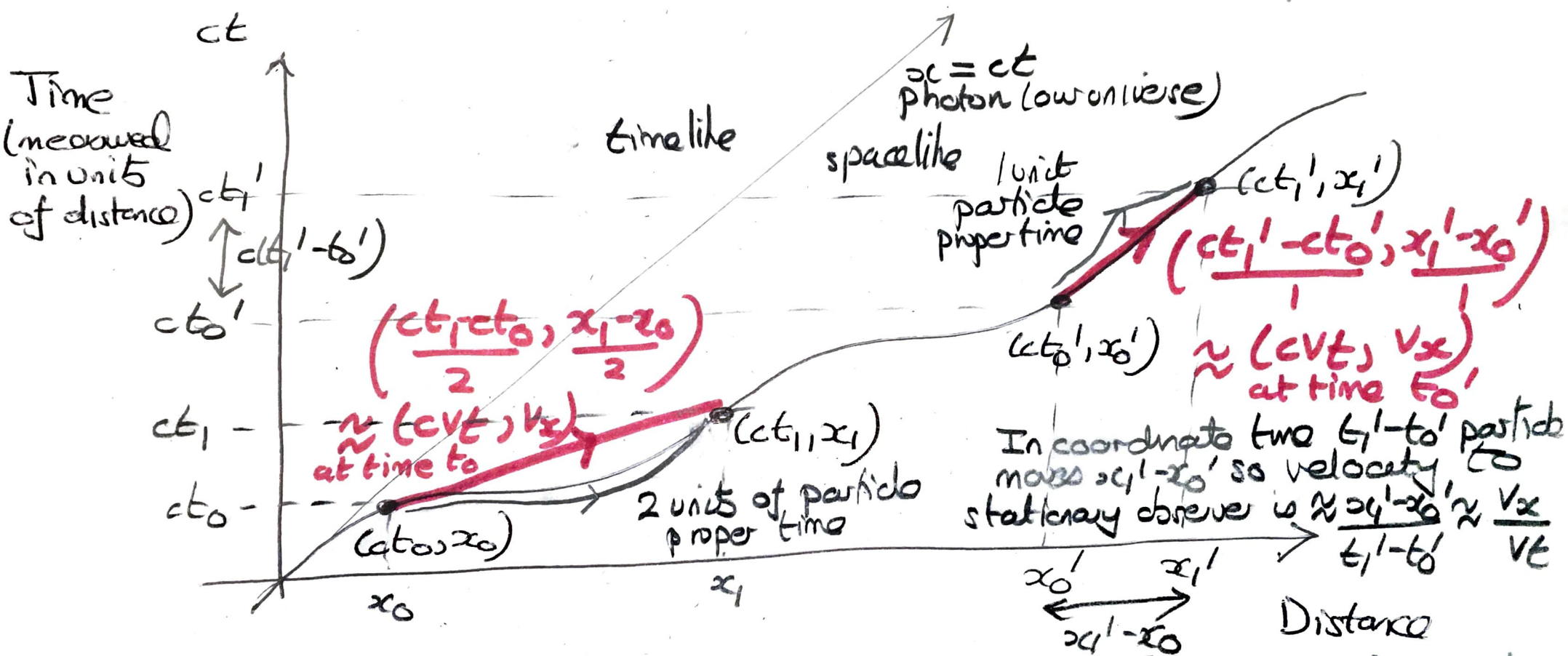
ct
Time (measured in units of distance)
ct_1'
$c(t_1'-t_0')$
ct_0'
ct_1
ct_0
$x = ct$
photon (our universe)
timelike
spacelike
1 unit particle proper time
(ct_1', x_1')
$\left(\frac{ct_1'-ct_0'}{1}, \frac{x_1'-x_0'}{1}\right)$
(ct_0', x_0')
$\approx (cv_t, v_x)$ at time t_0'
$\left(\frac{ct_1-ct_0}{2}, \frac{x_1-x_0}{2}\right)$
$\approx (cv_t, v_x)$ at time t_0
(ct_1, x_1)
(ct_0, x_0)
2 units of particle proper time
In coordinate two $t_1'-t_0'$ particle moves $x_1'-x_0'$ so velocity to stationary observer is $\approx \frac{x_1'-x_0'}{t_1'-t_0'} \approx \frac{v_x}{v_t}$
x_0
x_1
x_0'
x_1'
$x_1'-x_0$
Distance