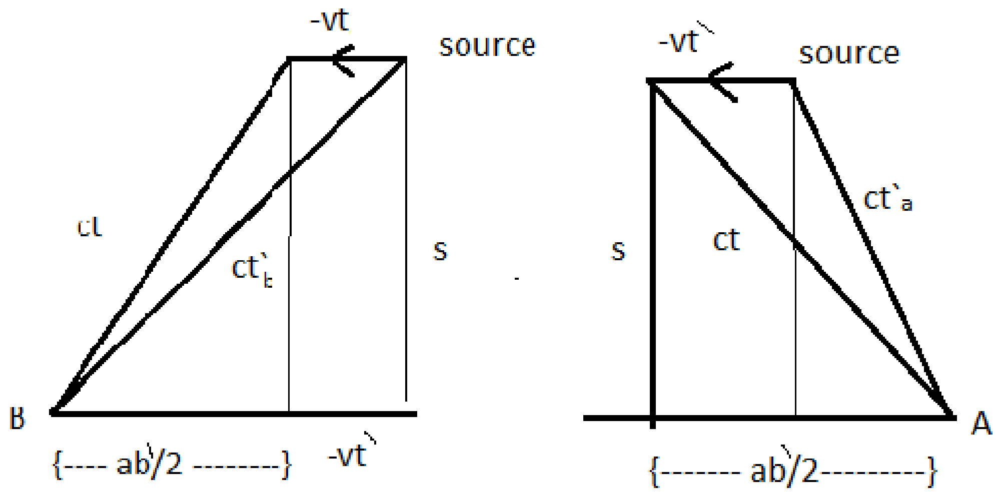
Consider the diagram showing the path of 2 lights from the source to slits A and B. For the slits, the source is moving with –vt`



$(Ct`_a)^2 = s^2 + (\frac{ab`}{2} - vt`_a)^2$

$(Ct`_b)^2 = s^2 + (\frac{ab`}{2} + vt`_b)^2$

$(Ct`_a)^2 = s^2 + \left(\frac{ab`}{2}\right)^2 - 2\left(\frac{ab}{2}`\right) v\, t`a + (v`t_a)^2$

$(Ct`_b)^2 = s^2 + \left(\frac{ab`}{2}\right)^2 + 2\left(\frac{ab`}{2}\right) v\, t`b + (v`t_b)^2$

Ordering the factors yield 2 quadratic equations in independent variables $t`_a$ and $t`_b$:

$t`_a{}^2\,(c^2 - v^2) + ab`\,v\,t`_a - (s^2 + \left(\frac{ab`}{2}\right)^2) = 0$

$t`_b{}^2\,(c^2 - v^2) - ab`\,v\,t`_b - (s^2 + \left(\frac{ab`}{2}\right)^2) = 0$

Solving for the roots:

$$t`_a = \frac{-ab`\,v \pm \sqrt{(\mathrm{ab`\,v})^2 + 4(\mathrm{c2 - v\,2})(\mathrm{s2} + \left(\frac{ab}{2}`\right)2\ )}}{2(\mathrm{c2 - v\,2})}$$

$$t`_b = \frac{+ab`\,v \pm \sqrt{(\mathrm{ab`\,v})^2 + 4(\mathrm{c2 - v\,2})(\mathrm{s2} + \left(\frac{ab}{2}`\right)2\ )}}{2(\mathrm{c2 - v\,2})}$$

$$\Delta t` = (t`_b - t`_a) = \frac{2\ ab`\ v}{2(c2 - v\ 2)} = \frac{\frac{ab`\ v}{c2}}{\frac{(c2 - v\ 2)}{c2}} = \frac{\frac{ab`\ v}{c2}}{1 - \frac{v\ 2}{c2}}$$

But ab\` = ab $\sqrt{1-(v/c)^2}$

$$\Delta t` = \frac{\frac{ab\ v}{c2}}{\sqrt{1-(v/c)^2}}$$ which is the same time difference from Lorentz transform