

206 (4) : Some possible constraints.

The original Minkowski metric is:

$$ds^2 = c^2 dt^2 - dr^2 - r^2 d\theta^2 \quad (1)$$

Consider: $\frac{dr}{d\theta} = x \quad (2)$

Per: $d\theta^2 = \frac{dr^2}{x^2} \quad (3)$

So the first equation is:

$$ds^2 = c^2 dt^2 - dr^2 \left(1 + \left(\frac{r}{x} \right)^2 \right) \quad (4)$$

The second equation is given by use of eq. (3) i.e. eq.

(4) to give:

$$ds^2 = c^2 dt^2 - x^2 d\theta^2 \left(1 + \frac{r^2}{x^2} \right) \quad (5)$$
$$= c^2 dt^2 - d\theta^2 (x^2 + r^2)$$

It is possible to construct the equation:

$$ds^2 = c^2 dt^2 - x^2 d\theta^2 - \frac{r^2}{x^2} dr^2 \quad (6)$$

by using eq. (3) twice i.e. eq. (1).

All three equations are valid, and all three can be used to construct equation

of motion with:

$$L = \frac{1}{2} mc^2 \quad (7)$$