Short note concerning the Higgs boson mass

(Private Research-Associates*), internal paper, dated: August 2026)

As to the topic stated in the headline, citing our previous work on neutrino mass eigenstates ("Short note concerning neutrino mass eigenstates", PDF on the www.culetto.at website) is inevitable for contextual reasons, and for presentation of the formalism used too: "In our search of hypothetical, fractionally charged heavy leptons (see the summary article PDF "Fractionally charged massive (FCM) leptons predictions: Summary " (2018) of the www.culetto.at website) using the M_P/m_e, M_P/m_i ($i = e, \mu, \tau$, and M_P & m_e being the Planck and electron mass, respectively) approximation formulae Eqs.(1) - (3), an anomaly as to the energy scale had been met. By extending Eq.(3) to continuous external angle values ξ_0 ex [P, 1/2] in the Mandelbrot set's chaotic c-region, and further "analytic continuation" to ξ_0 values > 1/2 and to winding number 1 too, the $2(M_P/2m_e)(m_i/M_P)(m_{e,\ exp})$ [TeV/c^2] relation yielded m_i-results around 5TeV/c^2 at $\xi_{0i} = (1 + 16/31)$. In stark contrast, winding number 1 plus the upper external angle 15/31 of the M-antenna's period-5 last appearance cardioid's cusp gave the extremely small mass result of approx.1.29 x10^{-20} TeV/c^2. Thus, thinking of some connection to light dark matter or/and neutrinos wasn't that weird" (if DM isn't just fossil plastic deformation of spacetime). And in addition to this finding, the very strong $\partial m_i/\partial \xi_{0i}$ dependence seen nourished the hope of maybe even getting the Higgs boson mass-energy equivalent reproduced in terms of the given approximations formalism:

$$\frac{M_P}{2m_e} \approx \frac{\sqrt{2}\,\ln(\delta_{2D})}{\sqrt{\pi P}|c_D|\ln(\delta)} \exp(\gamma^{1/2} e^{\pi/2+1/2} \pi^{e/2+1/2}) \qquad \text{Eq.(1)}$$

$$\frac{M_P}{m_i} \approx \frac{2\ln(\delta_{2D})}{\sqrt{\xi_{0i}P}\,\Gamma(\xi_{0i})|c_D|\ln(\delta)} \exp(\gamma^{1/2} e^{B(1/2,\,\xi_i)/2+1/2} B(1/2,\,\xi_i)^{e/2+1/2})\ ,\quad i = e, \mu, \tau \qquad \text{Eq.(2)}$$

$$\xi_i = (1/2 + \frac{\pi^2\Gamma(\pi/2+1/2)^2\xi_{0i}^{\ 2}}{4\Gamma((e/2+1/2)\ln(\pi))\Gamma(1/2-\xi_{0i})})\ , \qquad \text{Eq.(3)}$$

$\xi_{0e} = 1/2$, $\xi_{0\mu} = \mathrm{SQRT}(P/2)$, $\xi_{0\tau} = P$, (e, μ, τ - mass case),

$$\xi_{0i} = \delta/\pi + [\frac{(\gamma-1)c_{GT}}{4(\Gamma(1-P)/3 - \xi_{00i})\Gamma(1/2-\xi_{00i})}]^3 \quad (\nu\text{-mass eigenvalue case}), \qquad \text{Eq.(4)}$$

$\xi_{001} = 1/2$, $\xi_{002} = \mathrm{SQRT}(P/2)$, $\xi_{003} = P$,

where γ is the Euler-Mascheroni constant, P the Thue-Morse constant, c_D the Mandelbrot set's main bifurcation-series' Myrberg-Feigenbaum point's coordinate, δ Feigenbaum's universal number, δ_{2D} the Feigenbaum number for an area-preserving 2-dimensional

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map (M. Tabor; E.W. Weisstein /Wolfram Research), c_{GT} the coordinate of the pre-period-3 and period-1 Misiurewicz point $M_{3,1}$ (see Pastor et al.) at c = –1.5436890... (= c_{GT} in Eq.(4), abbreviation for this Großmann-Thomae's B_0 - B_1 chaotic band merging point) used as kind of a shortcut-link to chaos, and B being Euler's Beta function.

Like in case of the neutrino mass eigenvalues approximation (see the corresponding PDF of our website), as to Eq.(4), the "zero point" external angle value was kept δ/π, the ratio of the ultimate characteristic numbers in period-doubling-cascade- and period-1-oscillations, respectively. And residues of self-similarity – visible in the set of formulae above – again served as guide to Eq.(6) below, the following ansatz been used:

$$\xi_{0i} = \delta/\pi + \left[\frac{\mathrm{const.}|c|_{max}.|c_{GT}|}{4(\Gamma(1-P)/3 - \xi_0)\Gamma(1/2-\xi_0)}\right]^3 \quad \text{(Higgs boson mass case)}, \qquad \text{Eq.(5)}$$

where $|c|_{max}$ = 4 in order to still get all of the M set's combinatorial features preserved (see A. Douady), the nearest-field (upper) external angle ξ_0 = 1/4 due to the right angle π/2 between the field line and M's c-axis, and thus 3/4 being the substitute for the main series Myrberg-Feigenbaum point's lower external angle (1 – P). After quite some trial-and-error method steps, the following relation was gotten

$$\xi_{0i} = \delta/\pi + \left[\frac{\sqrt{2}|c_{GT}|/|c_D|}{16\gamma(\Gamma(3/4)/3 - 1/4)\Gamma(1/4)}\right]^3 \quad \text{(Higgs boson mass case)}, \qquad \text{Eq.(6)}$$

yielding a Higgs mass energy equivalent of ≈125.4 [GeV] in the formalism above applied. A better but more complicated approximation would contain $\pi\sqrt{3}(4+c_D)/2\gamma|c_{GT}|/(16\delta)$ instead of $\sqrt{2}|c_{GT}|/(16\gamma|c_D|)$ and yield ≈125.1[GeV]**). An earlier approximation by us concerning the Higgs boson – electron mass ratio found the relation

$$\frac{m_{Higgs}}{m_e} \approx \frac{1}{\delta\delta_{2D}}\left(\frac{\ln(\delta)}{\ln(\delta_{2D})}\, e^{\pi+1}\pi^{e+1}\right)^2, \qquad \text{Eq.(7)}$$

where inserting the experimental electron mass value (NIST, converted to [GeV/c^2]) yields a Higgs boson mass of 125.146 [GeV/c^2]. The $1/\delta\delta_{2D}$ pre-factor might be coming from $(\sqrt{\delta\delta_{2D}}\ln(\delta) /(\sqrt{\delta\delta_{2D}}\sqrt{\delta\delta_{2D}}\ln(\delta_{2D})))^2$, there $\sqrt{\delta\delta_{2D}}$ being the geometric mean of the Feigenbaum numbers per dimension of the underlying map. Contrasting to our proton-electron and neutron-electron mass ratio approximation formulae (PDFs see website www.culetto.at), all ingredients in common are being squared here, thus "reproducing" the Klein-Gordon Hamiltonian case, and with the fermions mass ratio approximations, Dirac's "square root" results. Mandelbrot set's many features and fractal geometry in general might be of more impact on the fundamentals of everything there is than widely believed. But AI – asked in this context – neither found a connection to the mainstream science nor any acceptance of our ideas, or criticism of these, respectively.

**) $m_{Higgs,\ exp}$ value from LHC run 2, ATLAS-collaboration (2023), is 125.11 ± 0.11 [GeV/c^2]