

一. A system is shown in Fig.1. The input voltage is 100 V.
The torque-speed curve is $T_m = -8\omega_m + 200$.

(25%)

Please

- (1) Compute the $G(s) = \theta_L(s) / E_a(s)$
- (2) Is it a stable system? Why?

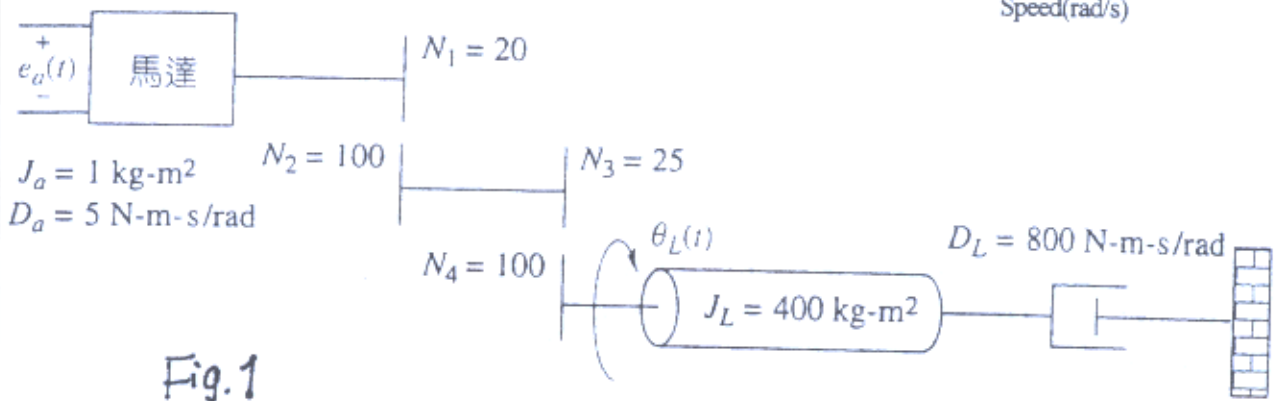
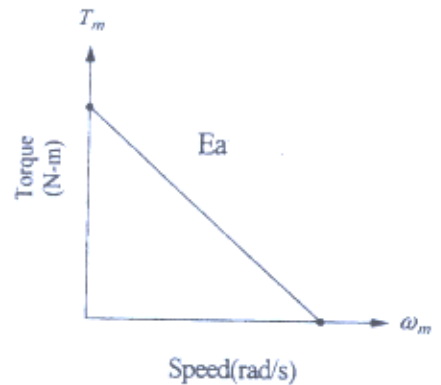


Fig.1

二. A control system is shown in Fig.2, $G(s)=C(s)/R(s)$

(25%)

Please compute the followings: (25%)

- (1) T_r (Rising time)
- (2) T_p (Peak time)
- (3) T_s (Settling time)
- (4) %OS (Max overshooting)
- (5) $e_{ss}(\infty)_{step}$ (Steady-State error for step input)

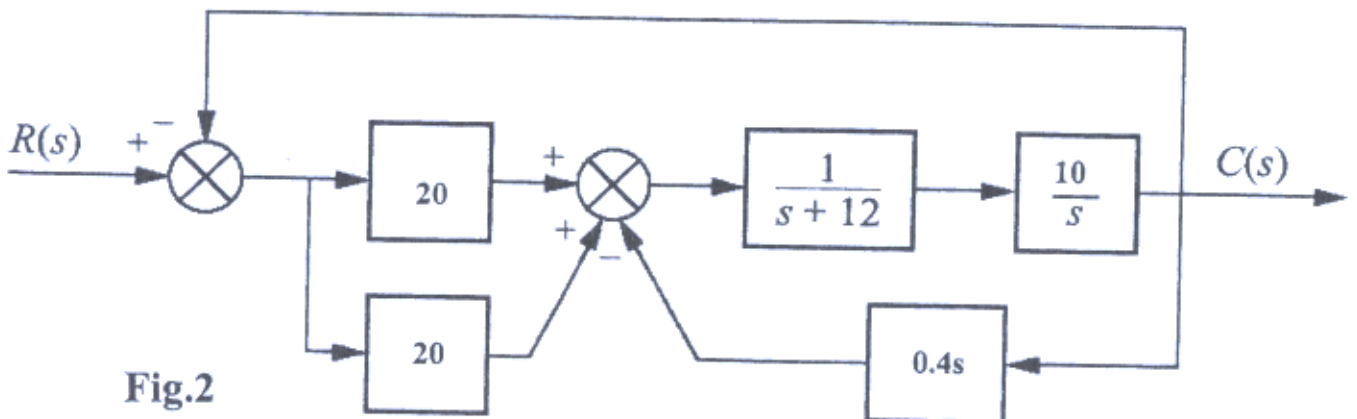


Fig.2

三. For the system shown in Fig.3, find k and α to yield a settling time of 0.4 second and 30% overshoot. (25%)

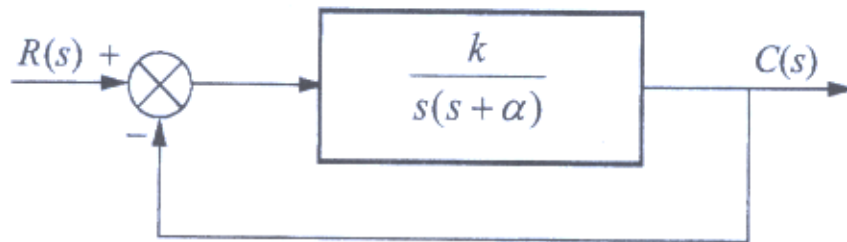


Fig. 3

四. For the system shown in Fig.4, please find K_D and K_P to design a PD controller so that the modified system can operate with a peak time that is 2/3 of uncompensated system at 20% overshoot and $e_{ss}(\infty)_{\text{step}} = 0$. (25%)

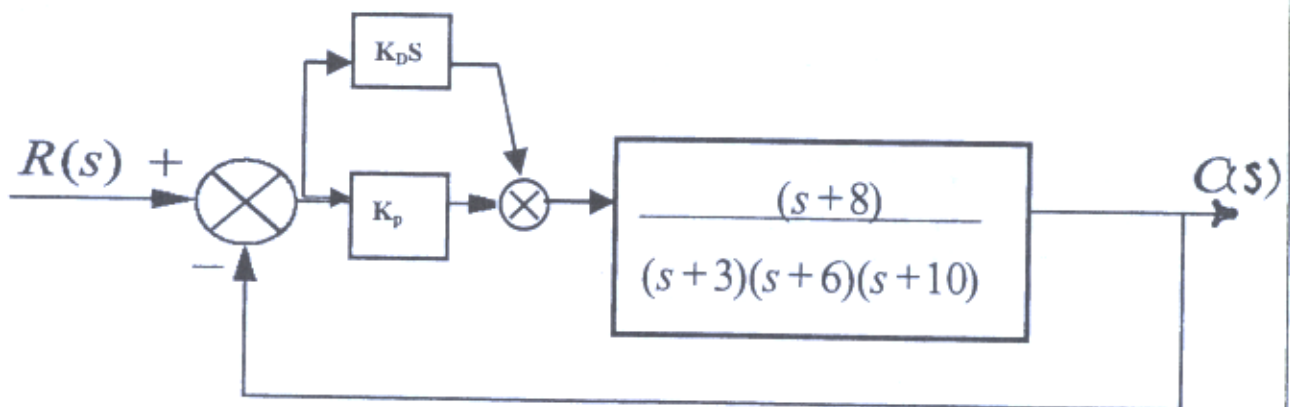


Fig. 4

共計四題！