

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 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 p_{fr} (free parameter): $p_{fr} = \pi$.
2	Scalar parameter of the elementary charge $\alpha_{\pi 0}$. Is the real root of the equation $\varphi_{\pi 0}^3 \cdot \pi^2 \cdot \alpha_{\pi 0} \cdot \bar{\beta}_{\pi} = (1 + \Delta y_{\pi 0} \cdot \alpha_{\pi 0})^3,$ where: $\varphi_{\pi 0} = \sqrt{2} \cdot \pi$; $\Delta y_{\pi 0} = \sqrt[4]{2} \cdot \pi$; $\bar{\beta}_{\pi} = 1 + \bar{\beta}_{\pi 0}$; $\bar{\beta}_{\pi 0} = \alpha_{\pi 0} / \varphi_{\pi 0}$.
3	Scalar structure parameter of space – time $f_{\pi s 0}$: $f_{\pi s 0} = \alpha_{\pi 0} \cdot \bar{\beta}_{\pi}.$
4	Constant parametric bias $\Delta y_{\pi e}$: $\Delta y_{\pi e} = \frac{\Delta_{\pi x}}{\Delta y_{\pi 0}^3}.$
5	Coefficient $\Delta_{\pi x}$. Is determined from the equation $\frac{1}{\varphi_{\pi 0}} \cdot \alpha_{\pi x 1, 2}^2 + \alpha_{\pi x 1, 2} - \bar{\beta}_{\pi} = 0$ in the form $\Delta_{\pi x} = \frac{\alpha_{\pi x 1}}{\alpha_{\pi x 2}}$.
6	Constant parametric connection $\beta_{\pi e}$: $\beta_{\pi e} = 1 + \beta_{\pi 0 e}; \beta_{\pi 0 e} = \frac{\bar{\beta}_{\pi 0}}{\bar{\beta}_{\pi}^3}.$
7	Scalar parameter of the elementary charge $\alpha_{\pi e}$. The real root of the equation $\varphi_{\pi 0}^3 \cdot \pi^2 \cdot \alpha_{\pi e} \cdot \beta_{\pi e} = (1 + \Delta y_{\pi e} \cdot \alpha_{\pi e})^3.$
8	Scalar structure parameter of space – time $f_{\pi s e}$: $f_{\pi s e} = \alpha_{\pi e} \cdot \beta_{\pi e}.$

N The name of the parameter and the formula Pi-Theory

9 Scalar structure parameter of space – time $\vec{f}_{\pi s}$:

$$\vec{f}_{\pi s} = \sqrt[4]{f_{\pi s 0} \cdot f_{\pi s e}^3} .$$

10 Scalar structure parameter of space – time $f_{\pi s}$:

$$f_{\pi s} = \sqrt[3]{\frac{f_{\pi s e}^4}{f_{\pi s 0}}} .$$

11 Coefficient of skewness k_{π} :

$$k_{\pi} = \sqrt[4]{\frac{\vec{f}_{\pi s}}{f_{\pi s}}} .$$

12 Coefficient of absolute stability $k_{\pi st}$:

$$k_{\pi st} = k_{\pi}^9 .$$

13 Scalar parameter of the elementary charge α_{π} :

$$\alpha_{\pi} = \frac{\alpha_{\pi e}}{k_{\pi}} .$$

14 Constant parametric connection β_{π} :

$$\beta_{\pi} = \frac{f_{\pi s}}{\alpha_{\pi}} .$$

15 Constant scale invariance ψ_{π} :

$$\psi_{\pi} = k_{\pi \psi} \cdot \psi_{\pi 0} ; k_{\pi \psi} = \frac{2 \cdot \alpha_{\pi}^6}{\sqrt{\pi} \cdot f_{\pi s}^6} , \psi_{\pi 0} = 4 \cdot \pi^6 \cdot f_{\pi s}^9 .$$

16 Constant parametric bias Δy_{π} . Determined by direct calculation from the equation

$$\varphi_{\pi 0}^3 \cdot \pi^2 \cdot f_{\pi s} = (1 + \Delta y_{\pi} \cdot \alpha_{\pi})^3 .$$

17 Constant of the strong interaction $\alpha_{\pi s}$. The real root of the equation

$$\varphi_{\pi 0}^3 \cdot \pi^2 \cdot \alpha_{\pi s} \cdot \beta_{\pi} = (1 + \Delta y_{\pi} \cdot \alpha_{\pi s})^3 .$$

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

$$\varphi_{\pi 0}^3 \cdot \pi^2 \cdot \alpha_{\pi x} \cdot \bar{\beta}_{\pi} = (1 + \Delta y_{\pi 0} \cdot \alpha_{\pi x})^3 \text{ and } \varphi_{\pi 0}^3 \cdot \pi^2 \cdot \alpha_{\pi y} \cdot \beta_{\pi e} = (1 + \Delta y_{\pi e} \cdot \alpha_{\pi y})^3 \text{ respectively.}$$

19 Anomaly of the magnetic moment $a_{\pi ex}$. Determined by direct calculation from the equation

$$(1 + \Delta y_{\pi e} \cdot \alpha_{\pi e})^3 = k_{\pi q}^4 \cdot (1 + \Delta y_{\pi e} \cdot a_{\pi ex})^3 .$$

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 $a_{\pi e}$:

$$a_{\pi e} = \alpha_{\pi} - \Delta_{\pi a} .$$

22 Anomaly of the magnetic moment $a_{\pi \mu x}$:

$$a_{\pi \mu x} = \frac{f_{\pi s e}^3}{a_{\pi ex}^2} .$$

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23 Anomaly of the magnetic moment of the muon $a_{\pi\mu}$:

$$a_{\pi\mu} = a_{\pi\mu x} \cdot \left(\sqrt[4]{(1 + \Delta y_{\pi} \cdot \alpha_{\pi})^3} \right)^3 \cdot k_{\pi}^4.$$

24 Coefficient electroweak of asymmetry $k_{\pi w}$:

$$k_{\pi w} = k_{\pi} \cdot \left(\frac{1 + f_{\pi se}}{1 + f_{\pi s}} \right)^2 \cdot \left[1 + \left(-\frac{(\pi - 1)^2}{\pi} \right)^4 \cdot \frac{4}{\varphi_{\pi 0}} \cdot f_{\pi s}^4 \right].$$

25 Scalar parameter weak interaction $\alpha_{\pi w}$:

$$\alpha_{\pi w} = k_{\pi w}^3 - 1.$$

26 Electron-proton mass ratio $r_{\pi ep}$:

$$r_{\pi ep} = \frac{m_{\pi e}}{m_{\pi p}} = \left[\frac{f_{\pi s} \cdot (1 + \Delta y_{\pi} \cdot \alpha_{\pi})^3}{\sqrt[3]{\pi^2}} \right] \cdot \left(1 - \frac{\alpha_{\pi}}{\alpha_{\pi s}} \right) \cdot k_{\pi st}.$$

27 Electron-neutron mass ratio $r_{\pi en}$:

$$r_{\pi en} = \frac{m_{\pi e}}{m_{\pi n}} = \left[\frac{f_{\pi s} \cdot (1 + \Delta y_{\pi} \cdot \alpha_{\pi})^3}{\sqrt[3]{\pi^2}} \right] \cdot \left(\frac{a_{\pi e} + \alpha_{\pi w}}{a_{\pi e} + \Delta_{\pi a}} \right).$$

28 Neutron-proton mass ratio $r_{\pi np}$:

$$r_{\pi np} = \frac{m_{\pi n}}{m_{\pi p}} = \left(1 - \frac{\alpha_{\pi}}{\alpha_{\pi s}} \right) \cdot \left(\frac{a_{\pi e} + \Delta_{\pi a}}{a_{\pi e} + \alpha_{\pi w}} \right) \cdot k_{\pi st}.$$

29 Proton-neutron magnetic moment ratio $r_{\pi\mu, pn}$:

$$r_{\pi\mu, pn} = \frac{\mu_{\pi p}}{\mu_{\pi n}} = \left[-\frac{(\pi - 1)^2}{\pi} \right] \cdot \frac{(1 + \alpha_{\pi w})^2}{(1 + \Delta_{\pi a})^2}.$$

30 Muon-nuclear magneton magnetic moment ratio $r_{\pi\mu N}$:

$$r_{\pi\mu N} = \frac{\mu_{\pi\mu}}{\mu_{\pi N}} = \left(-\frac{(2 \cdot \pi - 1)^2}{\pi} \right) \cdot \left(\sqrt[4]{\frac{f_{\pi se}}{f_{\pi s}}} \right)^9 \cdot \left(1 - \frac{\alpha_{\pi}}{\alpha_{\pi s}} \right)^9.$$

31 Muon-proton mass ratio $r_{\pi\mu p}$:

$$r_{\pi\mu p} = \frac{m_{\pi\mu}}{m_{\pi p}} = (1 + a_{\pi\mu}) \cdot \frac{\mu_{\pi N}}{|\mu_{\pi\mu}|}.$$

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

N	The name of the parameter	Symbol	Formula	Unit SGS
1	Compton wavelength	$\lambda_{\pi C0}$	$\lambda_{\pi C0} = 2 \cdot \sqrt{\frac{\psi_{\pi}}{f_{\pi s}}} \cdot u_{\pi l}$	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	$R_{\pi\infty}$	$R_{\pi\infty} = \frac{R_{\pi\infty 0}}{k_{\pi R}}$	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	$q_{\pi c}$	$q_{\pi c} = \lambda_{\pi C} \cdot c$	$\text{sm}^2 \text{s}^{-1}$
9	Planck constant	h_{π}	$h_{\pi} = m_{\pi e} \cdot q_{\pi c}$	$\text{g sm}^2 \text{s}^{-1}$
10	Elementary charge	e_{π}	$e_{\pi} = (\pm \sqrt{\alpha_{\pi}}) \cdot \sqrt{h_{\pi} \cdot c}$	$\text{g}^{1/2} \text{sm}^{3/2} \text{s}^{-1}$
11	Electron charge to mass quotient	$k_{\pi e/m}$	$k_{\pi e/m} = \frac{ e_{\pi} }{m_{\pi e}}$	$\text{g}^{-1/2} \text{sm}^{3/2} \text{s}^{-1}$
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	$m_{\pi p}$	$m_{\pi p} = \frac{m_{\pi e}}{r_{\pi ep}}$	g
14	Proton Compton wavelength	$\lambda_{\pi C,p}$	$\lambda_{\pi C,p} = r_{\pi ep} \cdot \lambda_{\pi C}$	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	$m_{\pi n}$	$m_{\pi n} = \frac{m_{\pi e}}{r_{\pi en}}$	g
18	Neutron Compton wavelength	$\lambda_{\pi C,n}$	$\lambda_{\pi C,n} = r_{\pi en} \cdot \lambda_{\pi C}$	sm
19	Atomic mass constant	$m_{\pi u}$	$m_{\pi u} = \frac{r_{\pi \mu, pn}^2}{\sqrt[3]{\pi^2}} \cdot \left(\frac{1 + r_{\pi ep}}{r_{\pi pn}} \right) \cdot \left(\frac{f_{\pi s 0}}{f_{\pi s}} \right)^4 \cdot m_{\pi p}$	g
20	Molar Planck constant	$h_{\pi M}$	$h_{\pi M} = \frac{h_{\pi}}{m_{\pi u}}$	$\text{sm}^2 \text{s}^{-1}$
21	Faraday constant	F_{π}	$F_{\pi} = \frac{ e_{\pi} }{m_{\pi u}}$	$\text{g}^{-1/2} \text{sm}^{3/2} \text{s}^{-1}$
22	Josephson constant	$K_{\pi J}$	$K_{\pi J} = \frac{2 \cdot e_{\pi} }{h_{\pi}}$	$\text{g}^{-1/2} \text{sm}^{-1/2}$
23	von Klitzing constant	$R_{\pi K}$	$R_{\pi K} = \frac{h_{\pi}}{e_{\pi}^2}$	$\text{sm}^{-1} \text{s}$
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	$G_\pi = \frac{h_\pi \cdot c}{m_{\pi P}^2}$	$\text{g}^{-1} \text{sm}^3 \text{s}^{-2}$
28	The matching coefficient temperature $u_{\pi T} = 1,0 [\text{K}], T_0 = 273,16 [\text{K}]$	$k_{\pi T}$	$k_{\pi T} = \frac{T_0}{u_{\pi T}}$	-
29	Boltzmann constant	$k_{\pi B}$	$k_{\pi B} = \sqrt{\frac{\psi_\pi^3}{2 \cdot \pi^2 \cdot f_{\pi S}^3}} \cdot \frac{2 \cdot m_{\pi P} \cdot c^2}{k_{\pi T} \cdot u_{\pi T}}$	$\text{g sm}^2 \text{s}^{-2} \text{K}^{-1}$

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

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	\mathbf{p}_{fr}	3.141 592 653 589 793 238 462 643 383 2795
2	scalar structure parameter of space – time	$\mathbf{f}_{\pi S}$	1.161 712 977 019 596 928 970 254 553 1147 x 10^{-3}
3	coefficient of skewness	\mathbf{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	$r_{\pi ep}$	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	$a_{\pi e}$	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	$r_{\pi en}$	5.438 673 445 786 830 889 662 641 220 105 x 10^{-4}
16	neutron-proton mass ratio	$r_{\pi np}$	1.001 378 419 386 085 276 312 923 899 0331
17	proton-neutron magnetic moment ratio	$r_{\pi \mu, pn}$	-1.459 898 124 622 977 783 495 815 120
18	muon-nuclear magneton magnetic moment ratio	$r_{\pi \mu N}$	-8.890 596 980 041 473 335 184 878 209 923
19	muon-proton mass ratio	$r_{\pi \mu p}$	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 $1.097\ 373\ 156\ 8539(55) \cdot 10^5 [\text{sm}^{-1}]$ (CODATA 2010), speed of light in vacuum $2.997\ 924\ 58 \cdot 10^{10} [\text{sm} \cdot \text{s}^{-1}]$, temperature $T_0 = 273.16 [\text{K}]$.

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

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