

## Postulate 1

*Abstract: Modern fundamental physics theories such as the Standard Model (SM) contain many assumptions. So where do all these assumptions come from? This is not real understanding. It is curve fitting. So why bother? This theory in contrast has only one real simple postulate:*

### **Postulate 1**

*So there is reason to be excited. This is the only postulate since the **1** in the postulate of 1 generates through symbol definitions the  $1 \cup 1 \equiv 1+1$  list-define algebra (eg., appendix C, eq.3.6) natural number underpinning of the rational numbers:*

*define the real number **1** from a Cauchy sequence of rational numbers (Cantor) using iteration  $z_{N+1} = z_N z_N + C$  (eq.1a),  $\delta C = 0$  (eq.1b). In that regard solve 1a for noise C in  $\delta C = 0$  (eq.1b) and get  $\delta(z_{N+1} - z_N z_N) = 0$  implying  $z_N$  is finite since  $\infty - \infty$  cannot equal 0. So as  $N \rightarrow \infty$ ,  $C \rightarrow 0$  then  $z_{N+1}$  (defined to be z then) has to approach **1** so eq.1a  $z_{N+1} = z_N z_N + C$  turns uniquely into  $z = z z + C$  (eq.1) (eg.,  $1 = 1 \times 1 + 0$ ) thereby*

*defining real#1 in the postulate of 1 as it must. Alternatively:*

*Solve the same eq.1a,1b for C and z(eigenvalues,eq.3.6). So plug eq.1 into eq.1b getting Special Relativity(SR) and a unbroken degeneracy Clifford algebra (sect.2). Equation1a explicitly defines the Mandelbrot set  $C_M$ (since  $z_{N+1}$  finite) with fractal  $(1/4)^M$  Mandelbulbs and  $(10^{40})^N$  Xcosmology.  $C_M$  turns SR into GR and breaks that 2D degeneracy into a **4D** Clifford algebra of Mandelbulbleptons(eq.9) and associated triplets and singlets (i.e., the SM Bosons, sect.4).*

*Summary: **Postulate of real#1. That is the whole shebang.***

*So the **1** in the postulate of  $1 \rightarrow 1 \cup 1$  natural numbers  $\rightarrow$  rational numbers  $\rightarrow$*

*Cauchy seq.of rational numbers(same as eq.1a,1b)  $\rightarrow$  real#**1**). But eq. 1a,1b also gives eigenvalue math(physics).*

*That **4D** implies we got not more and not less than the physical universe. Also given the fractalness, astronomers are observing from the inside of what particle physicists are studying from the outside, that **ONE** thing (eq.9) we postulated. So by knowing essentially nothing (i.e.,ONE) you know everything! We finally do understand.*

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### **Introduction**

We postulate real 1. This is the only postulate since the **1** in the postulate of 1 generates the  $1 \cup 1 \equiv 1+1$  list-define natural number algebra (appendix C) underpinning of rational numbers. **We define the real number 1 in the postulate of 1** from a Cauchy sequence of these rational numbers (Cantor) defined from iteration  $z_{N+1} = z_N z_N + C$  (eq.1a),  $\delta C = 0$  (eq.1b).

In that regard solve eq.1a for noise C and substitute it in  $\delta C = 0$  (eq.1b) and get  $\delta(z_{N+1} - z_N z_N) = 0$  implying  $z_N$  is finite since  $\infty - \infty$  cannot equal 0. So as  $N \rightarrow \infty$ ,  $C \rightarrow 0$  then  $z_{N+1}$  (defined to be z then) has to approach **1** and so the sequence generated by eq.:  $z_{N+1} = z_N z_N + C$  turns uniquely into  $z = z z + C$  (eq.1), (eg.,  $1 = 1 \times 1 + 0$ ) **defining 1 as a real number in the postulate of 1!** This “circular reasoning” ( $1 \rightarrow$  natural numbers  $\rightarrow$  rational numbers  $\rightarrow$  real numbers  $\rightarrow 1$ ) keeps us down to **just one postulate** and also gives us both real# math and theoretical physics: a prerequisite for getting the correct theoretical physics.

So we will have derived both math and physics.

The mundane context for this 1 in the postulate 1 is that of an averaged *observed* signal X in  $X \pm \Delta X$ ,  $\Delta X = \text{Standard Deviation} = SD = \sqrt{\text{variance}}$ . So observation (sensor defined noise) plays a math role here, where X is a function of  $\{\text{observer} \cup \text{signal}\}$  with random error  $\Delta X$ . Then normalize  $X/X \pm \Delta X/X \equiv 1 \pm (\Delta 1)' \equiv 1 \pm (\delta 1)' \equiv \text{Generic Signal (GS)} \equiv z'$ .

So then how do you easily remember this entire theory? Just **Postulate 1**. That's the whole theory! Ah, you say, that can't be all there is to it since "ONE" has *algebraic* properties too (eg.,  $1=1*1+0$ ). My response to that statement is that this merely means you then have an equation for *algebraic* properties, equation 1.

Note this still means "Postulate 1".

Note the only way to include C noise in that  $1=1*1$  algebraic definition of 1 is to simply add it so as is usual  $z \equiv 1 + \delta z$ :  $GS + C = GS * GS$  or  $z - z z \equiv C$  (eq.1).

for limit  $C \rightarrow 0$ . Also a "postulate" is trivial unless what you postulated *exists*. Note noise  $\delta z' \equiv C$  ( $z'=1$ ) cannot be infinity given  $\delta C=0$  since  $\infty - \infty \neq 0$  and given the normalization  $1/X$  cannot be zero since  $0/0$  is undefined. So signal *exists* (i.e., is not 0 and is not drowned out by noise) if  $\delta C=0$  (eq.1b).

with "existence", and so  $\delta C=0$  thereby is **required for eigenvalues** in eq.3.6. The 1 in postulate 1 itself provides the starting point for a positive integer list-define algebra (sect.3) underpinning of eq.1 without any new postulates (axioms) making this a self-contained theory.

Note this still means "Postulate 1".

## Section 1 Rewrite equation 1 in $z=1+\delta z$ form

(Define  $z=z'+\delta z$ ,  $z' \equiv 1$ ,  $\delta z \equiv C$ )

So first rewrite eq.1:

$$z' + \delta z = (z' + \delta z)(z' + \delta z) + C,$$

So  $1 + \delta z = (1 + \delta z)(1 + \delta z) + C$  and rearranging

$$1 + \delta z = 1 + 2\delta z + \delta z \delta z + C \quad \text{and canceling}$$

$$\delta z \delta z + \delta z + C = 0 \quad (1.1)$$

Equation 1.1 is a quadratic equation with in-general complex 2D solution (eg., if large noise C)

$$\delta z = dr + idt \quad (1.2)$$

or  $\delta z = dr - idt$  for all orthogonal ( $90^\circ$ ,  $\perp$ )  $dr$  and  $dt$  and so arbitrary  $dx \perp dy$  (eg.,  $\delta z = dx + idy$ ) (1.3)

with speed coefficient  $c$  in  $cdt \equiv dt$  explicitly a constant here given variation only over  $t$  (1.4)

Equation 1.2 from 1.1 constitutes the derivation of space and time (in the context of eq. 2A).

## Section 2 Small C. Solve for z

Solve eq.1 for C, plug into eq.1b and factor the result to **solve for z**. By plugging the small C in equation 1 back into  $\delta C=0$  (eq.1b) we get  $0 = \delta C = \delta(\delta z + \delta z)$  and we have

$$\delta(\delta z \delta z) = \delta[(dr + idt)(dr + idt)] = 0 \quad (2)$$

the equivalent of eq. 1a, 1b. Note to 'solve for  $z (=1 + \delta z)$  we must solve for the (linear  $dr \pm dt$ ) factors.

### 2.1 Factoring Eq. 2 'solves for z'

$$\delta(\delta z \delta z) = \delta[(dr + idt)(dr + idt)] = \delta(dr^2 + i(dr dt + dt dr) - dt^2) = 0 \quad (2)$$

The Imaginary part of eq.2 is from the (eq.2) generic  $\delta(dr dt + dt dr) = 0$  (2B)

If the  $dr, dt$  are +integers (see sect.4.2) then  $dr dt + dt dr = 0$  is a minimum. Alternatively if  $dr$  is negative then  $dr dt + dt dr = 0$  is again a maximum for  $dr - dt$  solutions. So all  $dr, dt$  cases imply invariant

$$dr dt + dt dr = 0 \quad (2B1)$$

Note in general if  $dr \neq dt$  then 2B1 holds. Next **factor** the real part of eq.2 to get

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

So  $dr^2 - (1)^2 dt^2 = ds^2$  is invariant along with  $1=c$  from eq.1.4. So we have derived special relativity. (The later sect.4 second solution  $C_M$  just rotates  $dr \rightarrow dr' \equiv dr - C_M$ ,  $dt \rightarrow dt' \equiv dt + C_M$  making the form of 2A unchanged and giving GR). So after **factoring** eq.2A then eq.2A is satisfied by:

2AI  $\delta(dr+dt)=0$ ;  $\delta(dr-dt)=0$ . +e,-e two simultaneous objects,  $2D \oplus 2D$ ,  $1 \cup 1$ , eq.9

2AIIA  $\delta(dr+dt)=0$ ,  $dr+dt=0$  pinned to the  $dr^2=dt^2$  light cone. v

2AIIB  $\delta(dr-dt)=0$ ,  $dr-dt=0$  “ “ (note also dichotomic with 2AI) anti v

2AIII  $dr-dt=0$ ,  $dr+dt=0$  so  $dt=0, dr=0$ , no  $ds$  so eigenvalues=0, vacuum: the default  $C_M=0$  **solution**

So if the variation  $(dx+dy)=0$  i.e.,  $\delta(dx+dy)=0$ , then  $dx+dy=ds$ =invariant. So for invariant  $ds$ :

2AIA  $dr^2+dt^2 = ds^2$  (so  $\delta z = ds e^{i\theta}$ )  $ds^2$  is a min at  $45^\circ$  (so extremum  $\delta z = ds e^{i\theta/2}$ ) and  $drdt$  is a max since 2AI  $dr+dt$  is invariant.

2AIIA  $dr+dt=ds$ ,  $dr+dt=0$

2AIIB  $dr-dt=ds$ ,  $dr-dt=0$

2AI  **$dr+dt=ds$ ,  $dr-dt=ds$** ; So there are *two* simultaneous 2AIs for every eq.1.1 for 2AI. So we

must write eq.1.1 as an average in the case of eq.2AI. For our positive  $dr$  &  $dt$  need 1<sup>st</sup> and 4<sup>th</sup>

quadrants (given 2AIA;  $45^\circ$ ) so  $dr \approx dr_1 \approx dr_2$ ,  $dt \approx dt_1 \approx -dt_2$ . So for average eq.1.1  $\delta z = dr + i dt \approx$

$(dr_1 + dr_2)/2 + i(dt_1 - (-dt_2))/2 \equiv (dx_1 + dx_2)_{2AI} + i(dx_3 + dx_4)_{2AI} \equiv ds_{rt} + i ds_{tr}$ . So given eqs.1.2 and 2AI we

have then the **2D unbroken** degeneracy  $\delta z = dr' + dt' = ds_{rt} + ds_{tr} \equiv (dx_1 + dx_2 + dx_3 + dx_4) = ds$ . (2C)

and the **dr+dt** solutions for  $\delta z$  and so **z**.

### Section 3 Eigenvalues of z formalism from equation 1b and 2AIA

Note also some invariant C exists from eq.1b (introduction). Note also C is a uncertainty so all numbers are finite precision here so can be multiplied by a large enough number (appendix A) to become integers so will then not require new axioms (postulates). Recall also from eq.1:  $zz = z - C = z + z\delta z = z - C$ . So

$$\delta zz = C \quad (3.1)$$

Also eq.1  $zz + C = z$  and from equation 2AIA rotation at  $\theta_0 = 45^\circ$  implies  $\delta z = ds e^{i45^\circ + \Delta\theta}$ . In eq.3.1

$\delta zz = C$  we then move the  $e^{i45^\circ}$  from the  $\delta z$  to  $z$  and then redefine  $z \approx 1$  ( $\equiv s'$ ) as  $z''$  so the equality  $\delta zz = C \equiv \delta z_M z''$

$$(3.2)$$

remains. So for this new  $z''$ ,  $\delta z_M z'' = C$ .  $\delta z_M$  is a constant in eq. 3.2 so  $z''$  rotates with noise C

dichotomically in the complex plane as  $z'' \equiv 1 e^{i(45^\circ + \Delta\theta)} = 1 e^{i(\theta_0 + \Delta\theta)}$

$$(3.3)$$

From 2AIA  $ds^2 = dr^2 + dt^2$  and so we have a circle:  $dz = ds e^{i\theta}$ .  $\theta = kr + wt$ .

$dz/z = C$ . So  $dsz' = C$ . Can multiply by both sides by  $ds$  and eq.2AIA implies  $ds^2 z' = C ds$  and the

$ds^2$  are still diagonalized as  $(dr^2 + dt^2) dz'$ . Cross terms  $drdt$  let us say are not allowed or the

invariance  $ds$  fails with this new eq.3.1 method. So  $ds^3 z' = C$  is not allowed. All we are

allowed then is  $dsz' = C$  and  $ds^2 z' = C$  were  $s' \approx 1 > ds$  given 2AIA. So we can substitute  $1(\cos\theta) \equiv t$ ,

$1(\sin\theta) \equiv r \gg dr$  into:

$$z'' \equiv 1 e^{i\theta} \equiv e^{i(\theta_0 + \Delta\theta)} \equiv s' e^{i((\cos\theta dt + \sin\theta dr)/s) + \theta_0} \equiv s' e^{i(\omega t + kr + \theta_0)} \quad (3.4)$$

In the exponent of eq.3.4  $1 \sin\theta = r$ ,  $k \equiv dr/s$  so  $ikz'' = \partial z'' / \partial r$  so

$$kz'' = -i \partial z'' / \partial r = (dr/s) z'' = p_r z'' \quad (3.5)$$

defines our ‘operator’ and is the reason for factoring in sect.1. So for simultaneous 2AI+2AI

coming out of our **eigenvalue generator**  $\delta C = 0$  (gave 2AI) and 2AIA (gave eq.3.5) we define the

number 2 from **operator  $2z''$**   $\equiv (1 \cup 1) z'' \equiv (2AI + 2AI) z'' \equiv ((dr+dt) + (dr-dt)/s) z'' \equiv -i 2 \partial z'' / \partial r$  (3.6)

$=(\text{integer})kz''$  (or alternatively subtract to get  $(\text{integer})\omega z''$ ). Also eq.3.6 implies  $((dr+dt)^2/ds^2))z'' \equiv \partial^2 z''/\partial t^2 + \partial^2 z''/\partial r^2$  given 2B1 gets rid of the drdt cross terms. But  $ds^3$  does not give integer eigenvalues needed for list-define math. So from eq.3.6 we obtain the eigenvalue of  $z=0,1$  (3.7 and 1+1. So eq.3.6 defines the finite +integer list (i.e.,  $1 \cup 1 \equiv 1+1 \equiv 2$ )--define (i.e.,  $A+B=C$ ) math required for the algebraic rules underpinning eq.1 without any added postulates (axioms). That Clifford algebra cross term generation (with  $C_M < 0$ ) requires we define larger numbers than 2 with this math and also implies a 130° dichotomic rotation, sect.4.3).

The integer k and  $\omega$  integer changes  $K\Delta\omega$  are due to Frobenius series termination jumps in the eq.9 solutions (Ch.9) of finite countable N without resorting to ad hoc SHM. So  $\Delta E \equiv K\Delta\omega \equiv \hbar N\Delta\omega$  (rename  $\Delta\omega \rightarrow \omega$ ) and thereby subdivide all of physical reality:  $E_{\text{universe}} = \sum_i \hbar \omega_i$ . Also 2AI 45° diagonal (large noise C so 'wide slit') is a particle eg., 2AI. On dr axis (small C, so 'narrow slit') the 2AIA wave equations dominate implying wave-particle duality. So given eigenvalue generators eq.2AIA, or equivalently eq.3.6 operator formalism and eq.9 (sect.3) we have derived quantum mechanics from first principles.

## Section 4. Large C

Instead of solving eq.1 and eq.1b  $ds = \sqrt{2}ds = dr \pm dt$  (eq.2AI, 2AII, 2AIA) as in section 2 we solve the general case of eq.1a, 1b which thereby imply the Mandelbrot set  $\{C_M\}$  on the -dr axis with  $-dr = drdr + C_M$ . On the next smaller ( $10^{40}X$ ) fractal scale (our baseline subatomic  $10^{-40}$  scale)  $drdr \ll dr$  and so  $-dr \approx C_M$ . (4.1a).

(For  $(1/4)^n$  Mandelbulb scale size 1/64 (appendix B) there can alternatively be small dr and huge drdr terms for dr order 1 let's say. ). (4.1b)

So from 4.1a to preserve the ds invariance  $\sqrt{2}ds = (dr - C_M) + (dt + C_M) \equiv dr' + dt'$  (4.1) Here  $C \rightarrow \pm C_M$  (dichotomic 130° rotation in eq.1 with  $C = C_M = \text{Feigenbaum point } 1.40115..$ ) instead of 0 in eq.4.1 and we fill in the gaps with that C. This  $\pm C_M$  rotation results in composites.

## 4.2 Rotation of $\delta z$ by $C_M$ Creates Curved Space Two Body Eigenvalue Physics

So from 2AIA at 45° and 2AI and eq.3.6  $\sqrt{2}ds = (dr - \varepsilon/2) + (dt + \varepsilon/2) \equiv dr' + dt'$  (4.1)

Given the eq.4.1a dr (and so dr') dependence we can alternatively define constant  $\zeta$  in  $dr' \equiv (1 + \zeta)dr$  if dr is a (near) constant,  $\theta$  can then change by  $\Delta\theta = (\varepsilon/2 + \zeta dr)/(2ds) \equiv C_M/s$  at  $\theta = 45^\circ$ . Note  $\zeta = 0, \varepsilon = 0$  on light cone. Also putting  $C_M$  into eq.2AI  $dr + dt$  at 45° here **breaks those equation 2C 2D degeneracies** giving us our **4D**.

Define  $r \equiv dr$  and  $\kappa_{rr} \equiv (dr/dr')^2 = (dr/(dr - \varepsilon/2))^2 = 1/(1 - r_H/r) + r_n$  (4.2)

Putting the  $\kappa_{\mu\nu}$ s in eq.2AIA we obtain for both of these spherical symmetry  $\kappa_{rr}$  metric coefficients:

$$ds^2 = \kappa_{rr} dr'^2 + \kappa_{oo} dt'^2 \quad (4.3)$$

Note from 2AIA drdt is invariant (at 45°) and so  $dr' dt' = \sqrt{\kappa_{rr}} dr \sqrt{\kappa_{oo}} dt = drdt$  so  $\kappa_{rr} = 1/\kappa_{oo}$  (4.4) i.e., the old Schwarzschild- $r_n$  result outside  $r_H$ . Use tensor dyadics to derive the other GR metrics

So we derived General Relativity by (the  $C_M = \varepsilon$ ) **rotation of special relativity** (eqs 2A, 2AI).

Also from 2AIA and eq.4.1:  $ds^2 = dr'^2 + dt'^2 = dr^2 + dt^2 + dr\varepsilon/2 - dt\varepsilon/2 - \varepsilon^2/4$  (4.5)

For large dr (eg., Limacon in Mandelbrot set) baseline -1 then here  $dr^2 = +C_M - C_M, C_M \equiv E_1^2$  in eq.4.5.

**2AII:** From eq.2AII and equation 3.5 the neutrino is defined as the particle for which  $-dr' = dt$  (so can now be in 2<sup>nd</sup> quadrant  $dr', dt'$  can be negative) so  $dr\varepsilon/2 - dt\varepsilon/2$  has to be zero and so  $\varepsilon$  has to be zero therefore  $\varepsilon^2/4$  is 0 and so is pinned as in eq.2AII (*neutrino*).  $\delta z \equiv \psi$ . So  $C_M = \varepsilon = mdr = 0$  and so the neutrino is uncharged and also massless in this flat space.

**2A1:** Recall eq.2AI electron is defined as the particle for which  $dr \approx dt$  so  $dr\epsilon/2 - dt\epsilon/2$  cancels so  $\epsilon$  ( $=C_M$ ) in eq.4.5 can be small but nonzero so that the  $\delta(dr+dt)=0$ . Thus  $dr, dt$  in eq. 2AI are automatically both positive and so can be in the *first quadrant as positive integers*. **2A1** is not pinned to the diagonal so  $\epsilon^2/4$  (and so  $C_M$ ) in eq.4.5 is not necessarily 0. So *the electron is charged*. If that  $\pm C_M$  rotation covers 2AI or 2AII the charge on these objects (eg., charge on 2AII is 0) becomes the charge on the composite. This added intermediate white noise is not charged.

### 4.3 Eq.2AI Eigenvalues in equation 3.6 incorporating $C_M$

To remain within the set of eq.1 solutions set (allowing infinitesimal rotation within the noise) we note that the *2D degeneracy of eq.2C is broken by the solution 2 rotation (eq.4.1)* were we use ansatz  $dx_\mu \rightarrow \gamma^\mu dx_\mu$  where  $\gamma^\mu$  may be a 4X4 matrix and commutative ansatz  $dx_\mu dx_\nu = dx_\nu dx_\mu$  so that  $\gamma^\mu \gamma^\nu dx_\mu dx_\nu + \gamma^\nu \gamma^\mu dx_\nu dx_\mu = (\gamma^\mu \gamma^\nu + \gamma^\nu \gamma^\mu) dx_\mu dx_\nu$  ( $\mu, \nu=1,2,3,4; \mu \neq \nu$ ). So from eq.2AI and resulting eq.(2C) then  $ds^2 = (\gamma^1 dx_1 + \gamma^2 dx_2 + \gamma^3 dx_3 + \gamma^4 dx_4)^2 = (\gamma^1)^2 dx_1^2 + (\gamma^2)^2 dx_2^2 + (\gamma^3)^2 dx_3^2 + (\gamma^4)^2 dx_4^2 + \Sigma_{\mu\nu} (\gamma^\mu \gamma^\nu dx_\mu dx_\nu + \gamma^\nu \gamma^\mu dx_\nu dx_\mu)$ . But  $\gamma^\mu \gamma^\nu dx_\mu dx_\nu + \gamma^\nu \gamma^\mu dx_\nu dx_\mu = (\gamma^\mu \gamma^\nu + \gamma^\nu \gamma^\mu) dx_\mu dx_\nu$  implying  $\gamma^\mu \gamma^\nu + \gamma^\nu \gamma^\mu = \mathbf{0}$  from **2B1** and also  $(\gamma^\mu)^2 = 1$  from 2AIA. So the two 2AI results and 2B1 *imply the defining relation for a 4D Clifford algebra*: we have derived our 4Dimensions) with the time component defined to be  $\gamma^4 dx_4$ . So with  $\kappa_{\mu\nu}$  in eq.3.2 we have

$$ds = (\gamma^1 \sqrt{\kappa_{11}} dx_1 + \gamma^2 \sqrt{\kappa_{22}} dx_2 + \gamma^3 \sqrt{\kappa_{33}} dx_3 + \gamma^4 \sqrt{\kappa_{44}} dx_4) \quad (4.6)$$

Eq.4.6 also implies we can convert the 2AI  $(dr+dt)z''$  and the 2AIA  $(dr^2+dt^2)z''$  to first and second derivatives of  $z''$  terms ( $z'' \equiv \psi$ ). For example using 4.6:

Eq.2AI  $\rightarrow ds = (\gamma^1 \sqrt{\kappa_{11}} dx_1 + \gamma^2 \sqrt{\kappa_{22}} dx_2 + \gamma^3 \sqrt{\kappa_{33}} dx_3 + \gamma^4 \sqrt{\kappa_{44}} dx_4) z'' \rightarrow \gamma^\mu \sqrt{(\kappa_{\mu\mu})} \partial \psi / \partial x_\mu = (\omega/c) \psi$  (9) (eq.9) which is our new pde, adds the  $C_M$  to equation 3.5 (electron observables). It also becomes 2AII ( $v$  pinned to the light cone where  $C_M = r_H = \epsilon = 0$  (sect.4.1)). The 6 Clifford algebra cross term requirements imply many multiple lepton contributions giving us Boson fields around them. The two required simultaneous 2D eq.2AI in 4D eq.9 imply observer plus observed objects needed to have the 4D wavefunction  $\psi$ . So the wave function “collapses” to the observed one when it is observed (Copenhagen interpretation).

**Hamiltonian and its Energy E Eigenvalues:** The Hamiltonian is associated with the time derivative in eq.3.6 as it is in the old Dirac equation. So to find energy eigenvalues and the Hamiltonian we compare the old Dirac equation  $E$  with the new one, eq.9. From 104.10, 105.9, Sokolnikov, Tensor Analysis, 2<sup>nd</sup> Ed. Wiley we have  $dt/ds = 1/\kappa_{00}$  with  $\kappa_{00} = 1 - r_H/r$ . Also from the first term in equation 8.1 we can compare the location of the energy  $E$  term (and so Hamiltonian) in the ordinary Dirac equation with the new one equation 8.1 and find that  $\mathbf{E} = (dt/ds) \sqrt{\kappa_{00}} = (1/\kappa_{00}) \sqrt{\kappa_{00}} = 1/\sqrt{\kappa_{00}}$

### 4.4 Eq. 2A1A Boson Eigenvalues $m_1 + m_2$

Start by plugging eq.1 into eq.1b. Get 2AI, 2AII. Include the  $C_M$  of eq.1b. To preserve the  $ds$  invariance then  $\sqrt{2} ds = (dr - C_M) + (dt + C_M) \equiv dr' + dt'$  in eq.4.1. We repeat the  $m_1 + m_2$  Pauli principle addition of sect.4.3. Here  $C \rightarrow \pm C_M$  (dichotomic 130° rotation) instead of 0 in eq.4.1 and we fill in the gaps with that  $C$ . Here we added  $\xi dr$  and  $\epsilon$  as sources since it is not on the light cone. So we have large  $C_M$  dichotomic 130° rotation to the next Reimann surface of 2AIA  $(dr^2 + dt^2)z''$  from some initial angle  $\theta$ . Eq.1a solutions imply complex 2D plane Stern Gerlach dichotomic rotations using noise  $z'' \propto C$  (4.2) using Pauli matrices  $\sigma_i$  algebra, which maps one-to-one to the quaternion algebra. From sect.4.2, eq.4.11 we start at some initial angle  $\theta$  and rotate by 130° the noise rotations are:  $C = z'' = [e_L, \forall_L]^T \equiv z'(\uparrow) + z'(\downarrow) \equiv \psi(\uparrow) + \psi(\downarrow)$  has a eq.4.5 infinitesimal unitary generator  $z'' \equiv U = 1 - (i/2) \epsilon n \cdot \sigma$ ,  $n \equiv \theta/\epsilon$  in  $ds^2 = U^\dagger U$ . But in the limit  $n \rightarrow \infty$  we find, using

elementary calculus, the result  $\exp(-i/2)\theta^*\sigma = z'' \cdot (dr+dt)z''$  in eq.4.11 can then be replaced by  $(dr^2+dt^2+..)z'' = (dr^2+dt^2+..)e^{\text{quaternion}^A}$  Bosons because of eq.2A1A. Rotate:  $z''$ :

**2AB: 2A1IA+2A1IB** Dichotomic variables  $\rightarrow$  Pauli matrix rotations  $\rightarrow z'' = e^{\text{quaternion}^A} \rightarrow$  Maxwell  $\gamma$  = Noise C blob. See Appendix A for the derivation of the eq.2A1A 2<sup>nd</sup> derivatives of  $e^{\text{quaternion}^A}$ .

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

**2AD: 2A1+2A1+2A1** at  $r=r_H \equiv C_M$  (also stable but at high energy, including Z,W.)

**2AE: 2AI+2A1+2AII** Dichotomic variables  $\rightarrow$  Pauli matrix rotations  $\rightarrow z'' = e^{\text{quaternion}^A}$ , Proca Z,W Ch.8,9 on baryon strong force with Nth fractal scale  $r_H = 2e^2/m_e c^2$ .  $\pm C_M$  rotation. Equation 2AE is a current loop implying that the Paschen Back effect with B flux quantization  $\Phi = Nh/2e$  gives very high particle mass-energy eigenvalues. So we solved the hierarchy problem. Frobenius series solution from eq.9 gave lower hadron energies. All are singlet or triplet noise C blobs(2). See davidmaker.com, part II.

We have thereby found the **eq.2A1A Boson eigenvalue solutions**.

**Summary: Solved eq.1 for z. Then we found the eigenvalues of z (eg., 2AI)**

Note in equation 9 the  $\kappa_{00} = 1 - r_H/r$ . Given the  $10^{40} X C_M$  fractalness in the  $C_M = r_H$  of equation 9 “Astronomers are observing from the inside of what particle physicists are studying from the outside, **ONE** object, the new pde (2AI) electron”, the same ‘ONE’ we postulated. Think about that as you look up at the star filled sky some night! Also postulating 1 gives no more and no less than the physical world. That makes this theory remarkably comprehensive (all of theoretical physics and rel# math) 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

- 1) E. Schrodinger, Sitzber. Preuss. Akad. Wiss. Physik-Math., 24, 418 (1930) At  $>$  Compton wavelength there is no zitterbewegung, just a probability density blob. So instead of deriving Schrodinger’s blob from the Dirac equation we derive the Dirac equation (and the rest of physics) from the most general stable blob, our averaged data and  $SD \equiv \Delta z = \delta z$  region (section 2).
- 2) Konstantin Batygin. Monthly Notices of the Royal Astronomical Society, Volume 475, Issue 4, 21 April 2018. He found that cosmological Schrodinger equation metric quantization actually exists in the (observational) data.
- (3) davidmaker.com

**Appendix A 2AB**  $(dr^2+dt^2+..)e^{\text{quaternion}^A}$  **Derivation From Sect.4.3 and operator in eq.4.6 180° rotation from 90°**

A is the 4 potential. From 3.4 we find after taking logs of both sides that  $A_0 = 1/A_r$  (A1)

Pretending we have a only two i,j quaternions but still use the quaternion rules we first do the r

$$\begin{aligned} \text{derivative: } dr^2 \delta z &= (\partial^2 / \partial r^2) (\exp(iA_r + jA_0)) = (\partial / \partial r) [(i \partial A_r / \partial r + \partial A_0 / \partial r) (\exp(iA_r + jA_0))] \\ &= \partial / \partial r [(\partial / \partial r) i A_r + (\partial / \partial r) j A_0] (\exp(iA_r + jA_0)) + [i \partial A_r / \partial r + j \partial A_0 / \partial r] \partial / \partial r (i A_r + j A_0) (\exp(iA_r + jA_0)) + \\ & (i \partial^2 A_r / \partial r^2 + j \partial^2 A_0 / \partial r^2) (\exp(iA_r + jA_0)) + [i \partial A_r / \partial r + j \partial A_0 / \partial r] [i \partial A_r / \partial r + j \partial / \partial r (A_0)] \exp(iA_r + jA_0) \quad (A2) \end{aligned}$$

Then do the time derivative second derivative  $\partial^2 / \partial t^2 (\exp(iA_r + jA_0)) = (\partial / \partial t) [(i \partial A_r / \partial t + \partial A_0 / \partial t)$

$$\begin{aligned} (\exp(iA_r + jA_0))] &= \partial / \partial t [(\partial / \partial t) i A_r + (\partial / \partial t) j A_0] (\exp(iA_r + jA_0)) + \\ & [i \partial A_r / \partial t + j \partial A_0 / \partial t] \partial / \partial r (i A_r + j A_0) (\exp(iA_r + jA_0)) + (i \partial^2 A_r / \partial t^2 + j \partial^2 A_0 / \partial t^2) (\exp(iA_r + jA_0)) \\ & + [i \partial A_r / \partial t + j \partial A_0 / \partial t] [i \partial A_r / \partial t + j \partial / \partial t (A_0)] \exp(iA_r + jA_0) \quad (A3) \end{aligned}$$

Adding eq. A2 to eq. A3 to obtain the total D’Alambertian  $A2+A3=$

$[i\partial^2 A_r/\partial r^2 + i\partial^2 A_r/\partial t^2] + [j\partial^2 A_o/\partial r^2 + j\partial^2 A_o/\partial t^2] + ii(\partial A_r/\partial r)^2 + ij(\partial A_r/\partial r)(\partial A_o/\partial r)$   
 $+ ji(\partial A_o/\partial r)(\partial A_r/\partial r) + jj(\partial A_o/\partial r)^2 + ii(\partial A_r/\partial t)^2 + ij(\partial A_r/\partial t)(\partial A_o/\partial t) + ji(\partial A_o/\partial t)(\partial A_r/\partial t) + jj(\partial A_o/\partial t)^2$  .  
 Since  $ii=-1, jj=-1, ij=-ji$  the middle terms cancel leaving  $[i\partial^2 A_r/\partial r^2 + i\partial^2 A_r/\partial t^2] +$   
 $[j\partial^2 A_o/\partial r^2 + j\partial^2 A_o/\partial t^2] + ii(\partial A_r/\partial r)^2 + jj(\partial A_o/\partial r)^2 + ii(\partial A_r/\partial t)^2 + jj(\partial A_o/\partial t)^2$   
 Plugging in A1 and A3 gives us cross terms  $jj(\partial A_o/\partial r)^2 + ii(\partial A_r/\partial t)^2 = jj(\partial(-A_r/\partial r))^2 + ii(\partial A_r/\partial t)^2$   
 $= 0$ . 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)  
 $i[\partial^2 A_r/\partial r^2 + i\partial^2 A_r/\partial t^2] = 0, j[\partial^2 A_o/\partial r^2 + i\partial^2 A_o/\partial t^2] = 0$  or  $\partial^2 A_\mu/\partial r^2 + \partial^2 A_\mu/\partial t^2 + \dots = 1$  (A5)  
 A3 and A4 are Maxwell's equations (Lorentz gauge formulation) in free space, if  $\mu=1,2,3,4$ .  
 $\square^2 A_\mu = 1, \square \bullet A_\mu = 0$  (A6)

**Postulate 1 as  $z = z + C$ . goes to Mandelbrot set  $C_M$  near r axis  $C_M = z^{-1}$  since no preferred scale** . . . . .

Calculate  $z$  and its eigenvalues  $(\delta C = 0)$ .

Get (2)  $\delta(\delta z \delta z) = \delta[(dr + idt)(dr + idt)] = \delta(dr^2 + i(drdt + dt dr) - dt^2) = 0$

SR  $drdt + dt dr = 0$

(2A)  $\delta(dr^2 - dt^2) = \delta[(dr + dt)(dr - dt)] = ds^2 =$   
 $[[\delta(dr + dt)](dr - dt)] + [(dr + dt)\delta(dr - dt)] = 0$ . factor  $(\mu, \nu = 1, 2, 3, 4; \mu \neq \nu)$

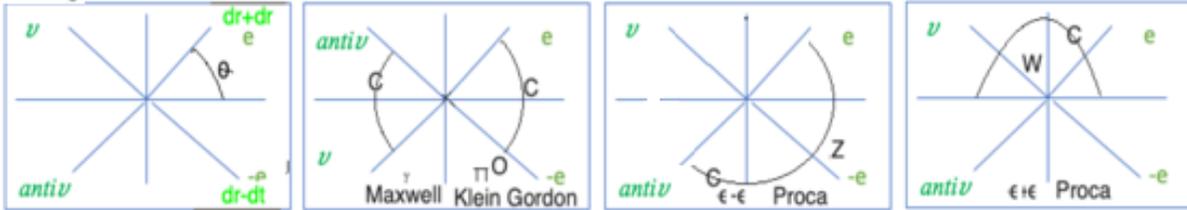
2AI  $\delta(dr + dt) = 0; \delta(dr - dt) = 0$ . 2D degenerate  $drdt + dt dr = 0$  (or  $\gamma^\mu \gamma^\nu + \gamma^\nu \gamma^\mu = 0$ )

2AIIA  $\delta(dr + dt) = 0, dr + dt = 0$  pinned to LC  $drdt + dt dr = 0$  (or  $\gamma^\mu \gamma^\nu + \gamma^\nu \gamma^\mu = 0$ )  $\nu$

2AIIB  $\delta(dr - dt) = 0, dr - dt = 0$  pinned to LC  $drdt + dt dr = 0$  (or  $\gamma^\mu \gamma^\nu + \gamma^\nu \gamma^\mu = 0$ ) anti  $\nu$

Rotate  $dr + dt$  by  $C_M$  ( $10^{40}$  X fractal)  
 $ds = (dr - C_M) + (dt + C_M) = dr' + dt'$  GR  
 Breaks 2AI 2D degeneracy  
 4D Clifford Algebra +e, -e New pde eq9  
 (def.  $z=1, z = z' + \delta z$ , LC = light cone)

Min ds on diagonal  $ds^2 = dr^2 + dt^2$ . Rotate by C again. Dichotomic variables  $\rightarrow$  Pauli matrix rotations  $\rightarrow z = e^{\text{quaternion} A} = C$  Noise Blob 180deg



**$m_e$  Source Term at  $r=r_H$  Inside Angle C**

For  $\delta z = -1$  (middle of Mandelbrot set) adding noise C causes a counterclockwise rotation as we see from the  $\delta z = \frac{-1 \pm \sqrt{1-4C}}{2}$ . Analogously from 2AC we get with the eq.4.1 doublet  $\epsilon \pm \epsilon$  the

Proca equ (3) *neutrino and electron*  $\Delta \epsilon$  at  $r=r_H$  extremum in E. As in sect.6.13 in  $\kappa_{00}$  we normalize out the muon  $\epsilon$ . So we are left with the electron  $\Delta \epsilon$ :  $\kappa_{00} = 1 - [\Delta \epsilon / (1 \pm 2\epsilon)] + [r_H(1 + ((\epsilon \pm \epsilon)/2))/r]$  from the two above rightmost (Proca) diagrams. So extremum in E Source =  $E_{ZW} = \frac{1}{\sqrt{\kappa_{00}}} = \frac{1}{\sqrt{1 - \frac{\Delta \epsilon}{1 \pm 2\epsilon} - \frac{r_H \epsilon}{r(1 + (\epsilon \mp \epsilon)/2)}}} \approx \frac{1}{(1 \pm \epsilon)\sqrt{\Delta \epsilon}}$ , at  $r = r_{He} +$  is for Z and  $-$  is for W. So W (right fig.)

is a single electron  $\Delta \epsilon + \nu$  perturbation at  $r=r_H = \lambda$  (Since two body  $m_e$ .): So  $H = H_0 + m_e c^2$  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  
 $4pt = 2G \iiint_0^{r_w} \psi_1 \psi_2 \psi_3 \psi_4 dV = 2G \iiint_0^{r_w} \psi_1 \psi_2 \frac{1}{V^{1/2}} \frac{1}{V^{1/2}} V = 2 \iiint_0^{r_w} \psi_1 \psi_2 G \equiv$   
 $\iiint_0^{V_w} \psi_1 \psi_2 (2m_e c^2) dV_w = \iiint_0^{V_w} \psi_1 (2m_e c^2) \psi_2 dV_w$ . (A3)

What is Fermi G?  $2m_e c^2 (V_w) = 9 \times 10^{-4} \text{ Mev} \cdot \text{F}^3 = G_F$  **the strength of the weak interaction.**

**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 Mandelbulb  $m_\mu, m_\tau, m_e$ , 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  $\theta_w$ ,  $g\sin\theta_w=e$ ,  $g'\cos\theta_w=e$ ; 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 Mathematical Considerations

### 1<sup>st</sup> type of Fractalness ( $10^{40}$ )<sup>N</sup> Mandelbrot Set Repeat Of The Universe

Go to the Utube HTTP with the 275 in the title to explore the Mandelbrot set. 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  $3^{2.7 \times 62} = 10^N$  so  $172 \log 3 = N = 82$ . So there are  $10^{82}$  splits.

So there are about  $10^{82}$  splits per initial split. But each of these Mandelbrot set Feigenbaum points is a  $r_H$  in eq.9. So for each larger electron there are  **$10^{82}$  constituent electrons**. At the bifurcation point, which is also the Feigenbaum 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  $C < 1/4$  creating our noise. So  $1/4 = (3/2)kT/(m_p c^2)$ . So T is 20MK. So here we have *derived the average temperature of the universe* (stellar average). The universe doesn't look like the Mandelbrot set but is a solution to equation 9 for  $r < r_C$ : electron. There are some consequences of the N+1th fractal scale observer and the value of  $dr$  in  $-dr = dr dr + C_M$  eq.1.1.

### 2<sup>nd</sup> type of Fractalness, the ( $1/4$ )<sup>N</sup> Radius Mandlebulbs.

Note from eq.1.1 that  $\frac{-1 \pm \sqrt{1-4C}}{2} = \delta z$ . So that  $\delta z$  is real for noise  $C < 1/4$  creating our noise

Mandlebulbs in  $1.25 + \text{Mandelbulb noise diameters} = 1.25 + (2 \sum_{n=2}^{\infty} (\frac{1}{4})^n) = 1.4167..$  where 1.25 is the invariant part.  $1.4167 - 1.40115 = 1/64.3$  so we must subtract  $1/64.3$  to terminate at the Feigenbaum point  $C_M$ . so that the termination index is  $n=3$ , the  $1/64$  term. Also in our resulting Kerr metric application of these results  $J^2 = (a/r)^2 = (dr/r)^2 = \text{Energy}$  (eq.6.1). So  $E = C_M^2$ . There is  $1/64$  Mandelbulb sitting on the Feigenbaum point where  $\delta C = 0$  and so  $1/64$  is invariant and fractal as well. So  $E_1 = [(1/64)^2 / (1 - \epsilon)]$ .  $\epsilon = 2 * .02976$ :  $1/(1 - \epsilon)$  is the usual normalization for a charged particle (appendixA) which is used only once. Given the  $\pm$  noise, the negative part of the  $\pm$  is half the noise Mandelbulb "diameter" and so subtracts from the invariant part 1.25 by the noise level:  $1.25 - 1/4 - (1/16)$ . But that  $(1/64)[1/(1 - \epsilon/2)]$  must be subtracted as well to get the Feigenbaum point. So  $(1.25 - 1/4 - (1/16)) - [(1/64)/(1 - \epsilon/2)] = .92141..$  So  $E_2 = .92141^2 = .8490$ . Also  $(1/64)^2 = .00024414..$ , So  $[1777/.8490].00024414 = .511 \text{Mev}$ ,  $[1777/.8490]X.8490 = 1777 = m_\tau$  which then picks up that charge normalization as well.  $0.510998950 = \text{actual } m_e$ .

There is also a variable radius noise term here  $1/4^2 .85 \approx m_\mu = \epsilon$  in sect. 7.1. These three noise ( $1/4$ )<sup>N</sup> circles with 2AIA complex variable mapping through the branch cut must form 2D Reimann surfaces of these new smaller and smaller Mandelbrot sets with each individual 2AI,2AII occupying each such complex plane: hence we have derived the 3 lepton families. Notice here we found from the Mandelbrot set (eq.1a,1b) the

**size of the universe**  $10^{40} \times \text{classical electron radius, fractal universe.}$

**Number of particles in the universe**  $10^{82}$

**The temperature of the universe.**  $20 \text{MK (interior of stars)}$

For  $C \rightarrow 0$  we get eq.2AI,2AII eq.9 **particle physics**(sect.1-4) including **the Lepton masses&families**. Eq.2AIA yields the operator formalism of QM  
 From fractal eq.9 the **oscillation of the universe**.

**Relativity** (eq. 2A rotated by  $C_M$ ).

Note that eq.1a,1b came out of the postulate of 1 (sect.1).

## Appendix C Origin Of Mathematics

### Single Postulate Of 1

eq.3.6 defines the finite +integer *list*(i.e.,  $1 \cup 1 \equiv 1+1 \equiv 2$ )--*define*(i.e.,  $A+B=C$ ) math *required* for the algebraic rules underpinning eq.1 **without any added postulates** (axioms). Also

*list*  $2*1=2$ ,  $1*1=1$  *defines*  $A*B=C$ . Division and **rational numbers** defined from  $B=C/A$ .

We repeat with the list  $3*1=3$ , etc., with the Clifford algebra terms satisfaction keeping this going all the way up to  $10^{82}$  and start over given the above fractal result given the  $r_H$  horizons of eq.4.2.

Note the noise  $C$  guarantees limited precision so we can multiply any number in our list with the above integer  $10^{82}$  to obtain the integers in eq.3.6 which gives us quantization of the Boson fields

### Real Numbers Defined from Our Rational Numbers

Real numbers are the core of mathematics (Try balancing your checkbook or measuring a length without them!) and physics. 1 is a real number. The key thing is that we are postulating 1, not 1 and a bunch of other stuff.

There are several equivalent ways of defining the real numbers.

One way is through Dedekind cuts. Another method is to define a number as a "real" number by defining a *Cauchy sequence of rational numbers* (Cantor's method) for which it is a limit.

For example it is easy to define  $\pi$  as a real number. You can use the Cauchy sequence  $4(-1)^N/(2N+1)$  resulting in the series  $\sum 4(1-1/3+1/5-1/7+...)=\pi$ .

Note this is a sequence of *rational* numbers adding up to an *irrational* number sum ('summability' in the parlance of 'real analysis'). The union of the set of irrational and rational numbers is the "real" numbers by the way. Note this real number definition *required* that Cauchy sequence of rational numbers.

In contrast the rational number sequence defined by the iteration  $Z_{N+1}=Z_N Z_N + C$  (eq.1a);  $\delta C=0$  (eq.1b);  $N \rightarrow \infty$ , noise  $C \rightarrow 0$  defines 1 (and not  $\pi$ ) as a real number. Solve for  $C$  in eq.1a and plug that into eq.1b and get  $\delta(Z_{N+1}-Z_N Z_N)=0$ . Note the variation of  $\infty-\infty$  cannot be zero so  $Z_{N+1}$  has to be a *finite* number. So the resulting series has to be summable. Thus given  $C \rightarrow 0$  and  $N \rightarrow \infty$  we *cannot* start the sequence with a number that ends up with a divergent sequence. We are thereby finally left with a sequence beginning with  $z_0=1$  or 0 ( $N=0$ ) as  $C \rightarrow 0$  and  $N \rightarrow \infty$ . Defining  $Z_{N+1}=Z$  for  $N \rightarrow \infty$  eq.1a then becomes  $Z=Z^2+C$  (eq.1) (Recall  $1=1 \times 1 + 0$ ), our algebraic definition of 1. We have also thereby imbedded the eq.1a,1b fractalness into the definition of the real number 1!

### Mandelbrot Set

Limit $C \rightarrow 0$ .	Pick upper limit of $z_0$ in $Z_{N+1}=Z_N Z_N + C$	rational $\delta z$ choice	$ z =1-\delta z$
$C$	that gives finite $Z_{N+1}=Z_\infty$	and	$\delta z =  z_\infty - z_0 $ .
$C=.5$			
$C=.075$			
			1=limit

So you have defined 1 in terms of a Cauchy sequence of rational numbers with limit=1 in the context of this  $C \rightarrow 0$  in the Mandelbrot set with rational  $Z_N$ . So you have defined 1 as a real

number with the Mandelbrot set. The Mandelbrot set and  $C \rightarrow 0$  and are synonymous with this Cauchy sequence.

This is a **unique** method (**just giving us 1,0**) given the existence of noise  $C$  since we required equation 1a to generate equation 1 in that case, which gave us our algebraic definition of 1 in the end. Note we have also *defined set theory* and also arithmetic in operator equation 3.6 with simultaneous eq.(2A1+2A1) and its  $1 \cup 1 \equiv 1+1$  eigenvalues. In that regard note also on this fundamental 'set theoretical' level (i.e., 1U1), zero behaves like the null set  $\emptyset$  and we all know the null set is an element of every set *anyway*. So we really **have just postulated 1** with the 0 merely coming along for the ride.

With that 'uniqueness' there are no other equations besides 1a, 1b (at least not ones that give us 1,0 since requiring that Cauchy sequence of rational numbers limit of 1 severely restricts our choices) that do this. Everybody knows 1 is a real number so it obeys eq.1a, 1b.

Postulate **1**

So get all of physics from eq. 1a,1b.

Use the **1** in the postulate of 1 to define the list-define algebra  $1 \cup 1 \equiv 1+1$  underpinnings of eq.1a

### Elementary Math Is Theory: Gaussian Elimination

So Solve Two Equations (eq.1,eq.2) For Two Unknowns. **Even Babies Can Do It**

Baby math example

1)  $x = x^2 + y$

2)  $2y = 2$

Solve for x and y

Postulate **1** (In other words postulate 1 as a real number since it is.).

1)  $z_{N+1} = z_N z_N + C$  eq.1a (postulate of **1**). For  $C \rightarrow 0$ ,  $z = z z + C$  (**eq.1**)

2)  $\delta C = 0$

Solve for **z** and C.

**1<sup>st</sup> solution. Solve for y**

Plug eq.1 y into eq.2.

**1<sup>st</sup> solution. Solve for z.** Define  $z \equiv 1 + \delta z$ .

Solve for C in eq.1, plug into eq.2 and get

$\delta(\delta z \delta z) = 0$  resulting in eq.2A,2B

Factor, get **z component** 2A1,  $dr + dt = ds\sqrt{2} = \text{invariant}$

2AII, 2AIA. **Get z** (as  $\delta z$  in  $z \equiv 1 + \delta z$ )

**2<sup>nd</sup> solution. Solve for x**

Get  $x = (1 \pm \sqrt{1-4})/2$

**2<sup>nd</sup> solution Solve for C**

eq.1a,1b imply Mandelbrot set  $C_M = C$  (2nd solution)

Rotate by  $C_M$  in  $(dr - C_M) + (dt + C_M) = ds\sqrt{2}$  as

**2AIA rotation at 45° to get actual eigenvalues of z**