Appendix (E): Internal summary/supplement

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Abstract
The appendix E is a resumption of results & statements of the Appendices B – D (see the website http://culetto.at/private_research_associates/appendix...) as well as of our other work on the Mandelbrot set's possible evolutionary role done from 2006 on.

Contents

As was already described in the quoted sources, there seems to be some evidence of the possible existence of a connection between the Hausdorff-dimension (and maybe also the hyperbolic dimension) of special Julia sets J, i.e. $D_H(J)$ (and also $D_{hyp}(J)$) and quantum particle dynamics' relative energy E/E_0 of the average form $E/E_0 = f(D_H(J))$. As all of the fractals involved according to our given reasoning are subsets of the plane, their Hausdorff-dim must stay less (or equal) 2. Informally, when the fractal eventually locally "fills" the plane, there is no space left for (quantum) particle's further acceleration, i.e. neither for mass- nor for velocity-increase (except for very special / extremely rare situations, likely linked to cases in which Julia sets with area(J) $\neq$ 0 occur).The fact that twice renormalization is sufficient to obtain Hausdorff-dim 2 Julia sets (M. Shishikura, arXiv:math/9201282v1 (1991) and Ann. Math.147, (1998), 225-267) strongly supports the conjecture that one reaches the topological limit before having ended up in the infinite momentum frame. The empirical existence of a *speed of action's propagation* thus went back to the said geometrical restrictions, another indication that one couldn't escape geometrization. An almost trivial tentative procedure involving two reference frames, the one of the propagating quantum particle (labelled p) and one labelled sys, has to result in a relation guaranteeing that the resulting Hausdorff-dimension stays between 1 and 2 for all (non-pathological) dynamical cases. Such in its simplest form can readily be found and, written in an abbreviated manner, is

$$D_H^{(res)} = \frac{D_H^{(p)} D_H^{(sys)}}{1 + (D_H^{(p)} - 1)(D_H^{(sys)} - 1)} \quad , \qquad \text{Eq. (1)}$$

which also is symmetrical against frame exchange. In case of $(D_H^{(p,\, sys)} - 1) = |\beta^{(p,\, sys)}|$ the composition law for velocities in special relativity is recovered, which can be rewritten to yield

$$\beta^{(res)} = \frac{\beta^{(p)} + \beta^{(sys)}}{1 + \beta^{(p)}\beta^{(sys)}} \quad . \qquad \text{Eq. (2)}$$

Thus Lorentz invariance emerged from the geometrical/topological restri<u>ction respected</u>. Generally, $f(D_H(J))$ likely is to be much more complicated than is just $1/\sqrt{D_H(J)(2 - D_H(J))}$, this according to the case treated before. Above the mass^2 cutoff (= approx. $0.16\, M_P{}^2$) of our fine-structure constant $\alpha(0)$ approximation formula (file sciencephilosophy4.pdf) effects like high yield real small black holes formation (in the positive area J–domain) at massive perturbation of the underlying iterative maps are likely to occur. And much J-complexity too.