

假設開路的增益為  $A(s)$ ，回授電路為  $\beta(s)$ ，則整體的回授轉移函數為

$$\frac{V_0(s)}{V_I(s)} = \frac{A(s)}{1 + \beta(s)A(s)}$$

由圖 (3-2) 知道

$$A(s) = \frac{k_P k_m k_{tach_o}}{1 + \tau s}, \beta(s) = 1$$

因此，

$$\begin{aligned} \frac{\Omega(s)}{R(s)} &= \frac{\frac{k_P k_m k_{tach_o}}{1 + \tau s}}{1 + \frac{k_P k_m k_{tach_o}}{1 + \tau s}} \\ &= \frac{\frac{k_P k_m k_{tach_o}}{1 + k_P k_m k_{tach_o}}}{\left( \frac{\tau}{1 + k_P k_m k_{tach_o}} \right) s + 1} \end{aligned}$$

$$k_P = -\frac{1M}{100k} \times 0.8 = 8$$

$$k_m = 0.87$$

$$k_{tach_o} = 1$$

$$\tau = 0.51$$

$$\rightarrow \frac{\Omega(s)}{R(s)} = \frac{0.87437}{0.06407s + 1}$$