Quiz 6

$V_g = 40mV$ Find $V_o(t)$

$R_a = 400k$ $R_1 = 500k$

$R_b = 400k$ $R_2 = 2.5 \times 10^6$

$C_1 = 250 \times 10^{-9}$ $C_2 = 100 \times 10^{-9}$

particular solution: $V_{o1}(\infty) = V_g\left(\frac{-R_a}{R_1}\right) = \frac{40}{1000}\left(\frac{-4\times10^5}{5\times10^5}\right) = 0.04 \times (-0.8) = -0.032$

$\Rightarrow V_{o1}(t) = -0.032 + Be^{-\alpha t}$

$=$

$\tau_1 = 5\times10^5 \times 250\times10^{-9} = 0.125$

$\tau_2 = 2.5\times10^6 \times 100\times10^{-9} = 0.25$

$$\frac{d^2V_o}{dt^2} + (8+4)\frac{dV_o}{dt} + (32)V_o = \frac{0.04}{4\times10^5 \times 250\times10^{-9} \times 400\times10^3 \times 100\times10^{-9}}$$

$$\Rightarrow \frac{d^2V_o}{dt^2} + 12\frac{dV_o}{dt} + 32V_o = 10$$

$\Delta = (R_1+R_2)^2C_2^2 - 4R_1C_1R_2C_2$

$= (3M)^2(10^{-14}) - 125\times10^{10} \times 25000\times10^{-18}$

$= 9\times10^{-12} - 0.03125$

< 0

underdamped