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## Origin Of Mathematics is postulate0

*Abstract* I have derived both mathematics and physics from first principles (ie So we finally understand how it all works!). Nobody else has done that.  $z=zz+C$  is the key & first principle=0 given the algebraic properties defining 0 (ie  $0=0X0, 1=1X1, 1=1+0$ , sect.1) imply  $z=zz+C$  (C constant thus  $\delta C=0$  **real#** derivative sect.2) which then implies Mandelbrot set and Dirac eq (5).

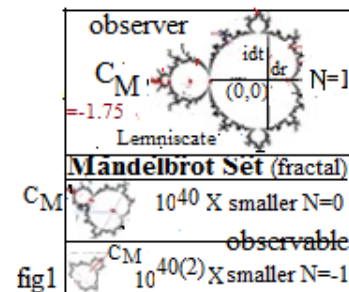
**1) Algebraic Properties of 0:**  $0=0X0, 1=1X1$  (defining symbol  $zz=z$  for  $z=0$  or  $z=1$ ) and  $1=1+0$  defining symbol  $z=zz+C$  eq1 if some  $C=0$ . A **Real number** is defined as the limit of a rational Cauchy sequence that must double here as the unique iteration  $z_{N+1} \equiv z_N z_N + C$  if some  $C=0$  since we then get  $z=zz+C$  for  $z_0=0,1$  so can **Postulate0** as  $z_0=0, (1)=z$  (eg. some  $C=0$  at origin in fig1

**1a) Theorems from Postulate0:** Parenthesis  $(0,1)$  multiplication is defined as  $zz_N + zz_M \equiv z(z_N + z_M)$  eg  $1X1=1X(1+0) \equiv 1X1+1X0=1+1X0=1+0$ . After 4 such examples  $(a+b)(c+d) \equiv ac+ad+bc+bd$  **distributive law**) implying  $1X0=0$  (so  $z=0$  or  $1$ ) then  $1Xz=z$  so (for  $z=1$ )  $1 \equiv z/z$  so  $1/z$  (new symbol  $/$ ) case of the **multiplicative inverse** for *fields*.  $\delta C=0$  defines  $C_1 - C_2 = 0$  so **ring additive inverse**. **Associativity:** Define  $e \equiv bc$  then  $abc = a(e)$ ;  $ab \equiv f$  then  $abc = (f)c$  so  $(ab)c = a(bc)$ . So **postulate0** ( $z_0=0$  generates **real#** mathematics (for big C too). So plug ansatz  $z=1+\delta z$  into **eq1** get  $\delta z + \delta z \delta z = C$  (3)

$$\text{So (for } -1/4 > C) \quad \frac{-1 \pm \sqrt{1+4C}}{2} = \delta z \equiv dr \pm i dt \quad (4)$$

**2) C is Constant** (Thus we must plug **eq1**  $z=zz+C$  (and its iteration  $z_{N+1} = z_N z_N + C$ ) into  $\delta C=0$ )

**2a) Plugging the eq1 rel iteration** ( $z_{N+1} = z_N z_N + C$ ) into  $\delta C$  implying  $\delta C = \delta(z_{N+1} - z_N z_N) = \delta(\infty - \infty) \neq 0$  for some C. The Cs that result *instead* in finite  $z_\infty$ s (so  $\delta C=0$ ) define the **Mandelbrot set C** in fig1. The lemniscate circles sum projection(11) to the fig1  $dr \approx dR$  axis is continuous as required by the derivative in  $\delta C \equiv (\partial C / \partial R) dR = 0$  at  $C = C_M = C_{M(N=1)} 10^{xN}$  where  $\frac{\partial C}{\partial C_M} \frac{\partial C_M}{\partial x} \frac{\partial x}{\partial R} = 0$  extremum  $\frac{\partial x}{\partial R} = 0$  lemniscate scale jump  $xN$  is at  $(\frac{\partial C}{\partial C_M} = 0) C_M = -1.75$  ( $N=1$ ) with the largest  $x \approx 40$ .  $\frac{\partial C}{\partial R} dR = 0 = \delta C$  sinusoidal extremum (at  $C=-2$ ) so sinusoidal newpde  $C \approx \delta z$  so requiring that eq20  $(\delta z)^2$ .



For example for  $N=1$  huge  $\delta z$ : fractal scale fig1  $\delta z \gg \delta z$  since we always 'observe' tiny  $N=0$  'observables' such as photon-electron-atomic scale interactions. So extreme  $(0, -1.75)$  solve  $\delta C=0$  so are only allowed zoompoints (pulling out fig1 lemniscates).

<http://www.youtube.com/watch?v=0jGao87u3A> continuous lemniscates

**2b) Plugging eq1 directly into  $\delta C=0$**  is also required. So given  $N=1$  eq1 and thus eqs 3,4  $\delta C = \delta(\delta z + \delta z \delta z) = \delta \delta z + 2(\delta \delta z) \delta z \approx \delta(\delta z \delta z) = \delta((dr + i dt)^2) = \delta[(dr^2 - dt^2) + i(dr dt + dt dr)] = 0 =$  (5) **Minkowski metric** + **Clifford algebra**  $\equiv$  **Dirac equation** (See eq7a  $\gamma^\mu$  derivation from eq5.). But ( $N=0, 2D$ )  $\delta \delta z$  must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the ( $N=1, 2D$ ) independent Dirac  $dr$  implying  $2D$  Dirac +  $2D$  Mandelbrot =  $4D$  Dirac **Newpde**  $\equiv \gamma^\mu (\sqrt{\kappa_{\mu\mu}}) \partial \psi / \partial x_\mu = (\omega/c) \psi$  for  $v, e$ ;  $\kappa_{00} = e^{i(2\Delta\epsilon/(1-2\epsilon))} r_H/r$ ,  $\kappa_{rr} = 1/(1+2\Delta\epsilon r_H/r)$ ;  $r_H = C_M/\xi = e^2 X 10^{40N}/m$  (fractal jumps  $N = -1, 0, 1, \dots$ )  $1 \gg \epsilon \equiv \mu \gg \Delta\epsilon \equiv m_e$  (appendix A, B, C, fig2). **Postulate0** means *real 0 exists* (causing the newpde to have *real* eigenvalue operators). Thus **a number**  $dr/ds$  "exists" if it's also a *real* eigenvalue on the eigenfunction  $\psi$  of the Newpde. davidmaker

### 3)completeness and choice are immediately proven

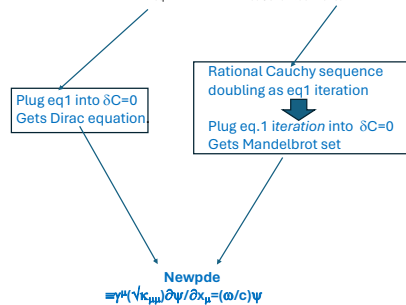
Also note our postulate of 0 with that eq1 (ie  $z=zz+C$ ) provides the important mathematical concepts of “**Completeness**” ( $\min(zz-z)>0$ ) given  $((-1.75)^2-(-1.75)=4.8>0)$  for the -C domain (sect.2,  $C\leq 0$ ) of  $(-1.75,0)$  and “**choice**” (since the *single* “choice” function is “ $z=zz+C$ ”) which amazingly are NOT axioms anymore here. Also *counting* the zoom trifurcations (real eigenvalue counters in the Mandelbrot set given sect.2 Dirac eq result of a plugin) replaces **Peano’s** counting **axioms** (of mathematical induction).

**Conclusion** Postulate0 is the simplest idea imaginable (Hold that thought: Note that it draws a ‘blank’.), all the rest is applications. If you can straighten out mathematics (eg., one simple axiom0 gets everything) you will also straighten out theoretical physics (next page).

Concept: Ultimate Occam’s Razor(postulate0)  $\rightarrow$  math&Newpde

Origin of mathematics:

List#s-define symbols and (single simple axiom) postulate0:  $z=zz+C$  (with C constant)  
eq1 so  $\delta C=0 \rightarrow$  deriv C real



Origin of physics:

$$\text{Newpde} = \gamma^\mu (\kappa_{\mu\nu}) \partial \psi / \partial x_\mu = (\omega/c) \psi$$

**Intriguing result:** Mandelbrot set  $10^{40N}XC_M$ , N integer in Newpde) of fig1 implies that by increasing the scale by  $10^{40}X$  we are right back to where we started! So

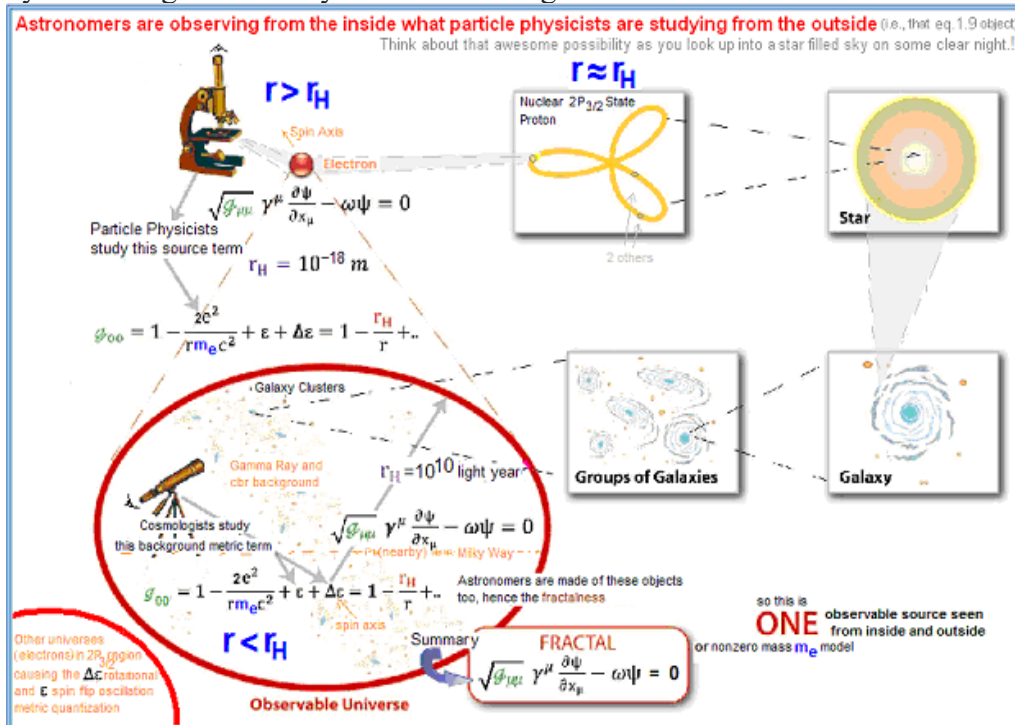


fig2

Object B +objectA +objectC=proton again: Respectively appendices A,B,C  
( $g_{00}=\kappa_{00}$  fractal scale bridging condition implies above smaller objects(galaxies, globulars,..A3)

In that regard Dirac in 1928 made his equation(1) flat space(2). But space is not in general flat, there are forces.

So over the past 100 years people have had to try to make up for that mistake by adding ad hoc convoluted gauge force after gauge force until fundamental theoretical physics became a mass of confusion, a train wreck, a junk pile. So all they can do for ever and ever is to rearrange that junk pile with *zero actual progress* in the most fundamental theoretical physics ... forever. We died.

By the way note that Newpde(3)  $\gamma^\mu \sqrt{\kappa_{\mu\mu}} \partial\psi/\partial x_\mu = (\omega/c) \psi$  is NOT flat space (4) so it fixes the problem (5).

## References

(1)  $\gamma^\mu \partial\psi/\partial x_\mu = (\omega/c) \psi$

(2) Spherical symmetry:  $(\gamma^x \sqrt{\kappa_{xx}} dx + \gamma^y \sqrt{\kappa_{yy}} dy + \gamma^z \sqrt{\kappa_{zz}} dz + \gamma^t \sqrt{\kappa_{tt}} dt)^2 = \kappa_{xx} dx^2 + \kappa_{yy} dy^2 + \kappa_{zz} dz^2 - \kappa_{tt} dt^2 = ds^2$   
 $\kappa_{xx} = \kappa_{yy} = \kappa_{zz} = \kappa_{tt} = 1$  is flat space, Minkowski, as in his Dirac equation(1).

(3) Newpde:  $\gamma^\mu \sqrt{\kappa_{\mu\mu}} \partial\psi/\partial x_\mu = (\omega/c) \psi$  for e,v. So we didn't just drop the  $\kappa_{\mu\nu}$  (as is done in ref.1)

(4) Here  $\kappa_{oo} = 1 - r_H/r = 1/\kappa_{rr}$ ,  $r_H = (2e^2)(10^{40N})/(mc^2)$  with  $N = \dots -1, 0, 1, \dots$  fractal scales (first page)

(5) This Newpde  $\kappa_{ij}$  contains a Mandelbrot set(6)  $e^2 10^{40N}$  Nth fractal scale source(fig1) term (from eq.13) that also successfully **unifies theoretical physics**. For example:

For  $N = -1$  (i.e.,  $e^2 \times 10^{-40} \equiv G m_e^2$ )  $\kappa_{ij}$  is then by inspection the Schwarzschild metric  $g_{ij}$ ; so we just derived General Relativity and the gravity constant G from Quantum Mechanics *in one line*.

Otherwise people have been trying to do this for over 100 years with no success.

For  $N = 1$  (so  $r < r_c$ ) Newpde-Dirac zitterbewegung oscillation expansion stage explains the universe expansion thereby explaining cosmology *in one line* (appendix A). For example:

For  $N = 1$  zitterbewegung harmonic coordinates and Minkowski metric submanifold gets the De Sitter ambient metric we observe. DESI data appears to extrapolate to this harmonic oscillation.

For  $N = 0$  at  $r = r_H$   $SP^2$  is the 3e baryons, (QCD not required) and Hund's rule  $1S_{1/2} \mu$ ,  $2S_{1/2} \tau$  leptons since stable  $2P_{3/2}$  at  $r = r_H$  (section IIIa). The 4 Standard electroweak Model (SM) Bosons ( $Z_0, W^+, W^-, \gamma$ ) are derived from required 4 axis rotations of the Newpde e,v (App.C, eqs.16,C1). Thus we derived the SM from first principles\* (postulate0) which has not been done before.

For  $N = 0$  spherical harmonic  $2P_{3/2}$  at  $r = r_H$  with B flux quantization gives ultrarelativistic electron +e ( $\gamma = 917$ ) extremely narrowed E field lines at center *explaining the strong force* with the same large  $\gamma$  also explaining the big baryon masses (sect.IIIa and part2.). We do not need QCD anymore

For  $N = 0$  the higher order Taylor expansion(terms) of  $\sqrt{\kappa_{ij}}$  gives the anomalous gyromagnetic ratio and Lamb shift *without* the renormalization and infinities (Appendix A,B): very important.

So  $\kappa_{uv}$  provides the general covariance of the Newpde. Eq. 4 even provides\* us space-time r,t. So we got all of physics here by mere inspection of this (curved space) Newpde with no gauges.

So where does this Newpde come from? From a *first principles* (ie postulate0) derivation: given algebraic definition of zero  $0 = 0X0$ ,  $1 = 1X1$ ,  $1 = 1+0$  (so  $z = zz + C$  eq1), and 0 constant so  $\delta C = 0$  implying C is a Real# (sect2a) which is a rational Cauchy *sequence* (limit), doubling here as eq1 *iteration* plugged into  $\delta C = 0$  giving the Mandelbrot set. Plug eq1 directly into  $\delta C = 0$  to get Dirac eq. Both together is  $2D + 2D = 4D$  Newpde\*. It works because it is the simplest imaginable idea of ultimate Occam's Razor **postulate0**. We figured it out. We finally understand.