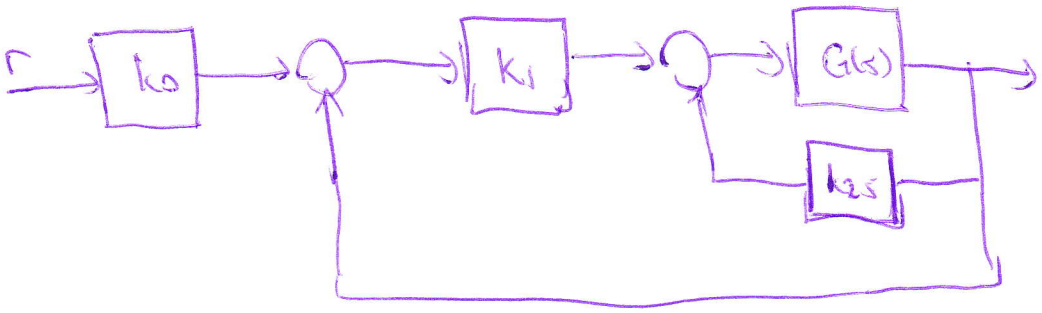
(a) $$\frac{Y(s)}{R(s)} = \frac{k_1(s-1)}{(1+k_2)s^2 + (k_1-k_2)s + (k_1+4)}$$

$$= \frac{\frac{k_1}{1+k_2}(s-1)}{s^2 + \frac{k_1-k_2}{1+k_2}s - \frac{k_1+4}{1+k_2}}$$

If is not possible to find a set of k_1 and k_2 such that $T(s) = \frac{Y(s)}{R(s)}$. We introduce an additional gain (a precompen

at the ref. i/p.



where $\left(\frac{k_1-k_2}{1+k_2}\right) = 5.2$

$-\frac{k_1+4}{1+k_2} = 5$

$\Rightarrow k_1 = -2.66$

$k_2 = -1.268$

$$\frac{k_0 k_1}{1+k_2} = -1.8 \Rightarrow k_0 = -0.181$$

$\Rightarrow \frac{Y(s)}{R(s)}$ will implement $T(s)$