of theoretical calculations

Table 3. The results of the theoretical calculations in accordance with Table 1.

N	The name of the parameter	Symbol	Numeric value
1	the scalar parameter of the Medium	p_{fr}	3.141 592 653 589 793 238 462 643 383 2795
2	scalar structure parameter of space – time	$\mathrm{f}_{\pi s}$	1.161 712 977 019 596 928 970 254 553 1147 x 10^{-3}
3	coefficient of skewness	k_π	1.000 000 081 371 686 023 215 889 742 3969
4	scalar parameter of the elementary charge	α_π	1.161 409 733 400 893 939 488 207 988 0708 x 10^{-3}
5	constant parametric connection	β_π	1.000 261 099 601 615 200 373 179 794 6737
6	coefficient of absolute stability	$k_{\pi st}$	1.000 000 732 345 412 577 634 571 480 525
7	constant scale invariance	ψ_π	1.669 642 831 928 813 892 580 472 151 077 x 10^{-23}
8	coefficient electroweak of asymmetry	$k_{\pi w}$	1.000 000 081 810 773 063 436 894 140 0978
9	scalar parameter weak interaction	$\alpha_{\pi w}$	2.454 323 392 693 189 976 915 245 746 5274 x 10^{-7}
10	constant of the strong interaction	$\alpha_{\pi s}$	1.571 115 208 075 978 141 954 476 726 012 x 10^{1}
11	electron-proton mass ratio	$r_{\pi \mathrm{ep}}$	5.446 170 218 699 090 667 403 109 649 777 x 10^{-4}
12	electromagnetic the constant of asymmetry	$\Delta_{\pi a}$	1.757 552 613 321 940 865 158 064 577 x 10^{-6}
13	anomaly of the magnetic moment of the electron	$a_{\pi \mathrm{e}}$	1.159 652 180 787 571 998 623 049 923 493 x 10^{-3}
14	anomaly of the magnetic moment of the muon	$a_{\pi \mu}$	1.165 920 932 325 338 116 640 429 308 749 x 10^{-3}
15	electron-neutron mass ratio	$r_{\pi \mathrm{en}}$	5.438 673 445 786 830 889 662 641 220 105 x 10^{-4}
16	neutron-proton mass ratio	$r_{\pi \mathrm{np}}$	1.001 378 419 386 085 276 312 923 899 0331
17	proton-neutron magnetic moment ratio	$r_{\pi \mu, \mathrm{pn}}$	-1.459 898 124 622 977 783 495 815 120
18	muon-nuclear magneton magnetic moment ratio	$r_{\pi \mu \mathrm{N}}$	-8.890 596 980 041 473 335 184 878 209 923
19	muon-proton mass ratio	$r_{\pi \mu \mathrm{p}}$	0.112 609 527 029 494 823 131 341 129 339

Table 4. The results of the theoretical calculations in accordance with Table 2. Source data: Rydberg constant $1.097\ 373\ 156\ 8539(55) \cdot 10^5 \left[\mathrm{sm}^{-1}\right]$ (CODATA 2010), speed of light in vacuum $2.997\ 924\ 58 \cdot 10^{10} \left[\mathrm{sm} \cdot \mathrm{s}^{-1}\right]$, temperature $T_0 = 273.16\ \left[\mathrm{K}\right]$.

N	The name of the parameter	Symbol	Numerical value (SGS)	Unit SGS
1	Compton wavelength	$\lambda_{\pi C0}$	2.397 686 311 973 620 x 10^{-10}	sm
2	Rydberg constant	$R_{\pi\infty 0}$	1.10 473 757 591 524 x 10^{5}	sm^{-1}
3	the matching coefficient constants $R_{\pi\infty 0}$ (Pi-Theory) and R_{∞} (CODATA)	$\kappa_{\pi R}$	1.011 938 145 7946	-
4	Rydberg constant	$R_{\pi\infty}$	1.097 373 156 8539 x 10^{5}	sm^{-1}
5	Compton wavelength	$\lambda_{\pi C}$	2.426 310 240 7357 x 10^{-10}	sm
6	Bohr radius	$a_{\pi 0}$	5.291 772 111 1867 x 10^{-9}	sm
7	electron mass	$m_{\pi e}$	9.109 382 325 3402 x 10^{-28}	g
8	quantum of circulation	$q_{\pi c}$	7.273 895 109 4073	sm^{2} s^{-1}
9	Planck constant	h_{π}	6.626 069 154 6014 x 10^{-27}	g sm^{2} s^{-1}
10	elementary charge	e_{π}	4.803 204 354 1649 x 10^{-10}	$g^{1/2}$ $sm^{3/2}$ s^{-1}
11	electron charge to mass quotient	$k_{\pi e/m}$	5.272 810 145 2098 x 10^{17}	$g^{-1/2}$ $sm^{3/2}$ s^{-1}
12	constant for Rydberg atom of protium	$R_{\pi H}$	1.096 775 834 0655 x 10^{5}	sm^{-1}
13	proton mass	$m_{\pi p}$	1.672 621 669 8229 x 10^{-24}	g
14	proton Compton wavelength	$\lambda_{\pi C,p}$	1.321 409 857 4420 x 10^{-13}	sm
15	muon mass	$m_{\pi\mu}$	1.883 531 351 3804 x 10^{-25}	g
16	muon Compton wavelength	$\lambda_{\pi C,\mu}$	1.173 444 105 7513 x 10^{-12}	sm
17	neutron mass	$m_{\pi n}$	1.674 927 243 9581 x 10^{-24}	g
18	neutron Compton wavelength	$\lambda_{\pi C,n}$	1.319 590 907 7531 x 10^{-13}	sm
19	atomic mass constant	$m_{\pi u}$	1.660 539 062 8310 x 10^{-24}	g
20	molar Planck constant	$h_{\pi M}$	3.990 312 123 8863 x 10^{-3}	sm^{2} s^{-1}
21	Faraday constant	F_{π}	2.892 557 279 5476 x 10^{14}	$g^{-1/2}$ $sm^{3/2}$ s^{-1}
22	Josephson constant	$K_{\pi J}$	1.449 789 986 2181 x 10^{17}	$g^{-1/2}$ $sm^{-1/2}$
23	von Klitzing constant	$R_{\pi K}$	2.872 062 163 8102 x 10^{-8}	sm^{-1} s
24	Planck length	$l_{\pi P}$	4.051 071 501 4798 x 10^{-33}	sm
25	Planck time	$t_{\pi P}$	1.351 291 999 9741 x 10^{-43}	s
26	Planck mass	$m_{\pi P}$	5.455 886 822 7026 x 10^{-5}	g
27	Newtonian constant of gravitation	G_{π}	6.673 381 632 9142 x 10^{-8}	g^{-1} sm^{3} s^{-2}
28	the matching coefficient temperature $u_{\pi T} = 1.0\,[\mathrm{K}]$, $T_0 = 273.16\left[\mathrm{K}\right]$	$\kappa_{\pi T}$	273.16	-
29	Boltzmann constant	$k_{\pi B}$	1.392 329 050 1871 x 10^{-16}	g sm^{2} s^{-2} K^{-1}

Table 5 shows the comparison of data CODATA 2010 with theoretical calculations of the Pi-Theory.

Table 5. In accordance with the list of parameters from tables 1 and 2 shows: the values of FPC recommended by CODATA (2010) for international use – from the publication on the NIST website at the address http://physics.nist.gov/cuu/Constants/index.html; the calculation results from tables 3 and 4; the results of data comparison (column 6), δ_r – the relative uncertainty.

parameter a (CODATA)	Numerical value, SGS (CODATA 2010)	Relative std.	parameter a* (Pi-Theory)	Numerical value, SGS (Pi-Theory)	$\delta_r = \dfrac{a^* - \bar{a}}{a^*}$
1	2	3	4	5	6
α	7.297 352 5698(24) x 10^{-3}	3.2 x 10^{-10}	$\alpha_\pi \cdot 2\pi$	7.297 352 572 519 857 x 10^{-3}	3.7 x 10^{-10}
a_e	1.159 652 180 76(27) x 10^{-3}	2.3 x 10^{-10}	$a_{\pi e}$	1.159 652 180 787 572 x 10^{-3}	0. x 10^{-10}
a_μ	1.165 920 91(63) x 10^{-3}	5.4 x 10^{-7}	$a_{\pi\mu}$	1.165 920 932 325 338 x 10^{-3}	0.2 x 10^{-7}
m_e / m_p	5.446 170 2178(22) x 10^{-4}	4.1 x 10^{-10}	$r_{\pi ep}$	5.446 170 218 699 091 x 10^{-4}	1.7 x 10^{-10}
m_e / m_n	5.438 673 4461(32) x 10^{-4}	5.8 x 10^{-10}	$r_{\pi en}$	5.438 673 445 786 832 x 10^{-4}	-0.6 x 10^{-10}
m_n / m_p	1.001 378 419 17(45)	4.5 x 10^{-10}	$r_{\pi np}$	1.001 378 419 386 085	2.2 x 10^{-10}
μ_p / μ_n	-1.459 898 06(34)	2.4 x 10^{-7}	$r_{\pi\mu,pn}$	-1.459 898 124 622 978	0.4 x 10^{-7}
$\mu_{\pi\mu} / \mu_{\pi N}$	-8.890 596 97(22)	2.5 x 10^{-8}	$r_{\pi\mu N}$	-8.890 596 980 041 473	0.1 x 10^{-8}
$m_{\pi\mu} / m_{\pi p}$	0.112 609 5272(28)	2.5 x 10^{-8}	$r_{\pi\mu p}$	0.112 609 527 029 495	-0.1 x 10^{-8}
R_∞	1.097 373 156 8539(55) x 10^{5}	5.0 x 10^{-12}	$R_{\pi\infty}$	1.097 373 156 8539 x 10^{5}	0.0
λ_C	2.426 310 2389(16) x 10^{-10}	6.5 x 10^{-10}	$\lambda_{\pi C}$	2.426 310 240 7357 x 10^{-10}	7.6 x 10^{-10}
a_0	0.529 177 210 92(17) x 10^{-8}	3.2 x 10^{-10}	$a_{\pi 0}$	0.529 177 211 1187 x 10^{-8}	3.8 x 10^{-10}
m_e	9.109 382 91(40) x 10^{-28}	4.4 x 10^{-8}	$m_{\pi e}$	9.109 382 325 3402 x 10^{-28}	-6.4 x 10^{-8}
h / m_e	7.273 895 1040(47)	6.5 x 10^{-10}	$q_{\pi c}$	7.273 895 109 4073	7.4 x 10^{-10}
m_μ	1.883 531 475(96) x 10^{-25}	5.1 x 10^{-8}	$m_{\pi\mu}$	1.883 531 351 3804 x 10^{-25}	-6.6 x 10^{-8}
m_p	1.672 621 777(74) x 10^{-24}	4.4 x 10^{-8}	$m_{\pi p}$	1.672 621 669 8229 x 10^{-24}	-6.4 x 10^{-8}
m_n	1.674 927 351(74) x 10^{-24}	4.4 x 10^{-8}	$m_{\pi n}$	1.674 927 243 9581 x 10^{-24}	-6.4 x 10^{-8}
$\lambda_{C,\mu}$	1.173 444 103(30) x 10^{-12}	2.5 x 10^{-8}	$\lambda_{\pi C,\mu}$	1.173 444 105 7513 x 10^{-12}	0.2 x 10^{-8}
$\lambda_{C,p}$	1.321 409 856 23(94) x 10^{-13}	7.1 x 10^{-10}	$\lambda_{\pi C,p}$	1.321 409 857 4420 x 10^{-13}	9.2 x 10^{-10}
$\lambda_{C,n}$	1.319 590 9068(11) x 10^{-13}	8.2 x 10^{-10}	$\lambda_{\pi C,n}$	1.319 590 907 7531 x 10^{-13}	7.2 x 10^{-10}
m_u	1.660 538 921(73) x 10^{-24}	4.4 x 10^{-8}	$m_{\pi u}$	1.660 539 062 8310 x 10^{-24}	8.5 x 10^{-8}
l_P	1.616 199(97) x 10^{-33}	6.0 x 10^{-5}	$l_{\pi P} / \sqrt{2\pi}$	1.616 143 702 8696 x 10^{-33}	-3.4 x 10^{-5}
t_P	5.391 06(32) x 10^{-44}	6.0 x 10^{-5}	$t_{\pi P} / \sqrt{2\pi}$	5.390 875 119 5788 x 10^{-44}	-3.4 x 10^{-5}
m_P	2.176 51(13) x 10^{-5}	6.0 x 10^{-5}	$m_{\pi P} / \sqrt{2\pi}$	2.176 583 930 6611 x 10^{-5}	3.4 x 10^{-5}
h	6.626 069 57(29) x 10^{-27}	4.4 x 10^{-8}	h_π	6.626 069 154 6014 x 10^{-27}	-6.3 x 10^{-8}
G	6.673 84(80) x 10^{-8}	1.2 x 10^{-4}	G_π	6.673 381 632 9142 x 10^{-8}	-0.7 x 10^{-4}
k	1.380 6488(13) x 10^{-16}	9.1 x 10^{-7}	$k_{\pi B}$	1.392 329 050 1871 x 10^{-16}	0.85%

4. Conclusions

From comparison of the data presented in table 5, it follows that proposed in this paper analytical method suitable for the theoretical definition of FPC. Data CODATA 2014 - this checking of Pi-Theory on "aptitude".