

## Acceleration Creates Tensions in Both Length and Time

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<https://www.youtube.com/watch?v=kU8TEcie4hY&lc=Ugxp3MKUOEs3jXe7tMJ4AaABAq>

A Comment on the minutephysics post:

*The Rocket & String Paradox*

<https://youtu.be/kU8TEcie4hY>

One detail missing from this superb video on SR length-tension is that there is also an SR time-tension or *age gradient*, which in moving-frame length metrics is

$$\alpha_m = -\frac{\beta}{c}$$

Multiplying  $\alpha_m$  times the uncontracted length of the object gives the total age delta:

*Google Calculator version (replace QQvariables with numbers)*

$$-((QQbeta)/c)$$

*-OR-*

$$-((QQbeta)/c)(QQlength)$$

Front clocks in a 0.6 c 100 m spaceship thus show times 200 ns earlier than rear clocks.

Due to Lorentz contraction, the relativistic age gradient  $\alpha$  can grow indefinitely large:

$$\alpha = -\frac{\gamma\beta}{c} = -\frac{\beta}{c\sqrt{1-\beta^2}} = -\frac{v}{c\sqrt{c^2-v^2}}$$

*Google Calculator version (replace QQvariables with numbers)*

$$-((QQbeta)/(c*\sqrt{1-(QQbeta)^2})$$

*-OR-*

$$-((QQvelocity)/(c*\sqrt{c^2-(QQvelocity)^2}))$$

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PDF: <https://sarxiv.org/apa.2022-09-26.1055.pdf>