t : $\rho(t) \rightarrow \frac{\mathcal{E}(t)}{c^2}$

$a(t) \rightarrow$ $r(z) = a(t) \cdot r_c$

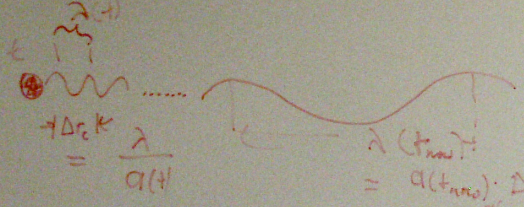
$v(t) = \dot{a}(t) \cdot r_c$

$\frac{v(t)}{r(t)} = \frac{\dot{a}}{a} = H(t)$

$\left(r_c = \frac{r(t)}{R(t)} \right)$ or $\frac{r(\text{today})}{c/H_0}$

$[H(\text{today}) = H_0]$

$H_0 = 70 \frac{\text{km/s}}{1\,\text{Mpc}} = \frac{1}{14\,\text{Byr}}$



Light moving? $\frac{dr}{dt} = c = a \cdot \frac{dr_c}{dt}$

$\frac{dr_c}{dt} = \frac{c}{a(t)}$

$r_c(\text{emitter})$?

$dr_c = -\frac{c}{a(t)} dt$

$\int_{r_c(\text{emit})}^{0} dr_c = -\int_{t_{emit}}^{t_{now}} \frac{c}{a(t)} dt$

$r_c(\text{emit}) = c \int_{t_{emit}}^{t_{now}} \frac{dt}{a(t)}$

$z = \frac{a(t_{now})}{a(t_{emit})} - 1$