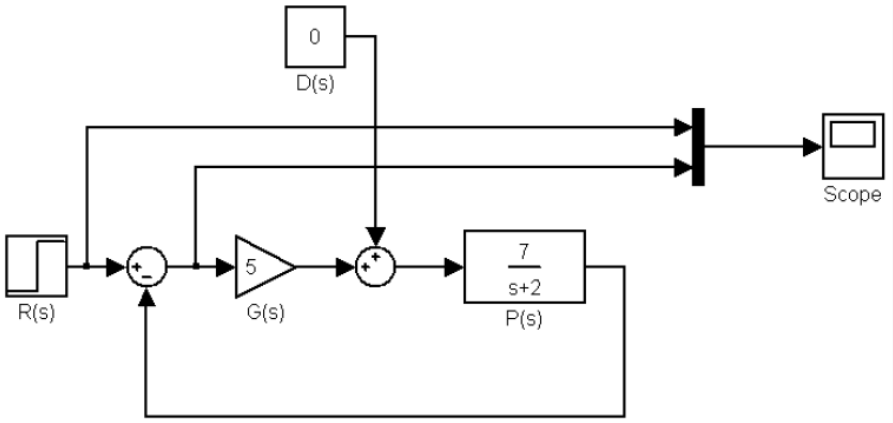
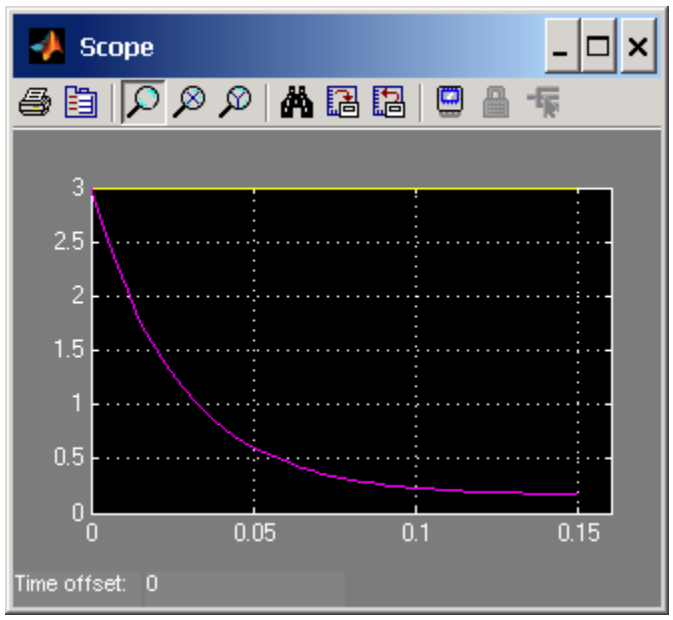
40.

a. The open loop transmission is $G(s)P(s) = \dfrac{35}{s+2}$, so $K_P = \lim_{s\to 0} G(s)P(s) = \dfrac{35}{2}$. For a unit step input $e_{ssr} = \dfrac{1}{1+K_P} = 0.0541$. Since the input is threefold that we have that

$e_{ssr} = 3(0.0541) = 0.1622$

b.

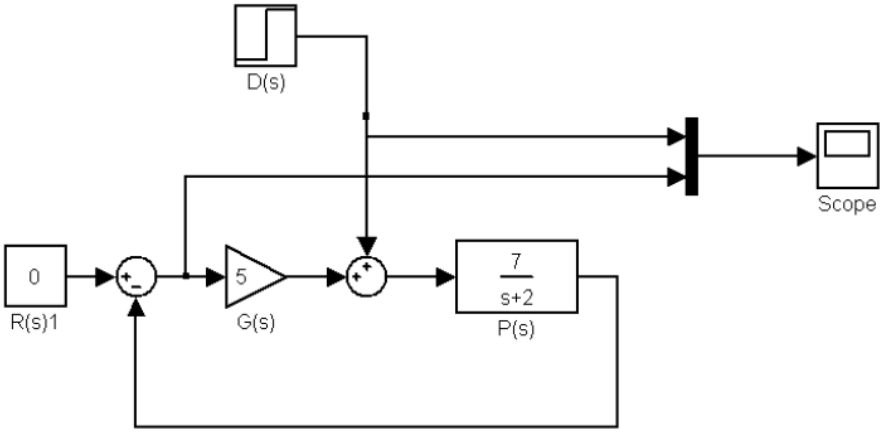


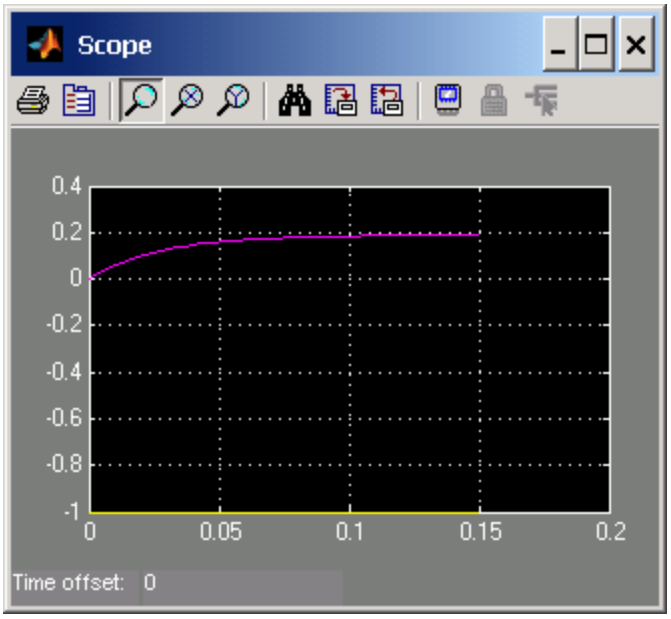


c. The transfer function from disturbance to error signal is $\frac{E(s)}{D(s)} = -\frac{\frac{7}{s+2}}{1+5\frac{7}{s+2}} = -\frac{7}{s+37}$

Using the final value theorem $e_{ssd} = \lim_{s\to 0} sE(s) = \lim_{s\to 0} s\left(-\frac{7}{s+37}\right)\left(-\frac{1}{s}\right) = \frac{7}{37} = 0.1892$

d.





e. $e_{tot} = e_{ssr} + e_{ssd} = 0.1622 + 0.1892 = 0.351$

f.