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淡江大學 96 學年度碩士班招生考試試題

系別：機械與機電工程學系

科目：自動控制

准帶項目請打「V」	
✓	簡單型計算機

本試題共 2 頁

本試題雙面印製

- (1) Please determine the parameter a and b for the zero steady-state error, from the feedback system in figure 1. where $R(s) = 1/s$, $G(s) = 1/(s + a)$, and $H(s) = 1/(s + b)$, a and b are constants. (20%)

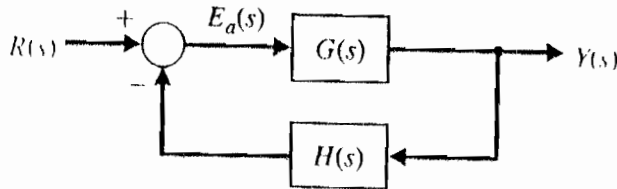


Figure 1

- (2) For the system shown in figure 2, find out (i)percentage of maximum overshoot %OS, (ii)settling time t_s , and (iii)peak time t_p of the unit-step response. (20%)

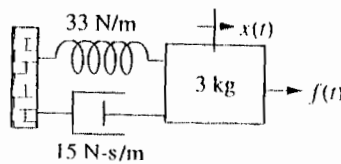


Figure 2

- (3) Please design the parameter a and b for the settling time $t_s < 6$ sec and the %OS < 6%, from the feedback system in figure 1. where $R(s) = 1/s$, $G(s) = b/(s(s + a))$, and $H(s) = 1$, a and b are constants. (20%)

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- (4) (i) Plot the root locus of the system in Fig. 1 with
 $G(s) = k/((s+3)(s^2+4s+25))$, and $H(s) = 1$.
(ii) Determine the value of parameter k for a stable control system.
(20%)
- (5)(i) Sketch the polar plot of the frequency response for the control system with transfer function of $F(s)=1/(s+1)$.
(ii) Sketch the bode plot of the frequency response for the control system with transfer function of $F(s)=100/(s(s+20))$.
(20%)