1.1 $\rightarrow$ $$\Omega_M(a) = \frac{\rho_M}{3\left(\frac{\dot{a}}{a}\right)^2 / 8\pi G}$$

$$= \frac{\rho_{M_0}}{a^3 \frac{3H_0^2}{8\pi G}\left(\frac{\Omega_M}{a^3} + \Omega_\Lambda + \frac{(1-\Omega_T)}{a^2}\right)}$$

$$= \frac{\Omega_M}{\Omega_M + \Omega_\Lambda a^3 + (1-\Omega_T)a}$$

$\rightarrow$ $$\cancel{\left(\frac{1-\Omega_T(a)}{a^2}\right)a^2 = \left(\frac{1-\Omega_{T_0}}{a_0^2}\right)a_0^2}$$

$\rightarrow$ $$\left(\frac{\rho_c(a) - \rho_T(a)}{\rho_c(a)}\right)a^2 = \left(\frac{\rho_c - \rho_T}{\rho_c}\right)a_0^2$$

$$\Omega_T(a) = 1 - \frac{1-\Omega_{T_0}}{\frac{\Omega_M}{a} + \frac{\Omega_\Lambda}{a^2} + (1-\Omega_T)}$$

$\rightarrow$ $$\Omega_\Lambda(a) = \frac{\rho_\Lambda}{\rho_c} = \frac{\rho_\Lambda}{3\left[\frac{\Omega_M}{a^3} + \Omega_\Lambda + \frac{(1-\Omega_T)}{a^2}\right] / 8\pi G}$$

$$= \frac{\Omega_\Lambda}{\left(\frac{\Omega_M}{a^3} + \Omega_\Lambda + \frac{(1-\Omega_T)}{a^2}\right)}$$

i) $\Omega_M = \Omega_T = 1 \Rightarrow \Omega_\Lambda = 0$

$\Rightarrow \Omega_M(a) = 1, \quad \Omega_T(a) = 1, \quad \Omega_\Lambda(a) = 0$

a never falls below 0.5.

case (ii) & (iii) are plotted