Arab Academy for Science and Technology & Maritime Transport

College of Engineering & Technology

Department : Electrical power and computer control

Course : Control System I **Course No:** EE 411

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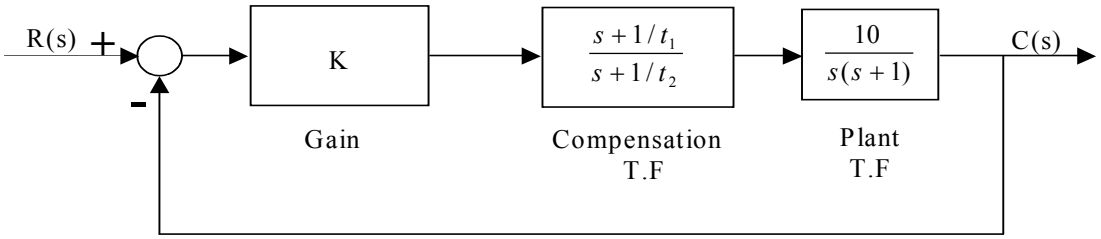
TA : Eng.

Sheet (2)

1. For a unity feedback type 2 system with G(s)=$\frac{k}{s^2}$,It is desired to compensate the system so as to meet the following specifications:
   Settling time ≤ 4 sec
   Peak over shoot $\leq$ 20%
   K ≤ 10

2. For a type 1 system with an open loop transfer function GH(s) $= \frac{k}{s(s+1.5)}$, is to be compensated to meet the specifications in Problem 1.

3. Determine the value of k, t_1, t_2 of the system shown in fig., so that the dominant closed loop poles have $\zeta = 0.5$ and $\omega n = 3$ rad/sec.



4. Consider a unity feedback control system whose feed forward T.F is given by:
   $G(s) = \frac{10}{s(s+2)(s+8)}$
   Design a compensator so that the dominant closed-loop poles are located at $S = -2 \pm j\sqrt{3}$.

5. The forward T.F of a unity feedback system is given by $G(s) = \frac{30}{s(s+3)(s+6)}$. It is desired to compensate the system so that the steady-state error must not exceed 0.1, design a lag compensator to achieve this requirement.

6. For the system $G(s) = \frac{3}{s(s+1.5)(s+3)}$ and F(s) = 1
   Design a lag compensator to satisfy static velocity error coefficient $K_v > 6.7$ sec $^{-1}$ without effecting transient response where $\zeta = 0.5$.