ECE 476/576

HW #2

6.2

$$\tau_p = \frac{\text{Round-trip time}}{\text{fraction lost}} = \frac{2(d_1+d_2)/c}{1 - R_1R_2R_3R_4} = 78.9 \text{ nsec}$$

6.3

$\lambda_0 = 5000$ Å; $\therefore \nu_0 = 6^{+14}$ Hz = 600 THz; $\Delta\nu_{1/2} = \dfrac{1}{2\pi\tau_p} = 2.02$ MHz;

$$Q = \frac{\nu_0}{\Delta\nu_{1/2}} = 2.98\times10^{+8}$$

6.4

(a) If path 1 had a power gain of G; $\tau_p = \dfrac{2(d_1 + d_2)/c}{1 - GR_1R_2R_3R_4} = 38.8$ ns if G = 0.85;

(b) If G = 1.1, $\tau_p = 253.8$ ns; (c)If τ_p is positive, dN_p/dt is negative, and N_p decreases (passive cavity). If τ_p is negative, dN_p/dt is positive, and N_p increases. Something has to give: N_p cannot increase indefinitely.