1. Solve Problem 13 textbook

2. Solve Problem 16 textbook


4. Find the values of $k$ and $\alpha$ that yield a settling time of 0.05 seconds and a 73% of overshoot

\[ \frac{k}{s(s + \alpha)} \]

5. Design $k$ and $\alpha$ for the resulting system to have a 30% of overshoot and a settling time of 0.1 s

\[ \frac{1}{s + 1} \quad \frac{k}{s + \alpha} \]
6.- Given the following system, find its closed loop transfer function \( T(s) = \frac{C(s)}{R(s)} \).

Simply the result as much as possible

Use: 
\[ G_1(s) = 6 \quad G_2(s) = \frac{s}{s + 2} \quad G_3(s) = \frac{s}{s^2 + s + 4} \quad H_1(s) = \frac{3}{s + 3} \]
7. Simplify the following system. Carefully explain the different steps that you take.

\[
\frac{s}{s + 3} + \frac{3s}{s + 4} + \frac{1}{s + 2} + 4 \times \frac{5}{s}
\]

8. Simplify the following system. Carefully explain the different steps that you take.

\[
R(s) \times s + s + 1/s + 1/s + s
\]