Wolfram Derivation of STR Time Dilation equation.

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Wolfram Derivation

Solve the expression $(cT)^2 = (ct)^2 + (vT)^2$ to derive the Time Dilation equation

of Special Relativity $T = \dfrac{t}{\sqrt{1^2 - \dfrac{v^2}{c^2}}}$ using Wolfram.

$$T = \frac{ct}{\sqrt{c^2 - v^2}} \quad \text{(Wolfram's Solution)}$$

$$T^2 = \frac{(ct)^2}{(c^2 - v^2)} = \frac{c^2 t^2}{(c^2 - v^2)} = \frac{t^2}{\left(1/c^2\right)(c^2 - v^2)} = \frac{t^2}{\left(\dfrac{c^2 - v^2}{c^2}\right)} = \frac{t^2}{\left(1^2 - \dfrac{v^2}{c^2}\right)}$$

$$T = \frac{t}{\sqrt{1^2 - \dfrac{v^2}{c^2}}}, \text{ the "Time Dilation Equation"}$$

Derivation (non-Wolfram)

$$(cT)^2 = (ct)^2 + (vT)^2$$

$$T^2 = \left(\frac{c}{c}\right)^2 t^2 + \left(\frac{v}{c}\right)^2 T^2$$

$$T^2 - \left(\frac{v}{c}\right)^2 T^2 = (1_c)^2 t^2, \quad 1_c := \left(\frac{c}{c}\right)$$

$$T^2 \left(1^2 - \left(\frac{v}{c}\right)^2\right) = (1_c)^2 t^2$$

$$T^2 = \frac{(1_c)^2 t^2}{\left(1^2 - \left(\dfrac{v}{c}\right)^2\right)}$$

$$T = \frac{(1_c) t}{\left(1^2 - \left(\dfrac{v}{c}\right)^2\right)}$$

Note the role of $1_c = \frac{c}{c} \neq c\left(\frac{c}{c}\right) = c(1_c) = c$

This is critical in understanding why Einstein is wrong (and Pythagoras) are wrong.,