Comment on our sciencephilosophy.pdf files 1- 4, 2006 - 2008

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Dear reader,

The heuristic & tentative work reported in the files mentioned started in 2004/2005 and was based on α(0)- , Planck mass- and charged lepton rest-masses' CODATA 2002 values. Our aim in search of a possible role of fractal geometry (understood in a more general sense) in scaling electrodynamics' fundamentals could never be utmost precision of relations found (if any), due to trial-and-error fit methods used. Nevertheless, good accuracy was strived for whenever possible. Meanwhile, new CODATA values are available, e.g. α(0) = 0.0072973525376(50) instead of its 2002 value α(0) = 0.007297352568(24). The data re-evaluation's effect on fit precision of our $M_{Planck}/2m_{electron}$ relation is accuracy's reduction from 6ppm to 11ppm, but there probably is no need for formula's correction. Our modified α(0)-approximation, this written in terms of the M_P/m_e mass ratio mentioned (the modification affecting the small correction term of Eq.(1) by a Γ(P)/2 factor, Γ(P) suspected to be missing by our symmetry considerations, Γ(ξ(c)) been present but Γ(ξ(c_k)) absent) now reads

$$\alpha(0) \approx \frac{1}{2\pi\delta^2}[\exp(-\frac{1}{\ln(CM_P^2/m_e^2)^2/4 - \gamma\pi\Gamma(P)P/4})]\,, \quad C = \frac{\pi P}{8}\frac{c_D^2\ln(\delta)^2}{\ln(\delta_{2D})^2}\,, \qquad \text{Eq.(1)}$$

the so modified expression for the infinite distance limit of electromagnetic force's effective coupling constant – rewritten to stress join to number theory – now being

$$\alpha(0) \approx \frac{1}{2\pi\delta^2}[\exp(-\frac{1}{\gamma(e^{\pi+1}\pi^{e+1} - \pi\Gamma(P)P/4)})]\,. \qquad \text{Eq.(2)}$$

There is some concern over the exp-function-argument's denominator's shape, the terms likely from spontaneous symmetry breaking/polarization and charge↔mass interplay (this outlined by external angles $\xi^{\infty}(c)\xi^{\infty}(c_k)$) present, but such only tied to close-range field ($\sim\xi^0(-2)\xi^0(c_D)$ among [$\gamma(e^{\pi+1}\pi^{e+1} - \pi P/2) - \ln(2)^2/16$] shape) absent. In generalization of the πΓ(P)P/4 term toward a relative variable-mass-at-constant-charge expression, rewritten in terms of external angles and Mandelbrot set's real c-axis values, $[\Gamma(\xi(-2))^2\Gamma(\xi(c_D))\xi(-2)\xi(c_D)]/2$ could be used, so finally ending up with a $[\Gamma(\xi_o)^2\xi_o\Gamma(P)P]/2$ term. Thus, the small correction term in the generalized α(0)'s exp-function's argument in its modified form (Maxwell's curve ~fit in brackets**) reads**

$$Z_{int}^2 \equiv \frac{\gamma\Gamma(\xi_o)\Gamma(\xi_o+1)\Gamma(P)P}{2\Gamma(4\xi_o)^{2+\pi P}}\,, \text{ resembling } (\frac{2\Gamma(P)[\delta^2/(2\pi)]^{3/2}}{\Gamma((e\pi/2)^{1/2})}\xi_o^2\exp(-\delta^2\xi_o^2/2)). \qquad \text{Eq.(3)}$$

The generalized α(0) approximation (file sciencephilosophy4.pdf) after correction

then is given by

$$\alpha(0) \approx \frac{1}{2\pi\delta^2}[\exp(-\frac{\Gamma(4\xi_o)^{2+\pi P}}{\gamma(e^{B(1/2,\,\xi)+1}B(½,\,\xi)^{e+1} - \Gamma(\xi_o)^2\xi_o\Gamma(P)P/2)})]\text{ , with} \qquad \text{Eq.(4)}$$

$$\xi = (1/2 + \frac{\pi^2\,\Gamma(\pi/2+1/2)^2\,\xi_o^{\,2}}{4\Gamma((e/2+1/2)\ln(\pi))\,\Gamma(1/2-\xi_o)})\quad \text{and} \quad \xi_o \in [P,\,1/2]\,. \qquad \text{Eq.(5)}$$

Alternatively, one could tentatively co-incorporate the 1/2 factor of the expression $[\Gamma(\xi(-2))^2\Gamma(\xi(c_D))\xi(-2)\xi(c_D)]/2$ as 2^{nd} $\xi(-2)$ factor, so getting $[\Gamma(\xi(-2))^2\Gamma(\xi(c_D))\xi(-2)^2\xi(c_D)]$, i.e. finally $[\Gamma(\xi_o+1)^2\Gamma(P)P]$ and a $Z_{int}^{\,2} = [\gamma\Gamma(\xi_o+1)^2\Gamma(P)P]/\Gamma(4\xi_o)^{2+\pi P}$ term. Latter term is less suitable for approximately fulfilling the periodicity condition $Z_{int}^{\,2}(1) = Z_{int}^{\,2}(0)$ forced by $0 \le \xi_o < 1$ than $[\gamma\Gamma(\xi_o)^2\xi_o\Gamma(P)P]/[2\Gamma(4\xi_o)^{2+\pi P}]$ is (this for $\xi_o = 1$ giving already $\approx 7.10^{-4}$ instead of zero). Relating to the generalized $\alpha(0)$ fit (both variants give the same value for the electron, $\xi_{oe} = 1/2$), the small corrected terms' effect is small too compared to the large one's unchanged and thus cannot improve the $\alpha(0)$ fit in the 2^{nd} and 3^{rd} generation charged leptons context. Both $Z_{int}^{\,2}(\xi_o)$ curves got resemble Maxwell's (directionally averaged) distribution and in the case of $Z_{int}^{\,2}(1)=0$ remind of the relativistic $v/c \to 1$ limit. So one has the distinct feeling that the occurrence of special relativity originates from phase functionals' periodicity, $\xi(c)$ being $g(f(\varphi))$. Such idea (of course without reference to fractal geometry then) was conjecture by H. Dorfer (private communication in the early 1970s), quite probably by others too.

Use of a $(\pi/2 - 1/2)$ correction factor instead of $\Gamma(P)/2$ and co-incorporation of the 1/2 factor gave $[(\Gamma(\xi(-2))^2 - 1)\Gamma(\xi(-2))^2\xi(-2)^2\xi(c_D)]$, i.e. $[\Gamma(\xi_o+1)^2(\Gamma(\xi_o)^2 - 1)P]$ after its generalization and finally a $Z_{int}^{\,2} = \gamma\Gamma(\xi_o+1)^2(\Gamma(\xi_o)^2 - 1)P/\Gamma(4\xi_o)^{2+\pi P}$ term which fulfils the periodicity condition but looks much less Maxwellian too. Here more insight is needed to get one's choice "in line with nature". Instead of the $\Gamma(P)/2$ or $(\pi/2 - 1/2)$ factors, $2\delta/\delta_{2D}$ was a suitable correction factor too, this intimately related to period doubling oscillations in 1–2D. A 3^{rd} corrective term (p.1, l.37) can be absorbed too.

If the $M_P/2m_e$ mass ratio approximation (from file sciencephilosophy.pdf), rewritten in terms of the approximated $\alpha(0)$ (Eq.(2) of the comment) is needed, the modified one (the $\Gamma(P)/2$ correction factor variant used) reads

$$\frac{M_P}{2m_e} \approx \frac{\sqrt{2}\,\ln(\delta_{2D})}{\sqrt{\pi P}|c_D|\ln(\delta)}\exp([\gamma\pi\Gamma(P)P/4 - 1/\ln(2\pi\delta^2\alpha(0))]^{1/2}). \qquad \text{Eq.(6)}$$

Let Eq.(6)'s exp-function's prefactor be A, then for any of its good fit value variants the mass ratio approximation reads $M_P/m_e \approx 2A\exp([\gamma\pi\Gamma(P)P/4 - 1/\ln(2\pi\delta^2\alpha(0))]^{1/2})$.

If any of the results from sciencephilosopy.pdf files are referred to by the scientific community or by whomever else, corrections given in this comment for the sake of accuracy are asked to be mentioned then too although these do not alter the basic ideas behind, like low-D dynamics' effects maybe telling from nature's digital side.