Appendix (G1): Internal summary/supplement (October 2020): Mandelbrot set and Special Relativity

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Consider $f_{\mathbb{C}}(z) = z^2 + \mathbb{C}$, and the Mandelbrot set's big cardioid M_1 too, which contains all $\mathbb{C}$ for which $f_{\mathbb{C}}(z)$ has a stable fixed point. By computing $\lambda = df_{\mathbb{C}}(z)/dz$ at the fixed point and by also imposing the stability condition $|\lambda| < 1$, the said period-1 hyperbolic component is the set

$$M_1 = \{ \mathbb{C} \in \mathbb{C} : \mathbb{C} = \frac{\lambda}{2} (1 - \frac{\lambda}{2}) , |\lambda| < 1 \} , \qquad \text{Eq.(1)}$$

(H.-O. Peitgen and P.H. Richter: The Beauty of Fractals, 58, (1986)). The $\mathbb{C} = \lambda/2 - \lambda^2/4$ or $4\mathbb{C} = 2\lambda - \lambda^2$ relation may get rewritten as $4\mathbb{C} = 1 - (\lambda - 1)^2$, which formally is resembling the $(1 - \beta^2)$ factor of SR. Let $D_H(J_{\mathbb{C}}(z)) \in [1, 2]$ be the quadratic Julia set $J_{\mathbb{C}}$'s Hausdorff dimension, then, in case of $(D_H(J_{\mathbb{C}}(z)) - 1) = \beta_{SR}$, $(1 - \beta^2)$ would equal $2D_H(J) - D_H^2(J)$. On the other hand, the relative version of A. Einstein's on-shell relation used by us reads $(E/(2m_0c^2))^2 = (p/(2m_0c))^2 + 1/4$, which is of $z^2 + \mathbb{C}$ shape when being complexified, and the constant $\mathbb{C} = (1/4 + 0i)$ being the cusp point of M_1. For $z_1 = (p/(2m_0c))$, the mentioned derivative would then yield $\lambda = 2z_1$, and the stability condition eventually $|p/(m_0c)| < 1$. From the Pythagorean character of Einstein's relation, $\tan\Theta = p/(m_0c)$, and the period-1 property $f_{\mathbb{C}}(z) = z$ which yields $\mathbb{C} = z - z^2$, one would end up with $\mathbb{C} = \tan\Theta/2 - \tan^2\Theta/4$.

As to the impact of the said stability condition on our hypothesized $\Omega_{dm,0}$ - partitioning, the common area of $A_{2^o infl}$ and the unit disc was calculated by numerical integration (by first evaluating/collecting the unit disc area's parts not covered by $A_{2^o infl}$, these lying in the 1st and 4th quadrant, and then subtracting the sum from pi ; $A_{2^o infl} = 3\pi(1/4 + c_D)^2/2$, c_D being the main bifurcation series Myrberg-Feigenbaum point's coordinate $-1.401155... + 0i$, and $((x - 1/4)^2 + y^2 + (|c_D| - 1/4)(x - 1/4))^2 = (|c_D| - 1/4)^2((x - 1/4)^2 + y^2)$ being the cardioid curve). Inserting the common area $A_{com} = 2.49779...$ in the areas-ratio formula

$$\frac{2(A_{2^o infl} - A_{com})}{A_{c\text{-}disc} - 2A_{2^o infl}} = 0.19837\ldots \ , \ A_{c\text{-}disc} = 16\pi \ , \qquad \text{Eq.(2)}$$

the $\Omega_{dm,0}$ - partitioning by the stability condition would approx. be (0.1984 + 0.0698) = 0.2682, i.e. the larger part of dark matter's contribution to (our) universe's energy budget maybe might behave different than matter does as to usual SR, but not necessarily as far as the mass-energy balance itself is concerned. The entire matter-linked area $A_{2^o} = 3\pi/8$ is a subset of the unit disc, A_{2^o} cancelling in Eq(2) along $2(A_{2^o infl} - A_{2^o} - (A_{com} - A_{2^o}))$.