194(5): Solution for $m(r)$

From notes 194(3) and 194(4):

$$m(r) = \frac{1}{2}\left(\frac{E}{mc^2}\right)\left(1 \pm \left(1 - 4\frac{v^2}{c^2}\left(\frac{mc^2}{E}\right)^2\right)^{1/2}\right) \quad -(1)$$

where

$$v^2 = \frac{1}{m(r)}\left(\frac{dr}{dt}\right)^2 + r^2\left(\frac{d\theta}{dt}\right)^2 \quad -(2)$$

$$dZ = 0. \quad -(3)$$

in the plane

From previous work:

$$\frac{dr}{dt} = cbm(r)\left(\frac{1}{b^2} - m(r)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right)^{1/2} \quad -(4)$$

$$\frac{d\theta}{dt} = \frac{cbm(r)}{r^2} \quad -(5)$$

So:

$$v^2 = c^2b^2m(r)\left(\frac{1}{b^2} - m(r)\left(\frac{1}{a^2} + \frac{1}{r^2}\right)\right) + \left(\frac{cbm(r)}{r}\right)^2 \quad -(6)$$

$$v^2 = c^2m(r)\left(1 - \left(\frac{mc^2}{E}\right)^2 m(r)\right) \quad -(7)$$

using

$$\frac{b}{a} = \frac{mc^2}{E}$$

Now solve eqs. (1) and (6) for $m(r)$. Eq. (1) is:

$$m(r) - \frac{1}{2}\left(\frac{E}{mc^2}\right) = \pm\frac{1}{2}\left(\frac{E}{mc^2}\right)\left(1 - 4\frac{v^2}{c^2}\left(\frac{mc^2}{E}\right)^2\right)^{1/2} \quad -(8)$$

2) So:

$$\left(n(r) - \frac{1}{2}\left(\frac{E}{mc^2}\right)\right)^2 = \frac{1}{4}\left(\frac{E}{mc^2}\right)^2\left(1 - 4\frac{v^2}{c^2}\left(\frac{mc^2}{E}\right)^2\right)$$

$$= \frac{1}{4}\left(\frac{E}{mc^2}\right) - \frac{v^2}{c^2}$$

$$= \frac{1}{4}\left(\frac{E}{mc^2}\right)^2 - n(r)\left(1 - \left(\frac{mc^2}{E}\right)^2 n(r)\right) \quad -(9)$$

using eq (6).

So:

$$n^2(r) - \left(\frac{E}{mc^2}\right)n(r) + \frac{1}{4}\left(\frac{E}{mc^2}\right)^2 \quad -(10)$$

$$= \frac{1}{4}\left(\frac{E}{mc^2}\right)^2 - n(r) + \left(\frac{mc^2}{E}\right)^2 n^2(r)$$

So $$n^2(r)\left(1 - \left(\frac{mc^2}{E}\right)^2\right) = n(r)\left(\frac{E}{mc^2} - 1\right) \quad -(11)$$

$$n(r) = \left(\frac{E}{mc^2} - 1\right)\left(1 - \left(\frac{mc^2}{E}\right)^2\right)^{-1}$$

$$\boxed{n(r) = \left(\frac{E}{mc^2}\right)^2\left(1 + \frac{E}{mc^2}\right)^{-1}} \quad -(12)$$

This is true for all spherical spacetimes

3)

This result refutes all of general relativity for all infinitesimal line elements of the type:

$$ds^2 = c^2 d\tau^2 = n(r) c^2 dt^2 - \frac{dr^2}{n(r)} - r^2 d\theta^2$$

— (13)

because:

$$\boxed{n(r) = \text{constant}} \quad -(14)$$

This is a complete catastrophe for general relativity unless line elements are used more general than eq. (13).

1) The Einsteinian:

$$n(r) =^? 1 - \frac{r_0}{r} \quad -(15)$$

cannot be true.

2) A more general infinitesimal line element than eq. (13) is needed, the spacetime cannot have a spherical symmetry because a spherical spacetime always produces a constant $n(r)$.

3) Precessing elliptical orbits cannot be produced by general relativity.