

Quantum Gravity Via Expansion–Contraction 6.0: Riccati 2 Version Using Special Relativity Beta Squared

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The Riccati–2 Differential equation version of the Quantum Gravity equation is obtained by a method which also sheds light on how we can determine whether various models and theories relate causally to each other. Recall that the square root of the quantity:

$$1) 1 - v^2/c^2$$

or its inverse is the Special Relativity Beta or Gamma factor that yields the Lorentz or Lorentz–Fitzgerald contraction. Let's set y of the Riccati Differential equation $dy/dt = A(t) + B(t)y + C(t)y^2$ equal to $1 - v^2/c^2$, which yields:

$$2) -2va/c^2 = A(t) + B(t)(1 - v^2/c^2) + C(t)(1 - v^2/c^2)^2$$

with acceleration $a = dv/dt$. Expanding, we obtain:

$$3) -2va/c^2 = A(t) + B(t) - B(t)v^2/c^2 + C(t)(1 - 2v^2/c^2 + v^4/c^4)$$

and expanding further yields:

$$4) -2va/c^2 = A(t) + B(t) - B(t)v^2/c^2 + C(t) - 2C(t)v^2/c^2 + C(t)v^4/c^4$$

Now factor similar terms on the right hand side of (4):

$$5) -2va/c^2 = [A(t) + B(t) + C(t)] - (v^2/c^2)[B(t) + 2C(t)] + C(t)v^4/c^4$$

Let's write $D(t)$ for $A(t) + B(t) + C(t)$ for brevity, and then divide both sides of (5) by v/c^2 or in other words multiply by c^2/v :

$$6) -2a = D(t)c^2/v - v[B(t) + 2C(t)] + C(t)v^3/c^2$$

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Multiply both sides of (6) by m (assumed constant) to obtain:

$$7) -2F = mc^2 D(t)/v - p[B(t) + 2C(t)] + C(t)Kv/c^2, K = \text{kinetic energy}, p = \text{momentum}$$

Use $E = mc^2$ for energy E in (7) to obtain:

$$8) -2F = ED(t)/v - p[B(t) + 2C(t)] + C(t)Kv/c^2$$

Again force relates to energy and momentum as in the previous Sections of this thread, but this time there is no separate mass term and there are separate energy and kinetic energy terms and there are some hints of a sign relationship between F and p which I'll try to explore later.

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