

Hubble parameter:

$$\begin{aligned} H^2 &= H_0^2 \left[\frac{\Omega_r}{a^4} + \frac{\Omega_m}{a^3} - \frac{Kc^2}{a^2 H_0^2} + \Omega_\Lambda \right] \\ &= H_0^2 \left[\frac{\Omega_r}{a^4} + \frac{\Omega_m}{a^3} + \frac{1 - \Omega_0}{a^2} + \Omega_\Lambda \right] \end{aligned}$$

Comoving distance:

$$\begin{aligned} dt &= \frac{da}{\dot{a}} \rightarrow -dw = \frac{cdt}{a} = \frac{cda}{a\dot{a}} = \frac{cda}{a^2 H} \\ w(z_1, z_2) &= \frac{c}{H_0} \int_{a(z_2)}^{a(z_1)} \frac{da}{\sqrt{a\Omega_m + a^2(1 - \Omega_m - \Omega_\Lambda) + a^4\Omega_\Lambda}}, z_1 < z_2 \end{aligned}$$