Abstract **Postulate I**

According to the mainstream the more we discover the more complicated the universe appears to be. I could site many examples. In contrast I am finding that the more we discover the simpler it is! I.e.,.1. But we need mathematical rigor so we:

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Postulate 1

algebraically as *min(z-zz)* (≡C with *small C*)

We merely **define** "***min*** & ***z-zz***", "***small C***" and **summarize**,

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That is the whole shebang (SmallC definition implies Cauchy sequences making "1" a real#.)

Definition (of **min** & **z-zz)**

Imply the two most profound axioms in mathematics: "completeness" (∃**min**sup) and "choice" (choice function f(z)=**z-zz**) are mere definitions (of "min" and "z-zz") since z=zz implies only one z (see summary). (min(z-zz) also implies the amazing equation(1.6) in one step(1)).

Definition (of **small C**)

Can rewrite min(z-zz) as z-zz=C (1.1), δC=0 (1.2). Define z≡1+δz here so get δ(*δz+δzδz*)=0 (1.6). The smallC δz<<1 *limit itself* is then z≈zz giving 1=1X1 thereby defining postulate 1. But the eq.1.14, eq.1.4 (*δz+δzδz=C)* algebra with rel+Im solution(1), and δz<<1 also gives a successive approximation Sloan sequence of lemniscates (so also Cauchy sequences) with the limit the tip of the Mandelbrot set (Fiegenbaum pt. C_M) where the electron new pde(1) holds with fractal cosmology (sect.II). So postulate 1 implies BOTH physics(1) and mathematics (eg., completeness and choice(2)).

Summary

Given the fractalness astronomers are observing from the inside what particle physicists are studying from the outside, that 1 object we postulated at the beginning, the new pde electron. Contemplate that as you look up at the starry night sky. (see http//davidmaker.com for backups)

(1) So why is δ(*δz+δzδz*)=0 (eq.1.6) amazing? Because it's real part is *special relativity*, imagin. part *Clifford algebra* and both imply the *operator formalism* & *4D*; all *in one step* (sect.I)

So neutrino ***ν*** Dirac equation

Stable electron **e** Dirac equation (C_M contributes GR, forces, fractal cosmology(sect.II)) with composite **e**,***ν*** the Standard electroweak Model(SM), the mother of all reality checks. Composite 3**e** solves particle physics (PartII). It doesn't get any better than that. That's why.

(2) Yes, ONE indeed is the simplest idea imaginable.

But unfortunately we had to complicate matters by (correctly) algebraically defining it as min(z-zz) (=C, small C) to connect it to the two most profound mathematical axioms of all (i.e., choice, completeness) to give the postulate 1 *complete* mathematical rigor. "completeness" and "choice" thereby become mere definitions of min and z-zz (the amazing equation is merely an equivalent definition and δz<<1 implies that eq.1.4, 1.14 Sloan successive approximation). So, given also that the list-define math (of appendix C PartI) replaces the order axioms,mathematical induction axiom (giving **N**) and the rest of the field axioms: we finally prove then that the postulate of 1 really is the only postulate needed for both math and physics. So the whole universe really is infinitely simple: 1 (see above summary)

Postulate 1

Abstract In this paper we use the postulate of 1 to derive both physics and math.
We get fundamental understanding with the fewest and simplest postulates: 1. So
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Postulate 1 as min(z-zz) (≡C with small C).
We merely define "min & z-zz" and "small C". and write the **summary**.
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That is the whole shebang (Small C definition implies Cauchy sequences so "1" can be a real#.)

Definitions (of min & **z-zz):**
Imply the two most profound axioms in mathematics: "completeness": (∃**min**sup) and "choice" (choice function f(z)=**z-zz**) are actually just definitions of min and z-zz here because we dropped the field axiom 1z=z identity mapping (replaced it with z=zz), implying only ONE z (see summary) and so this one minsup and this one choice function *definition* of min and z-zz respectively. By the way min(z-zz) gives the amazing equation (1.6) in one step. See sect.1.1.
Definition (of **small C**)
Can rewrite min(z-zz) as z-zz=C (1.1), δC=0 (1.2). Define z≡1+δz here so get δ(*δz+δzδz*)=0 (1.6). The smallC δz<<1 *limit itself* is then z≈zz giving 1=1X1 thereby defining postulate 1. But the eq.1.14, eq.1.4 (*δz+δzδz=C)* algebra with rel+Im solution(1), and δz<<1 also gives a successive approximation Sloan sequence of lemniscates (so also Cauchy sequences) with the limit the tip of the Mandelbrot set (Fiegenbaum pt. C_M) tip spike (where δ(iδt)=0 and the electron new pde(1)) is). This implies **postulate** 1 can then be algebraically rewritten as z=zz+C_M/ξ (large ξ, section II) substituting for those δC=0, eq.1.14, small C constraints. This puts the electron at the (fractal) Fiegenbaum point C_M≡charge, so charge is fractal, ξ=mass implying also gravity and cosmology. So the electron is the 1 object we postulated at the beginning and so we have come full circle. We also have derived both physics(1) and mathematics (eg.,**completeness**, **choice**) from the postulate of 1. The order axioms and mathematical induction axiom (giving you N), and the rest of the field axioms, are handled with that list-define method of appendix C in partI.

Summary: Given the fractalness astronomers are observing from the inside what particle physicists are studying from the outside, that *ONE* object we postulated at the beginning, the new pde electron. Contemplate that as you stare up into the starry night sky!
The End

Chapter 1. Postulate 1 algebraically as min(z-zz). (≡C, small C)

I.1 Solving the Amazing equation 1.6

Note min(z-zz) can be written as z-zz=C (1.1), δC=0 (1.2)
Plug z=1+δz into eq.1.1 get δzδz+δz+C=0 (1.3) Solving eq.1.4 quadratic equation:
δz=[-1±√(1-4C)]/2. So for noisy 1 real C>¼ in general δz=dr+idt (1.5)
(So we derived `space-time.`). Plug 1.3 into eq. 1.2 δC=δ(*δz)+δ(δzδz*)=0 (1.6)
≡amazing equation. Given eq.1.5 then $\delta(\delta z\delta z)=\delta[(dr+idt)(dr+idt)]=\delta(dr^2+i(drdt+dtdr)-dt^2)$ (1.7
At C_M spike δ(iδt)=0 (stability) in 1.6 so the Imaginary part of eq.1.6 is *δ(drdt+dtdr)=0* (1.8)
If dr,dt positive then drdt+dtdr=ds_3=0 is a minimum. Alternatively if dr,dt is negative then drdt+dtdr=0 is maximum instead for dr-dt solutions. In fact all dr,dt sign cases imply a single invariant extremum: *drdt+dtdr=0* (our 1st invariant.sect.2.5)) (1.9)

Since we have two *independent* variables r,t in rel$\delta(\delta z\delta z)=\delta(dr^2-dt^2)=\delta dr^2-\delta dt^2+\delta k^2\equiv$ $\delta(dr^2-dt^2+k^2)\equiv\delta(dy^2+dz^2)\equiv$-Real$\delta(\delta z)$ still with two independent variables y,z because we can choose k^2 randomly. Thus real eq.1.6 *Real*$(\delta(\delta z\delta z)+\delta\delta z)=0$ becomes $\delta(dx^2+dy^2+dz^2-dt^2)=0$ with 1.9 still holding (since $\delta(idt)=0$). So we have $2\oplus2=$**4 dimensions** and $dr^2\equiv dx^2+dy^2+dz^2$. Note in general dr,dt are any two of these 4 independent variables implying eq.1.9 defines a Clifford algebra(A3). Next **factor** the real part of eq.1.7 to get (our 4D universal 2nd invariant $ds^2=dr^2-dt^2$)

$$\delta(dr^2-dt^2)=\delta[(dr+dt)(dr-dt)]=\delta(ds^2)=[[\delta(dr+dt)](dr-dt))]+[(dr+dt)[\delta(dr-dt)]]=0 \quad (1.10)$$

Solve eq. 1.10 and get (→±**e**) $dr+dt=\sqrt{2}ds$, $dr-dt=\sqrt{2}ds$, (1.11)

(→light cone ν) $dr+dt=\sqrt{2}ds$, $dr=-dt$, (1.12)

" " $dr-dt=\sqrt{2}ds$, $dr=dt$, (1.13)

(→vacuum) $dr=dt$, $dr=-dt$)

Equation 1.10 gives Special Relativity $ds^2=dr^2-(1)^2dt^2$ (note natural unit *constant* 1^2 ($\equiv c^2$) in front of the dt^2) and eq.1.9 gives the Clifford algebra (Sect.2.5). The third invariant gives the operator formalism and so these equations become Dirac equations (sect.1.2). Composite **e**,ν (appendixA) is the Standard electroweak Model(SM), the mother of all reality checks.

Composite 3**e** solves particle physics (PartII).

Section I.2 Third Invariant Changes mdr/ds = mv into a derivative (operator)

Recall the previous two invariants of eq.1.9,1.11 In fig.1 squaring 1.11: $ds_1^2=(dr+dt)(dr+dt)$ $=dr^2+drdt+dt^2+dtdr=[dr^2+dt^2]+(drdt+dtdr)\equiv ds^2+ds_3=ds_1^2$. Since ds_3 (from 1.9, is max or min) and ds^2 (from 1.10) are invariant then so is $ds^2=dr^2+dt^2=ds_1^2-ds_3$ as in figure 1 for all angles from the axis extremum. So $\delta z=dse^{i\theta}$ is a circle C. (1.14)

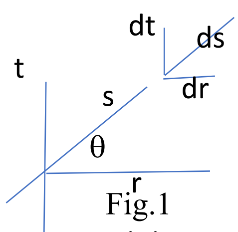
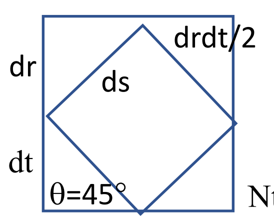


Fig.1



Nth scale

Minimum $ds^2=dr^2+dt^2$ so at 45°: $\delta z=dse^{i\theta}$ (eq.1.15 diagonal). Note in fig.1 45° is always measured from extremum axis'(also in fig.4).

So $\delta z=dse^{i\theta}=dse^{i(\Delta\theta+\theta o)}=dse^{i((\cos\theta dr+\sin\theta dt)/(ds)+\theta o)}\equiv dse^{i(kr+\omega t+\theta o)}$, $\theta_o=45°$, (1.15)

So $\theta=f(t)$. $\delta z=dse^{i(45+\Delta\theta)}$. In eq.1.15 we define $k\equiv dr/ds$, $\omega\equiv dt/ds$, $\sin\theta\equiv r$, $\cos\theta\equiv t$. $dse^{i45}=ds'=ds$.

Then eq.1.15 becomes $\delta z=dse^{i(\Delta\theta)}=dse^{i\left(\frac{\sin\theta dr}{ds}+\frac{\cos\theta dt}{ds}\right)}$ so $\frac{\partial\left(dse^{i\left(\frac{rdr}{ds}+\frac{tdt}{ds}\right)}\right)}{\partial r}=i\frac{dr}{ds}\delta z$ so

$$\frac{\partial\left(dse^{i(rk+\omega t)}\right)}{\partial r}=ik\delta z \quad (1.15a)$$

$k\delta z=-i\frac{\partial\delta z}{\partial r}$ Multiply both sides by ħ. $\hbar k\equiv mv=p$ since $k=dr/ds=v/c=2\pi/\lambda$ from eq.1.15 for our unit mass $\xi_s\equiv m_e$. $\delta z\equiv\psi$,(eq.6.6.1) Note we also derived the `DeBroglie wavelength`$\lambda=h/mv$

$p_r\psi=-i\hbar\frac{\partial\psi}{\partial r}$ which is the observables p_r condition gotten from that eq.1.15 circle. (1.16)

operator formalism thereby converting eq.1.11, 1.12, 1.13 into Dirac eq. pdes.

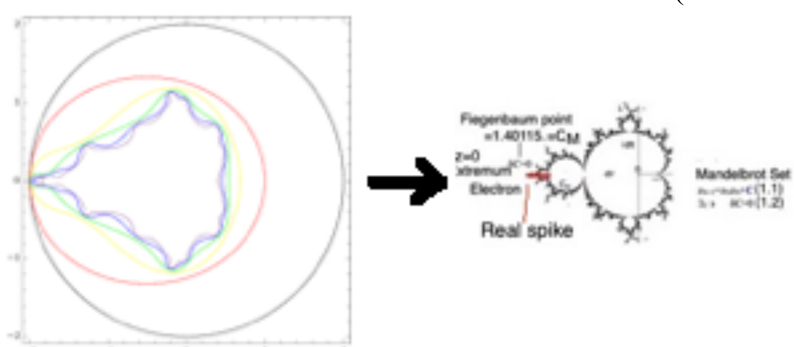
Note these p_r operators are Hermitian and so we have 'observables' with the associated eq.1.11-1.13 Hilbert space **eigenfunctions δz** (=ψ). We `derived QM` here.

Note rotation to 45° for min ds_3 in figure 1 on the eq.1.14 circle.

1.3 Origin Of Math from Eigenvalue of δz: Since $ds \propto dr+dt$ can make $(dr+dt)/ds$ a integer:
2δz$\equiv (1\cup 1)\delta z \equiv (1.11+1.11)\delta z \equiv ((dr+dt)+(dr-dt))/(k'ds)))\delta z \equiv -i2(ds/ds)\partial(\delta z)/\partial r \equiv -i2\partial(\delta z)/\partial r$ (1.16a)
$=(\text{integer})k)\delta z$.
So from eq.1.16a we obtain the eigenvalues of: $\delta z=0,-1$ making our $z=1+\delta z$ eq.1 **real numbers 1,0 =z (binary) also observables. So we have come full circle and so use this result to develop the list-define algebra** required to use eq.1-1.2. eg.,"list" as in 1+1=2, 2+1=3; "define" a+b=c replacing the usual ring and field algebraic formalism. See appendix C, Part I. Note this third invariant ds also *gives us the quantum mechanics* operator formalism (eq.1.16).

Section II C< ¼ Deriving the small C (δz<<1) case and so postulate of 1

2.1 Finally our postulate of 1 $z\approx 1$ requires $|C|<<z$ so that $|\delta z\delta z|<<|\delta z|<<1$ in eq.1.4 (and also note that $\delta z^*\delta z=C$ in eq.1.14) and so as a first approximation in eq.1.4 $|\delta z|\approx|C|$. Also from eq.1.14 *single* circle constraint $C\equiv dz^*dz=dr^2+dt^2$, eq.1.14. So $|\delta z\delta z|<<|\delta z|$ allows us to start a successive approximation of our solution (analogous to Newton's method) to eq.1.4 given our constraints (eg.,$|\delta z\delta z|<<|\delta z|<<1$, $\delta C=0$, and eq.1.14). So we start by multiplying both sides of eq.1.4 $\delta z=\delta z\delta z+C$ by complex conjugate δz^* giving $\delta z^*C\equiv C'$ for example. But $\delta z^*\delta z\equiv C= dr^2+dt^2$ =circle from eq.1.14. So the first of these successive approximations is $\delta z^*\delta z\approx C=C'$. Plug that back into eq.1.4 and get C'=CC+C and keep on going (eg.,C''=C'C'+C, etc.,), with this successive approximation. After doing this an infinite number of times we get the Sloan sequence of Lemniscates and the Mandelbrot set shell extremum (since $\delta C=0$) at the Fiegenbaum point C_M.



Lemniscate sequence (Wolfram, Weisstein, Eric) $C_{N+1}=C_NC_N+C$. $C=C_1=dr^2+dt^2$, $C_0=0$.
Next divide both sides by ξ. $z_{N+1}/\xi=z_Nz_N/\xi+C_M/\xi$ and get $z'_{N+1}=z'_Nz'_N+C$ where $C_M/\xi\equiv C$ and we get the only noniterative equation z=zz+C that is in the Mandelbrot sequence formula where C is small (since $\delta z<<1$ given $z\approx 1$) for the **postulate** of 1: $z=zz+C_M/\xi$
The Mandelbrot set C_M is (and from the postulate $\delta C_M=0$), $z_{N+1}=z_Nz_N+C_M$.
(since $\delta(z'-zz)=\delta(z_{N+1}-z_Nz_N)=\delta(\infty-\infty)\neq 0$). Thus $C=C_M/\xi$ (ξ large) in eq.1.1 is then merely a more compact and useful way of writing those eq. 1.2,1.4,1.14 constraints.

2.2 Fiegenbaum point structure

Go to http://www.youtube.com/watch?v=0jGaio87u3A to explore the Mandelbrot set near the Fiegenbaum point. The splits are in 3 directions from the orbs. There appear to be about 2.5 splits going by each second (given my PC baud rate) and the next Mandelbrot set comes up in about 62 seconds. So
$3^{2.7X62}=10^N$ so 172log3=N=82. So there are 10^{82} splits.
So there are about 10^{82}splits per initial split. But each of these Mandelbrot set Fiegenbaum points is a r_H in eq.2. So for each larger electron there are **10^{82} constituent electrons**. At the bifurcation

point, which is also the Fiegenbaum point, the curve is a straight line and so $\delta C_M=0$. Also the scale difference between Mandelbrot sets as seen in the zoom is about $\mathbf{10^{40}}$**, the scale change** between the classical electron radius and 10^{11}ly giving us our fractal universe.

So that $\delta z = \frac{-1\pm\sqrt{1-4C}}{2}$. is real for noise C<¼ (B1)

creating our noise on the N+1 th fractal scale. So $¼=(3/2)kT/(m_pc^2)$. So T is 20MK. So here we have *derived the average temperature of the universe* (stellar average). $N=r^D$. So the **fractal dimension=** D=logN/logr=log(splits)/log(# r_H in scale jump) $=\log 10^{80}/\log 10^{40}$ $=\log((10^{40})^2)/\log(10^{40})=$ 2

2.3 Finite Fiegenbaum Point C_M On Nth Fractal Scale Contribution To dr,dt Still Keeping ds Invariant We assume large dt noise but the Fiegenbaum pt. noise $C=C_M/\xi$ is finite and still adds noise $\delta z\approx C\equiv C_M/\xi$ as well. Yet ds is invariant in1.11. To resolve this add eq.1.4 associated uncertainty $\pm C_M/\xi=\delta z$: $(dr-\delta z)+(dt+\delta z)=(dr-(C_M/\xi_o))+(dt+(C_M/\xi_o))=\sqrt{2}ds=dr'+dt'$ (1.17)
= 2 rotations from ±45° to next extremum (appendixAI below). Note we keep eq.1.10 invariance Recall z=0 rotations big C_M/ξ_o so from A1 $\theta=C_M/ds\xi=45°+45°=90°$. For z=1 ξ_1 big so $\theta=45°-45°\approx0$ since small $\delta z=C_M/\xi_1$. Define

$\kappa_{rr}\equiv(dr/dr')^2=(dr/(dr-(C_M/\xi_o)))^2=1/(1-r_H/r)^2=A_1/(1-r_H/r)+A_2/(1-r_H/r)^2$

The A_I term can be split off from RN as in classic GR and so $\kappa_{rr}\approx1/[1-((C_M/\xi_o)r))]$ (1.18)
From partial fractions where N+1th scale $A_1/(1-r_H/r)$ and Nth $=A_2/(1-r_H/r)^2$ with A_2 small here.
Generalizing $ds^2=\kappa_{rr}dr'^2+\kappa_{oo}dt'^2$ (1.19)
So a new frame of reference dr',dt'. Note from 1.8 $dr'dt'=\sqrt{\kappa_{rr}}dr\sqrt{\kappa_{oo}}dt=drdt$ so $\kappa_{rr}=1/\kappa_{oo}$ (1.20)
We do a rotational dyadic coordinate transformation of $\kappa_{\mu\nu}$ to get the Kerr metric which is all we need for our GR applications. Note on the N+1th fractal scale $\kappa_{\mu\nu}$ is the ambient metric.
So we derived General Relativity (eqs.1.18,1.19,1.20) by the C_M **rotation** *of special relativity* z (eq. 1.10). For only z=0,1 big $C=C_M/\xi_o$ only if the 2 big Cs cancel with the 3rd still C_M/ξ_1 so still z≈zz in eq.1.1and so a z=1 must still be a constituent (Flux quantized 3e baryons, PartII) defining our 0,1 state.

z=0 $\boldsymbol{\kappa_{\mu\nu}}$ **Metric:** $\kappa_{00}=(1-((C_M/\xi_o)/r))$ ξ_o=small=ξ_o. So $E=\xi_1/\sqrt{(1-((C_M/\xi_o)/r))}\equiv m_L/\sqrt{(1-r_H/r)}$ where $r_H=C_M/\xi_s\equiv ke^2/m_ec^2$ from sect.1.

z=1 $\boldsymbol{\kappa_{\mu\nu}}$ **Metric:** $\kappa_{00}=(1-((C_M/\xi_1)/r))$ $\xi_1=\text{big}\equiv m_L=\tau+\mu+e$. So $E=\xi_1/\sqrt{(1-((C_M/\xi_1)/r))}=$ $m_L/\sqrt{(1-((ke^2/m_L)/r))}$. Recall z≡1+δz and in eq.1.2 $\delta(C_M)\equiv\delta(\xi\delta z)=\delta\xi\delta z+\xi\delta\delta z=0$. For z≈1 then δz is small (in $C_M=\xi\delta z$) so ξ_1 has to be big so in $C\equiv C_M/\xi_1$ the C is still small. z=0 is also a solution to 1.1 so z=1+δz δz=-1 so is big. Thus δξ is small and so the z=0 particle is stable ($\xi_o\equiv m_e$) in $\xi_1=\xi+\xi_o=m_L\equiv$KMQ. Note both ξ_1 and ξ_o. are spin½ so ξ must be ½-½=0 must be two spin½ particles. So $\xi_1=\xi_2+\xi_3+\xi_o\equiv\tau+\mu+m_e.\equiv1+\varepsilon+\Delta\varepsilon$

So $\kappa_{00}=1-m_e-(C_M/m_L)/r$. We get all of leptonic particle physics here. $E\propto1/\sqrt{\kappa_{00}}$. Next multiply by ξ_1 to normalize the first order Taylor expansion term $(C_M/2\xi_1)/r$ to the Coulomb potential:
$E=\xi_1/\sqrt{\kappa_{00}}\equiv\xi_1/\sqrt{(1-(C_M/\xi_1)/r)}=m_L/\sqrt{(1-((ke^2/m_L)/r))}$ (1.21)
Note $\xi_1=m_L$ (≈4000m_e) really is big. So those eq.1.11 single free space **leptons** (or equivalently TeV COM mass collision 3e (PartII) $2P_{3/2}$ objects) **really are point like particles**. You also get the DeBroglie wavelength from k'/m=h and mv=p in eq.1.16. But to connect to inertia we Note in equation 1.15a if $dz=dr=dse^{i(\omega t+kr)}=dse^{i(t/\sqrt{\kappa_{oo}}+kr)}$ so $(a/r)^2=(\xi e^{i(t/\sqrt{\kappa_{oo}}+kr)})^2$ (1.21b)
with Taylor series Δεε cross terms in B3. Note ξ (mass) and dt share the same eq.1.10 Lorentz transformation γ, sect.1). But dt=0 and δdt =0 (and so δξ=0, the electron, z=0) is seen even in the zoomed (sect.A5) Mandelbrot sets at their respective rotated Fiegenbaum Points(FP) implying

FP is still the global $\delta C=0$ |C| max even in the zoomed sets. Thus we have a (10^{40}Xsmaller) fractal universe with tinier and tinier electrons (eg.,with their respective eq,2 zitterbewegung *expansion* (and contraction) oscillations for $r<r_C$) separated casually by these r_H horizons thereby deriving cosmology.

2.4 z=1 Charge Associated With These Two Eigenfunctions (since $\varepsilon=C_M$ not 0)

One result is that from eq.1.18 we have nonzero ε in $(dr-\varepsilon)\equiv dr'$

So from 1.19: $$ds^2=dr'^2+dt'^2=dr^2+dt^2+dr\varepsilon/2-dt\varepsilon/2-\varepsilon_1^2/4 \qquad (1.22)$$

From eq.1.12 the neutrino is defined as the particle for which $-dr'=dt$ (so can now be in 2nd quadrant dr', dt' fig.2 can be negative) so $dr\varepsilon/2-dt\varepsilon/2$ has to be zero and so ε has to be zero therefore $\varepsilon^2/4$ is 0 and so is pinned as in eq.1.12 (*neutrino*). $\delta z\equiv\psi$. So on the light cone $C_M=\varepsilon=mdr=0$ *and so the neutrino is uncharged and also massless in this flat space.* Also see Ch.2 for nonflat results.

1.11: Recall eq.1.11 electron is defined as the particle for which $dr\approx dt$ so $dr\varepsilon/2-dt\varepsilon/2$ cancels so ε_1 ($=C_M$) in eq.1.16 can be small but nonzero so that the $\delta(dr+dt)=0$. Thus dr,dt in eq. 1.11 are automatically both positive and so can be in the *first quadrant*. 1.11 is *not* pinned to the diagonal so $\varepsilon^2/4$ (and so C_M) in eq.1.22 is not necessarily 0. So *the electron is charged* since C_M is not 0. This then explains the positioning of the +e,-e, ν vectors in figure 2.

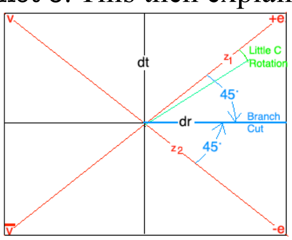


fig.2

Note for finite C in 1.17 we also **break** the **two** 2D **degeneracies (**in eq.1.11) giving us our **4D.**

2.5 4D eq.1.11

Note from the distributive law square 1.11: $(dr+dt+..)^2=dr^2+dt^2+drdt+dtdr+$.But Dirac's sum of squares=square of sum is missing the cross term drdt+dtdr requiring the γ^μ Clifford algebra. So this is the same as if those cross terms drdt+dtdr=0 as in eq.1.9. So equation 1.9 with 4D 1.11, automatically implies a Clifford algebra $\gamma^\mu\gamma^\nu+\gamma^\nu\gamma^\mu=0$, $(\gamma^\mu)^2=1$. From eq.1.9 there is also the coefficient $\kappa_{\mu\mu}(\gamma^\mu)^2=\kappa_{\mu\mu}$. So after multiplying both sides by $\delta z\equiv\psi$ causes the **4D** operator equation 1.16 to cause eq.1.11$\rightarrow$ $ds=(\gamma^1\sqrt{\kappa_{11}}dx_1+\gamma^2\sqrt{\kappa_{22}}dx_2+\gamma^3\sqrt{\kappa_{33}}dx_3+\gamma^4\sqrt{\kappa_{44}}dx_4)\delta z\rightarrow$

$$\gamma^\mu\sqrt{(\kappa_{\mu\mu})}\partial\psi/\partial x_\mu=(\omega/c)\psi \qquad \textbf{(2)}$$

$\omega\equiv m_Lc^2/h$. Eq.2 is our new 4D pde which implies eigenfunctions δz ($=\psi$) and with $C_M>0$ gets leptons for z=1,0 and also 1.12 (ν pinned to the light cone so $C_M=\varepsilon/r_H=0$). For z=0 3e see PartII.

2.6 Implication for Real plane: Recall all observable z satisfy eq.1.15 so that $z\propto e^{i\theta}$. Eq.1.4 $\delta\delta z=0$ implies that we must rotate by $\theta=C_M$ that adds a spin½ (since it goes through a 45° lepton) and then $-C_M$ subtracts it using eq.0.1. For example start at 0° and rotate through $+45°=C_M$ through the 1st quadrant (electron) $dr+dt=\sqrt{2}ds$ in fig.1, fig.3 and get:

+45°, $[(dr+dt)/(ds\sqrt{2})]z=z_{1,r}+z_{1,t}$.. Do $z_{1,r}$ and $z_{1,t}$ separately. So just for $z_{1,r}$: $z_{1,r}=-idz/dr$ (partial derivatives). Then do the $-C_M$ rotation:

-45°, $(dr/ds)z_{1,r}=z_{2,r}$. So $-idz_{1,r}/dr=z_{2,r}=-i[(d/dr)(-id/dr)z=(d^2/dr^2)z$. Do both and get for

45°+45° rotation $dr^2z+dt^2z\rightarrow$ $(d^2/dr^2)z+(d^2/dt^2)z$ (0.2)

So S=½+½=1 making z=0 real Bosons, not virtual. Note we also get the Laplacians characteristic of Bosons by those 45°+45° rotations so e.q1.4 implies Bosons accompany our leptons, so they exhibit "force". Note 2 small C rotations for z=1 can't reach 90° 2 particles. So it stays leptonic. With eq.1.4 and eq.1 we then have eigenfunctions z. This time however *all* variations δC=0 (even the 45° rotation to branch cut extremum) are realized and so have real (stable electron) particles instead of virtual(transitory).

2.7 z=0 Complex Plane Z,W Composites of e,v

So the *large* **C** z rotation application from the 4 different axis' max extremum (of 1.15) branch cuts gives the 4 results: Z,+-W, photon bosons of the Standard Model fig.4. So we have derived the Standard Model of particle physics in this very elegant way. So we have large C_M dichotomic 90° rotation to the next Reimann surface of 1.15, eq.0.1 $(dr^2+dt^2)z''$ from some initial extremum angle(s) θ. Eq.1.5a solutions imply complex 2D plane Stern Gerlach dichotomic rotations using noise $z''\propto C$ (0.1) using Pauli matrices σ_i algebra, which maps one-to-one to the quaternionA algebra. From sect.0, eq.0.2 we start at some initial angle θ and rotate by 90° the noise rotations are: $C=z''=[e_L,\nu_L]^T\equiv z'(\uparrow)+z'(\downarrow)\equiv\psi(\uparrow)+\psi(\downarrow)$ has a eq.0.2 infinitesimal unitary generator $z''\equiv U=1-(i/2)\varepsilon n*\sigma)$, $n\equiv\theta/\varepsilon$ in $ds^2=U^tU$. But in the limit $n\rightarrow\infty$ we find, using elementary calculus, the result $\exp(-(i/2)\theta*\sigma)=z''$. We can use any axis as a branch cut since all 4 are eq.1.15 large extremum so for the 2nd rotation we move the branch cut 90° and measure the angle off the next diagonal since Pauli matrix dichotomic rotations are actually axis rotations, leaving our e and v directions the same. In any case $(dr+dt)z''$in eq.1.11 can then be replaced by eq.1.14, eq.0.2 $(dr^2+dt^2+..)z''=(dr^2+dt^2+..)e^{quaternionA}$Bosons because of eq.1.15. Then use eq. 0.2 to R rotate: z":

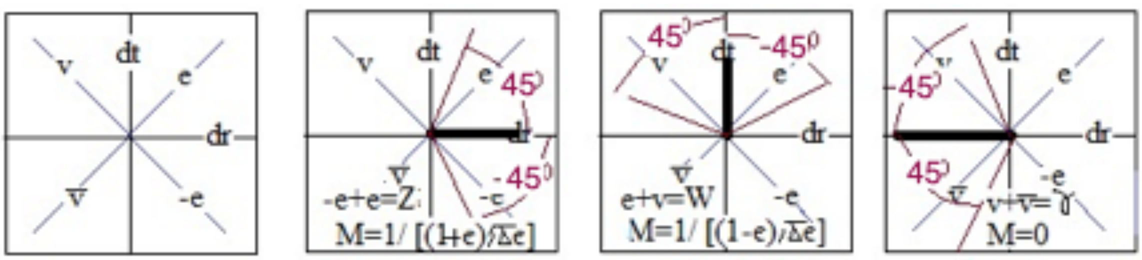


Figure 4. See eq.B4. The Appendix A derivation applies to the far right side figure.
Recall from section 0.1 $2C_M$=45+45=90°, gets Bosons. 45-45= leptons.

2AB: 1.12 Dichotomic variables→Pauli matrix rotations→$z'=e^{quaternion\ A}\rightarrow$Maxwell γ =Noise C blob. See Appendix A for the derivation of the eq.1.15 2nd derivatives of $e^{quaternion\ A}$.

2AC: 1.11+1.11 Dichotomic variables→Pauli matrix rotations→$z''=e^{quaternion\ A}\rightarrow$KG Mesons.

2AD: 1.11+1.11+1.11at $r=r_H\equiv C_M$ (also stable baryons, partII and also appendix B2.

2AE: 1.11+1.11+1.12 Dichotomic variables→Pauli matrix rotations→$z''=e^{quaternionA}$, Proca Z,W

Summary: Min(z-zz) Then we found the resulting eigenvalues of z (eg., from eq.2)

Note in equation 2 the $\kappa_{oo}=1-r_H/r$. Given, at the Feigenbaum point, the $10^{40}XC_M$ fractalness in the $C_M=r_H$ of equation 2 "Astronomers are observing from the inside of what particle physicists are studying from the outside, **ONE** object, the new pde (1.11) electron", the same 'ONE' we postulated. Think about that as you look up at the star filled sky some night! Also postulating 1 gives 4D for eq.2, no more and no less than the physical world. That makes this theory remarkably comprehensive (all of theoretical physics and Rel# math from eq.,1,1.1) and the origin of this theory remarkably simple: "one".

So given the fractal self-similarity, by essentially knowing nothing (i.e., ONE) *you know everything!* We finally do understand.

References

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Appendix A **2AB** eq.0.2 $(dr^2+dt^2+..)e^{\text{quaternion } A}$ =rotated through C_M in eq.1.15. example C_M in eq.0.1 is a 90° CCW rotation from 45° through *ν* and anti*ν*

A is the 4 potential. From eq.2.2 we find after taking logs of both sides that $A_o=1/A_r$ (A1)

Pretending we have a only two i,j quaternions but still use the quaternion rules we first do the r derivative: From eq. 2.3 $dr^2\delta z=(\partial^2/\partial r^2)(\exp(iA_r+jA_o))=(\partial/\partial r[(i\partial A_r\partial r+\partial A_o/\partial r)(\exp(iA_r+jA_o)]$
$=\partial/\partial r[(\partial/\partial r)iA_r+(\partial/\partial r)jA_o)(\exp(iA_r+jA_o)+[i\partial A_r/\partial r+j\partial A_o/\partial r]\partial/\partial r(iA_r+jA_o)(\exp(iA_r+jA_o)+$
$(i\partial^2Ar/\partial r^2+j\partial^2A_o/\partial r^2)(\exp(iA_r+jA_o)+[i\partial A_r/\partial r+j\partial A_o/\partial r][i\partial A_r/\partial r+j\partial/\partial r(A_o)]\exp(iA_r+jA_o)$ (A2)

Then do the time derivative second derivative $\partial^2/\partial t^2(\exp(iA_r+jA_o)=(\partial/\partial t[(i\partial A_r\partial t+\partial A_o/\partial t)$
$(\exp(iA_r+jA_o)]=\partial/\partial t[(\partial/\partial t)iA_r+(\partial/\partial t)jA_o)(\exp(iA_r+jA_o)+$
$[i\partial A_r/\partial r+j\partial A_o/\partial t]\partial/\partial r(iA_r+jA_o)(\exp(iA_r+jA_o)+(i\partial^2A_r/\partial t^2+j\partial^2A_o/\partial t^2)(\exp(iA_r+jA_o)$
$+[i\partial A_r/\partial t+j\partial A_o/\partial t][i\partial A_r/\partial t+j\partial/\partial t(A_o)]\exp(iA_r+jA_o)$ (A3)

Adding eq. A2 to eq. A3 to obtain the total D'Alambertian A2+A3=
$[i\partial^2A_r/\partial r^2+i\partial^2A_r/\partial t^2]+[j\partial^2A_o/\partial r^2+j\partial^2A_o/\partial t^2]+ii(\partial Ar/\partial r)^2+ij(\partial A_r/\partial r)(\partial A_o/\partial r)$
$+ji(\partial A_o/\partial r)(\partial A_r/\partial r)+jj(\partial A_o/\partial r)^2++ii(\partial Ar/\partial t)^2+ij(\partial A_r/\partial t)(\partial A_o/\partial t)+ji(\partial A_o/\partial t)(\partial A_r/\partial t)+jj(\partial A_o/\partial t)^2$.

Since ii=-1, jj=-1, ij=-ji the middle terms cancel leaving $[i\partial^2Ar/\partial r^2+i\partial^2Ar/\partial t^2]+$
$[j\partial^2A_o/\partial r^2+j\partial^2A_o/\partial t^2]+ii(\partial Ar/\partial r)^2+jj(\partial A_o/\partial r)^2+ii(\partial Ar/\partial t)^2+jj(\partial A_o/\partial t)^2$

Plugging in A1 and A3 gives us cross terms $jj(\partial A_o/\partial r)^2+ii(\partial Ar/\partial t)^2=jj(\partial(-A_r)/\partial r)^2+ii(\partial Ar/\partial t)^2$
$=0$. So $jj(\partial A_r/\partial r)^2=-jj(\partial A_o/\partial t)^2$ or taking the square root: $\partial A_r/\partial r+\partial A_o/\partial t=0$ (A4)
$i[\partial^2A_r/\partial r^2+i\partial^2A_r/\partial t^2]=0$, $j[\partial^2A_o/\partial r^2+i\partial^2A_o/\partial t^2]=0$ or $\partial^2A_\mu/\partial r^2+\partial^2A_\mu/\partial t^2+..=1$ (A5)

A4 and A5 are Maxwell's equations (Lorentz gauge formulation) in free space, if μ=1,2,3,4.

$$\Box^2A_\mu=1,\ \Box\bullet A_\mu=0 \qquad \text{(A6)}$$

Still ONE Postulated Object: By the way we note A_μ (composed of two ν identified as 1 γ in this 90°rotation) also *composes* the z=1 $\kappa_{oo}=1-r_H/r$ virtual particle potential energy (r_H/r) of the electron. So we are *still* only postulating that single eq.2 object by since we must include ν&γ. in it. We derived the SM here because other derivations similar given their respective fig.4 sources

A2 Derivation of the Standard Model But With No Free Parameters

Since we have now derived M_W, M_Z, and their associated Proca equations, and m_μ,m_τ,m_e, etc., Dirac equation, G_F, ke^2, Bu, Maxwell's equations, etc. we can now write down the usual Lagrangian density that implies these results. In this formulation $M_z=M_W/\cos\theta_W$, so you find the Weinberg angle θ_W, $g\sin\theta_W=e$, $g'\cos\theta_W=e$; solve for g and g', etc., We will have thereby derived the standard model from first principles (i.e.,postulate1) and so it no longer contains free parameters!

Appendix B Fiegenbaum point structure

Go to http://www.youtube.com/watch?v=0jGaio87u3A to explore the Mandelbrot set near the Fiegenbaum point. The splits are in 3 directions from the orbs. There appear to be about 2.5 splits going by each second (given my PC baud rate) and the next Mandelbrot set comes up in about 62 seconds. So

$3^{2.7X62} = 10^N$ so 172log3=N=82. So there are 10^{82} splits.
So there are about 10^{82}splits per initial split. But each of these Mandelbrot set Fiegenbaum points is a r_H in eq.2. So for each larger electron there are **10^{82} constituent electrons**. At the bifurcation point, which is also the Fiegenbaum point, the curve is a straight line and so $\delta C_M=0$. Also the scale difference between Mandelbrot sets as seen in the zoom is about **10^{40}, the scale change** between the classical electron radius and 10^{11}ly giving us our fractal universe.

So that $\delta z = \frac{-1\pm\sqrt{1-4C}}{2}$. is real for noise C<¼ (B1)

creating our noise on the N+1 th fractal scale. So $\frac{1}{4}=(3/2)kT/(m_pc^2)$. So T is 20MK. So here we have *derived the average temperature of the universe* (stellar average). $N=r^D$. So the **fractal dimension=** D=logN/logr=log(splits)/log(#r_H in scale jump) $=\log 10^{80}/\log 10^{40} =\log(10^{40})^2)/\log(10^{40})=$ 2

B2 z=0 Introduction To 2AE Chapter 6 and **PartII: pure states 1+ε+Δε= KMQ(sect.1.4)= KE+3m_e**

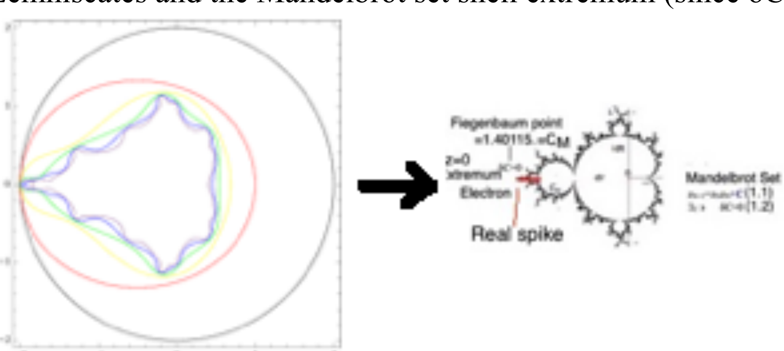
Recall by multiplying by ξ_o/ξ (for three 1.11 objects, 2e+,1e-) we shrunk m_L to m_e and so r to r_H in $\Phi=BA=B\pi r_H^2$=first B flux quantization level Φ=h/2e and so **we have the eq.2** $2P_{3/2}$ **proton** ($r=r_H$) with correct mass, charge and other properties with N the $2P_{1/2}$. The Paschen Back for the two 2e+ gives the **ortho** (s,c,b) multiplets (with their respective Ξ doublets) and **para** state t with ϒ and H the first Thomas precession perturbations of these two body ortho and para states respectively. The $2P_{3/2}$ state becomes important when we include the smaller central electron motion as well. We then get particle physics in PartII. Note the Frobenius series method applied to each Ξ doublet "ground state" gives the respective multiplets. Also that Frobenius series solution eq.9.22 J=0 zero point energy ε is also the Meisner effect formalism for low impact parameter high energy scattering here so $\kappa_{00}=1-m_e-(C_M/m_L)/r\rightarrow \kappa_{00}=1-\varepsilon-m_e-(C_M/m_e)/r$ (B2)
Eq. B2 is the basis for our PartII three eq.2 results 2+2+2 =|KMQ|/2.

z=0 Metric $\kappa_{\mu\nu}$: For only a single **electron Δε at $r=r_H$ in eq.1.14 $2P_{1/2}$ state** (N neutron) we must then normalize out the 1+ε so $\kappa_{00}=1+\Delta\varepsilon/(1+2\varepsilon)-r_H/r$. But more distant object C (Our large 3 object cosmological object is a proton) for a weakly bound state (eg., $2P_{1/2}$ at $r\approx r_H$) implies another smaller $r= C_M/\xi_2= r_H$, so $\kappa_{00}=\Delta\varepsilon/(1+2\varepsilon)\approx\Delta\varepsilon(1-2\varepsilon)$ or in general:$E=1/\sqrt{\kappa_{00}}=1/\sqrt{(\Delta\varepsilon(1\pm2\varepsilon))}=1/[(1\pm\varepsilon))\sqrt{(\Delta\varepsilon)}]=\xi_2$ (B4)
Eq. B4 gives the W,Z rest masses E. In fact **eq.B4 is the basis for 3 of the 4 rotations of the SM**. So W (right fig.4) is a single electron Δε+ν perturbation at $r=r_H=\lambda$ (Since two body m_e.): So $H=H_o+m_ec^2$ inside V_w. $E_w=2hf=2hc/\lambda$, $(4\pi/3)\lambda^3=V_w$. For the two leptons $\frac{1}{V^{1/2}}=\psi_e=\psi_3, \frac{1}{V^{1/2}}=\psi_\nu=\psi_4$. Fermi 4pt= $2G\iiint_0^{rw}\psi_1\psi_2\psi_3\psi_4\,dV=2G\iiint_0^{rw}\psi_1\psi_2\frac{1}{V^{1/2}}\frac{1}{V^{1/2}}V = 2\iiint_0^{rw}\psi_1\psi_2 G\equiv\iiint_0^{Vw}\psi_1\psi_2(2m_ec^2)dV_w=\iiint_0^{Vw}\psi_1(2m_ec^2)\psi_2 dV_w$. (B5)
What is Fermi G? $2m_ec^2(V_W)=.9X10^{-4}$Mev-$F^3=G_F$ **the strength of the weak interaction**.

B3 Eq.1.21b derivation of DeSitter, SM ϕ^4 and Part III: eg., from eq.1.21b and eq.1.16 and Kerr $\kappa_{00}=1-(a/r)^2-r_H/r_H=1-((dr/ds)r/r)^2-1=((dse^{(i\omega t+kr)/}ds)^2=e^{i2(\omega t+kr)}$. So $E=1/\sqrt{\kappa_{00}}=1/\sqrt{(e^{i2(\omega t+kr)})}=e^{-i(\omega t+kr)}$. So the time component is $E=e^{i\omega t}=e^{i(H/\hbar)t}$ (B6)
in SM ϕ^4 sombrero section 6.9. $\kappa_{oo}=e^{i2(\omega t+kr)}=e^{-i2(t/\sqrt{\kappa oo}-kr)}= e^{i2((1+\varepsilon/2+\Delta\varepsilon/2)-rH/rH)-kr)}$. (B6a)
So given above operator eq.1.16 input 1+ε+Δε are pure state operators. Again $r=r_H$ so $\kappa_{00}=e^-$

$^{2i(1+\varepsilon/2+\Delta\varepsilon/2-rH/rH)} =$ $e^{-i(\varepsilon+\Delta\varepsilon)}$ for the local ambient metric. For normalized out ε the cosine expansion gives $\kappa_{oo}=\mathrm{Re}\,l e^{i\Delta\varepsilon/(1-\varepsilon)}\approx 1-(\Delta\varepsilon/(1-\varepsilon)))^2/2+..$ (B7)
The Taylor expansion cross term operator εΔε is the starting point of PartIII. At $r=r_H$ in $\kappa_{00}=1-r_H/r$ in B6a the motion *along* the torus implies r_H numerator is ct=r and so $r=r_H$ for the denominator. The cosine expansion then gives $\kappa_{00}=1-(r/r_H)^2{}_{/2}$ (B8)
the starting point of the comoving DeSitter global metric derivation of section 6.14.

Appendix C Mathematics Resulting Postulate of 1, i.e., from Single valued z=zz+C, C small Eqs.1.4,1.14 together with δz<<1 is a lemniscate:
1 is more than just a written squiggle on a piece of paper. 1 must at least have algebraic definition min(z-zz)
Definitions
(eg.,1-(1X1)=0 with 0 such a min and with z=1 thereby defined). We omitted the field axiom 1Z=Z identity map definition of 1 that would have allowed many Z. So min(z-zz), is the algebraic definition of one *single* z (see summary). So min(z-zz) is defined both in terms of the completeness axiom (as ∃*min*sup) and axiom of choice (as the z-zz=f(z) choice function) symbolism which here then come out of the postulate of 1. implying only ONE z so one minsup and one choice function. The list-define math of PartI, appendixC, then takes care of the field, ordering and mathematical induction axioms so we also get the origin of real#math from the postulate 1. Also min(z-zz) can be written more conveniently as: z-zz=C (1.1), δC=0 (1.2)
Substitute z=1+δz into eq.1.1 and get 1+δz=(1+δz)(1+δz)+C (1.3). Thus δzδz+δz=-C (1.4). Finally our postulate of 1 z≈1 requires |C|<<z so that |δzδz|<<|δz|<<1 in eq.1.4 (and also note that δz*δz=C in eq.1.14) and so as a first approximation in eq.1.4 |δz|≈|C|. Also from eq.1.14 *single* circle constraint $C\equiv dz^*dz=dr^2+dt^2$.eq.1.14. So |δzδz|<<|δz| allows us to start a successive approximation of our solution (analogous to Newton's method) to eq.1.1 given our constraints (eg.,|δzδz|<<|δz|<<1, δC=0, and eq.1.14). So we start by multiplying both sides of δz=δzδz+C by complex conjugate δz* giving Cδz*≡C' for example. But $\delta z^*\delta z= C= dr^2+dt^2$ =circle from eq.1.14. So the first of these successive approximations is δz*δz≈C=C'. Plug that back into eq.1.4 and get C'=CC+C and keep on going (eg.,C''=C'C'+C, etc.,), with this successive approximation. After doing this an infinite number of times we get the Sloan sequence of Lemniscates and the Mandelbrot set shell extremum (since δC=0) at the Fiegenbaum point C_M.



Lemniscate sequence (Wolfram, Weisstein, Eric) $C_{N+1}=C_NC_N+C$. $C=C_1=dr^2+dt^2$, $C_0=0$.
Next divide both sides by ξ. $z_{N+1}/\xi=z_Nz_N/\xi+C_M/\xi$ and get $z'_{N+1}=z'_Nz'_N+C$ where $C_M/\xi\equiv C$ and we get the only noniterative equation z=zz+C that is in the Mandelbrot sequence formula where C is

small (since $\delta z<<1$ given $z\approx1$) for the postulate of 1. The Mandelbrot set C_M is (and from the postulate $\delta C_M=0$), $z_{N+1}=z_Nz_N+C_M$ (1.2)). (since $\delta(z'-zz)=\delta(z_{N+1}-z_Nz_N)=\delta(\infty-\infty)\neq0$). Thus $C=C_M/\xi$ (ξ large) in eq.1.1 is then merely a more compact and useful way of writing those eq. 1.4,1.14 constraints.

Real Numbers

Also there are many intersections with the real line: at "seahorse valley" and the "cardioid cusp" and many others and one at extremum real tip $\delta C=0$ Fiegenbaum point C_M where also $\delta(i\delta t)=0$ (stability) is. Note also the Mandelbrot set iteration sequences z_N can be used to define the Cauchy sequences z_N that define the real numbers making $z_N=1$ a real number also.

z=0 Is Also A Solution To z=zz

In the more fundamental set theory formulation $\{\varnothing\}\subset\{\text{all sets}\}\Leftrightarrow\{0\}\subset\{1\}=\xi C=z_1$. So ξ_o acts as 0 in eq.1 since $\varnothing=\varnothing\cup\varnothing\Leftrightarrow0+0=0$, $\{\{1\}\cup\varnothing\}=\{1\}\Leftrightarrow1+0=1$. Thus $z_1=\xi_1=m_L$ contains $z_o\approx0\approx\xi_o$ so $z_1=\xi_1=\xi+\xi_o$ is the same algebra **as the core idea** of set theory and so of both mathematics and physics (as we saw above)

Uniqueness: In this derivation we also can get the Mandelbrot set iteration formula $z_{N+1}=z_Nz_N+C_M$ by adding C to both sides of eq.1.1 z=zz iteratively and then defining z'=zz+C and repeating. So no other algebra is allowed on eq.1.1 that does not result in this formula. So our lemniscate derivation result is unique.

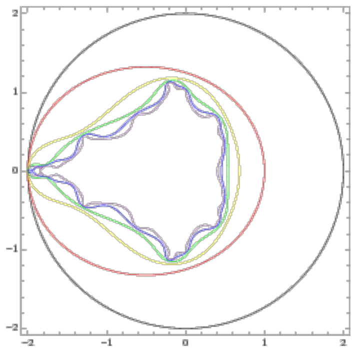
Recall from sect.1.3 the Fiegenbaum pt. result: z=zz+C where $C_M/\xi\equiv C$. Also recall $z\equiv1+\delta z$ and in eq.1.2 $\delta(C_M)\equiv\delta(\xi\delta z)=\delta\xi\delta z+\xi\delta\delta z=0$. For $z\approx1$ then δz is small (in $C_M=\xi\delta z$) so ξ_1 has to be big so in $C\equiv C_M/\xi_1$ the C is still small. z=0 is also a solution to 1.1 so $z=1+\delta z$ $\delta z=-1$ so is big. Thus $\delta\xi$ is small and so the z=0 particle is stable ($\xi_o\equiv m_e$) in $\xi_1=\xi+\xi_o=m_L\equiv KMQ$. Note both ξ_1 and ξ_o. are spin½ so ξ must be ½-½=0 must be two spin½ particles. So $\xi_1=\xi_2+\xi_3+\xi_o\equiv\tau+\mu+m_e.\equiv1+\varepsilon+\Delta\varepsilon$ So $\kappa_{00}=1-m_e-(C_M/m_L)/r$. We get all of leptonic particle physics here.

By the way a set theory rewrite of eq.1.11 is 1U1 and our 3e composite result as 1U1U1..

You may object that other definitions of 1 exist such as $z^4+C=z$ for example. But $\delta(z^x-z)=0$ defines extreme x also and 4 is not the extremum that defines 1. x=2 is that (smallest) extremum.

Appendix D QM

On the diagonals (45°) we have eq.1.11 holding: particles. Eq.1.15 as an operator equation (use 1.16) gives waves. A wide slit has high uncertainty, large C so we are at 45°(eg., particles, photoelectric effect). For a *small slit* we have smaller C so we are not large enough for 45° so only the *wave equation* 0.2 holds (small slit diffraction). Thus we proved wave particle duality. $\delta z^*\delta z$ is probability density since δz can always be normalized as in $1=\int\delta z^*\delta z dV=\int\psi^*\psi dV$. Also Eq.1.11 has *two* parts that solve eq.1.11 together we could label *observer* and *object* with associated 1.11 wavefunctions. So if there is no observer eq.1.11 doesn't hold and so there is no object wavefunction. Thus the wave function "collapses" to the wavefunction 'observed' (or eq.1.11 does not hold). Hence we derived the Copenhagen interpretation of Quantum Mechanics(QM). dt/k'ds≡ω in sect.1.2 implies in eq.1.16 that $E=p_t=\hbar\omega$ for all energy components, universally. But equation 2 is still the core idea since it creates the eigenfunction δz, directly. So along with eq. 1.15, 1.21a *we have derived Quantum Mechanics.*



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